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Countering Urban Redundancy with a Multipronged Strategy: Lessons from Ashram Road, Ahmedabad

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ABSTRACT

Urban redundancy, often observed in the core areas of cities, poses significant challenges to sustainable development and urban vitality. This study addresses urban redundancy by proposing a quantitative framework to both identify and mitigate its effects, using Ashram Road in Ahmedabad, India, as a case study. The research employs a Multi-Criteria Decision-Making Analysis (MCDMA) based on data collected through physical surveys and literature reviews. This analysis integrates approaches such as redevelopment, adaptive reuse, policy interventions, and economic strategies to counter redundancy effectively. The findings highlight that Ashram Road's core area, despite its historical and cultural significance, faces challenges like poor maintenance, high vacancy rates, and inadequate utilization of the available floor space index (FSI). The proposed framework aims to develop context-sensitive strategies that uphold the intrinsic value of core urban areas while promoting sustainable regeneration. The study demonstrates the need for a balanced approach that combines modern development with preservation, providing insights for urban policy-making that enhances the resilience and longevity of city cores.

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Highlights:

- The implementation of the Multi-Criteria Decision-Making Analysis (MCDMA) framework reduces urban redundancy and optimizes resource use.
- A balanced approach that integrates modern development with historical preservation enhances the cultural and economic vitality of core urban areas.
- A plot-by-plot urban regeneration strategy increases the effectiveness of interventions and minimizes waste.
- The combination of redevelopment, adaptive reuse, and economic strategies improves urban resilience and ensures the longevity of central business districts.

Contribution to the field statement:

The study offers a new entry point into urban renewal and regeneration. Existing literature is mainly focused on the nature and implications of regeneration or the stimuli for it. Relatively lesser scholarship exists on the decision-making process, and even lesser, on a plot-by-plot approach. The resultant gap is duly addressed through this research.

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1. Introduction

Urbanization in contemporary cities is rapidly evolving, leading to significant challenges such as inadequate infrastructure, environmental degradation, social disparities, and resource constraints (Koko & Bello, 2023). In India, much of the developmental activity over recent decades has occurred in what are now the core areas of cities—geographical centers that serve as hubs of connectivity, residential, and commercial functions while embodying the city's identity and character. These core areas play a vital role in sustaining urban vitality and combating urban decline (Miranda, Silva, & Costa, 2020).

However, despite their strategic importance, core areas in many Indian cities are facing a decline in growth. Urban expansion primarily occurs in peripheral areas, resulting in shrinking city cores. This shift in focus toward the city's peripheries has led to a neglect of the core areas, which were once central to urban development and economic growth (Rogerson & Giddings, 2021). Census data from 2011 reveals this trend, showing population declines in the core areas of cities like Delhi (-9.91% in the central district), Mumbai (3.87% growth, which is less than one-fifth of the previous decade), Chennai (6.97% growth, half of the previous decade), and Kolkata (-1.83% in the municipal corporation area). These statistics indicate a significant demographic shift away from city cores, suggesting that these areas are struggling to adapt to contemporary needs.

This inability of the core areas to accommodate present-day requirements leads to the phenomenon of "urban redundancy." Urban redundancy refers to built and public spaces that become obsolete or unusable due to various factors, including the lack of adaptability of existing infrastructure, poor maintenance, physical deterioration, demographic shifts, and changes in the urban morphology or character. Beyond physical attributes, urban redundancy also extends into the cultural domain, where collective practices or traditions may lose relevance within a particular context.

Given the intrinsic interconnectedness of the core areas with the overall urban fabric, redundancy in these areas can adversely affect the entire city. Urban cores function as key economic centers, meeting the city's population needs (Randhawa & Kumar, 2020). Redundancy, therefore, poses a risk to valuable urban assets and resources, creating a disconnect between older core areas and newer developments such as transit-oriented development and transferable development rights. This disconnect can lead to decreased engagement between residents and the city, reducing its 'porosity'—the fluid exchange of people, goods, and ideas within urban spaces (Baba, Aktaş, Balioğlu, & Kaba, 2023).

To counteract urban redundancy, there is a pressing need to optimize the utility of core areas while preserving their inherent value. The critical question that arises is whether these core urban areas can be reused, repaired, refurbished, and recycled to conserve their vitality, utility, and historical significance.

Addressing urban redundancy necessitates a detailed decision-making process that considers the specific type and extent of redundancy in a given area. Strategic decisions in urban planning have lasting impacts on living conditions, environmental sustainability, and the overall organization of urban spaces (Burinskienė et al., 2017). This study proposes a multi-faceted framework, demonstrated through the case of Ashram Road in Ahmedabad, India, as a vital tool for guiding urban policy and planning. According to NITI Aayog's 2021 report, India's urban policy must "shift from blanket regulations to area-specific regulations to ensure the optimum use of urban land" (NITI Aayog, 2021). An approach tailored to the specific area, considering market conditions at each location, is economically prudent (Byahut, Patel, & Mehta, 2020). This framework aims to facilitate complex urban regeneration and renewal initiatives, encouraging thoughtful and context-sensitive interventions in urban areas.

This research draws on existing theories about the lifecycle of a city to explore urban redundancy. Cities can be viewed as living organisms that evolve and change over time (Nassar, 2021). Two notable theories—the ones proposed by Lewis Mumford and Griffith Taylor—suggest that urban decay or decline is a natural stage in the lifecycle of a city. According to Mumford (1938), a city progresses through stages from its beginnings as an agricultural center ('Eopolis') to a mechanized, specialized hub ('Polis'), and finally to a vast, declining metropolis ('Necropolis') due to resource strain. Similarly, Taylor (1945) describes a city's evolution from a rudimentary settlement ('sub-infantile') to a complex urban environment that eventually experiences physical decay ('senile' stage).

Both Mumford and Taylor acknowledge urban decline as an inevitable phase, characterized by evident morphological changes and contextual shifts. This research delves deeper into these theoretical frameworks, focusing specifically on the core areas of cities. The study reviews several scholarly works

to understand urban decline and revitalization in the Indian context. For example, Ganapati (2014) examines the paradox of shrinking cities in India, noting population decline in urban cores alongside peripheral growth. Kumar and Kumar (2022) explore "bypass urbanization," where outdated policies and economic pressures exacerbate socio-spatial inequalities. Jariwala and Bhagat (2020) emphasize revitalization strategies that combine financial tools with historical preservation. Patel (1999) critiques Ashram Road's role as a Central Business District and suggests spatial interventions to rejuvenate the area.

The objectives of this study are to identify and classify the factors contributing to urban redundancy, understand the significance of core areas within the city, and mitigate the shortcomings in planning regulations for Central Business Districts (CBDs) to prevent redundancy. It also aims to analyze the spatial impacts of urban redundancy within core areas and CBDs, their interrelationships, and existing planning frameworks that address these issues.

Ashram Road in Ahmedabad was selected as the study site due to its historical and current significance as a core urban area. The research employs both bottom-up and top-down approaches, using physical surveys and visual documentation to assess the site's characteristics. A multi-criteria decision-making framework is developed to align site-specific attributes with appropriate urban regeneration strategies, providing a comprehensive response to urban redundancy.

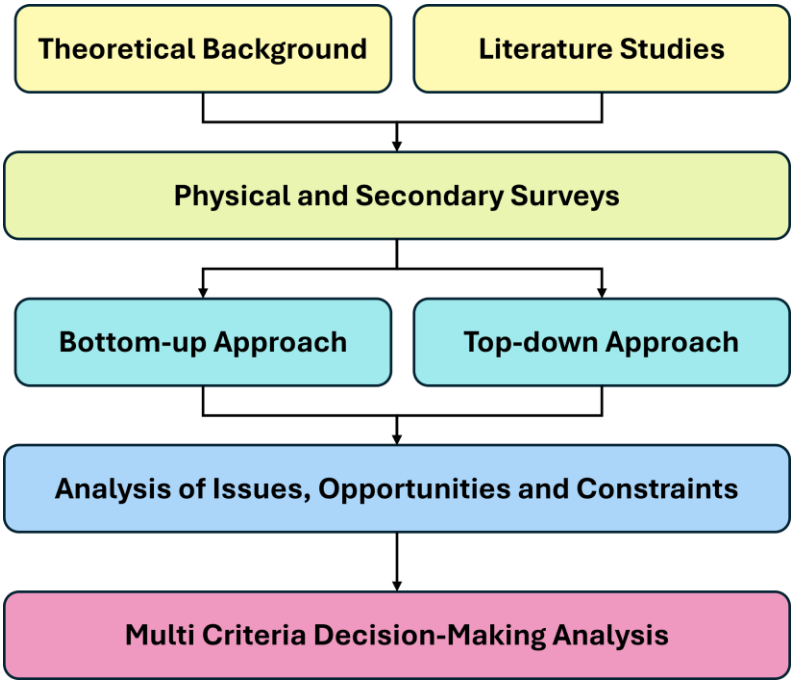

Figure 1. Diagram Depicting Chronology of Research Methodology.

1.2 Structure of The Study

A city originates from a core, which may be established due to many reasons. These include geographical stimuli, such as topography or proximity to a water body; a trade/commerce stimulus, such as a busy trade route; and historical or cultural stimuli, such as the birth of a kingdom or a community. As the city begins to develop, it invites a steady influx of population, creating dense settlements. A lot of commercial and residential infrastructure begins to take shape to accommodate the population growth. The core, with its well-distributed services and amenities, offers a lot of opportunities for business and recreation.

As the infrastructure of the core becomes overused, it gradually gives way to morphological deterioration. Peripheralization begins to occur, redistributing the existing population. This induces vacancy in the core area, and its morphology undergoes severe neglect and deterioration. It also becomes dissociated with newer development initiatives, ultimately growing redundant. Resurgence is achieved when the city core realigns itself with newer developments and policies and operates at full potential by increasing its capacity and replacing unproductive redundant areas with prime real estate and commercial hubs.

From a social perspective, redundancy may be caused when the pressure on existing resources increases, leading to a drop in the quality of life. Additionally, high-density occupation of a certain social class in the core may lead to segregation and increased crime. From an economic perspective, as demand supersedes supply, the cost of living in the city core may be too high for a majority of the population to afford. This manifests as a loss of economic opportunity. Economic conditions like deindustrialization, recession, etc. may force the population out of the city center. Redundancy may also be caused due to political conditions- a change in the government that introduces revised policies, or the disenfranchisement of a certain social group which subsequently shifts out of the core. The environmental reasons for redundancy are mostly, natural disasters such as earthquakes and floods. In such events, the natural topography and morphology may get temporarily or permanently altered. Redundancy may also be caused due to reasons such as man-made disasters, war, and civil or communal unrest, which may manifest as a safety threat or destruction of property. In such cases, the core may become a liability to the city, with a loss of revenue and a need for increased maintenance.

Once a core area displays poor morphological conditions, vacant real estate, loss of activity and demography, and unsafe living conditions, there is a tendency to overcome this situation by stimulating a market-led commercial approach. A concentration of commercial functions in a core area translates to a CBD, which contributes majorly to the GDP and tax revenue for the city while also bolstering employment opportunities. The CBD, along with a prominent industrial base in the region, can potentially facilitate business tourism. The city must be able to establish a standardized regulatory framework and a conducive business ecosystem for the CBD to flourish. In return, the CBD can provide stature, character, and monetary benefits to the city. The result of these conditions will provide a unique morphology to the city that is characterized by high-rise, high-density development in large, isolated plots with a singular use.

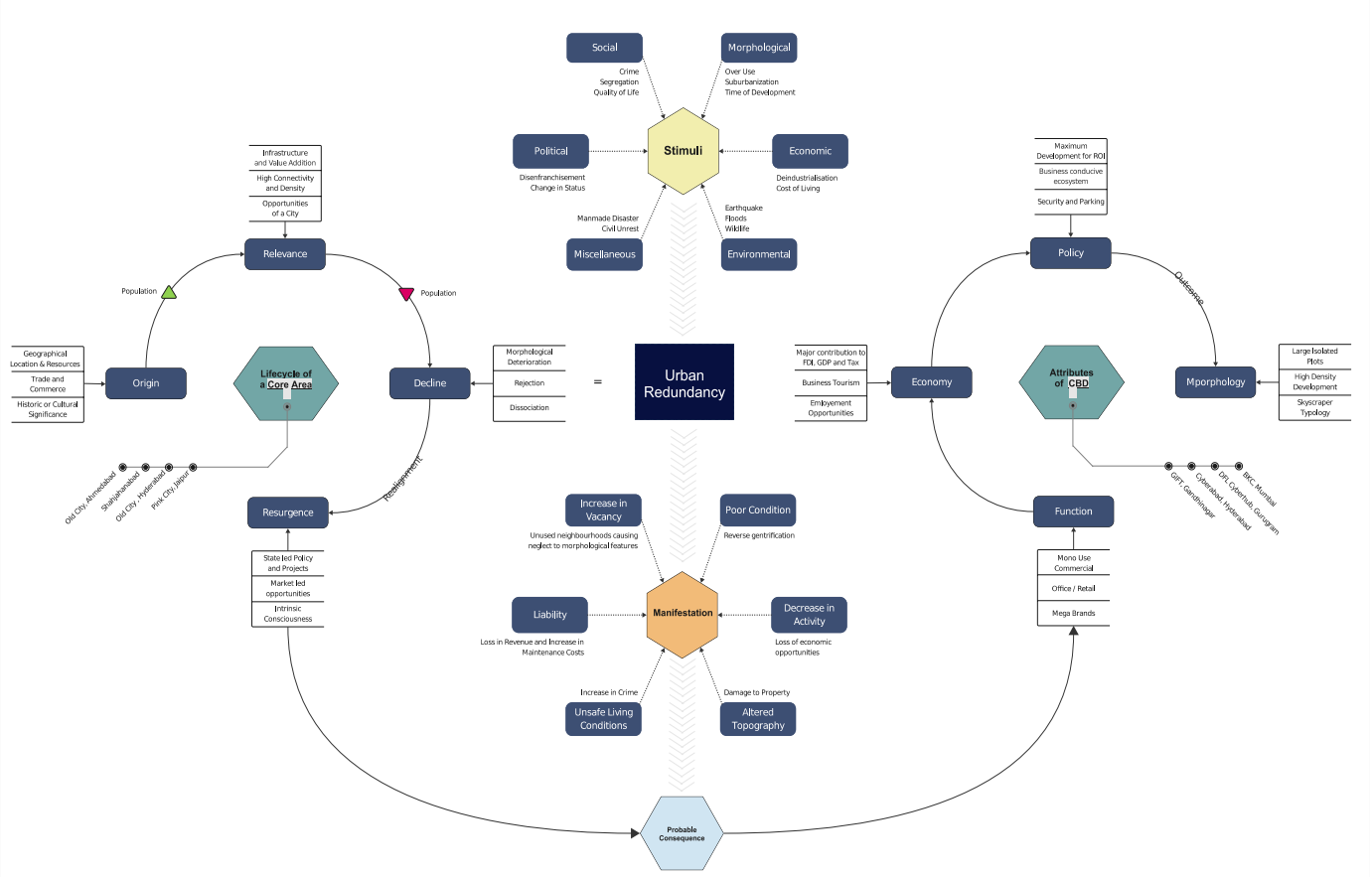

Figure 2. Structure of the Study.

This study can help plugin to the design strategies for revitalizing urban centers, enhancing liveability, and ensuring the longevity of city cores.

2. Urban Evolution and Site Selection: The Case of Ahmedabad

Ahmedabad, in western India, is Gujarat's largest city. The Sabarmati River runs through its heart, with the Gandhi Ashram located on the western side. On the opposite bank, the Calico Museum of Textiles features an extensive collection of both antique and contemporary textiles. These institutions reflect Ahmedabad's distinct cultural character. Cultural heritage, with its physical, diverse, and intangible aspects, needs innovative approaches for preservation, renovation, and adaptation. (Akdağ & Sayar, 2020).

Additionally, the area under the Ahmedabad Urban Development Authority (AUDA) and the Ahmedabad Municipal Corporation (AMC) has constantly been increasing with Town Planning Schemes as a development tool (Bharti & Mehrotra, 2020). Ahmedabad has experienced remarkable urban growth through strategic planning and development, transforming into a vibrant and inclusive city that blends modern infrastructure with its rich tradition (Tognon, Narayanan, & Rossi, 2020). However, the census data for Ahmedabad reflects a population decline of 0.76% annually in core-area wards like Navrangpura, while peripheral areas of Bopal, Ghuma, and Sanand are increasing at 20.89%, 25.83%, and 19.58% respectively. Ashram Road is located in the heart of the city, in the Navrangpura ward. It marks the point where the city of Ahmedabad was established and later began expanding westward. The area consists of significant residential, institutional, and commercial developments, some dating back to the 19th century. It is the cultural and financial hub of the city, yet it lacks a multiplicity of activities. Although designated a CBD in 1954, it differs from CBDs globally in planning regulations like higher ground coverage, FSI, height, etc. The building stock from the 1970s-1980s is now deteriorating due to poor maintenance and loss of character. Population restructuring, decline in activity, and degenerating morphology all together qualify Ashram Road as an opportunity to study redundancy.

2.1. Characteristics of The Site

Ashram Road in Ahmedabad is strategically positioned between two significant areas: CG Road, a prominent commercial and retail hub, and the Walled City, the historical core of Ahmedabad. This area is aligned with one of the city's largest infrastructure initiatives, the Sabarmati Riverfront Development, a project aimed at revitalizing the riverbanks for public use, enhancing urban aesthetics, and improving environmental conditions. Additionally, Ashram Road forms a substantial segment of the north-south metro corridor, which is a critical component of the city's expanding public transportation network.

An analysis of the occupancy trends over time on Ashram Road reveals a complex narrative of urban development and transformation. Although the built environment in this area has seen considerable expansion since the 1950s, the majority of buildings still date back to the 19th century. These older structures, many of which have historical and cultural significance, far outnumber the developments introduced over the last two decades. Notable landmarks along Ashram Road include the Mill Owners' Association Building, designed by Le Corbusier in the 1950s during the height of Ahmedabad's textile industry boom, the Town Hall, one of the city's oldest public assembly halls, and Chinubhai Tower, a multifunctional commercial complex that overlooks the Sabarmati River.

The strategic location of Ashram Road has made it a repository of Ahmedabad's architectural heritage, blending historical buildings with more recent developments. However, this has also resulted in a patchwork of jurisdictional boundaries governed by multiple urban local bodies, complicating urban management and planning efforts. These boundaries include lands under the Ahmedabad Municipal Corporation (AMC), the Special Purpose Vehicle: Sabarmati Riverfront Development Corporation Ltd. (SRFDCL), and the Indian Railways.

The multifaceted governance structure and jurisdictional complexities have led to fragmented development policies and inconsistent land use regulations. This situation creates challenges in maintaining a cohesive urban fabric and optimizing the area's potential for commercial and cultural revitalization. Furthermore, the site's positioning along the Sabarmati River and its inclusion in the metro corridor provide unique opportunities for connectivity and redevelopment, aligning with city-wide efforts to promote sustainable urban growth and integration.

Ashram Road's diverse urban landscape—ranging from historical precincts to modern infrastructural projects—reflects both its enduring significance and the challenges it faces in adapting to contemporary urban needs. As a result, it serves as an ideal site for studying the phenomena of urban redundancy and

exploring strategies for urban regeneration that balance heritage conservation with modern development demands.

3. Material and Methods

Peripheralization in cities often amounts to population losses from core city areas. At the outset, individuals often recognize the need to relocate to suburban areas to fulfill their aspirations, such as enjoying a closer connection to nature, breathing fresher air, embracing a different lifestyle, distancing themselves from the city core, gaining more privacy, living in detached homes, and having larger green spaces (Fuladlu, 2019). The change in the core area is manifested in the form of morphological changes, activity decline, and population loss. These can be analyzed through an urban design lens. A site study that oscillates from architectural to urban scale reveals aspects such as building age and architectural value through a study of vacancy, building condition, and urban context.

Further, the core area reflects the identity of the city and its growth. For planning initiatives that adopt a top-down approach, the city core is critical to gauge the needs of the city, and its response to large-scale changes. When the core is planned as a Central Business District, it becomes even more necessary to analyze its propensity to adapt to the corresponding development control regulations. An urban planning study reveals the regulatory frameworks and policy-making bodies involved in the implementation process.

3.1 The Urban Design (Part-To-Whole/Site Upwards) Lens

An analysis of the plot-by-plot morphological conditions of the site is the best entry point for this research because it reveals the degree of redundancy and the effect it has on the present condition of each plot. Planning-based studies for analyzing redundancy may suggest demographic decline, but urban design-based studies involving a physical analysis of built form and activity are necessary to rationalize this statistical data. For instance, low occupancy may be manifested through the ill-maintained or abandoned condition of a building, building age may be indicated through the state of degeneration, and context may reveal the heritage value of a building. Each of these parameters is necessary to firstly, define redundancy, and secondly, to classify it based on the causes of redundancy.

3.1.1 Methods

A qualitative method was employed for a series of mapping and classification tasks. This included conducting condition mapping based on the façade appearance of buildings through a physical survey. Architectural Value mapping was performed by classifying each building according to the uniqueness of its architectural styles, utilizing both physical surveys and literature reviews. Land ownership mapping was conducted by categorizing plots as public or private through surveys. Similarly, land use mapping involved classifying plots into categories such as residential, commercial, defunct, institutional, and mixed-use through physical surveys. Intangible value mapping was carried out based on the historic significance of buildings as described by residents. Additionally, various town planning schemes within the study areas were determined. The built morphology of the study area was visualized using physical surveys and satellite imagery.

A quantitative method was employed for specific tasks. This included conducting vacancy mapping through physical surveys. Ground coverage mapping was carried out by assessing the percentage of built-up area in each plot using satellite imagery. Additionally, the Floor Space Index (FSI) was performed by determining the existing FSI utilized on each plot as prescribed by the urban local body.

A mixed method was employed for the following set of tasks. Jantri rate (circle rate) mapping was conducted by reviewing the Revenue Department's Annual Statement of Rates (ASR) for individual plots. The three-dimensional visualization of vacancy rate was achieved through a combination of physical and satellite imagery. Finally, multi-criteria decision-making analysis was performed by converting various qualitative methods into quantitative data.

3.1.2 Physical surveys

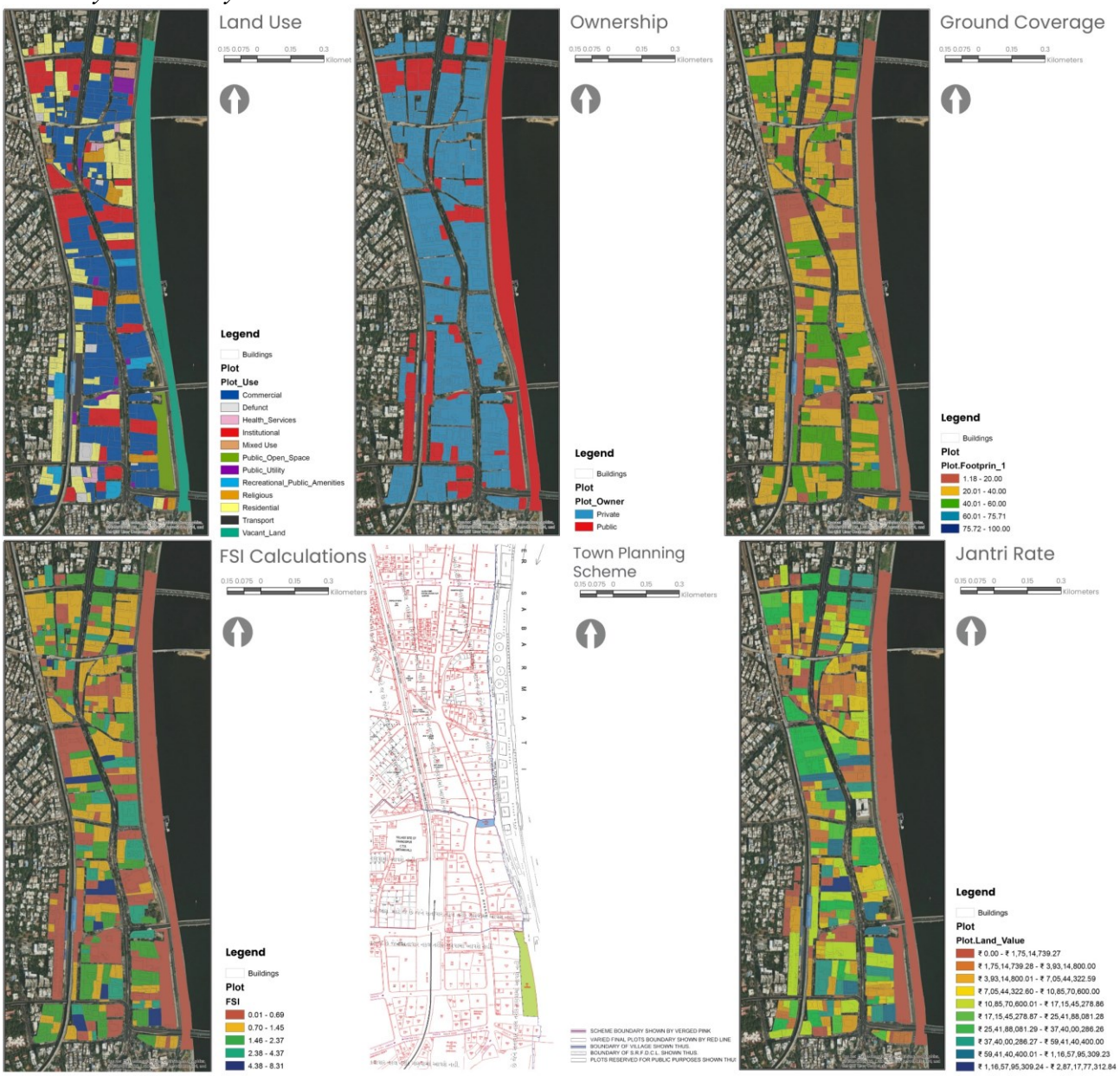

Figure 3. Physical Survey of Site.

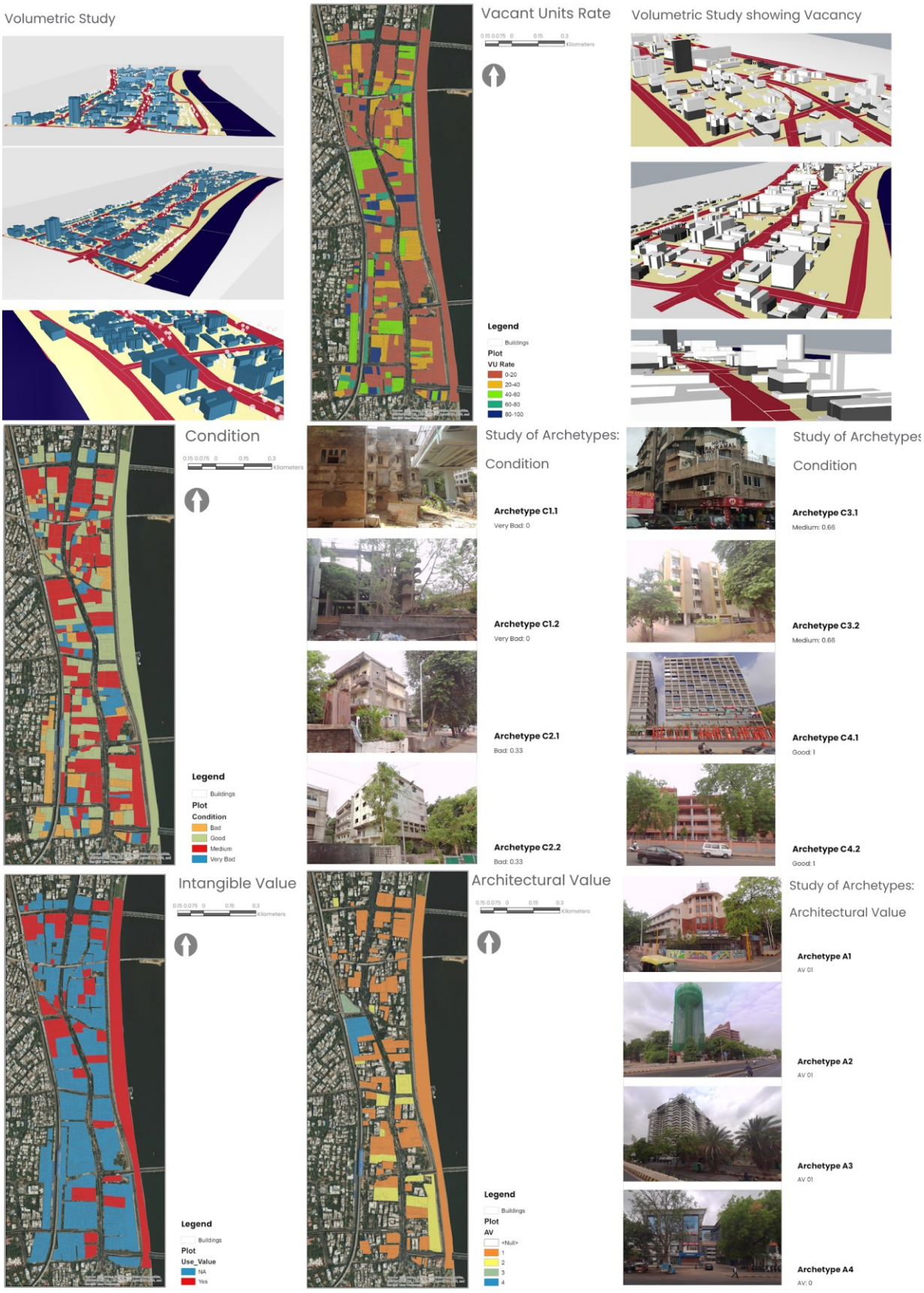

Figure 4. Physical Survey of Site.

3.2 The Planning (Whole-To-Part/City Downwards) Lens

Once parameters relating to the urban design analysis are established, then a study of the planning framework, legislation as well as regulations of CBD may help in ascertaining what aspects need to be considered for countering redundancy in the core area depending on the degree and cause of redundancy. These parameters will also help in defining the trajectory of growth and the developmental needs of the city.

3.2.1 Methods

A qualitative method was employed to investigate the process of urban development in the study area. A quantitative method was employed to determine the change in the percentage of existing and proposed land use through a literature review of reports prepared by urban local bodies. Additionally, demographic changes were investigated through the review of available census data.

A mixed method was employed for studying the development of Ahmedabad from 1487 to the present. The qualitative method revealed major milestones in the city's history, such as the establishment of a municipal corporation, economic movements, and infrastructural development. Concurrently, the quantitative approach provided detailed information on the percentage growth in the area through a literature review, physical surveys, and satellite imagery, Additionally, a mixed method was used to study existing development regulations concerning building unit area, ground coverage area, margins, FSI, height, and other factors for interventions in the study area. This included a three-dimensional visualization of the morphology permissible under existing regulations.

3.2.2 Primary/secondary data collected

Market dynamics:

Changing market preferences and shifting demand patterns could contribute to the decrease in transactions and increasing vacancy. Factors like varying demography, evolving lifestyles, and the rise of new real estate hubs might be responsible for redirecting demand from central locations to the outskirts of Ahmedabad (Mittal & Kashyap, 2015). When real estate capital is redirected to higher-yielding property types and locations, moderately priced components (buildings or districts) of an urban built environment are underinvested in (Derrington, 2021). The Ashram Road CBD has declined from 21% (2021) to 2% (2022) transaction split as compared to the other two CBDs in the periphery which contribute significantly at 83% (2022) from 58% (2021) and 15% (2022) from 22% (2021) in the same period.

Regulatory Frameworks

Ashram Road is governed by many layers of development control regulations, including those aligned with requirements for a CBD and for Transit Oriented Development, as well as those prescribed by regulatory bodies responsible for each of its multiple development boundaries. Some of these are discussed below:

1. *Development Control Regulations (DCR), Ahmedabad*

The maximum permissible floor space index (FSI) of a building unit shall be 5.4 with a base FSI of 1.8 and a chargeable FSI of 3.6. There is no restriction on the maximum permissible building height (subject to clearance from the Airport Authority). The minimum area for a building unit is 3500 sq. m. for buildings with a height of more than 45m. The permissible uses of a building are classified as Dwelling-1,2,3, Mercantile- 1&2, Business, Religious, Educational-1&2, Institutional, Hospitality-1&2, Assembly-1,2&3, Service Establishment, Sports and Leisure, Temporary Uses, Parks, Public utility, Public Institutional.

2. *Transit-oriented development (TOD), Ahmedabad*

The maximum permissible floor space index (FSI) of a building unit shall be 4 with base FSI as 1.8 and chargeable FSI as 2.2. The maximum building height of a building shall be calculated as per road widths. There is no restriction on the minimum area for a building unit. The permissible uses of a building are classified as Dwelling-1,2,3, Mercantile- 1&2, Business, Religious, Educational-1&2, Institutional, Hospitality-1&2, Assembly-1,2&3, Service Establishment, Sports and Leisure, Temporary Uses, Parks, Public utility, Public Institutional

3. *Conditions for Redevelopment, Gujarat*

The redevelopment of a building requires that either the building has completed a period of 25 years from the date of issuance of the development permission by the concerned authority, or that the building has been declared dilapidated, ruinous, or dangerous to any person occupying, visiting or passing by the structure or any adjacent structure of place by the concerned authority. The consent of not less than 75% of the building's members is mandatory for the redevelopment process to take place.

4. Central Business District (CBD) Regulations

The Central Business District (CBD) regulations specify an FSI of 5.4 for development. This supersedes Transit Oriented Development (TOD) regulations. Hence, the application of CBD regulations is done on the existing site to build possible scenarios as per the base floor space index (1.8) and permissible floor space index (5.4).

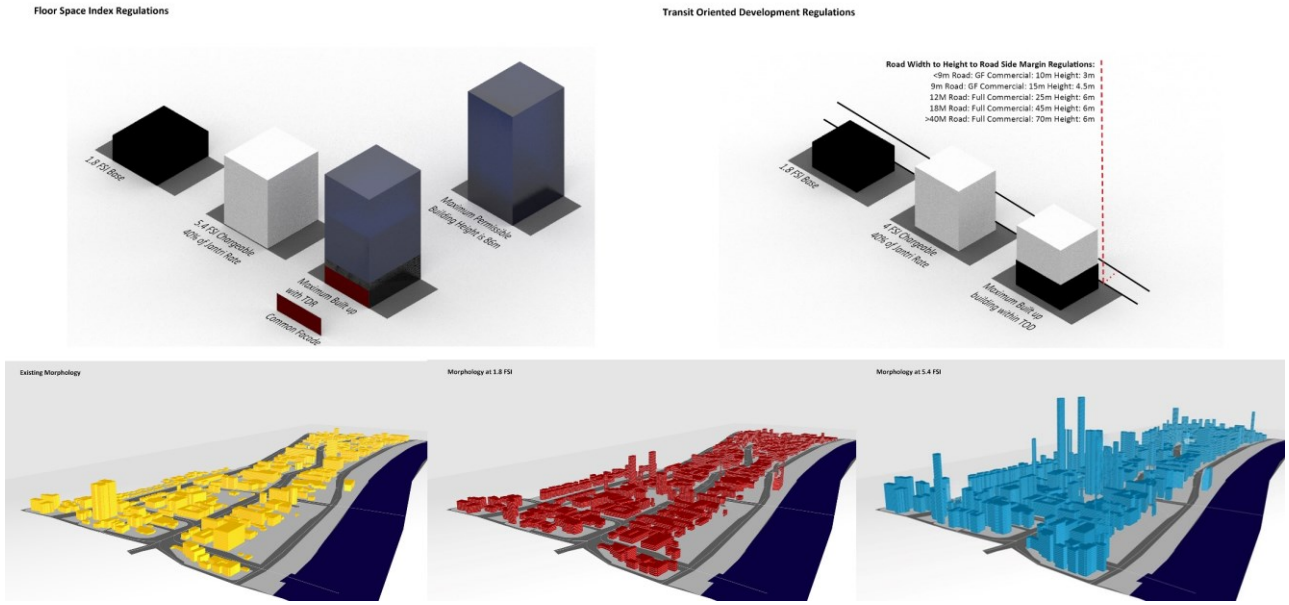

Figure 5. (Above) Visualization of the morphology resulting from the application of CBD and TOD regulations. (Below, from left to right) Visualization of the existing morphology of Ashram Road, morphology at a base FSI of 1.8, and morphology at a permissible FSI of 5.4.

3.3 Identification of Issues, Opportunities, and Constraints

According to the study of the function and architectural value of buildings, it is inferred that even the redundant areas in the core city have highly valuable assets that are a source of commerce, character, and identity for the city. The character of these assets is slowly diminishing as they are surrounded by defunct buildings. The loss of economic opportunities is causing a loss in public activity. On overlapping site surveys with the volumetric analysis of vacancy, it is inferred that there is a massive vacancy rate in Ashram Road in both built and open spaces. Built areas have a high number of vacant units that are decreasing the property value of the entire precinct. Open areas are almost entirely private and unused or underutilized, negatively impacting prevalent activity patterns. The study of regulations reveals that the floor space index (FSI) utilized is far less than the available FSI. According to site studies, the condition of the buildings on site was observed to be left in a state of disrepair and low maintenance, which may potentially attract illegal activities. This can lead to a decline in the quality of life and a sense of insecurity and can harm the overall vitality of the area. These observations establish the need for intervention in the selected site.

3.4 Multipronged Approaches for Intervention

Observing our cities and landscapes, it becomes clear that utilizing existing sites, repurposing remnants from the past, and adapting old buildings to new functions are practices that have existed throughout human history, beginning as intuitive responses. (Chiacchiera & Mondaini, 2023). It is essential to

approach the development of Ashram Road with a balanced perspective. Instead of viewing it as just another site for CBD expansion, it is crucial to recognize and preserve the specific characteristics that make Ashram Road unique. Maintaining its identity while fostering growth as a CBD requires a thoughtful and sensitive approach. This approach should prioritize a harmonious blend of modern development and the retention of Ashram Road's historical, cultural, and architectural significance. Historical elements, particularly, should be preserved and restored, given the detrimental effect that the loss of historical character can have on urban identity (Sönmez, 2020). A combination of multiple urban design approaches can be used to counter redundancy. These measures can be pro-development, which capitalize on resources that are under-utilized because of redundancy; or pro-preservation, which acknowledge the architectural, social, and cultural value of existing morphology; or pro-both, which make way for infrastructural growth with minimum impact on existing morphology. Pro-development measures include redevelopment, transit-oriented development, and market-driven development. Pro-preservation measures include adaptive reuse and conservation. Measures that combine both development and preservation include area-based development, transferable development rights, and policy-level intervention.

3.5 Multi-Criteria Decision-Making Analysis (MCDMA)

Taking into consideration the tangible and intangible characteristics of each plot, an MCDMA method is applied. This method is useful in streamlining and prioritizing multiple alternatives to determine the best one. Since the data sets pertaining to the research were extensive, derived from multiple sources, and included a combination of qualitative and quantitative aspects, MCDMA proved to be a logical decision-making tool. This method is used to rationalize the subjectivities pertaining to each characteristic to make an informed objective decision about what kind of approach may be suitable in each case.

3.5.1 Criteria for MCDMA

The criteria identified for the MCDMA method are based on the qualifying aspects of a CBD. These are listed below:

Plot area: The area of the plot determines its walkability, as larger plots create greater travel distances. Bigger plots with areas of 7500-8000 sqm have been identified for intervention.

Ground coverage: Lesser ground coverage implies that the rest of the plot may be used for reorganization or enabling newer developments. It has been identified that maximum plots utilize only 30-40 percent of the plot.

FSI: If the FSI utilized by plots produces a built-up area that is lesser than the maximum permissible built-up area, then there is scope for optimization. It is observed that the average FSI utilized is 0.7, and the range used by most plots is between 1 to 1.5.

Roads: Access to roads is important for the connectivity of plots. It is observed that maximum roads are arterial roads and there is an absence of local roads.

Building names are indicated on the plan to identify the buildings currently present on the site.

Figure 6. (From top left to top right, and bottom left to bottom right) Plans mapping the plot area, ground coverage, plot name, land use, ownership, FSI, road condition, architectural value, and vacancy rate.

Land use: Studying the present land use determines the current functionalities of each plot. It is observed that most of the land falls under commercial use.
Ownership: Public ownership of land is more feasible for any interventions in the given site area. However, this is not a major criterion as the plots will be subjected to reorganization. It is observed that most plots are under private ownership.
Condition: The condition of buildings in a plot can help determine the degree of intervention it requires. It is observed that the condition of most plots is between poor and very poor.
Architectural value: The presence of unique or important architectural characteristics in the buildings of a plot can determine whether it must be retained. Many plots, particularly in the northern part of the site, were identified as having considerable architectural value.
Vacancy rate: The vacancy rate of a plot indicates its current state of utility. It is observed that many plots display 30-70 percent vacancy.

3.5.2 Normalization

The criteria for design demonstration have been weighed against the best practices for each criterion to counter redundancy, so that we may quantify the subjective data obtained through the above inferences:
Plot area: To promote walkability in plots, an area of 3500 sqm is ideal. Plots larger or smaller than this may be improved through intervention.
Ground coverage: The ideal ground coverage is taken to be 70-100 percent. Below this range, plots may need intervention.
FSI: The optimum FSI to utilize the maximum built-up area has been calculated as 4.5 - any plots displaying an FSI below or above this threshold may need intervention.
Footprint: Since ground coverage is intended to be between 70-100 percent, the ideal building footprint is calculated to be 3500 sqm.
Intangible value: Plots with buildings that have cultural symbolism and historicity or induce an emotional attachment are considered preferable, as opposed to buildings that do not have these features.
Condition: Plots that have buildings that are in a good or moderate condition are closer to being ideal and are given preference over plots that are in poor or very poor conditions.

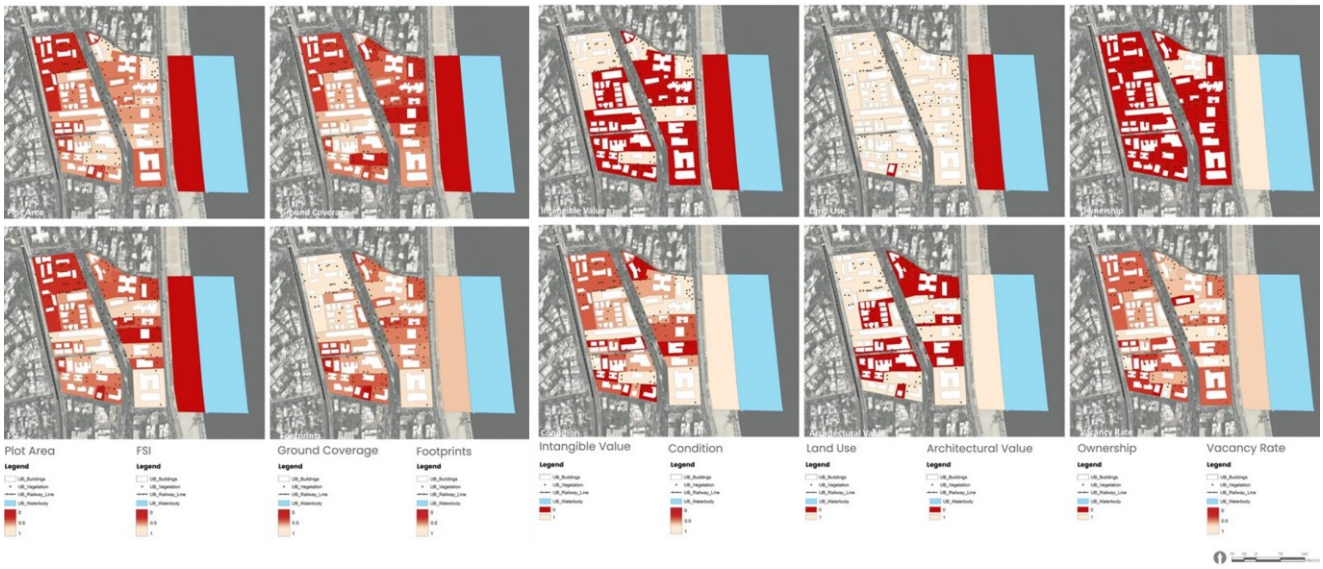

Figure 7. Plans mapping the normalization of the plot area, ground coverage, intangible value, land use, ownership, FSI (Floor Space Index), footprints, condition, architectural value, and vacancy rate (from top left to top right, and bottom left to bottom right).

Land use: Plots that are still in use are considered ideal as opposed to plots with buildings that are abandoned or defunct.
Vacancy Rate: Plots that consist of buildings that have an occupancy of 80-90 percent are considered ideal as opposed to plots with lesser or no occupancy.
Architectural value: Plots with buildings that have unique architectural characteristics are considered preferable over plots that do not have such buildings. Additionally, if plots have multiple buildings with significant architectural value, they are considered closer to the ideal as they may be retained.
Ownership: Public ownership in plots, which enables them to be utilized, can be considered to be ideal. However, this is not a mandatory criterion.

3.5.3 Weightage for Multi-Criteria Decision Analysis
Comparing design demonstration criteria against best practices helps assign scores to each criterion through a multi-criteria decision analysis. A comprehensive weightage is assigned to each criterion. This weightage helps in calculating a consolidated score for each plot which provides a threshold against which we can identify the plots that need intervention.

Table 1: Weightage is assigned to individual criteria.

Criteria	Weightage	Determinant (Beneficial)	Rationale
Plot Area	5	3500 sqm	Plot sizes become more walkable with, say, 35*100m
FSI	15	4.5	Qualify for Core Area CBD (4.5)
Ground Coverage	5	1.0	Built to plotline to promote more construction closer to the ground
Footprints	10	3500 sqm	Buildings do not become too large
Intangible Value	10	Yes	Intangible attachment will promote historicity
Condition	15	Good	Identify buildings in disrepair
Land Use	5	In use	The function of the plots will be reassigned

Architectural Value	15	Yes	Promoting aesthetic imageability
Ownership	5	Public	Town planning scheme provides an incentive
Vacancy Rate	15	0%	Identify the number of vacant units in buildings
Total	**100**		

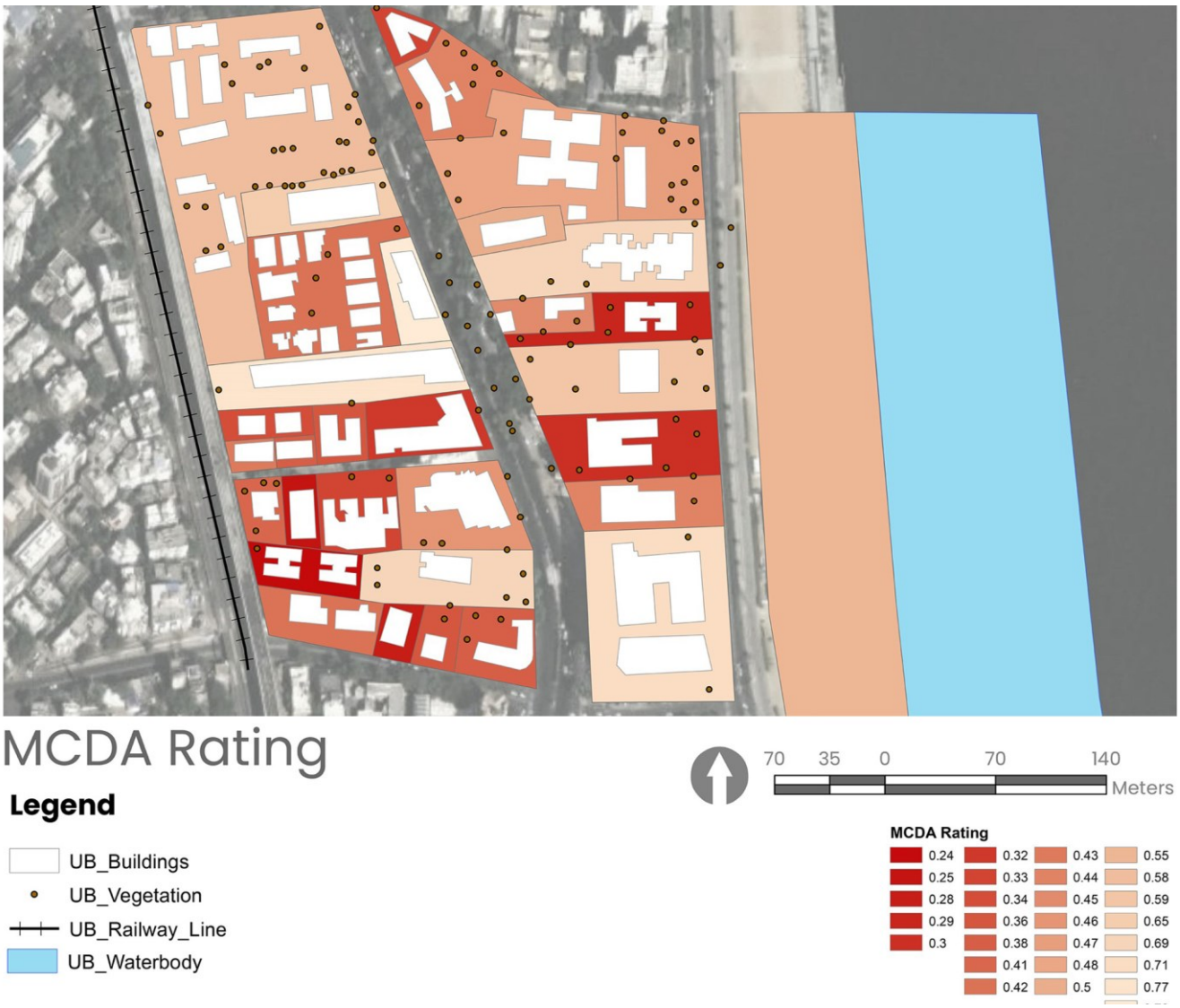

Figure 8. Plan mapping MCDA rating.

However, this type of weightage calculation results in a blanket solution which may not be the ideal response for each plot. The entry point for the intervention is also unclear. Therefore, an approach-based weightage must be undertaken. By using approach-based weightage we can focus the criteria on specific approaches. This allows a multi-pronged entry point at the plot level.

Under approach-based weightage, specific criteria are prioritized and in relation to each of these, a specific approach is determined.

Table 2: Weightage and Rationale Assigned to Each Proposed Approach.

Sr. No.	Approach	Criteria	Weightage	Rationale
1	Adaptive Reuse	Architectural Value	70	Architectural Value of a building will determine the need to retain a building for appropriation with a new function restore its vitality
		Vacancy Rate	10	
		Land Use	20	
2	Development	Plot Use	100	Open areas are required for future development
3	Maintenance	Condition	40	The condition of a building will ascertain a policy for maintenance and upkeep of the building to avoid deterioration
		Vacancy Rate	10	
		Intangible Value	5	
		Architectural Value	5	
		FSI	25	
		Ground Coverage	15	
4	Preserve	Architectural Value	70	Historicity of a building will provide identity and continuity
		Intangible Value	20	
		Ownership	10	
5	Redevelopment	FSI	40	Plots with lower FSI are impairing the operational potential of the core-area
		Condition	20	
		Vacancy Rate	10	
		Footprints	20	
		Plot Area	10	
6	Status Quo	FSI	30	Plots which utilize more FSI, with buildings which are in a good condition and display a low vacancy rate may not require immediate attention
		Ground Coverage	10	
		Condition	20	
		Architectural Value	5	
		Intangible Value	5	
		Vacancy Rate	20	

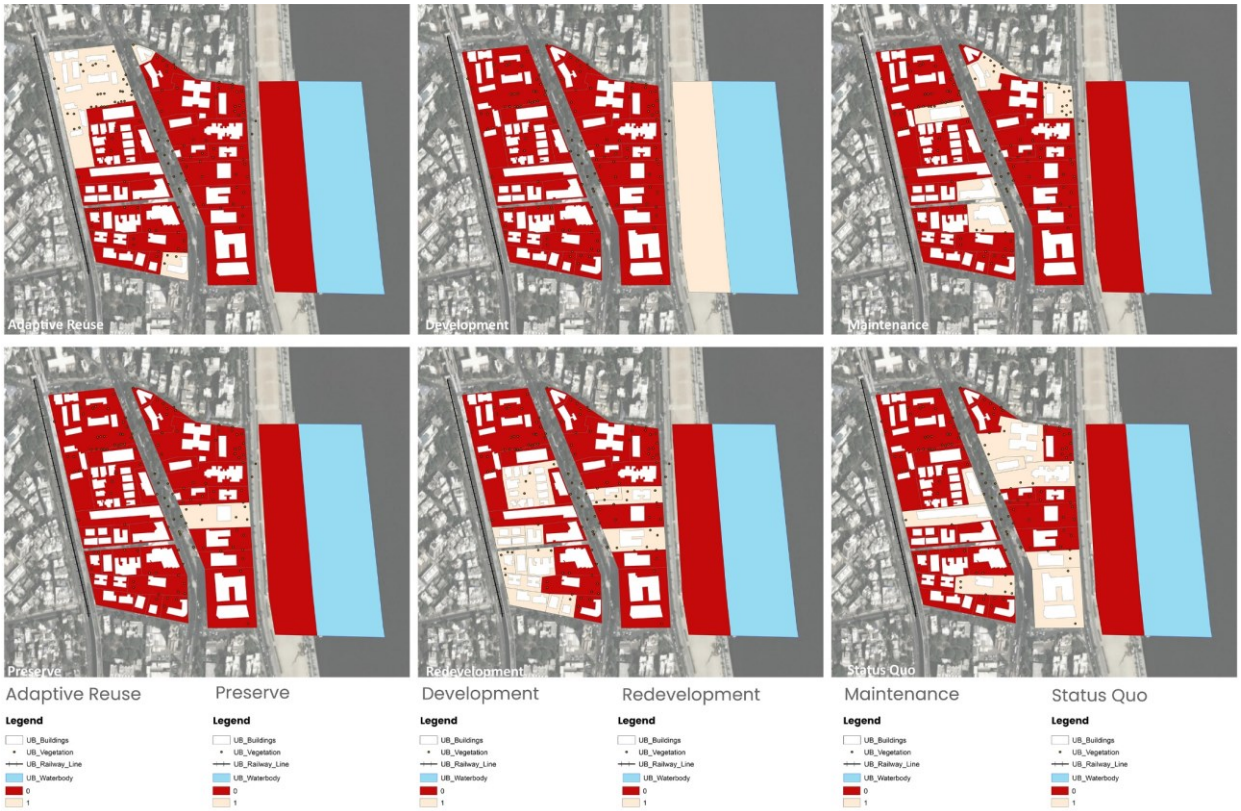

Figure 9. Plan mapping ideal plots for adaptive reuse, development, maintenance, preservation, redevelopment, and maintaining the status quo using an approach-based weightage method (from top left to top right, and bottom left to bottom right).

4. Results

According to the study of the function and architectural value of buildings, it is inferred that even the redundant areas in the core city have highly valuable assets that are a source of commerce, character, and identity for the city. According to qualitative and quantitative studies, plots can be categorized according to condition, vacancy, use, and architectural value, amongst other factors. Through the permutations and combinations obtained through such a classification, it is inferred that there is a diversity of typologies in the core area, implying that any intervention would have to be multi-faceted to target each of the unique combinations. Analysis of the census data revealed that the population growth is declining, and the city core is indeed shrinking. This corroborates with the morphological data obtained through the physical survey. Literature studies revealed that there is a vast disparity between the core-area regulations of the Indian context and that of other international contexts. CBD policies are also realized differently in cities around the world, which suggests that these differences may be the enablers for market-led development. Analysis of regulations reveals that 5.4 FSI provided is creating a state-led real estate approach to redevelopment creating high-rise buildings as a blanket solution to the entire Ashram Road resulting in the change in character and identity of the core area of Ahmedabad.

Implications of the MCDMA framework:

- Elimination of Redundancy: The plot-by-plot approach creates a customized response for each case of redundancy and streamlines available resources, thereby maximizing their potential and reducing wasteful practices.
- Future-ready: Integrating the site with proposed developments takes into account the changing real-estate trends and transportation systems, making the proposed response flexible and adaptable to future needs.
- Context Sensitivity: Attention to the urban character of the site and its historicity ensures that the site's identity is preserved and enhanced to create harmonious and contextually appropriate newer developments.
- Increased open public spaces: Increased number of open spaces generated by reorganizing plots for public utilization, enhance walkability, thereby creating an improved quality of life by providing opportunities for safe and accessible pedestrian and cycling paths, encouraging people to choose these sustainable modes of transport.

5. Discussions

Further research may delve into the mechanisms that render the real estate approach successful without leading to the redundancy of certain areas. By studying successful examples, urban designers can identify the factors and strategies that contribute to the sustained relevance and vitality of neighborhoods and districts over time. This research can inform urban design practices and help create solutions that prevent redundancy. Investigating the economic implications of redundancy is essential to develop informed urban design solutions. Understanding how redundancy affects property values, investment patterns, and the overall economic health of an area can provide valuable insights. By considering these factors, urban designers can propose interventions that support economic diversity, attract investment, and mitigate the negative consequences of redundancy. It is crucial to expand the inquiry beyond core areas and explore how redundancy impacts other parts of the city, such as specialized townships and peripheries. Each area may have unique characteristics and dynamics that influence the way redundancy manifests and its effects. By studying these different contexts, urban designers can identify tailored approaches that work best in each case, fostering resilience, and preventing redundancy. Balancing market-driven urbanism with the longevity of city areas is a critical aspect of addressing urban redundancy. While market forces play a significant role in shaping urban development, it is important to consider the long-term sustainability and liveability of city areas. Urban designers can explore strategies that promote a balance between market-driven growth and the preservation of the city's identity, cultural heritage, and social fabric. Heritage

interpretation can undoubtedly be crucial in revitalizing historic urban areas by engaging in the preservation of the area's cultural values. (Munasinghe, 2022) This approach may involve implementing regulations, incentives, and design guidelines that encourage adaptive reuse, mixed-use development, and community participation.

6. Conclusions

Addressing urban redundancy in core areas requires a multi-pronged approach that recognizes the value of the present and the significance of the geographical core in shaping a city's identity and functionality. Cities transform in diverse ways and at uneven rates (Nemouchi, 2023). The detrimental effects of redundancy extend beyond the core and impact the entire city, making it essential to counter this issue. By countering redundancy, cities can unlock a multitude of benefits, including economic revitalization, social vibrancy, and morphological improvement.

Ashram Road exemplifies the challenges posed by redundancy in most cities around the world- the presence of a deteriorating historically significant core area co-existing with contrasting contemporary high-rise developments. In such a scenario, countering redundancy holds not just a morphological but also a cultural value, wherein the attributes that define the core area are retained, thereby keeping its character intact. Newer developments introduced in such an ecosystem consequently enhance, but never replace this character, thereby integrating well within existing systems of connectivity and infrastructure. This study establishes that Ashram Road's redundancy can be tackled more effectively through a thorough assessment of its characteristics that informs intervention. The state-led approach of overall increased FSI to promote high-rise redevelopment is likely to cause damage to the core area's existing assets and character; however, the development is inevitable and necessary.

Drawing inspiration from thriving historic cores as a precedent for countering redundancy provides lessons on land use, density, and street networks. By leveraging successful examples, the proposed framework seeks to ensure the core area's revitalization, adaptability to future needs, and integration with the overall urban fabric.

In conclusion, an approach that considers the multidimensional aspects of redundancy in core areas is crucial for sustainable urban development. In this study, social factors were considered to provide context and inform the research, but the exploration of social dynamics was limited and not extensively delved into. Further research on social factors can enrich potential scholarship around this subject. By embracing the value of the present, addressing redundancy in the core, and implementing a strategic framework, cities like Ahmedabad can breathe new life into their urban cores. Ultimately, countering redundancy is not only a step toward revitalizing the core area but also a pivotal move toward creating more resilient, inclusive, and sustainable cities.

Future studies on this topic can further elucidate the details of each approach. Additionally, parallels can be drawn between the morphological characteristics and socio-cultural parameters, which have not been explored in this research. Further, MCDMA can be used as a reliable tool to inform urban policymaking.

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