



**Ministry of Housing
and Urban Affairs**
Government of India



WRI INDIA
—ROSS CENTER

FORM BASED CODES

Guide book

A step by step methodology for adopting
Form Based codes in Indian cities

Ministry of Housing & Urban Affairs
Government of India

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Executive Summary

Defining Form Based Codes

Form Based Codes (FBC) is a planning and zoning tool that is used for regulating development using physical form rather than land use segregation as the organizing principle for the code. It aims at contributing to better quality of life by fostering a high-quality public realm.

In the Indian context FBC can be adopted and applied as mandatory code, hybrid code or parallel code. The scale of application can be at the city level, area/neighborhood level or project/ site level.

Establishing methodology for adopting FBC codes

The document complements other regulation frameworks in the context of Indian cities and aims to establish a methodology for planning, design and implementation of form-based codes for Indian cities.

The methodology provides a detailed step by step process of each stage of FBC process and the components/ tasks involved within the same.

Organizing Principles and codes

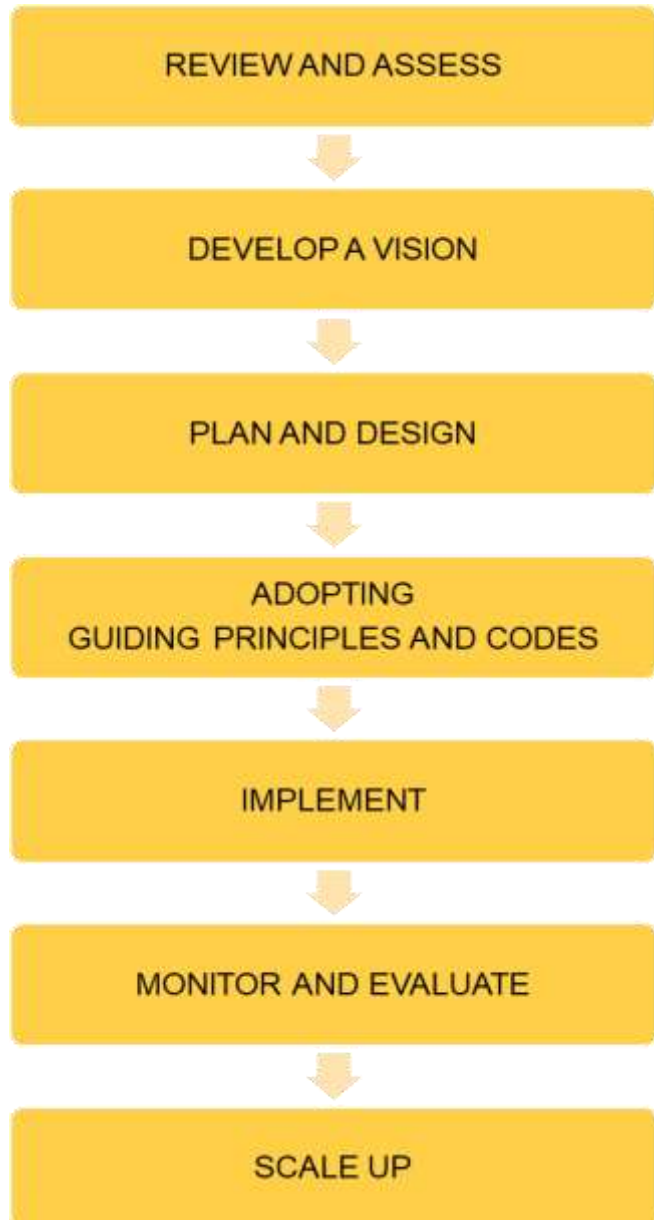
The document In Indian context FBC can be implemented using six organizing principles.as below. The organizing principles act as guiding elements to define planning and implementation of FBC process. These principles are derived from the research and best practices of FBC around the world and are contextualized for application in Indian cities. Once the city creates a vision for the chosen FBC area, it can pick and choose principles to be adopted which can help in realizing the vision and determine the design components.

The overall methodology for form-based codes essentially have seven broad stages of work including scaling up.

FBC is a bottom-up development approach which aims to achieve economic, social and environmental sustainability while ensuring

contextual planning that is functional and in accordance with the development goals of the city. The keystone of FBC is community involvement in not only determining community needs and priorities but also in its development and implementation.

Fig 1: Methodology/ Process for form Based codes



Frequently Asked Questions (FAQs)

To be added

List of Acronyms

FBC - Form Based Codes
FAR - Floor Area Ratio
DCR - Development Control Regulations
CBD - Central Business District
CDP - City Development Plan
CMP – City Master Plan
UDA – Urban Development Authority
PWD – Public Works Department
DPR - Detailed Project Report
ECS - Equivalent Car Space
FSI - Floor Space Index
IRC - Indian Roads Congress
ITDP - Institute for Transportation and Development Policy
IPT - Intermediate Para Transit
NMT - Non-Motorized Transport
TOD – Transit Oriented Development
SAP – Station Area Plans
CMAP – Chicago Metropolitan Agency for Planning
FBCI – Form Based Codes Institute
NHAI - National Highways Authority of India
PCB – Pollution Control Boards

1. Chapter 1- Introduction

1.1. Background

The current planning process in our cities emphasizes rigid land-use, zoning and development controls that fails to recognize the unique urban fabric, potentials and constraints of different areas/neighborhoods within the city needing area-specific solutions/interventions. The existing planning process emphasizes on land use zoning and blanket building development controls whereby ignoring local contexts and ground realities. This is often also the reason why prescriptive parameters are flouted and abused by development interests looking to maximize the use of their land and thereby profits irrespective of infrastructure, social and economic requirements and goals of the city. As a result, the livability of cities has degraded with unplanned urbanization, congestion and environmental degradation.

To address these dynamic conditions of urban areas, the competent authorities tend to resort to frequent land use changes and building regularization schemes to legalize the course of development. On a regional and national scale this lack of integration of spatial planning and economic planning has increased the skewed hierarchy of settlements where, benefits of economic planning and development schemes have not been fully realized.

Therefore, it has become imperative to look at alternative ordinances, standards and best practices to adopt an approach that acts at the local level, involves the community, promotes predictability in outcome, meets the development and growth needs of the city and is transparent in its formulation and implementation.

In this, Form Based Codes (FBC) have emerged as a powerful alternative to conventional zoning and building regulations. It focuses on comprehensive development and aims to economic, social and environmental sustainability while ensuring community involvement.

1.2. Defining Form Based Codes

Form based codes (FBC) is a planning and zoning tool that for regulating development using physical form rather than land use as organizing principle for the code. It aims at contributing to better quality of life by fostering predictable built results and a high-quality public realm. Form-based codes address the relationship between the form and mass of buildings in relation to one another as well as to the public realm, and the scale and types of streets and blocks.

Image 1: An illustration of ideal FBC development



Source: <http://www.urbancincy.com/2014/01/cincinnati-leaders-approve-citys-third-form-based-code/>

1.3. Difference between FBC and conventional codes

Table 1: Difference between Conventional zoning and Form based codes

Current Zoning/Development Control Regulations	Form Based Codes
Conventional codes focus on land use segregation.	A form-based code focuses on how development relates to the context of the surrounding community.
Top-down approach applied city wide	bottom-up approach with specific codes in response to local context; applied on at District/Local Area Plan
Based on segregation of uses	Based on compatibility of uses
Often encourages excessive land consumption and automobile dependency.	Encourages a mix of land uses, often reducing the need to travel extensively as part of one's daily routine
Ends up focusing on what uses are not allowed, rather than encouraging what the community requires.	Focuses on what the community requires.
Preparation process includes minimal public participation	Community input, public participation, interaction an integral part of the process
'Planning' perspective and fragmented	'Urban design' perspective, integrated
No or 5 yearly periodic revision	Periodic or annual review
Presented in the form of text, numbers and tables; lacks ease in comprehensibility. Also making it easier to flout, difficult to monitor and enforce.	In addition, also illustrates graphically (maps, sketches, etc.) making it clearer, easier to decipher. Easier to enforce, identify non-conformity.
Different departments for review and sanction of development proposals.	Special dedicated body to guide applicants, interpret, review, approve and monitor development proposals
Current Zoning/Development Control Regulations	Form Based Codes
Conventional codes focus on land use segregation.	A form-based code focuses on how development relates to the context of the surrounding community.
Top-down approach applied city wide	bottom-up approach with specific codes in response to local context; applied on at District/Local Area Plan
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1.4. Organizing Principles of FBC

The organizing principles act as guiding elements to define planning and implementation of FBC process. These principles are derived from the research and best practices of FBC around the world and contextualized for application in Indian cities. Once the city creates a vision for the chosen FBC project, it can pick and choose principles to be adopted which can help in realizing the vision and determine the design components.

The guiding principles adopted for the guidebook are as follows

i. Coordinated built form

The principle addresses the nature and characteristics of the built form and the correlation with the surrounding buildings and activities.

ii. Complete streets

This principle essentially focuses on developing streets and networks that are designed and operated to enable safe, attractive, and comfortable access and travel for all users and modes.

iii. Accessible public spaces

The principle focuses on contextually designed and located in the form of open spaces, parks and other civic spaces which help create livable neighborhoods.

iv. Effective mobility management

The principle focuses on creating strategies to reduce travel demand or to redistribute this demand in space or in time, through effective methods like use of public transport and discouraging private transport.

v. Contextual landscapes

The principle focuses on critical aspects of landscaping (vegetation and street elements) on both public areas as well as the private setback spaces of the properties.

vi. Environmental and cultural inclusivity

The principle addresses the need to preserve and incorporate unique cultural and societal

iconography of regions into the spatial order of settings of the FBC area.

1.5. Contextualizing Planning

The FBC approach is a relatively new in Indian context. The idea was primarily developed in US as a concept for defining a new language for a harmonious development as well as encourage higher densities and walkability. However, it is interesting to know that most of the FBC components like nature of built form, street typologies and coordinated social or economic character have already been incorporated in Indian planning in different ways (both historically and contemporary planning). The FBC is derived based on the local context and conditions. There is no 'one size fits all' approach to create FBC projects and it must be developed based on local context, geography and other influencing factors. The key factors which influence the FBC process are

Development context

The nature of built form and influencing activities in the area which can help delineate the FBC area and develop codes accordingly.

The stakeholder visions

This is the key factor which can help define the direction of growth for the FBC area. The stakeholder workshops organized at different stages of the process help shape the development based on the vision in turn create lesser resistance during the implementation process.

Scales of FBC

The different scales of intervention i.e. street, area and city level in combination with the vision helps determine the extent of intervention and the elements of FBC.

2. Chapter 2 - Form Based Codes Guidebook

2.1. Need for FBC codes

Form Based Codes (FBC) has potential to emerge as a powerful alternative to conventional zoning and building regulations. It focuses on comprehensive development and aims to economic, social and environmental sustainability while ensuring community involvement.

Most of the cities who are willing to adopt FBC for their respective cities lack expertise and the time necessary to develop the codes and therefore hire consultants to develop the FBCs for the respective projects in the city. Hence it becomes vital for the city to understand the scope of work for FBC as well as the extent and impact of its application.

2.2. Aim and objectives

The FBC guide book aims to function as a reference document for cities who are willing to initiate/adopt the FBC planning codes to achieve a people friendly and inclusive development in the city. The guidebook will assist the consultants, the city as well as the other stakeholders involved at various stages of FBC planning and implementation process.

The objectives of the guidebook are as follows

- To educate the city governments on understand and evaluate the need for FBC codes for their cities
- To provide a step by step methodology to identify, design and implement FBC codes
- To help gauge the amount of outside assistance (consultants) needed, financial and administration support required for the project.

2.3. Who should use this guidebook

The guidebook aims to act as a reference document for the cities who are willing to adopt FBC process and the process will be led by the

key administrative bodies of the city. But the interesting fact (or rather the strength) about the FBC codes is that, it is a community led approach and takes into account, the private players and other influencing stakeholders of the project. Hence it involves a diverse set of stakeholders in the project

Hence the guidebook will be primarily useful to

- City implementing agencies
- City governments
- Local representatives
- Other key decision makers of the city

However, the private stakeholders like developers, housing associations, institutions and the local decision makers can also refer this guide book to understand the process of FBC.

2.4. Scope and limitation

The guide book provides a methodology for adopting FBC codes in the context of Indian cities. This has been derived through research from other cities and learnings from the current Indian regulation mechanisms.

The document cross-references on other case studies and multiple guidelines and standards (street guide lines, zonal regulations) to serves as a plugin into the current Indian regulations and avoid 'reinventing the wheel'.

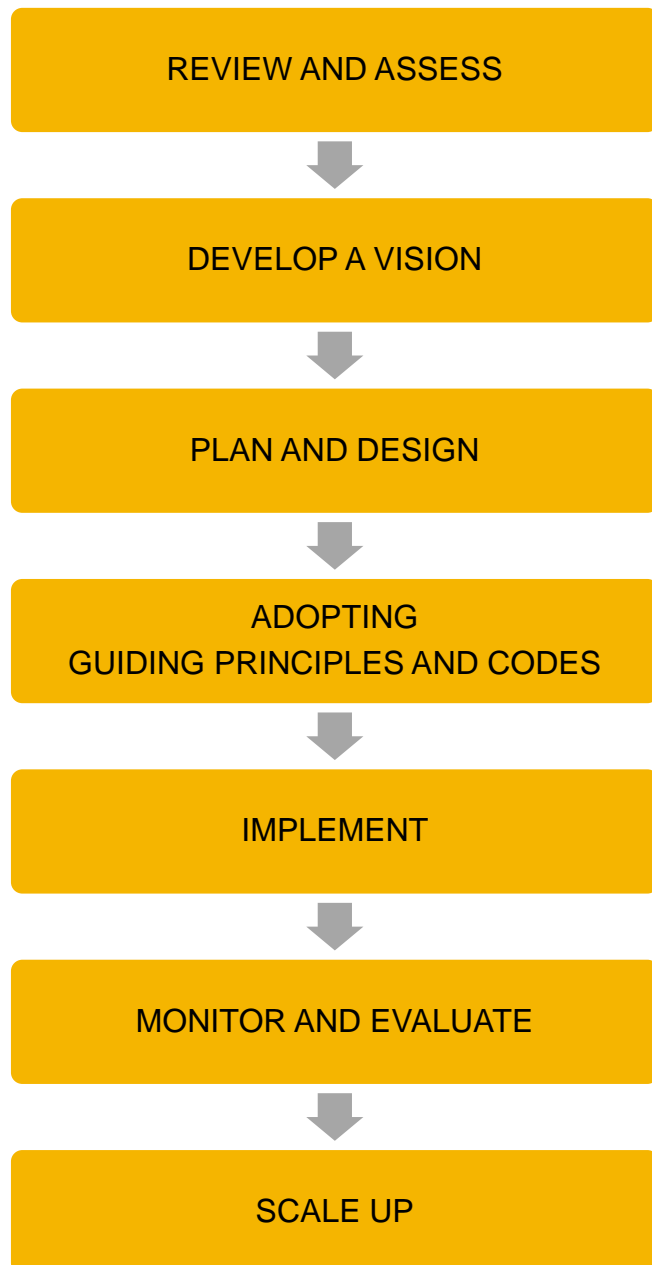
Considering the diverse contexts of Indian cities, the document being developed at a national level and the FBC codes being contextual and specific in nature, it is very hard to develop the codes which could be applicable to the entire country.

Hence the scope of the document is to clearly provide a methodology to adopt FBC.

2.5. Over all methodology

The overall methodology for developing FBC is as follows

Fig 2: Methodology/ Process for form Based codes



3. Chapter 3 – Review and Assess

This is the first stage of the FBC process where the city primarily needs to evaluate the need to adopt the codes as a part of their planning process. This is undertaken by assessing the internal capacities available (both in terms of knowledge of the process and staff time commitment required) as well as the need and impact, the project can create for the chosen area and the city.

The review and assessment parameters are as follows

3.1. Identify the current development and growth trend

The city needs to primarily analyze the current state of development in terms of building typologies and morphologies, concentration of densities and the growth patterns and the triggers for the same. It is a usual phenomenon that the cities get saturated within their cores and the investments start spreading towards peripheries. On the other hand, the cores start getting rebuilt with new form of developments. So, what happens to the identity of the city, is there a development language it can choose, or would it demand a new form of identity? The city hence needs to assess all the aspects thoroughly before deciding on next steps.

3.2. Review of current policies, plans, programs & institutional setup

Once the city understands the need for FBC, it needs to validate the same through tangible components. The city needs to review the existing planning mechanisms and regulations in place like the city master plan and extension plan, development control regulations and other guidelines. This will help determine the extent to which FBC codes that could be adopted to the city. Evaluating the respective staff and departments can help determine/identify potential capacities which can aid to formation of FBC committee.

3.3. Identify institutional capacities for implementation and research

The representatives from implementing agencies and govt form a critical part of the FBC committee to manage the planning and implementation of the project. Hence it is important to identify potential team from the preliminary stage of research. This can aid to improved knowledge sharing within team resulting in comprehensive FBC process.

Fig 3: Steps involved in review & assessment



4. Chapter 4 – Develop a Vision

Form-based codes are usually designed to achieve a specific outcome as desired by the community and involved stakeholders especially in terms of their form and function of the area in question. This kind of intervention requires a definite ‘vision’. The different steps involved in the visioning process are as follows:

The process can be strengthened by including the local groups who can serve as an important resource to validate the proposals. The city needs to identify key local groups and representatives of the community, institutions, experts and other key stakeholders who can contribute to the determining the tangible and intangible assets the chosen FBC area.

4.1. Identify potential stakeholders and decision makers

Identification of stakeholders in the earlier stages of the project helps validate the ideas for development of FBC codes, it also helps develop lesser resistance during implementation process.

4.2. Visioning workshop/consultation

The initial discussion should provide a brief insight about the form-based codes and the benefits that the stakeholders can gain through the process.

The organizing team can also use tools like maps, sheets, interactive activities, discussions, etc. to communicate with the stakeholders. This can help gain inputs which can help translate to strategies for the chosen area.

Based on the received inputs from the stakeholders the development vision of the FBC area can be derived.

4.3. Develop a conceptual plan

Once the vision is in place, the experts can discuss with the local community/Stakeholders to develop strategies to achieve the same and develop conceptual plan. The conceptual plan acts as a first step towards developing a successful overall regulating plan and requirements.

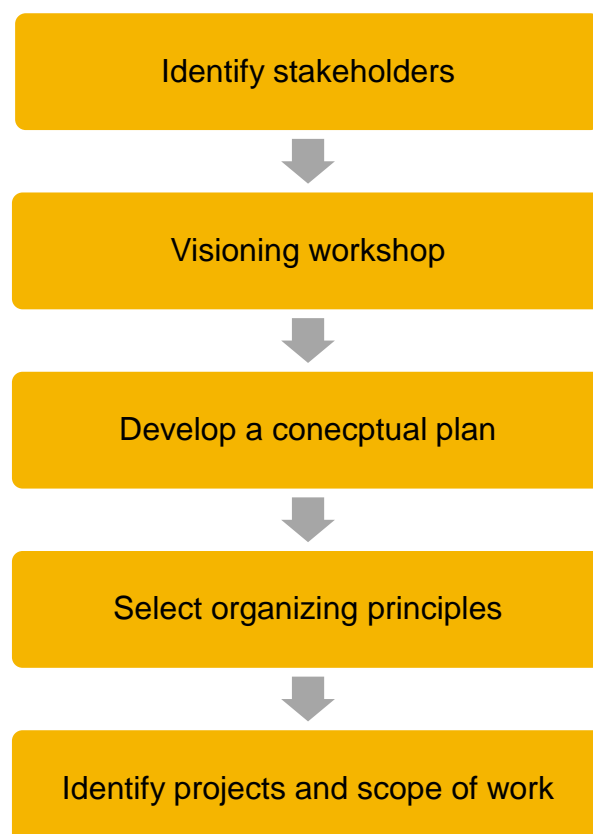
4.4. Select organizing principles

Based on the information on conceptual plan, the stakeholders need to select the organizing principles of the FBC which will help them derive the regulating plan which will be binding for the development of the FBC area.

4.5. Identify projects and scope of work

Based on the regulating plan created along with stakeholder inputs, identify priority projects (if possible) and define the scope of work.

Fig 4: Step by step process – vision to FBC



5. Chapter 5 – Plan and design

5.1. Identify FBC areas

Once the city takes a decision to go ahead with FBC process and creates the FBC team, the next stage to identify the FBC areas/ zone for the project.

The FBC codes can be identified as a combination of two aspects, development typology and area characteristics.

Table 2: Showing identification matrix format

Area typology →	Heritage Area	Transit zone	Ecological zone	Function specific areas	Other context specific area
Development typology					
Central Business Districts (CBD)					
Corridors					
Wedges					
Peripheries					

a. Development typology

This is determined based on the current need for the project and state of growth and development influence in the city. These geographies could be categorized under 4 sections

Central Business Districts (CBD): The city areas that are dense and have typical character to its existence often due to historical importance or robust trade centers/ economic activity agglomeration.

Corridors: Well-connected and diverse in character, these are areas along mass transit lines that extend from the center of the city to its periphery.

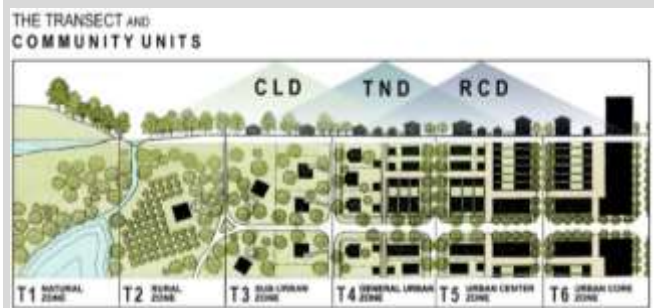
Wedges: Low-density/intensity areas between corridors where the neighborhoods are growing, evolving and stabilizing in terms of use and character

Peripheries: Under-served areas typically outside municipal boundaries where unplanned growth is occurring

An example of segregation of different areas in the city using the concept of Transect zones has been shown below.

Transect zones are basically classified by physical intensity of the built form, the relationship between nature and built environment and complexity of the uses within the zone. This not only helps develop an identity and harmony but also brings continuity to the current growth pattern (Refer Image and Table 3)

Fig 5: City zoning using Transect codes



Source - smart codes 9.2

Fig 6: Different stages of plan and design

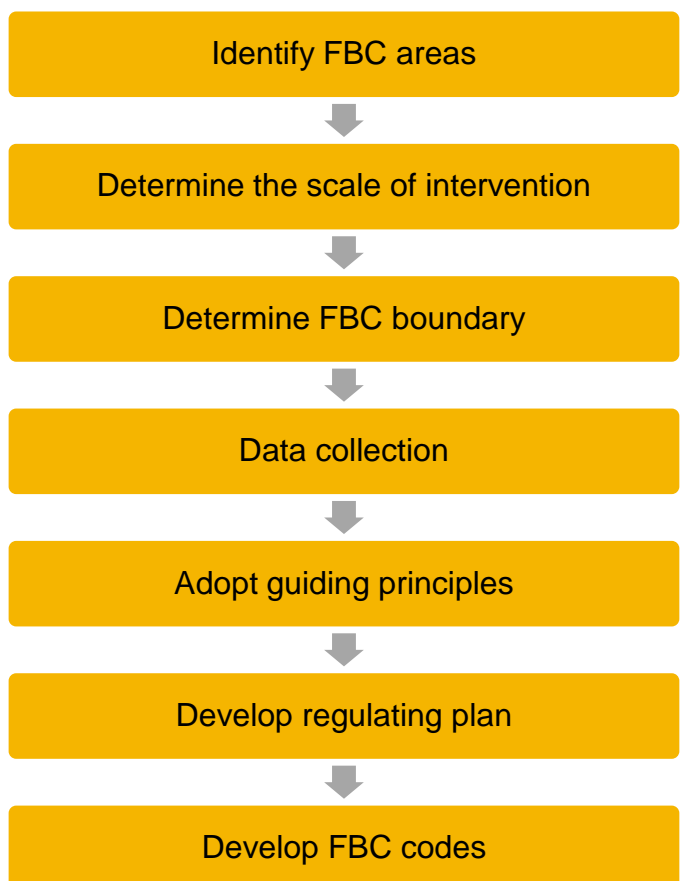


Table 3: Transect zone descriptions - smart codes 9.2

Source: Smart code 9.2

	<p>T-1 NATURAL T-1 Natural Zone consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation.</p>	<p>General Character: Natural landscape with some agricultural use Building Placement: Not applicable Frontage Types: Not applicable Typical Building Height: Not applicable Type of Civic Space: Parks, Greenways</p>
	<p>T-2 RURAL T-2 Rural Zone consists of sparsely settled lands in open or cultivated states. These include woodland, agricultural land, grassland, and irrigable desert. Typical buildings are farmhouses, agricultural buildings, cabins, and villas.</p>	<p>General Character: Primarily agricultural with woodland & wetland and scattered buildings Building Placement: Variable Setbacks Frontage Types: Not applicable Typical Building Height: 1- to 2-Story Type of Civic Space: Parks, Greenways</p>
	<p>T-3 SUB-URBAN T-3 Sub-Urban Zone consists of low density residential areas, adjacent to higher zones that some mixed use. Home occupations and outbuildings are allowed. Planting is naturalistic and setbacks are relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.</p>	<p>General Character: Lawns, and landscaped yards surrounding detached single-family houses; pedestrians occasionally Building Placement: Large and variable front and side yard Setbacks Frontage Types: Porches, fences, naturalistic tree planting Typical Building Height: 1- to 2-Story with some 3-Story Type of Civic Space: Parks, Greenways</p>
	<p>T-4 GENERAL URBAN T-4 General Urban Zone consists of a mixed use but primarily residential urban fabric. It may have a wide range of building types: single, sideyard, and rowhouses. Setbacks and landscaping are variable. Streets with curbs and sidewalks define medium-sized blocks.</p>	<p>General Character: Mix of Houses, Townhouses & small Apartment buildings, with scattered Commercial activity; balance between landscape and buildings; presence of pedestrians Building Placement: Shallow to medium front and side yard Setbacks Frontage Types: Porches, fences, Dooryards Typical Building Height: 2- to 3-Story with a few taller Mixed Use buildings Type of Civic Space: Squares, Greens</p>
	<p>T-5 URBAN CENTER T-5 Urban Center Zone consists of higher density mixed use building that accommodate retail, offices, rowhouses and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to the sidewalks.</p>	<p>General Character: Shops mixed with Townhouses, larger Apartment houses, Offices, workplace, and Civic buildings; predominantly attached buildings; trees within the public right-of-way; substantial pedestrian activity Building Placement: Shallow Setbacks or none; buildings oriented to street defining a street wall Frontage Types: Stoops, Shopfronts, Galleries Typical Building Height: 3- to 5-Story with some variation Type of Civic Space: Parks, Plazas and Squares, median landscaping</p>
	<p>T-6 URBAN CORE T-6 Urban Core Zone consists of the highest density and height, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets have steady street tree planting and buildings are set close to wide sidewalks. Typically only large towns and cities have an Urban Core Zone.</p>	<p>General Character: Medium to high-Density Mixed Use buildings, entertainment, Civic and cultural uses. Attached buildings forming a continuous street wall, trees within the public right-of-way; highest pedestrian and transit activity Building Placement: Shallow Setbacks or none; buildings oriented to street, defining a street wall Frontage Types: Stoops, Dooryards, Forecourts, Shopfronts, Galleries, and Arcades Typical Building Height: 4-plus Story with a few shorter buildings Type of Civic Space: Parks, Plazas and Squares; median landscaping</p>

b. Area characteristics/ features

This is determined based on significant characteristics of the area based on nature of built form, functional activities, economy, culture, history etc. If the area doesn't have a significant feature (particularly in green field projects) the typology can be determined based on the significant land use. A set of constants could be identified and benchmarked, which could then be adapted into the FBC guidelines.

A list of area typologies (but is not limited to) are given below

i. Type 1 - Heritage precinct

These are areas of significant heritage character and generally seen in old cores of the cities and can be determined in two ways.

Case 1 - Area which consists of an important monument or monuments and the surrounding development complementing the same. E.g.- axis street, market, built form etc.

Case 2 - The entire precinct is of historical significance both in terms of heritage value as well as architectural character.

Image 2: Indore old city core.



Constants – Heritage elements, nature of use in buildings, street types, public chowks etc.

ii. Type 2 – Transit area

These are areas which have mass transits (public or private) as the main anchor of the area. This in turn influences the land use and activities in the area. The surrounding streets and built form complement to the transit mode type.

Image 3: Area around MG road metro station, Bengaluru



Source: Rajeev, WRI India

Constants - Streets which support both mass transit and pedestrian movement, facilities for IPTs, supporting development (preferably commercial activities)

iii. Type 3 – Ecological zone

These could be areas around important ecological areas of the city like city parks, urban forests etc. The development around these zones is sensitive and pedestrian friendly in nature.

Image 4: Sanjay Van Mehrauli,



Source: Wikipedia

Constants – Low height-built form, cycle and pedestrian friendly transport, no truck or heavy vehicular zones.

iv. Type 4 - Function specific zones

These areas are determined by the function/ activities in the area. Here the development and streets are shaped based on the dominant

use or activity. E.g. – Industrial towns, housing, Central business districts, market streets etc.

Case Jamshedpur industrial town – where the area is designed keeping in mind the cycling needs of working class.

Image 5: Jamshedpur city



Source: Wikimedia commons
https://en.m.wikipedia.org/wiki/File:Viewing_Skyline_at_Jamshedpur_City.jpg

v. Type 5 - Other zones

These are the areas which consist of significant characteristics (tangible and intangible) like socio-cultural setting, economic factors, landmarks and important activities. These characteristics drive the nature of development and activities.

Image 6: Concentric planning of Madhurai city around Meenakshi temple



Source: Google maps

5.2. Determine the scale of intervention

In order to apply the guidelines and regulations to the chosen FBC area, the scale

of intervention needs to be determined. This will guide the design process for the FBC area. The different scales of interventions are as follows

- City level
- Area level
- Project/ site level

5.3. Delineate FBC boundary

Once the typology of the FBC zone is determined, the extent of FBC intervention must be determined. This is done based on the following parameters

- The extent of intervention required determined by community vision (retrofit, redevelopment or green field)
- Funding and time available
- Administrative and technical support available

The FBC boundary is demarcated based on

- Existing property lines
- Streets and public space boundaries
- Important landmarks etc.

Fig 7: Demarcation of a Transit based FBC boundary



Fig: Towards a walkable and sustainable Bengaluru - An accessibility project for Indiranagar Metro Station.
Source: WRI India

FAR	Description
1.75	Undersubdivided
1.75	Achieved
1.75	Oversubdivided
2.00	Undersubdivided
2.00	Achieved
2.00	Oversubdivided
2.25	Undersubdivided
2.25	Achieved
2.25	Oversubdivided
3.25	Undersubdivided
3.25	Achieved
3.25	Oversubdivided

Note: If streets are used to determine the boundary, make sure that at least one row of buildings are included on the outer edge of the boundary so that there are no buildings with two sets of regulations on either side of the road.

5.4. Collect and compile data

The generic components and specific site-based features must be documented to establish the bench marks of design and implementation. These can also help direct the design process. The components to document in a given FBC area have been listed below

- Location and connectivity
- Geographical study
- Existing built form conditions
- Future conditions
- Socio-cultural elements

- Economic influences
- Other contextual factors

5.5. Creating a concept or regulating plan

This is a concept plan which is developed to determine the segregation of built forms and uses. It provides a frame work for determining the guide lines for the area.

This involves basic zoning of the area, depending on land use, building typology, activities etc. The categorization of land as different zones aids to adopting the guiding principles and respective FBC codes

Fig 8: An example of a regulating plan

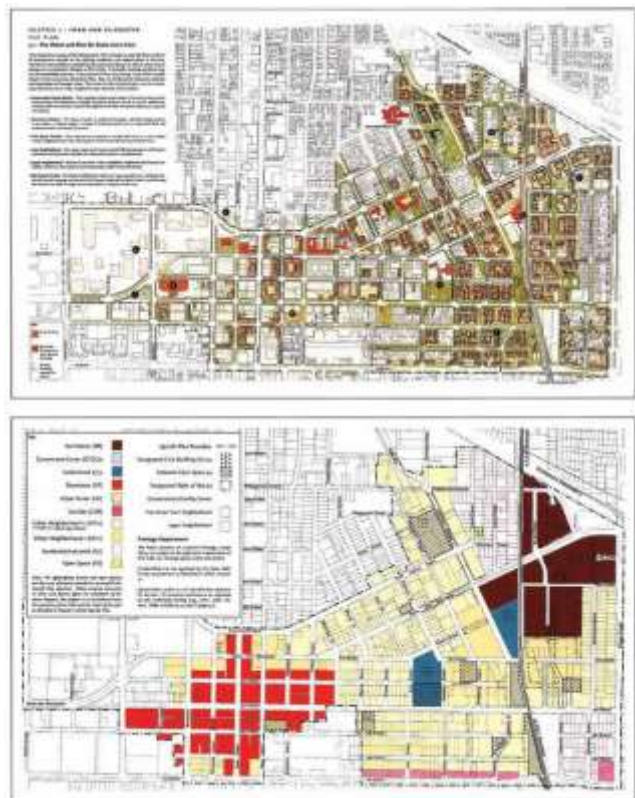


Fig. C2 Santa Ana Downtown Renaissance Specific Plan Illustrative Plan (top) and Regulating Plan (bottom)

5.6. Guiding principles

The organizing principles act as guiding elements to define planning and implementation of FBC process. These principles are derived from the research and best practices of FBC around the world and contextualized for application in Indian cities. Once the city creates a vision for the chosen FBC project, it can pick and choose principles to be adopted which can help in realizing the vision and determine the design components.

Fig 9: Guiding principles and respective FBC codes

Coordinated Builtform	<ul style="list-style-type: none"> • Building form • Building placement • Setbacks • Building frontage & projections • FAR & density caps • Landuse and building use • Building placement & setbacks • Block standards
Complete streets	<ul style="list-style-type: none"> • Street networks and Linkages • Street typologies/hierarchy • Street elements & infrastructure • Livability on streets
Accessible Public spaces	<ul style="list-style-type: none"> • Hierarchy of public spaces • Function of public spaces • Accessibility to public spaces • Public space elements • Streets as public spaces • Vending
Effective Mobility Management	<ul style="list-style-type: none"> • On street and offstreet parking • Access to public transport • NMT safety and access
Contextual Landscape	<ul style="list-style-type: none"> • Vegetation • Landscape elements
Environmental and cultural inclusivity	<ul style="list-style-type: none"> • Built heritage • Natural heritage • Intangible components • Inclusivity

a. Coordinated built form

The principle addresses the important characteristics of the building and its correlation with the surroundings while giving an identity to the type of building and create a harmonious development in the area.

These codes typically focus on the types of buildings that maybe allowed in a context. It elaborates aspects like

- Building form
- Building placement
- Height and nature of built form



b. Complete streets

This principle essentially focuses on creating complete streets that are designed and operated to enable safe, attractive, and comfortable access and travel for all users and modes including pedestrians, bicyclists, IPT, motorists and public transport. The principle focuses on three critical aspects

- Identifying and developing streets as vibrant urban public spaces
- Defining and developing vending spaces
- Elaborates the way a building should meet and define the street with detailing of parameters like height, frontage type and build -to-line.



vehicles), or to redistribute this demand in space or in time. This could be achieved by

- Rationalizing the different transport modes and their routes
- Promotion of public transport, IPT (Intermediate Para Transit) and NMT (Non-motorized Transport)
- Managing off street parking (within the buildings) and on street parking

c. Accessible public spaces

The public spaces function as lung spaces which contribute to both environmental as well as socio-cultural benefits of the city. The principle promotes assessments to identify the ecological, cultural and recreational public spaces of the city that can be enhanced through conservation, density control, land use planning and public space design.

Contextually designed and located in the form of open spaces, parks and other civic spaces; these spaces help create livable neighborhoods. The principle focuses on three critical aspects

- Developing the civic spaces and open spaces of the city
- Identifying and developing streets as public spaces
- Defining and developing vending spaces



d. Effective Mobility management

Mobility demand management is a process of creating strategies to reduce travel demand (specifically that of single-occupancy private



e. Contextual landscapes

Landscape functions as another critical component to an ecologically balanced and people friendly environment in the FBC area. The FBC codes focus on both public spaces i.e. streets as well as the private set back spaces of the properties. It is important to guide the landscape character and type in the private property as it affects the street edges.



f. Environmental and cultural inclusivity

The cultural landscapes reflect the elements of heritage/environmental/ social cultural importance of the past and the need to

preserve and incorporate them as a part of FBC areas. Embedded in the principle is the concern for unique cultural and societal iconography of regions and their importance. Their incorporation into the spatial order of urban settings is promoted.

The cultural landscapes are categorized into two categories

Tangible components - measurable components of heritage and environment

Intangible component - Non-measurable socio-cultural components.



5.7. FBC Codes

The codes play a key role in determining the outcome on ground. The codes are derived from respective guiding principles and address the application of standards on ground.

Note that all the images provided are indicative of the respective code. The cities however, are supposed develop code based on the local context.

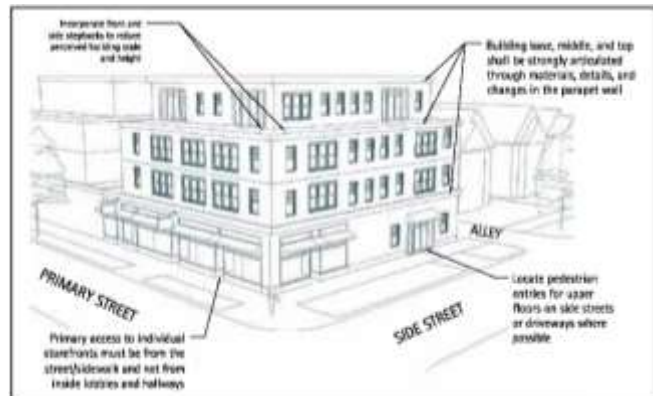
A list of FBC codes derived from their principles are as follows.

a. Built form codes

The building standards are necessary to create desired built form to address the street interface to create a healthy and vital public realm through good Urban Design. The guidelines help define basic parameters governing building construction, including the building envelope and certain required/

permitted elements, such as balconies, stoops and street walls.

Fig 10: FBC coded building and its characteristics



Mixed use building on a corner plot

The component of built form for area as follows

i. Building form

The building form standards play an important role in establishing the character of the FBC area. Functioning as the 'walls' of the street, the building facades are regulated for height to ensure appropriate proportion in relation to street width.

Regulate buildings of varying heights and proportions to ensure that they are developed based on the desired vision and help achieve a rich urban form through harmonious development.

ii. Building Placement

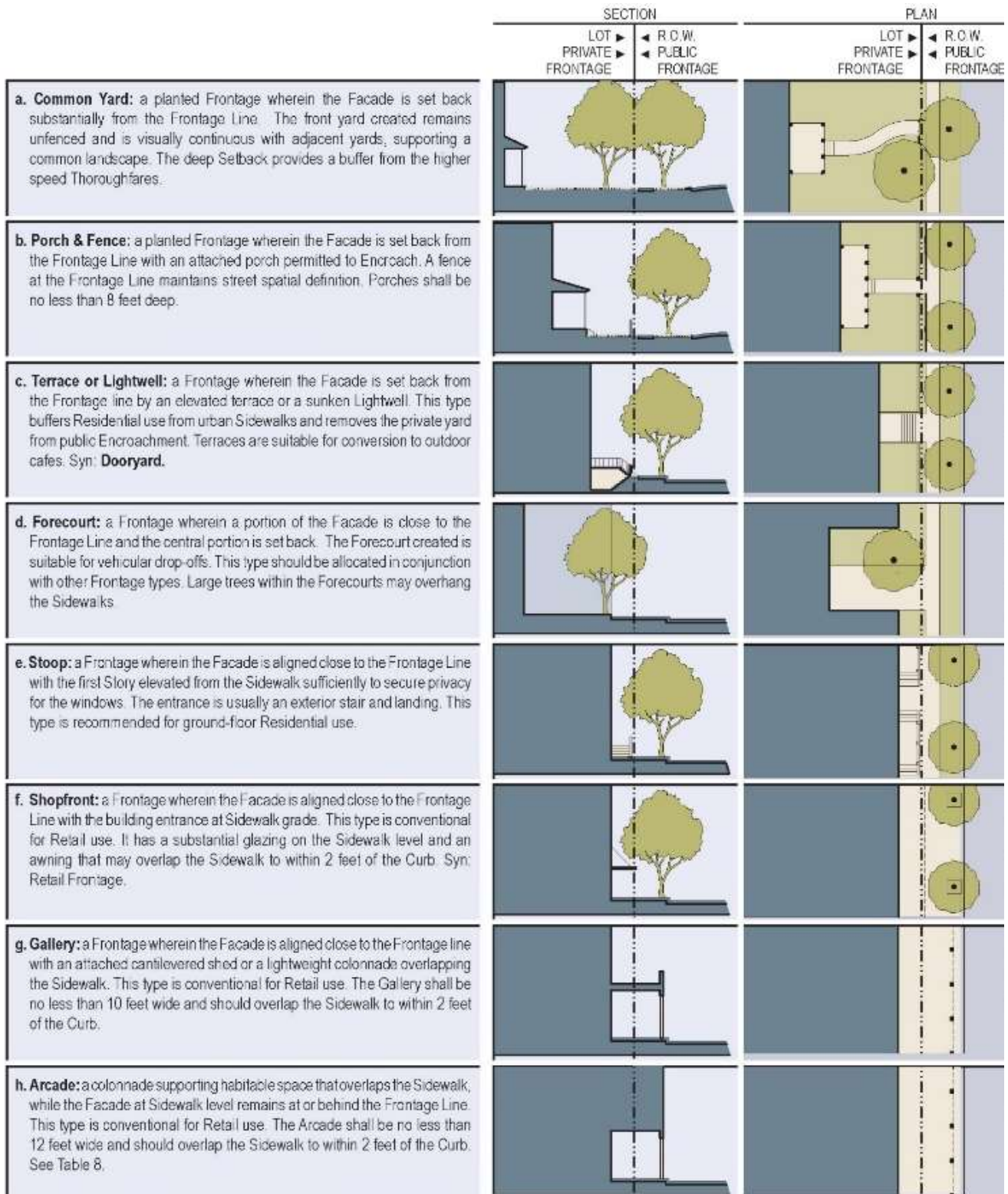
These are standards which regulate the placement of buildings (particularly the front edge of the building) in reference to the street edge. The placement of these buildings provides a foundation to preserve or establish the character of the FBC zone. Provide regulations for building placement standards which include the build-to line, setback, and widths of lots etc.

greater than 2/3 of the floor area footprint shall be counted as full stories. Basements up to a 1.2m height above average ground level shall not be counted as a storey.

can use a step back method to achieve the desired visual appeal.

Since the Form Based Codes are developed with a vision of creating a human centric development, the building heights to be proposed so as to maintain human scale (upto 4 storeys), and buildings higher than 4-5 floors

Fig 14: Building to street relationship



vii. Block Standards

To address larger project sites (typically larger than two acres) and encourage the creation of walkable neighborhoods, form-based codes may include block and subdivision standards to guide the division of large development sites into an interconnected network of new streets that follow the code's public space standards and smaller blocks that meet the code's standards for maximum block perimeter and length.

The following guidelines to be considered to define the intervention at block level

- Size of the block
- Public spaces and other existing constants of the site
- Main spines roads of the blocks
- Secondary streets and thoroughfares
- Plot sizes
- Build for typologies

Fig 15: Block design and components

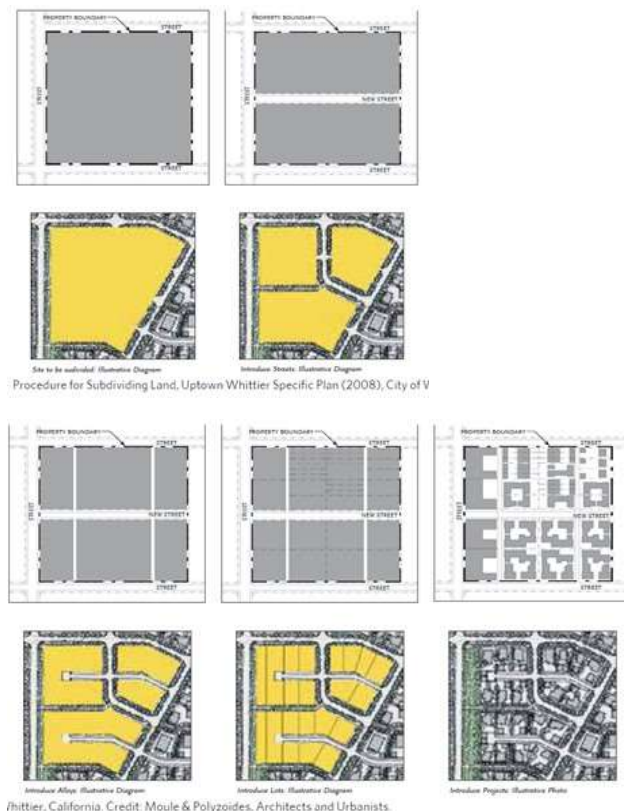


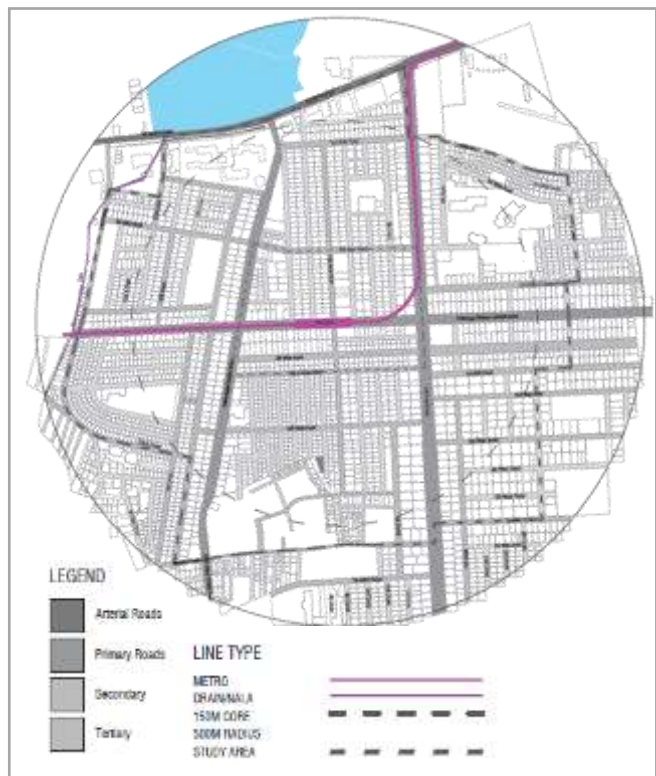
Fig: A demonstrative process of defining block and its components Source:

b. Complete Streets

i. Street networks and linkages

The first step is to understand and establish the linkage of important streets and spines in relation to surrounding areas and other parts of the city. This helps avoid a piecemeal approach and establish the smooth vehicular and mass transit flow and hence create enhanced pedestrian provision in the area.

Fig 16: Street hierarchy around Indiranagar metro station



Source: Towards a Walkable and Sustainable bengaluru, An accessibility project for indiranagar metro station report, EMBARQ India

ii. Street typologies

Street typologies to be determined based on the width, intensity of use and the nature of activities.

iii. Street elements

This includes all the surface elements and amenities to create a livable street. E.g. – benches, light poles, dustbins, water fountains, landscaping etc.

iv. Street infrastructure

This includes the surface and sub surface civil works required to create a universally accessible street. This includes creation of footpaths, ramps, crossings etc.

c. Accessible Public Spaces

This essentially includes open spaces or public areas which exist at different scales (city, neighborhood and street scale) and are accessible to all. This may include parks, playgrounds, squares, plazas, neighborhood parks etc. The streets on the other hand are also considered as linear public spaces of the city.

The guidelines to be established to regulate public spaces and this typically includes

- Restoration of existing public spaces.
- Identifying locations and function of new public spaces based on the FBC zones.
- Parameters for placement of public spaces.
- The amount of land area required for respective public spaces.
- Elements of the space (furniture, landscaping, planning).
- The nature of use the space is intended to facilitate and
- The appearance and design of the public space.

The section includes standards on

- i. Hierarchy of public spaces**
- ii. Function of public spaces**
- iii. Accessibility to public spaces**
- iv. Public space elements**
- v. Streets as public spaces**
- vi. Vending**

Refer Fig 17 for public space typology

d. Effective Mobility Management

The parking standards are derived from the conventional zoning regulations and are established according to the building use and activities designated for the FBC area. Surface parking damage the physically quality of the public realm on streets and the unplanned parking obstructs the movement of pedestrians. In response, FBC aims to reduce this negative impact by locating the parking in the rear side or in the center by pushing the built form to the edge (which also creates an active edge).

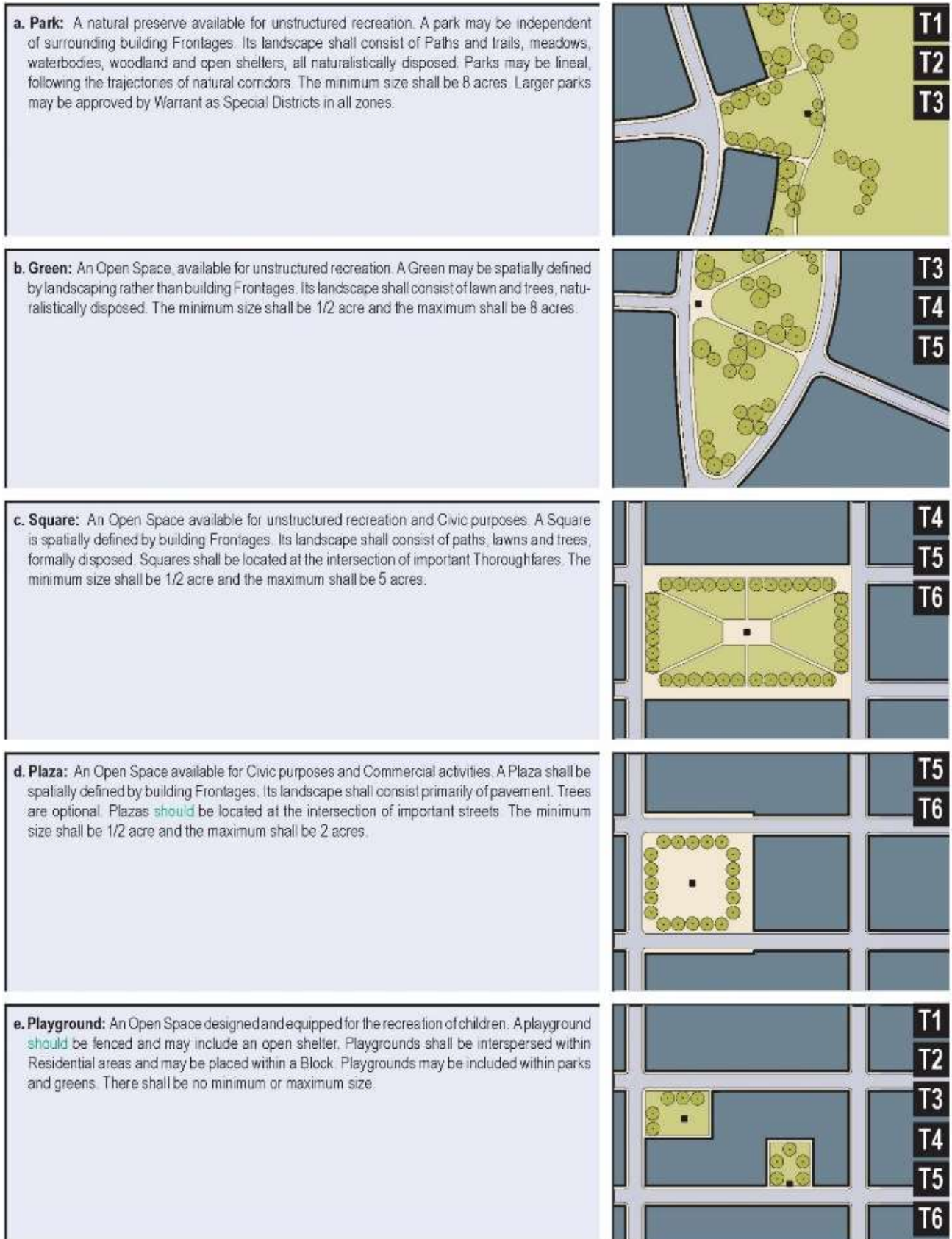
The parking standards are defined at two levels i.e. on street and off-street parking and the amount and type of parking is determined based on the density and use of the built form.

The amount of on street and off street to be calculated based on the city's zonal regulations and adapt the FBC codes based on the extent of parking required. The off street or the building level parking is defined within the private property while the on-street parking is designated as a part of street design guidelines. In addition to the number of parking spaces to be allotted, the typical off-street parking standards include, Area for parking, desired setbacks, size of parking spaces and adjoining landscape.

The section includes standards on

- i. On street parking**
- ii. Off street parking**
- iii. Access to public transport**
- iv. NMT design and infrastructure**

Fig 17: Public space typology



e. Contextual landscapes

The landscaping can be categorized into two. The landscape plays a very important role in creating a sustainable and environment friendly FBC codes for the chosen area. The key to achieve an effective landscape for the project is by using native species of vegetation as a part of the project.

The landscaping for a project can vary all the way from a single tree to a huge green space for a city. The strategies and solutions must be developed based on careful understanding of these scales.

The landscaping can be categorized into two components based on the nature of intervention.

i. Vegetation

It is recommended to identify the native species in the given region for planting both along the streets to shade the foot paths and also in private properties to control the porosity of built form



ii. Landscape elements

This consists of all the which complement and help shape the landscaping in a functional and aesthetic manner.

Some of the landscape elements include

- Tree guards
- Benches
- Bollards
- Lighting etc.

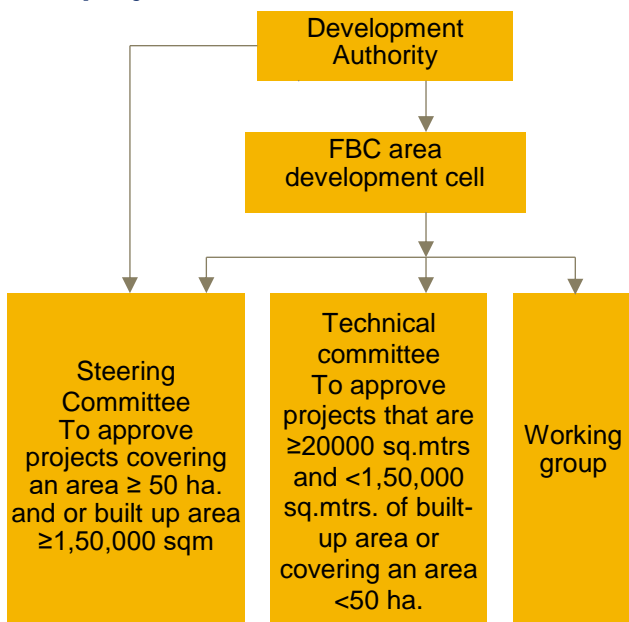
6. IMPLEMENTATION

6.1. Administration

For successful implementation of FBC, a dynamic intuitional setup is required. This section details out the proposed institutional set up long with roles and responsibilities and approval timelines.

a. Institutional setup

Fig 18: Institutional setup for approving FBC projects.



b. Roles, responsibilities and approval timelines

The development Authority shall oversee the development and implementation of the FBC Zone Plans.

The Development Authority shall:

- Establish a FBC area Development Cell for all FBC projects.
- Shall appoint the Head of Department for the constituted cell who shall be an Additional Commissioner Level personnel and Shall appoint a Director for the Department.

- Shall constitute a Steering Committee and a Technical Committee as part of the Special area development cell.

FBC area development Cell:

- Shall create Ring –fenced fund for FBC zones, earmarked special areas and managing the disbursement.
- Shall formulate the Working groups.
- Shall be responsible for conducting stakeholder and citizen consultations.
- Shall adopt one window clearance including all types of clearances
- No separate environmental clearance or pollution control board clearance will be required and shall be facilitated through an MoU between the Development Authority and Concerned Environment Clearance Authority.
- Shall create the online portal for uploading all necessary formats, regulations circulars etc. that can be refereed by the stakeholders at any given time.
- Shall accept the submission online based on the given formats and shall update the project details along with the status regularly that can be refereed by the stakeholders at any given time.

The Steering Committee:

- The steering committee meets once every month for assessing and approving scheduled projects.
- Shall be responsible for clarifying or cross check any query that arise during the assessment of projects from the working group.
- Shall call the proposal submitting entity within 15 working days for any required clarifications. Post this timeline, the submission shall be considered complete in all respect.
- Shall ensure the approval is issued within 60 working days from the date of submission of the proposal to the Special area development cell.

The Technical Committee:

- Shall be Chaired by the FBC area Development Cell head
- It shall have representation from Development Authority, Public works departments, Municipal Authority, fire department, State or center Environment department, pollution control board, Transport department, NHAI (if applicable), Flood and irrigation department, and Traffic police.
- Shall meet every week for assessing and approving the scheduled projects.
- Shall be responsible for clarifying or cross check any query that arise during the assessment of projects from the working group.
- Shall call the proposal submitting entity within 15 working days for any required clarifications. Post this timeline, the submission shall be considered complete in all respect.
- Shall ensure the approval is issued within 60 working days from the date of submission of the proposal to the FBC area development cell.

The Working Group:

- Shall be chaired by the Director of the FBC area development Cell.
- Shall be responsible for assisting FBC area development cell in conducting stakeholder consultations.
- It shall have representation from Ward Councilors and citizen representatives on invitation basis depending on the nature of the project.
- If any FBC Zone has two or more than two ward areas, then the constituted working groups shall have representation from Ward councilors and citizen representatives of all the wards that are part of the FBC Zone.
- The Ward councilors and citizen representatives shall be invited only for the working group meetings and not for

Technical committee meetings or Steering Committee meetings.

- Representation from Public works departments, Municipal Authority, fire department, State or center Environment department, pollution control board, Transport department, Flood and irrigation department, and Traffic police shall be on invitation basis.
- Working group can outsource preparation of plans through consultant appointment by following process as established by the development Authority.

6.2. Action Plan

i. Plan of action - Strategize phases of implementation

The implementation of Urban design and planning projects includes large funding and longer timelines. The implementation process hence needs to be phased to achieve outcomes at desired intervals. This also helps manage the funds and the staff time better, in turn help achieve impacts on ground. Each phase can be given part approval by the concerned Authorities and can also be given part completion depending on the nature of the project.

ii. Institutional Coordination

For successful implementation of FBC, institutional coordination is critical. The table below broadly list out the *(Reference to the table in the next page)*

iii. Timeline and approval process

This is covered in above sections. However, details for approval processes based on Public agency project, private agency project and PPP project may be detailed out in addition to what is detailed above.

iv. Prerequisites for FBC proposal submission

The consultant and the concerned implementation team need to abide to a set of requirements to fulfill the approval process of FBC project

Project stages	Tasks	Nodal/ Anchor Authority	Support Authority	Execution Authority
Administration	<ul style="list-style-type: none"> Developing a Special team for FBC management and approval process which involves representatives from all the departments (water supply, urban development, fire, electricity etc.) 	Urban development authority	All the concerned depts	Urban development authority
Review and Assess	<u>Mapping</u> <ul style="list-style-type: none"> Map land uses and key developments Identify priority transit demand corridors. Identify activity generators Map transit alignment and station locations 	Development Authority and FBC committee	Municipal Corporation	Development Authority + FBC team
	<u>Delineation and notification of FBC Zones</u> <ul style="list-style-type: none"> Delineate and notify FBC zone for implementation Creation of centralized data base of FBC Zones 	Special area development cell	Development Authority, FBC committee	FBC working group
	<u>Evaluate Existing conditions</u> <ul style="list-style-type: none"> Review of Planning documents followed by existing conditions baseline assessment. Identify activity generators. Develop FBC area typologies considering existing carrying capacities and existing development scenario. 	Special area development cell	<ul style="list-style-type: none"> Municipal Corporations Ward counsellors Fire Department Traffic Department Public works Department (Road, water Supply, Public Buildings, Sewage and storm water drainage and Horticulture) Irrigation Department Disaster Management Department Environmental Department 	FBC working group
Plan and Design	<u>Undertake Analysis of FBC Zones</u> <ul style="list-style-type: none"> Carrying Capacity Analysis and potential for upgradation. Undertake audit for way findings, usable public spaces. Urban form analysis (permissible, existing and proposed). Conduct SWOT (Strength, Weakness, Opportunity and threat) Analysis matrix to determine development context. Identify goals, targets and development opportunities. 			
	<u>Develop regulating Plans for FBC Zones</u> <ul style="list-style-type: none"> Developing vision for the FBC zone through public consultation. Adopting guiding principles Developing regulating plan 	Development Authority and FBC committee	<ul style="list-style-type: none"> Municipal Corporations Ward counsellors Fire Department Traffic Department Public works Department (Road, water Supply, Public Buildings, Sewage and 	Special area development cell

	<ul style="list-style-type: none"> • Undertaking Public consultation and incorporating the inputs in regulating plan • Finalizing regulation Plan • Identify a pilot/demonstration project • Identify a phasing and implementation strategy including catalyst projects 		<ul style="list-style-type: none"> • storm water drainage and Horticulture) • Irrigation Department • Disaster Management Department • Environmental Department 	
Implement	<ul style="list-style-type: none"> • Formulate a phasing strategy for implementing the regulating plan • Define clear roles and responsibilities of each involved stakeholder • Establish statutory relevance • Develop a community engagement strategy and outreach. 	Special area development cell	<ul style="list-style-type: none"> • Development Authority, FBC committee • FBC working group 	Developer entity
Funding/ Financing	<ul style="list-style-type: none"> • Creating ring-fenced fund for FBC area • Central government shall allocate fund to create initial corpus for FBC zones • Managing of funds and Distribution of funds to all stakeholders. • Fund allocation for FBC areas 	Special area development cell	<ul style="list-style-type: none"> • Finance Department of Development Authority. • Municipal Authority 	Special area development cell
	<ul style="list-style-type: none"> • Revenue generation / Value Capture/ collection based on spatial property map of all properties in FBC zones through applicable value capture mechanisms. • The generated revenue shall be used for development/ expansion/ upgradation of horizontal infrastructure in FBC Zones that includes, roads, water supply networks, sewerage networks, storm water drainage network, Solid waste management, Public spaces, water bodies etc. within the FBC Zones. • There shall be sharing of revenue between authorities based on development and service augmentation needed for the horizontal infrastructure. 	Special area development cell	Finance Dept. of Development Authority	Municipal Corporation
	<ul style="list-style-type: none"> • Identifying other potential funding mechanisms through PPP models, Land value capture mechanism etc 	Special area development cell	Finance Dept. of Development Authority	Municipal Corporation

6.3. Financing FBC

channeling and governance structures are in sync.

a. FBC financing frame work

The successful implementation of FBC requires significant public and private sector investments. With growing interest in India for adopting FBC to solve issues in existing and newly emerging urban areas, it is important to understand that its implementation requires bottom up approach for envisioning the desired development outcome. It will also require cross-disciplinary integration and partnering at various tiers of the Government, its departments along with involved community.

The project proponents must identify all the components that require financing, the best model that could finance them, the role of all stakeholders in the financing process and most importantly, the possible changes to the finance model if the project deviates from what was originally planned. The financials of the project must be scrutinized for being realistic and whether the project is feasible. A “business model framework” to support building capacity around the key elements of FBC investments and facilitating dialogue between key strategic actors on the options available, current gaps, and potential strategies for developing bankable business models for FBC investments need to be explored.

b. Potential funding and financing tools (Private and public)

Between the local, state and Central governments, transit agencies, business community, philanthropy leaders, community and community-based organizations, developers and financial institutions that provide resources and support to the FBC process, the amount of capital available for development is huge but it needs to be properly channelized. Hence, finance mechanisms such as land value capture should be explored and incorporated during the planning process so that it can be successfully used to facilitate FBC implementation in the country. Further the roles and responsibilities of the stakeholders should be structured so that the fund

7. Chapter 8 - MONITOR AND EVALUATE

As per business as usual, post implementation management is neglected. But it is an essential step to keep the violations at bay and ensure better management.

7.1. Establish a review committee

The FBC committee established during the project inception can continue to function as a review committee. This is useful since the team is equipped with the technical knowledge of the project and has been through the entire process from planning till implementation. This can also help to benchmark the project indicators and constants to track the change.

7.2. Feedback and evaluation

This is done through evaluation process by reviewing pre and post implementation of the project. This is done through bench marking of the indicators and measuring them at every stage. This also helps measure the KPI (Key Performance indicators) which can lead to sustainable development of the area.

This also helps to take next steps for the project growth and development.

7.3. Evolve the implementation strategies

Once the city evaluates the feedback for the project through data collected, the development authority and the corporation can take a decision on revisions to be carried out for future projects.

8. SCALING OF FBC

The implementation of any FBC project (of any urban project) is not the end but a precedent for the future projects. Each FBC project designed and implemented in the city is much more beyond a physical entity, it triggers the potential and sets a path for growth of the city and help define a pattern of growth for the city.

Hence documenting the learnings of the project helps to evolve the strategies of development especially for the future projects.

Each city during and post implementation of the FBC projects, can establish a methodology for the entire process. This will act as a reference to other projects in future.

As much as it is important to document a methodology of the implemented projects for future reference, it is important to understand that varying context and geography of the place shapes the true potential of the projects.

Hence the methodology developed can be shaped based on two components

- Generic principles – Looks at principles which could be adopted to most of the scenarios
- Specific principles – These are shaped based on the context and can vary due to the shift.

Appendix

To be added

Bibliography

To be added

The first part of the document discusses the importance of maintaining accurate records in a business setting. It highlights how proper record-keeping can help in decision-making, legal compliance, and financial management. The text emphasizes that records should be organized, up-to-date, and easily accessible to relevant personnel.

Next, the document addresses the challenges of data management in the digital age. It notes that while digital storage offers convenience and scalability, it also introduces risks such as data loss, security breaches, and information overload. The author suggests implementing robust backup strategies, access controls, and regular data audits to mitigate these risks.

The third section focuses on the role of technology in streamlining record-keeping processes. It mentions the use of cloud-based storage solutions, document management systems, and automation tools to reduce manual errors and improve efficiency. The text also touches upon the importance of training employees to effectively use these technologies.

Finally, the document concludes by reinforcing the idea that records are not just administrative burdens but valuable assets. It encourages businesses to view record-keeping as a strategic activity that supports long-term growth and operational excellence.