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PRACTICE NOTE

Synergizing Land Value Capture and Transit-Oriented Development:

A Study of Bengaluru Metro

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LIST OF ABBREVIATIONS

1.	ADB	Asian Development Bank
2.	AERA	Airports Economic Regulatory Authority of India
3.	AfD	Agence Française de Développement
4.	BBMP	Bruhat Bengaluru Mahanagara Palike
5.	BDA	Bengaluru Development Authority
6.	BIAL	Bengaluru International Airport Limited
7.	BMRL	Bengaluru Metro Rail Corporation Limited
8.	BRT	Bus Rapid Transit
9.	BWSSB	Bengaluru Water Supply and Sewerage Board
10.	CBD	Central Business District
11.	CMP	Comprehensive Mobility Plan
12.	CRS	Commuter Rail System
13.	DCR	Development Control Regulations
14.	DPR	Detailed Project Report
15.	DULT	Directorate of Urban Land Transport
16.	EIB	European Investment Bank
17.	FAR	Floor Area Ratio
18.	GM	General Manager
19.	GoI	Government of India
20.	GoK	Government of Karnataka
21.	HUDCO	Housing and Urban Development Corporation
22.	iDECK	Infrastructure Development Corporation Karnataka
23.	JICA	Japan International Cooperation Agency
24.	KTCP Act	Karnataka Town and Country Planning Act

25.	KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
26.	LPS	Land Pooling System
45.	LVC	Land Value Capture
46.	MRT	Metro Rail Transit
48.	MoHUA	Ministry of Housing and Urban Affairs
49.	MoUD	Ministry of Urban Development
50.	MRP	Metro Rail Policy
51.	MRTS	Mass Rapid Transit System
52.	NMT	Non-motorized Transport
54.	NUTP	National Urban Transport Policy
55.	ORR	Outer Ring Road
56.	PPP	Public-Private Partnership
58.	R+P	Rail + Property Development
59.	RMP	Revised Master Plan
67.	TDR	Transfer of Development Rights
68.	TIF	Tax Increment Financing
69.	TOD	Transit-Oriented Development
71.	TriMet	Tri-County Metropolitan Transportation District of Oregon
72.	UDD	Urban Development Department
76.	UMTA	Unified Metropolitan Transport Authority
77.	UTF	Urban Transport Fund
78.	VCF	Value Capture Financing
79.	VGF	Viability Gap Funding
80.	ZR	Zoning Regulations

HIGHLIGHTS

- The Government of Karnataka (GoK) and Bengaluru Metro Rail Corporation Limited (BMRCL) are exploring ways to offset the heavy economic burden of expanding the metro rail transit (MRT) network. Land value capture (LVC) is a public financing strategy that can recover a portion of the real estate value that development along the metro corridor generates for private landowners. Deployed effectively, LVC can help fund the growth of mass transit and allied infrastructure.
- Cities have a wide range of value capture mechanisms available to them. In the case of Bengaluru, inherent shortcomings in planning, policy, and institutional frameworks prevent the market from optimizing the benefits of transit-oriented development (TOD). This negatively impacts LVC and limits its potential.
- Two fee-based LVC mechanisms—Betterment Levy, a one-time upfront charge on the land value gain generated by public infrastructure investment, and Premium Floor Area Ratio (FAR), a one-time fee for relaxation of rules for FAR—are being considered by BMRCL, but are yet to be implemented. Two additional development-based LVC mechanisms—leasehold and joint development—are currently restricted to BMRCL's own properties.
- We recommend policy reorientation to synergize TOD and LVC so that the link between value capture and value creation can be strengthened, which will also lead to stakeholder buy-in. LVC is best optimized when it is linked with visible local area improvements that benefit the community. This will require BMRCL to play a leadership role in coordinating projects with other public sector agencies as well as with private developers and communities to advance integrated development along transit corridors.

EXECUTIVE SUMMARY

BACKGROUND

As of October 2020, India has 678 kilometers (km) of operational metro lines and another 457 km of approved routes. A further 462 km of lines are under construction (The Metro Rail Guy n.d.). Indian cities are veering toward building metro rail transit (MRT) systems to improve mobility and encourage compact growth. The downside is the heavy cost that creating city-scale infrastructure exacts on public coffers. Local and subnational governments are now exploring innovative financing or value capture mechanisms along with government grants and market finance as a supplementary source of funding. These mechanisms, when used effectively, can support the sustained growth and maintenance of the MRT as well as improvements in allied areas. Properties benefit from the increase in value due to proximity to the MRT, and land-based value capture (LVC) mechanisms help governments gain a revenue share from the property owners. Revenue from value capture offsets a portion of the costs and complements government grants and market borrowings. It has therefore become increasingly important to, first, explore the potential for harnessing value capture mechanisms to contribute to public revenue and, second, document instances where this has been successfully accomplished.

The Bengaluru Metro gave us an opportunity to capture substantive insights into the impact of MRT on real estate development along the metro transit corridor. Though the Bengaluru MRT has reported operational profits, the repayment of their domestic and international loans could take up to four decades. BMRCL is working on a TOD policy and has explored several LVC mechanisms to reduce the loan burden and bolster local contributions. Through this analysis, we have worked to better understand some typical challenges and opportunities for value capture in ways that benefit both the TOD communities and the government.

LVC AND TOD: THE SYNERGISTIC LINK

In this practice note, it is our aim to, first, evaluate and assess the potential for TOD and LVC to evolve in tandem with specific reference to the Bengaluru MRT and, second, posit strategies and recommendations to reorient policies in Bengaluru to leverage TOD as an opportunity for LVC, and vice versa.

We focused on the following areas:

- How building metro stations leads to real estate development and value creation in the vicinity of the metro corridor
- How TOD policies around metro stations can support LVC
- How LVC and TOD can support each other to enable metro infrastructure development

We present this as a preliminary analysis based on a report we prepared for the Asian Development Bank (ADB) in 2019 to evaluate value capture potential along Bengaluru's metro rail Phases 1 and 2. We illustrate our learnings through case studies of two metro stations: Indiranagar, an inner-city neighborhood, and Thalagattapura, an upcoming area in the periphery of the city. We selected these stations for our analysis as each offers a typical example in its category. We hope that this practice note will provide essential information to planners and decision-makers (particularly those engaged with Bengaluru's metro rail development) and aid them in developing a policy environment for better LVC through TOD.

OPPORTUNITIES TO OPTIMIZE LVC

The increased accessibility the metro provides has created a positive impact on real estate and business opportunities around metro stations. In our study of the Indiranagar and Thalagattapura metro stations, we observed that enhanced connectivity resulted in some inner-city areas evolving into commercial zones and stations on the periphery of the city, were emerging as lucrative markets for housing. This growth

signals a major potential for future development and opportunities for LVC in the form of tools, processes, and institutional frameworks. In that regard, this would be the right time to implement some of the institutional frameworks that the government has been contemplating but has not yet constituted, in particular, a fiscally empowered integrated regional transport authority for the city that can help coordinate land-use transport integration and finance TOD. Appropriate regulations and incentives through the city's master plan for plot amalgamation and revitalization of TOD areas can encourage real estate investments, thereby increasing the potential for LVC. Moreover, mechanisms such as ring-fenced financing and community participation can help the government reinvest at least part of the revenue earned from LVC for local area improvements in a transparent manner. The ability of the transit agency to raise and invest revenue can help it engage in public-private partnership (PPP) projects, which is good for the development-based LVC mechanisms being piloted in the city.

HURDLES TO IMPLEMENTING LVC

Several LVC mechanisms are under consideration by BMRCL, but are yet to be implemented. There are multiple factors responsible for this lag:

■ Spatial considerations

Existing planning and regulatory provisions have not helped the market adhere to TOD objectives, leading to a suboptimal outcome for LVC. The difference in the urban fabric of the inner-city areas vis-à-vis the peripheral areas of the city poses an obstacle to both TOD and LVC. The inner-city areas are harder to redevelop due to traditionally smaller land parcels and fragmented ownership. The small sizes of existing plots mean that new construction projects are unable to take advantage of the maximum FAR, as they are curtailed by zoning regulations such as setbacks and ground coverage. Plot amalgamations are not incentivized, and this hinders the potential for LVC, which is levied on the basis of the floor area of developments. Developers are unable to

leverage the TOD incentives provided in the form of additional buildable area rights by the government. Additional buildable rights are provided in a limited area of only 150 m around stations, which further limits the potential and opportunity for implementing LVC. In the case of outlying areas on the periphery of the city, where clubbing plots is more feasible, it is the lack of infrastructure and services that deters real estate investments.

■ Policy- and governance-related considerations

The city does not have an institutional structure to enable coordination between the various public agencies tasked with service delivery. Bengaluru city's master plans and its transit projects are prioritized by different agencies. The absence of a nodal body working with a composite picture results in dispersed decision-making. Each public agency acts on a narrow area of responsibility, which leads to conflicts that hamper systematic and planned development. As a consequence, many TOD areas remain untapped for development by the government. Regulations and plans do not adequately respond to local problems such as small plot sizes and multiple ownership of land parcels. This prevents landowners and developers from achieving the desirable goals of TOD. Residents along the metro corridor need to see local improvements that can enhance the public realm. The government is missing out on the opportunity of gaining the approval and confidence of citizens through its delay in undertaking such improvements. As a result, residents lack confidence in public-welfare-focused and proactive governance, and this results directly in public resistance to the fee-based LVC mechanisms proposed by BMRCL.

RECOMMENDATIONS FOR SCALING UP LVC AND TOD

Appropriate regulations and incentives through the city master plan for plot amalgamation and revitalization of TOD areas can encourage real estate investments, thereby increasing the potential for LVC. If BMRCL is

able to raise and invest revenue earned through LVC, it can redirect its efforts toward forging PPPs. PPP projects can drive the development-based LVC mechanisms being piloted in the city. Our recommendations, based upon our analysis, are as follows:

- **Revamping the regulatory framework and establishing tools, processes, and institutional frameworks:** The government is in the process of considering new institutional frameworks. Implementing and empowering these would boost TOD as well as the uptake of LVC. The Unified Metropolitan Transport Authority (UMTA) can help coordinate land-use transport integration for the city. The Urban Transport Fund (UTF) can drive fund generation and finance for TOD. Mechanisms such as ring-fenced financing and community participation can help the government reinvest at least part of the revenue earned from LVC for local area improvements in a transparent manner, thereby securing public buy-in for TOD and LVC.
- **Policy reorientations:** Our two case studies of Indiranagar and Thalagattapura metro stations demonstrate that the city government will benefit by shifting from siloed planning of land use and infrastructure to integrated urban planning that synchronizes projects to deliver development in TOD zones. The most effective strategy for the government would be a hands-on approach to development in the city in collaboration with developers and the community rather than relying on regulating the market alone. Revenue from LVC needs to fund local area development rather than being exclusively utilized for financing the MRT infrastructure. The upcoming TOD Policy and Master Plan revision provide an opportunity for driving this coherence.
- **Strategizing for value capture and value creation:** The link between value capture and value creation can be strengthened by designating TOD areas as special zones in the city, which will encourage a compact-built form, especially around mass transit. This will ensure that government investment in area improvements leads to maximum impact. The government needs to

develop entrepreneurial capacities to help it learn and adapt with changes in real estate markets and shifts in opportunities. Quick wins, such as projects that advance the goals of TOD in collaboration with private stakeholders, can be good for building confidence within the government as well as for strengthening people's trust in the government's efficiency. This much-needed change in public perception and confidence would increase public willingness to pay for LVC.

- **Scaling up across the city:** Formulating policies with a long-term perspective would entail investing in the opportunities that exist today so that TOD and LVC become sustainable over a longer period of time. LVC when combined with other sources of funding can enable the government to take on more complex urban planning interventions. For instance, Town Planning and Land Readjustment Schemes can facilitate organized infrastructure penetration. The government also needs to set out common priorities and facilitate a shared vision among the public agencies that are jointly responsible for planning and implementing services within the TOD areas of Bengaluru. Finally, BMRCL—the city's metro transit agency—needs to be, first, empowered with a prominent role in planning and, second, equipped with financial capabilities for it to take a leadership position in implementing TOD and LVC along the metro corridor in Bengaluru.

1. INTRODUCTION

Metro rail transit (MRT) systems improve mobility and productivity, thus shaping property values and land uses in the areas immediately surrounding them (Ingvardson and Nielsen 2018). Transit-oriented development (TOD) combines mass transit with compact livable neighborhoods and creates a proven opportunity for implementing land value capture (LVC) in the Asian context (Abiad et al. 2019). The socioeconomic impact of a functioning transit station frequently leads to an appreciation in real estate rents and land values within its surrounding locality,

otherwise denoted as its “influence zone.” LVC mechanisms offer an opportunity for the government to levy taxes and fees as mechanisms to raise revenue from within the influence zones. This revenue can then be used to fund the city’s MRT and allied infrastructure. In addition, city governments in India are able to leverage public land and assets for LVC through leases and joint development (Suzuki et al. 2015). It is essential to link LVC revenues to improvement of communities through value creation. Without this approach, it is not feasible to build citizens’ trust or secure their willingness to pay for LVC. Our study explores the relationship between LVC and TOD along the Bengaluru Metro corridor. Our aim is to contribute to an emerging body of knowledge that establishes the synergistic link between TOD and LVC. We hope this will provide a useful reference for planners and decision-makers.

Globally, the successful implementation of LVC has required city governments to offer a mix of development incentives and infrastructure improvements, and to levy charges for granting special rights to developers within the TOD areas. Cities have had to modify planning and zoning codes as well as respond appropriately to local market demand in order to encourage high intensity of infill and redevelopment near mass transit stations. There is an in-built incentive for local governments to undertake these modifications and transformations as gains in land value add to municipal revenues. Portland (United States) is a notable case. The city strategically invests and offers incentives that foster PPPs to help overcome market barriers (Oregon Metro 2014). Over the two decades since its inception, the TOD program has invested over \$46 million cumulatively. As a result, the 41 TOD projects completed at the time of this writing have leveraged \$15.3 million of this investment to support development activities worth more than \$684 million (Oregon Metro 2018). Another case in point is Bogota, which has used LVC revenues to construct public roads, while Portland and Shenzhen have leveraged PPPs to improve public utilities for the purpose of accommodating development along mass transit. In the case of Shenzhen, the city opted for integration between rail transit and land-use plans to mitigate mismatch

of property development with market demand. Coordinating investment between the public sector, rail transit companies, and real estate developers has helped Shenzhen align development with the potential of value capture. In the Portland example, the city has planned for an increase in the share of multi-family housing and proposes to accommodate over 40 percent of newcomers to the housing ladder into densified and mixed-use areas. Dallas (United States) is an example of using Tax Increment Financing (TIF) to redirect pooled funds and trigger redevelopment in areas that particularly lagged in infrastructure within the TOD zone. Compact urban form along mass transit allows cities to become sustainable due to higher network efficiencies through greater built density, which reduces the costs of providing infrastructure and better access.

Empowering the transit agency is another important step in successful implementation. In the case of Portland, the metropolitan transit agency had the power to enact taxation and policy ordinances, and levy certain taxes (i.e., employer payroll tax, self-employment tax within its service area). The mass transit agency (Tri-County Metropolitan Transportation District of Oregon [TriMet]) is empowered to issue and sell bonds (TriMet n.d.). This arrangement allowed TriMet to implement value capture with minimal administrative barriers while making its financial decisions independently.

In the context of Bengaluru, this capital city of Karnataka state is home to over 10.45 million residents (UNDESA 2016). This places it among the largest urban agglomerations in India, with obvious civic problems. Bengaluru has been grappling with the challenges of managing mobility and is among the most traffic-congested cities in the country. Rapid urban expansion not only continues to make irreversible changes to its suburban landscape, but has required the city government to plan for extending public services to the peripheral areas of the city. As Bengaluru constructs its MRT, the cost of financing such large infrastructure projects has proved to be more of an economic burden than the city can afford, given its current revenues. It has become imperative for the city to look toward innovative public financing methods and strategies.

2. AIMS

For this practice note, we aimed to identify and assess the various challenges and opportunities for strengthening the link between LVC and TOD along the MRT corridors in Bengaluru as a cohesive strategy for revenue generation and development.

Our aims were as follows:

- To understand the role of MRT in bringing about real estate transformation in Bengaluru
- To assess the corresponding monetary benefits generated by proximity to metro stations along the MRT corridor
- To evaluate the efficacy of current regulations in supporting implementation of core TOD principles and to recommend approaches to overcome the gaps
- To identify the potential for synergistic TOD and LVC implementation and to analyze the challenges in realizing it

3. SCOPE AND LIMITATIONS

The scope of our practice note is to explore and assess what the government can do to create an enabling environment for BMRL to deploy and optimize LVC.

There are, however, several limitations to our assessment. For instance, there is an underlying assumption that the market forces will align. Although densification through construction of higher FARs can be nudged by the government through regulations and incentivizing plot amalgamation, there are other factors affecting construction, such as the costs involved, product types, and willingness of owners. There is also an assumption that these factors will be taken care of by the development

market and the array of financing options available to owners, developers, and buyers. This practice note does not assess these factors and issues.

In addition to an enabling environment, revenue from LVC depends on the tax or fee rates that have been determined. Although we do discuss the instruments being deployed, we do not delve into the accuracy of the estimated yields, nor do we examine the basis of how these rates have been estimated.

Our assessment touches upon six broad LVC mechanisms that are being explored by the government; however, we look closely at only two specific mechanisms: Premium Floor Area Ratio (FAR) and Betterment Levy. For the purpose of this assessment, we do not speculate on the probabilities of when and to what extent these LVC mechanisms will be operationalized, nor do we discuss the challenges to or probability of any of the other tools being implemented.

Finally, the success of LVC would depend on the value perceived by citizens, and we acknowledge public opposition to the implementation of LVC. Although discussing a potential range of equity impacts such as the affordability of housing and the effects of gentrification is very important, such a discussion is not the focus of this practice note.

4. METHODOLOGY

We used a combination of spatial, qualitative, and statistical methods in our analysis. We collected primary data from surveys of residential property prices across the city between 2009 and 2018. We obtained detailed real estate data on property price appreciation in multi-dwelling units along Phases 1 and 2 metro stations in the city. Our team conducted a detailed assessment of the station areas that included physical mapping of development and land-use change around the stations and research into property value appreciation corresponding with the

timeline of the metro rail implementation. We then correlated the location of the projects and their price appreciation with reference to the individual metro stations along with their development timeline.

For our case studies, we evaluated change detection of built-up areas (validated by site visits) in two station neighborhoods: Indiranagar, an inner-city neighborhood, and Thalagattapura, an upcoming area in the periphery of the city. We supported this with insights from official sources such as government policies, notifications, Master Plans, regulatory frameworks, legislation, and peer-reviewed literature. The interviews we conducted with field experts include representation from stakeholders involved in development and service delivery along station areas. In addition, we referred to newspapers as well as unpublished sources to track the latest developments of Bengaluru Metro, the upcoming TOD policy, and the draft Revised Master Plan of the city for 2031.

5. POLICY LANDSCAPE AND PLANNING FRAMEWORK FOR VALUE CAPTURE

The approach of using value capture mechanisms to sustainably finance construction of MRT projects is nested in successful TOD. This is reflected in four key national policies that create the overarching landscape for planning, policy, and financing. The National Urban Transport Policy (NUTP) (MoUD 2006), National TOD policy (MoHUA 2017a), and Metro Rail Policy (MoHUA 2017b) deliberate on compact, dense, and connected urban form around mass transit and prescribe levying various taxes and fees that can add to infrastructure

finance (Suzuki et al. 2015). Building upon these, the Value Capture Finance policy (MoUD 2017) highlights several LVC methods that are typically either “area-based” or “project-based.” Area-based methods tap into the overall appreciation of real estate values of a locality due to transit infrastructure development. Project-based methods account for the appreciation of a parcel of land and building values in the area of influence of the project (see Box 1). The VCF policy also mentions that rail transit agencies can participate in various value capture mechanisms to help meet financing goals.

Through BMRCL, the Government of Karnataka (GoK) is currently in the process of drafting a dedicated TOD policy for the Bengaluru metropolitan region that is based on the national policies. The legal backing for TOD in Bengaluru is provided by the city master plan, which remains the most powerful and comprehensive tool to influence development in the city. Locally known as the Revised Master Plan (RMP), it is revised every 10 years. In 2009, the term TOD was introduced with very limited scope through interim amendments in the master plan for 2015. Typically, in Bengaluru, such amendments are made through Government Orders. As a norm, permissible FARs in Bengaluru range from 1.5 to 3.25. This has changed, with the RMP 2015 encouraging built-up density within a 150 m radius of metro stations by allowing developers to build up to a maximum FAR of 4 for all permissible uses. Additional FARs are desirable for value capture as they encourage higher density around metro stations and add to ridership. They also permit real estate developers and landowners to take advantage of more revenue-earning space. Although the government has so far refrained from imposing any charges for the additional FAR, BMRCL has now proposed a range of fee-based LVC mechanisms.

The GoK has permitted BMRCL to capitalize some of its own properties through leasing and commercial development, but the agency has limited capacity for managing and scaling these functions. Thus far, the discussions between the government and BMRCL have been limited to their focus on financing the

Land Value Capture tools, as outlined in the Value Capture Finance Policy 2017 of India, can be understood through two broad branches: area based and project based.

Area based

- Land Value Tax
- Betterment Levy
- Development charges or Impact Fees
- Vacant Land Tax
- Tax Increment Financing (TIF)

Area and project based

- Transfer of Development Rights (TDRs)
- Fees for changing land use from agricultural to non-agricultural
- Premium on relaxation of rules or additional FAR
- Land Acquisition and Development
- Land Pooling System (LPS)

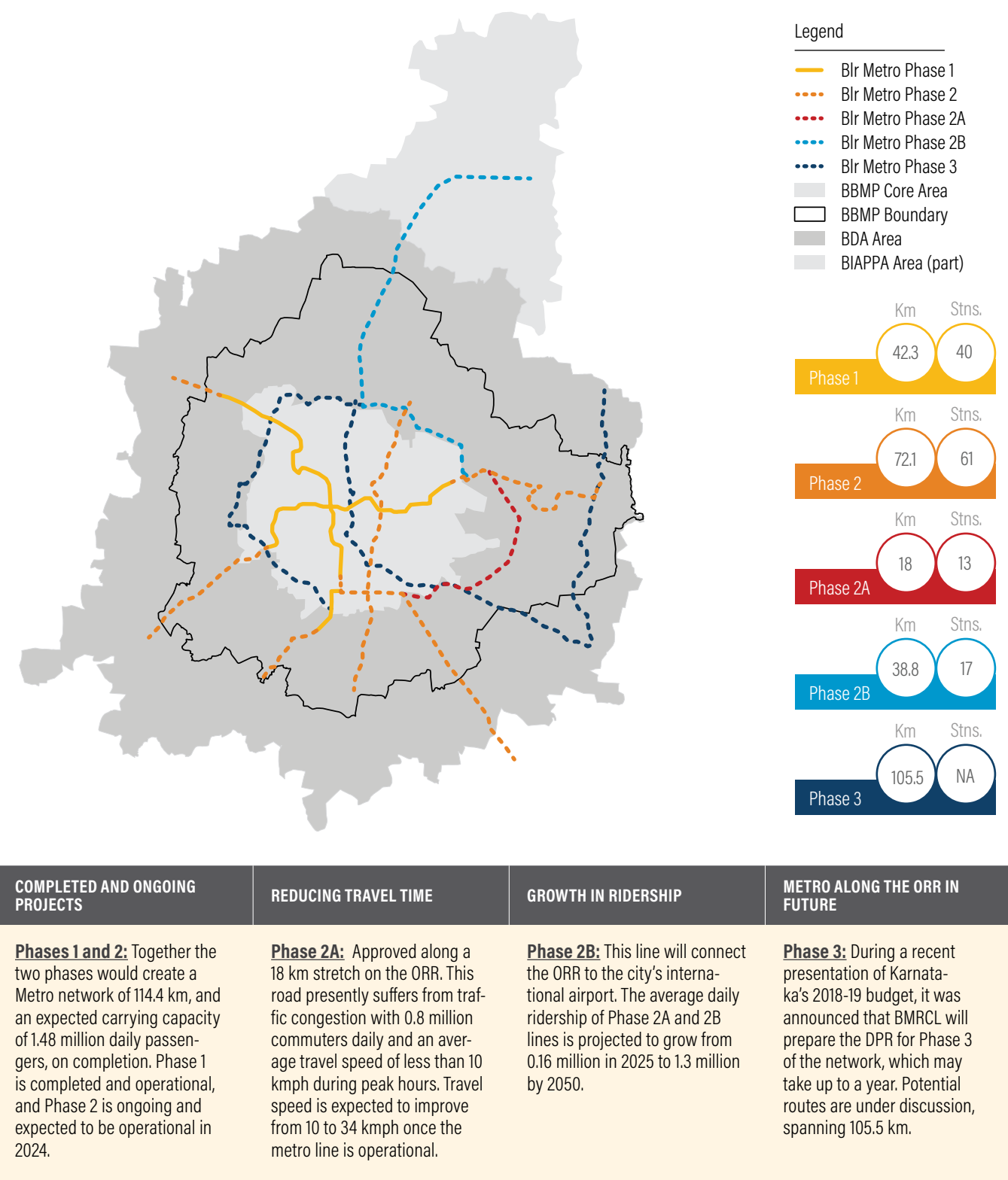
Source: MoUD 2017.

metro infrastructure through revenues earned. This narrow perspective falls short of making the link with the broader objectives of TOD that are highlighted in the national policies. This is not surprising, as the mandate of BMRCL is restricted to delivery of the MRT. The delivery of infrastructure and services such as roads, water supply, and bus transportation in the city falls under the authority of other agencies, which prepare their own separate plans and budgets. This is because Bengaluru has yet to establish a mechanism to coordinate between multiple service delivery

agencies in the city. The national policies, however, are indicative of a future direction as they deliberate upon establishing mechanisms such as a dedicated TOD fund and the Urban Transport Fund (UTF) to facilitate reinvestment of revenue from value capture into infrastructural improvement within TOD zones. For Bengaluru, using LVC to implement TOD would also necessitate substantial revenue generation. It will be important to secure willingness from private citizens to pay for LVC and equally important for BMRCL to take the initiative to scale up its efforts to collaborate with private developers and sponsors.

The performance of LVC mechanisms depends on the development intensity guided by urban planning and development in Bengaluru. At the project level, the zoning regulations and building bylaws of Bengaluru dictate construction. Narrow roads (less than 12 meters [m]) and small plot sizes (typically below 250 sq. m) are major barriers to achieving a high built-up density character in Bengaluru's traditional city core. The RMP 2015 had taken a step in the right direction by offering an incentive of 0.25–0.5 additional FAR for plots above 360 sq. m to ease amalgamation and reconstitution of properties. The draft RMP 2031 released for public consultation in 2017, however, focuses on development in the city's peripheries and has withdrawn the incentives for plot amalgamation and renewal that were allocated by the RMP 2015. Presently, the draft is under review. If brought to effect as is, the earlier encouraging FAR provisions along the TOD corridors would be limited to only those metro station areas located beyond the city's Outer Ring Road. This would curtail the opportunity to derive benefits from implementing LVC in the inner city.

Figure 1 | Bengaluru Metro Project Phases



Note: ORR = Outer Ring Road.
Source: BMRCL and DULT 2019.

6. FINANCING THE BENGALURU METRO

Bengaluru has an extensive transportation network. Until 2011, when the first leg of the metro became operational, most public transport services were delivered via the city's extensive bus system. The metro rail project in Bengaluru has been developed in three phases: Phase 1, which has been constructed; Phase 2, which is under construction; and Phase 3, which is proposed (see Figure 1). A total cost of INR

75,653 crores (10,341 million USD) is anticipated for operationalizing all three phases—which is about seven times (Poovanna 2020) the annual revenue of Bruhat Bengaluru Mahanagara Palike (BBMP), the municipal corporation. This section of our practice note lays out the financing arrangement of the project in detail, which includes estimation of returns if selected value capture mechanisms are implemented in the city.

6.1 Bengaluru Metro: System Characteristics and Financial Arrangements

Bengaluru's metro rail system, also referred to as “Namma Metro,” remains the second largest operational

Table 1 | Phase-Wise Financing of Bengaluru's Metro Rail

	LENGTH	STATUS	TOTAL ESTIMATED COST	FUNDING (INR ONLY)	VALUE CAPTURE
Phase 1	42.3 km; 40 stations	Complete and Operational (Oct 2011–Jun 2017)	13,845 Cr (1,938.3 million USD) actual expense 14,405 Cr (2016.7 million USD) incl. taxes	Domestic grants: 8,155.52 Cr (59% project cost). Approved for long-term loan: 5,689.49 Cr (domestic loans 509.9 Cr and foreign loans 5,137.11 Cr as of March 2017) & Metro bonds: 300 Cr	Estimated yield from proposed mechanisms: 682 Cr (95.48 million USD)
Phase 2	72.1 km; 61 stations	Approved and Under Construction (–2023)	26,405 Cr ^a (3,696.7 million USD)	Domestic grants: 14,264 Cr; Approved for long-term loan: 9,000 Cr (of which foreign loans are 5,300 Cr)	
Phase 2A	18 km; 13 stations	Approved (–2024)	5,227 Cr ^a (714 million USD)	Domestic grants: 2,424 Cr; Domestic & foreign loans (incl. ADB): 2,373 Cr. BMRCL (PPP): 600 Cr	Estimated yield from proposed mechanisms: 1,100–2,100 Cr (154 to 294 million USD)
Phase 2B	38.8 km; 17 stations	Approved (–2024)	9,616 Cr ^a (1,313 million USD)	Domestic grants: 5,334 Cr; Domestic and foreign loans (incl. ADB) or bonds: 3,721 Cr. BIAL (PPP): 800 Cr	
Phase 3	105.5 km	DPR under preparation by BMRCL	20,000 Cr ^b (2,800 million USD)		

Notes: a = approved estimated project cost; b = approximate expected cost; Cr = crores.

Domestic sources of grants include the GoI (Government of India) and GoK (Government of Karnataka). Public agencies offering loans include Housing and Urban Development Corporation Limited (HUDCO) and Karnataka Urban Infrastructure Development Finance Corporation (KUIDFC). Foreign agencies offering loans include Asian Development Bank (ADB), Japan International Cooperation Agency (JICA), Agence Française de Développement (AfD), and European Investment Bank (EIB). Other sources of finance are bonds by Bengaluru Metro Rail Corporation Limited (BMRCL) and development fees by Bengaluru International Airport Limited (BIAL).

Sources: BMRCL 2016, 2017; Kharola 2016; updated from www.themetrorailguy.com

metro network in the country. Phase 1 of the network, with two intersecting lines spanning just over 42 km, has been completed and progressively opened for commercial operations between October 2011 and June 2017. In a city beset by heavy traffic congestion, the metro is changing the commuting pattern for many. It provides East–West and North–South suburban connectivity within 35–45 minutes of travel time. With the average daily ridership frequently crossing the 0.4 million mark, the performance remains lower than the initial estimates but continues to rise steadily (September 2019 data). Table 1 summarizes the salient features of Bengaluru’s metro rail system and its financing arrangements, phase by phase.

Though BMRCL registered an operational surplus of over INR 40 crores (5.6 million USD) in the last six months of FY 2017–18, the entire amount went toward servicing debt and other expenses. Thus, repayment of the substantial loan amount continues to be a challenge. A recent news article pointed out that it may take two decades for BMRCL to repay all foreign or private borrowings, and another two decades to repay all public borrowings from central and state governments (Lalitha 2018). BMRCL is exploring funding sources other than the traditional staples of government grants and market finance to reduce its debt burden and bolster local contributions. To this end, BMRCL is now actively considering LVC mechanisms as a supplementary source of funding to augment the metro rail infrastructure.

6.2 Overview of Value Capture Mechanisms Considered by BMRCL

BMRCL is currently exploring several instruments that can help implement LVC in Bengaluru (Tables 2 and 3). The government has provided in-principle approval to some LVC mechanisms based on property taxes, along Phase 2 of the metro rail line. Due to ambiguity in legal clauses, pushback from citizens, and procedural delays, these, however, are yet to be operationalized. BMRCL

has been able to leverage some of their properties for LVC schemes such as joint development and leasehold.

Table 3 lists the estimated returns from value capture mechanisms proposed by BMRCL for piloting along the stretch of Phase 2A. It is also keen to adopt these along Phases 2 and 2B. Initial estimates indicate that about 50 percent of the project cost can be recovered using LVC, with the caveat that this potential will not be easily recoverable unless the government acts to amend the TOD framework.

6.3 Fee-Based LVC Mechanisms Proposed by BMRCL

The BMRCL has proposed two fee-based LVC mechanisms for potential value capture along the metro corridor. The first—Betterment Levy—is a one-time upfront charge on the land value gain brought about by public infrastructure investment. The second—Premium FAR—is a one-time fee collected by the development authority for relaxation of rules governing FAR or sanctioning an additional FAR over and above what was already permitted. This means that the greater the development in the transit corridor, the more revenue the government earns. TOD has a key role to play in incentivizing higher built-up density through increased FARs. The RMP 2015 offers a maximum FAR of 4 to property developers—free of charge—to encourage TOD along the metro corridor. However, the government is considering reducing the free limit and charging for the remainder of allowed building rights. The authority for collection of such fees currently lies with the Bengaluru Development Authority (BDA), which is the local planning authority. BMRCL is considering extending the designated TOD influence zone within which these stipulations will apply, from 150 m to 500 m. This would serve to increase the potential for LVC and widen its reach.

Table 2 | Instruments Being Considered for Value Capture in Bengaluru's Metro Project and Their Status

FINANCING INSTRUMENT	DESCRIPTION	STATUS
Levy of Surcharge	<ul style="list-style-type: none"> ■ Additional surcharge at 5% of the property's market value for developments within BDA's jurisdiction is proposed to be levied under Section 18A of the Karnataka Town and Country Planning (KTCP) Act ■ The proceeds would be credited to a "Metro Infrastructure Fund" and shared by BMRCL (65%), BWSSB (20%), and BDA (15%), respectively ■ To be used by BMRCL and other agencies for financing the Metro project, as well as provision of civic infrastructure 	<p>Legal clause of Section 18A/KTCP is causing difficulty as criteria for applicability are not clear</p> <p>Not yet operationalized</p>
Cess on Additional FAR	<ul style="list-style-type: none"> ■ Extend benefit of additional FAR of 4 to all developments within 500 m on either side of the metro track along Phase 1 and 2 ■ Surcharge of 10% on residential and 20% on commercial buildings to be levied on FAR granted in addition to the Base FAR up to 4 ■ Proceeds to be shared by BMRCL (60%), BBMP (20%), BWSSB (10%), and BDA (10%), respectively ■ To be used for debt servicing by BMRCL, and financing civic infrastructure improvements by other agencies to support dense and compact development of station areas 	<p>Modified proposal submitted and awaiting Government of Karnataka clearance</p> <p>Not yet operationalized</p>
Transfer of Development Rights (TDR)	<ul style="list-style-type: none"> ■ Would allow BMRCL to issue TDR as compensation for land acquisition during the metro project 	Under discussion
Public-Private Partnership (PPP)	<ul style="list-style-type: none"> ■ BMRCL can explore PPP initiatives for system works, rolling stock, and operations & maintenance (O&M) w.r.t. the two new lines in Phase 2; approaching Gol for viability gap funding (VGF) if required 	PPP on station development for three stations formalized
Carbon Credits	<ul style="list-style-type: none"> ■ BMRCL can explore earning carbon credits for the project (from reduced emissions/pollution) that can be traded to partly finance its operational expenditure 	Under discussion
Differential Fare Pricing	<ul style="list-style-type: none"> ■ BMRCL can explore a policy of differential fare pricing where feasible, charging higher fares in peak hours or for trips starting or ending at specific stations ■ The rationale is that the IT industry (which would benefit from better connectivity from certain Phase 2 lines), contribute toward improving farebox revenues to enhance the financial sustainability of the project 	<p>Phase 2 not complete</p> <p>Not yet operationalized</p>

Notes: Gol = Government of India; GoK = Government of Karnataka; BMRCL = Bengaluru Metro Rail Corporation Limited; BWSSB = Bengaluru Water Supply and Sewerage Board; BDA = Bengaluru Development Authority; BBMP = Bruhat Bengaluru Mahanagara Palike; FAR = Floor Area Ratio.

Source: Government Order UDD 179 PRJ 2011.

Table 3 | Value Capture Mechanisms Proposed by BMRL for Phase 2A

FINANCING INSTRUMENT	DESCRIPTION	ESTIMATED AVG. YIELD (RANGE)	STATUS
Premium FAR	<ul style="list-style-type: none"> ■ New developments within 1 km of metro line can buy additional FAR or “premium FAR” of 1 (over the existing permissible) from BDA ■ Minimum floor price of 10% of prevailing guidance value of land along the ORR ■ Progressively auctioned off to highest bidders ■ Estimated additional development potential of up to 15 million sq. ft 	802 Cr (112.28 million USD). Range with conservative and optimistic estimates: 573 to 1,143 Cr	Proposal submitted and awaiting GoK clearance. Not yet operationalized
Betterment Levy	<ul style="list-style-type: none"> ■ To capture land value appreciation due to metro, amend Section 20 of BDA Act to charge Betterment Levy (instead of Betterment Tax) ■ Applicable only to nonresidential properties > 1 million sq. ft built-up within 1 km of metro line ■ Charged at the rate of 1.5% of prevailing guidance value of commercial property; one-time upfront payment when metro project is approved 	500 Cr (70 million USD). Estimated for 50 million sq. ft at INR 100 per sq. ft	Not yet operationalized
Location, Naming, Advertising Rights	<ul style="list-style-type: none"> ■ Slight flexibility in positioning of stations ■ Tender Station Naming + Advertising Rights; minimum floor price of INR 10 Cr/year/station ■ 10-year period, with 30% of total estimated revenue paid upfront upon award of contract ■ Corporate-branded stations can include branded signage, route maps, and promotional and other material featuring the name of the successful bidder 	360 Cr (50.4 million USD). Estimated at INR 30 Cr each for 12 stations	Modified conditions—operationalized under PPP joint development scheme
Premium Ramp Access	<ul style="list-style-type: none"> ■ Direct ramp access to/from metro station would enhance safety, comfort, time, and energy savings for users ■ Upfront premium, equal to double the construction cost (avg. 300 m length would yield a minimum premium of 15 Cr) 	200 Cr (28 million USD). Range with conservative and optimistic estimates: 143 to 285 Cr	Modified conditions—operationalized under PPP joint development scheme
Airspace Commercialization	<ul style="list-style-type: none"> ■ Airspace development rights above Metro stations—lease of advertising, retail, commercial/office spaces ■ Awarded on a competitive bidding process for 60-year period to bidder quoting the highest upfront “development premium” (above a fixed minimum) 	219 Cr (30.66 million USD). Range with conservative and optimistic estimates: 51 to 281 Cr	Modified conditions—operationalized under PPP joint development scheme
Additional Cess on New Projects	<ul style="list-style-type: none"> ■ Additional cess or surcharge (under Section 18A of KTCP Act) levied on approval of new development projects within BDA jurisdiction 	50 Cr (7 million USD).	Legal clause difficult. Not yet operationalized
TOTAL		2,131 Cr (298.34 million USD)	

Note: FAR = Floor Area Ratio; Cr = crores; BDA = Bengaluru Development Authority; ORR = Outer Ring Road; GoK = Government of Karnataka; KTCP = Karnataka Town and Country Planning Act.

Source: Kharola 2016.

6.4 Asset Management around Station Areas by BMRCL

BMRCL has yet to fully exploit development-based LVC mechanisms such as joint development and leaseholds. The efforts have been fragmented and limited to a few properties that it currently owns. At present, BMRCL raises supplementary revenue by renting floor spaces within its stations and leasing other properties to big-box retail enterprises and commercial ventures (DH News Service 2018). A valuation conducted by Infrastructure Development Corporation Karnataka (iDeCK) found that BMRCL could earn between INR 25 to 80 crores (3.5 to 11.2 million USD) per station from branding, advertisements, renting commercial and retail spaces, and access rights to business campuses and apartment complexes. In addition to this, developing and utilizing self-owned properties could save on the portion of operational costs that is currently paid as rents for private buildings that BMRCL occupies. Investing in properties that it can lease to earn recurring revenue as opposed to one-time sales or rights would be a productive move for BMRCL. However, lacking the mandate and a supporting policy framework to empower it, BMRCL has been compelled to limit its efforts. The potential to earn increased revenues remains an opportunity waiting to be tapped. If strategized well, these various avenues could contribute significantly toward bringing in private sector finance for loan repayment.

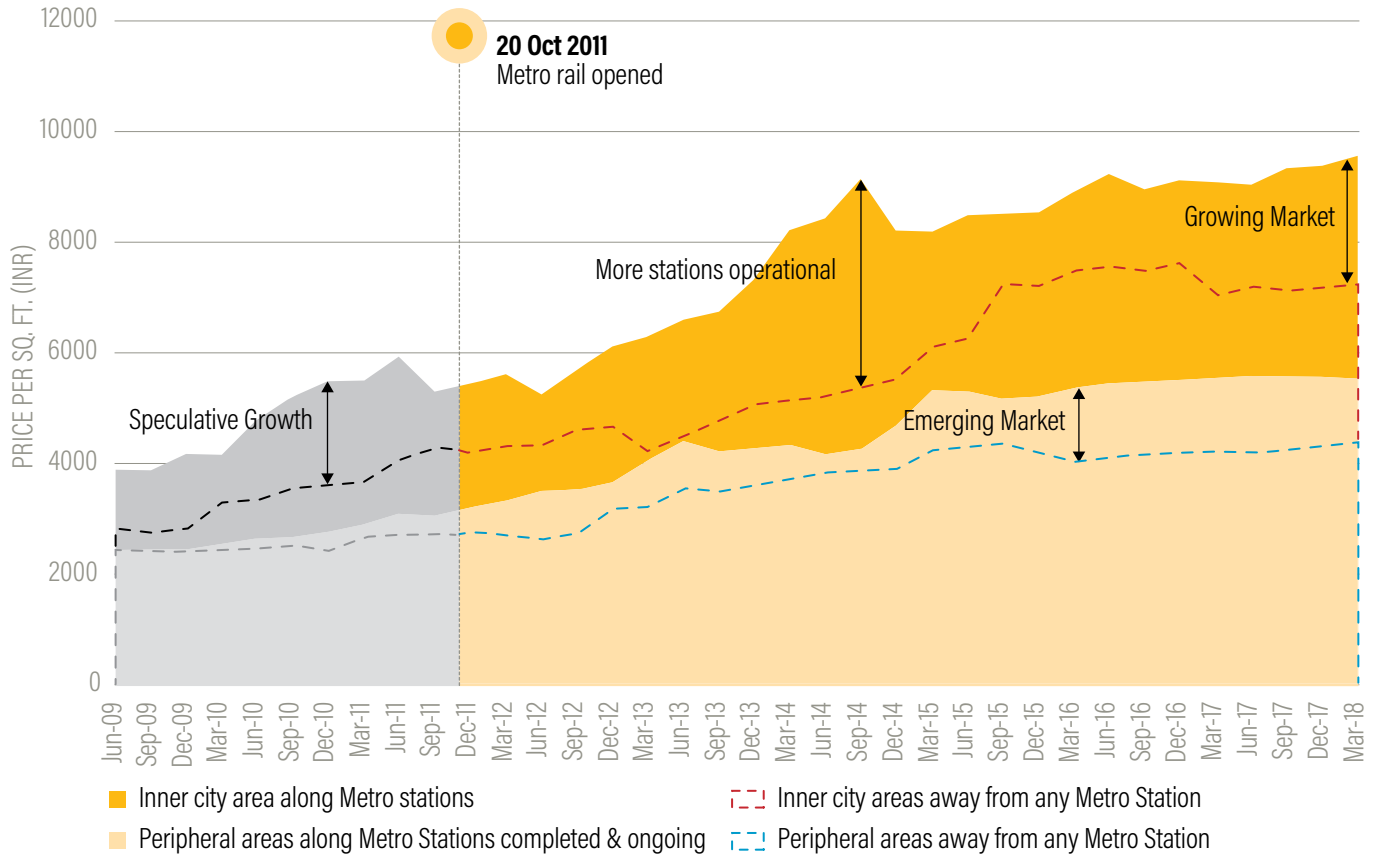
BMRCL has explored PPP relationships with sponsors but has not taken an active lead in shaping the land market through these partnerships. BMRCL, through its asset management efforts thus far, was able to raise an estimated INR 600 crores (80 million USD) from the private sector. The collected revenue is expected to be spent by BMRCL on the construction of the metro infrastructure. Although BMRCL has entered into PPP contracts for the development of five stations, it has yet to explore more collaborative relationships with private sector players. For instance, coordination with the private sector to increase infrastructure levels (including transport and public utilities) to encourage development along

the rail transit has not occurred in Bengaluru. These collaborations, especially in station influence zones, are imperative as they shape the land markets upon which the fee-based mechanisms are dependent.

7. THE IMPACT OF MRT ON REAL ESTATE ALONG THE TRANSIT CORRIDORS IN BENGALURU

Although TOD-related master plan amendments encourage densification of areas near metro stations, the implications for LVC must first be established through the link between metro construction and land value. We analyzed real estate trends near (within a 15 minute walking distance from the stations) and away (within reasonable reach of intermediate transport modes) from metro stations along Phases 1 and 2. We recorded real estate prices within half a square kilometer around the station area for the “near” areas. For the “away” areas, we demarcated a distance of up to 2 km from metro lines (existing, under construction, and proposed). We observed a clear separation of property price trends in areas near and away from the metro stations, evidencing the impact of improved connectivity on property prices. Notably, data on real estate prices were obtained by World Resources Institute India (WRI India) through (Liasis Foras) surveys and are limited to residential properties or multi-family dwellings by formal builders, as historic price trends were available. Commercialization is slow, and longitudinal data was available on a more recent trend that is restricted to inner-city areas.

Figure 2 | Property Prices along Metro Stations and the City



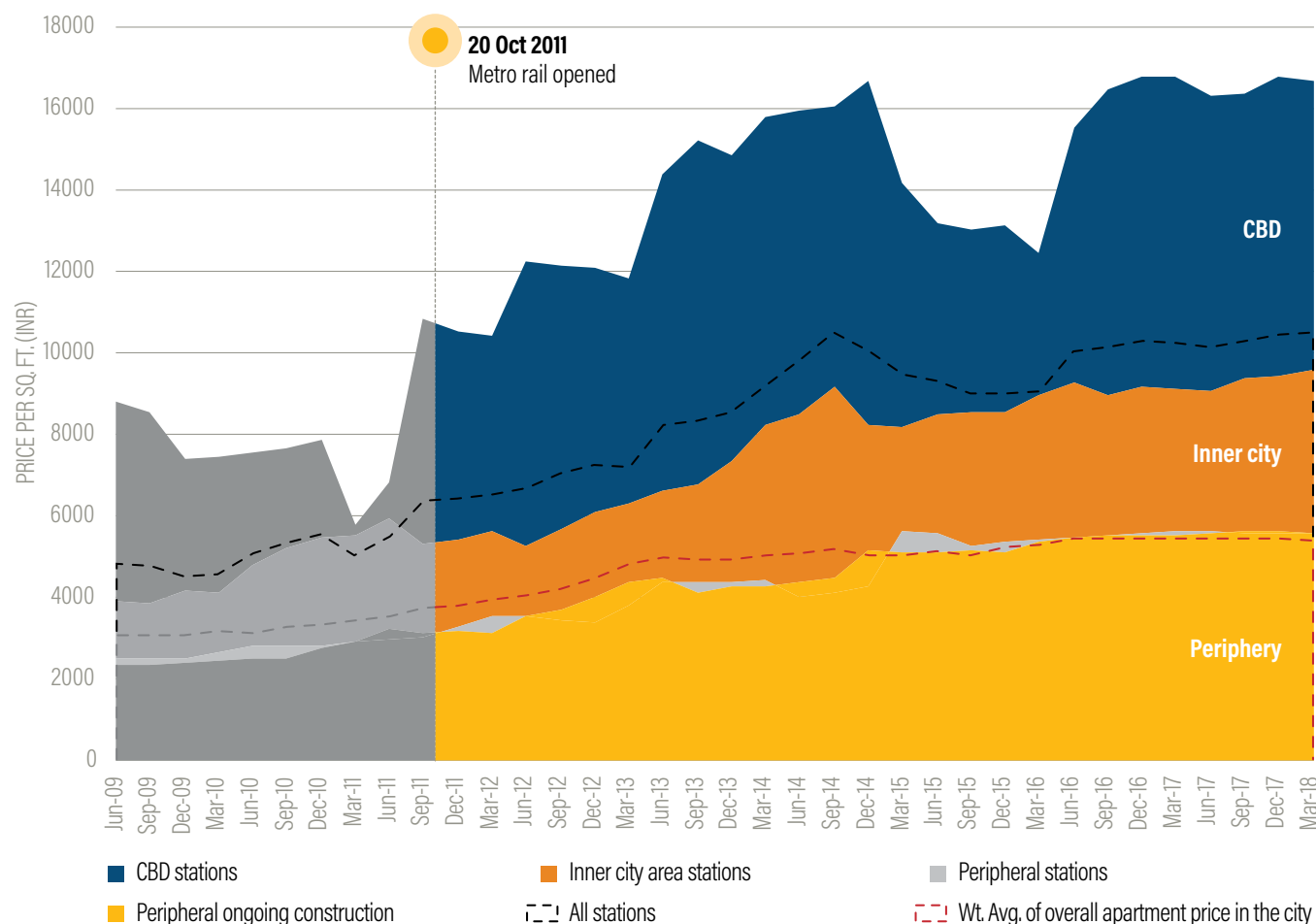
Source: WRI India authors.

The MRT impacts property prices along the corridor in both the core and the periphery. Following the general rule, Bengaluru's property prices in the city core are higher than those at the periphery. The three major factors for this are as follows:

- A lack of public infrastructure at the peripheries
- A greater amount of vacant land that is easily available at lower costs in the peripheral areas, as opposed to the dense built-up nature of the inner-city areas
- A higher connectivity of the core to the rest of the city, which has increased the demand for properties

Figure 2 shows that areas along metro stations demonstrate higher property price appreciation—both in inner-city areas (within the Outer Ring Road) as well as in peripheral areas (outside the Outer Ring Road) as compared to areas away from the metro route. In peripheral areas, the gap between prices near and away from the metro stations is narrow. However, it is growing consistently wider, depicting the positive impact of the metro rail. Our data show that metro connectivity has a clear and demonstrable influence on property value appreciation around stations even in far-flung areas of the urban periphery, which are emerging markets and have immense growth potential in the future.

Figure 3 | Residential Prices within Station Areas of Metro Phases 1 and 2



Source: WRI India authors.

There is a growing demand for housing along metro areas. This is because the metro passes through key commercial districts, improving work–home commutes between the central business district (CBD) and housing, which is provisioned typically in the periphery due to the low cost of development. Figure 3 charts real estate data we collected for the study from 2009 to 2017 on the formal supply of multi-family housing projects around a 1 km distance from the Bengaluru Metro Phases 1 and 2. The gap between prices along the metro corridor and prices through the rest of the city has varied between periods, but has typically widened around the time the metro

stations became operational in 2011 and between 2013 and 2015. Thus, the price rise can be reliably attributed to the improvement in accessibility.

Extending this analysis to 2 km, our study found property prices nearer to metro stations have increased the most. Over the period of metro construction, the area within 0–150 m experienced a peak price rise of 15.9 percent; within 300–800 m, the rise peaked at 13–14 percent, and beyond 800 m, the price rise was halved. Based on this, the metro’s optimal influence is assumed at 1 km (Figure 4).

Figure 4 | Price Change of Residential Projects along Metro Corridor between 2009 and 2017

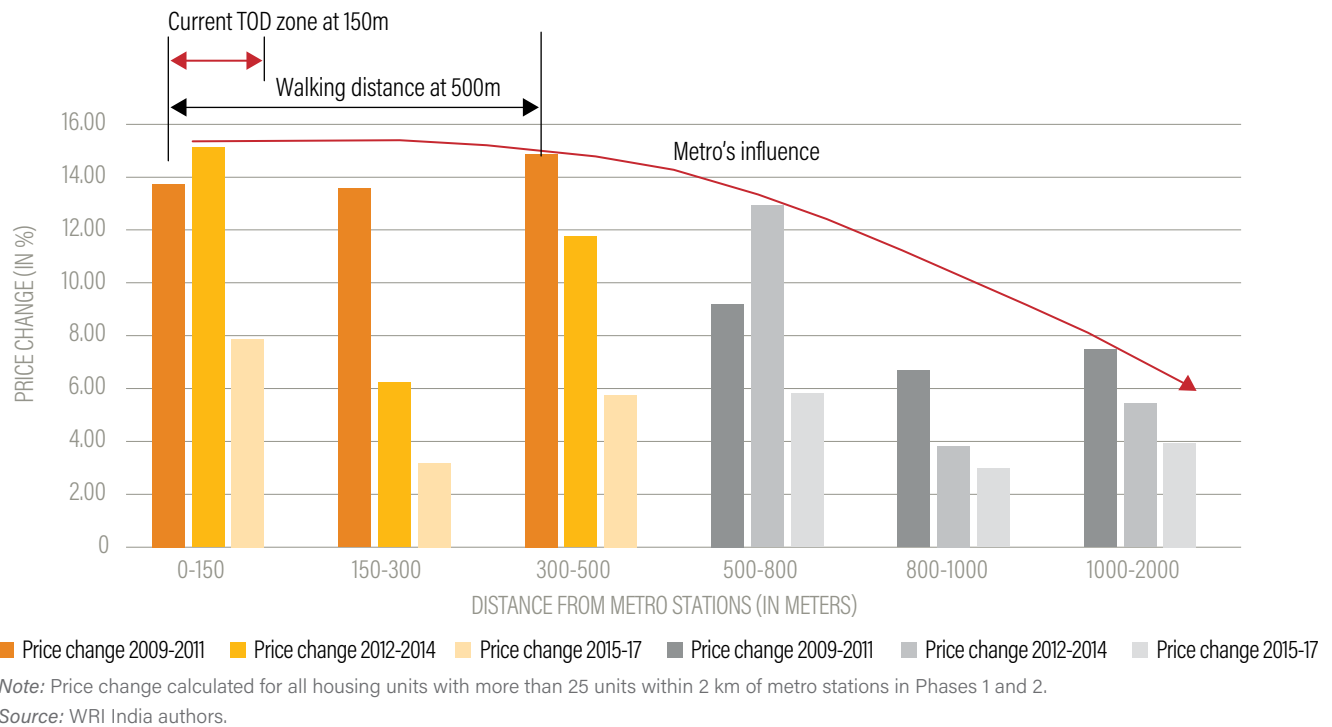
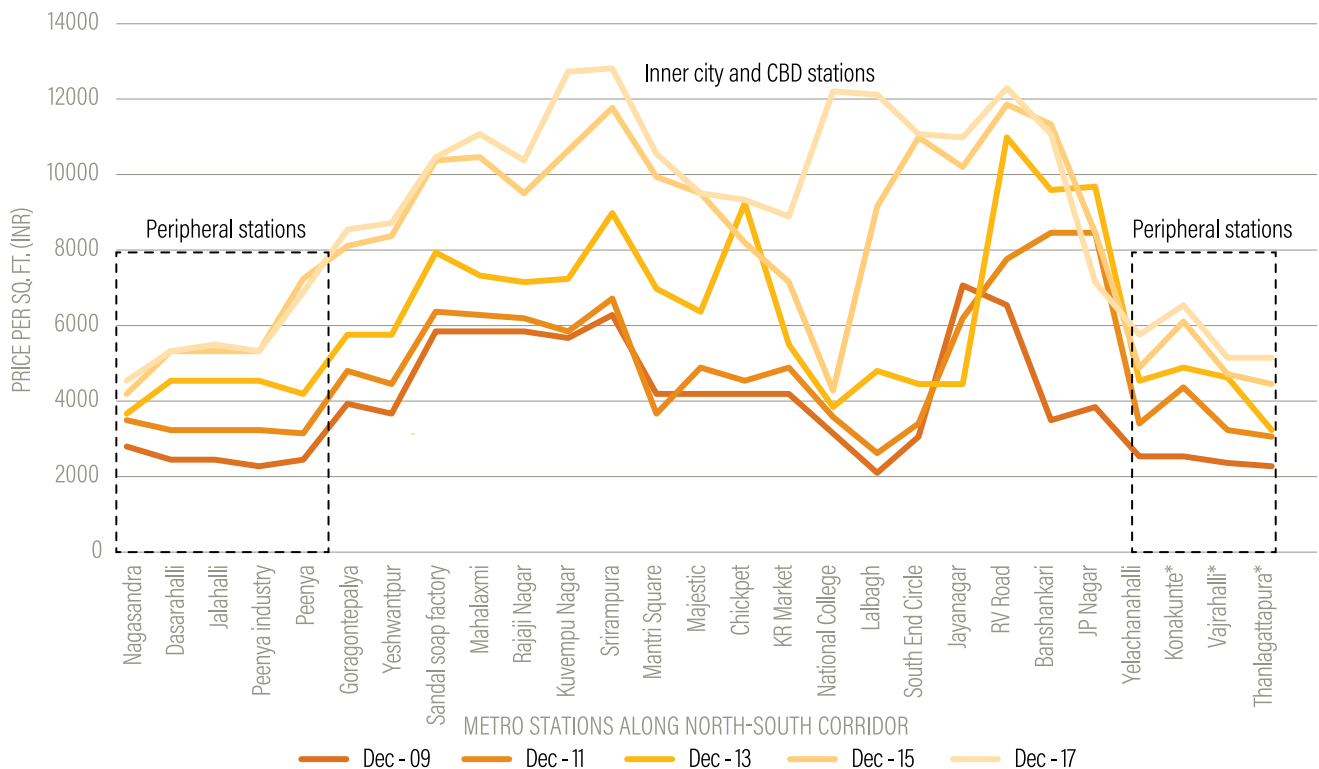


Figure 5 | Annual Real Estate Price Appreciation along the North-South Corridor of Phase 1

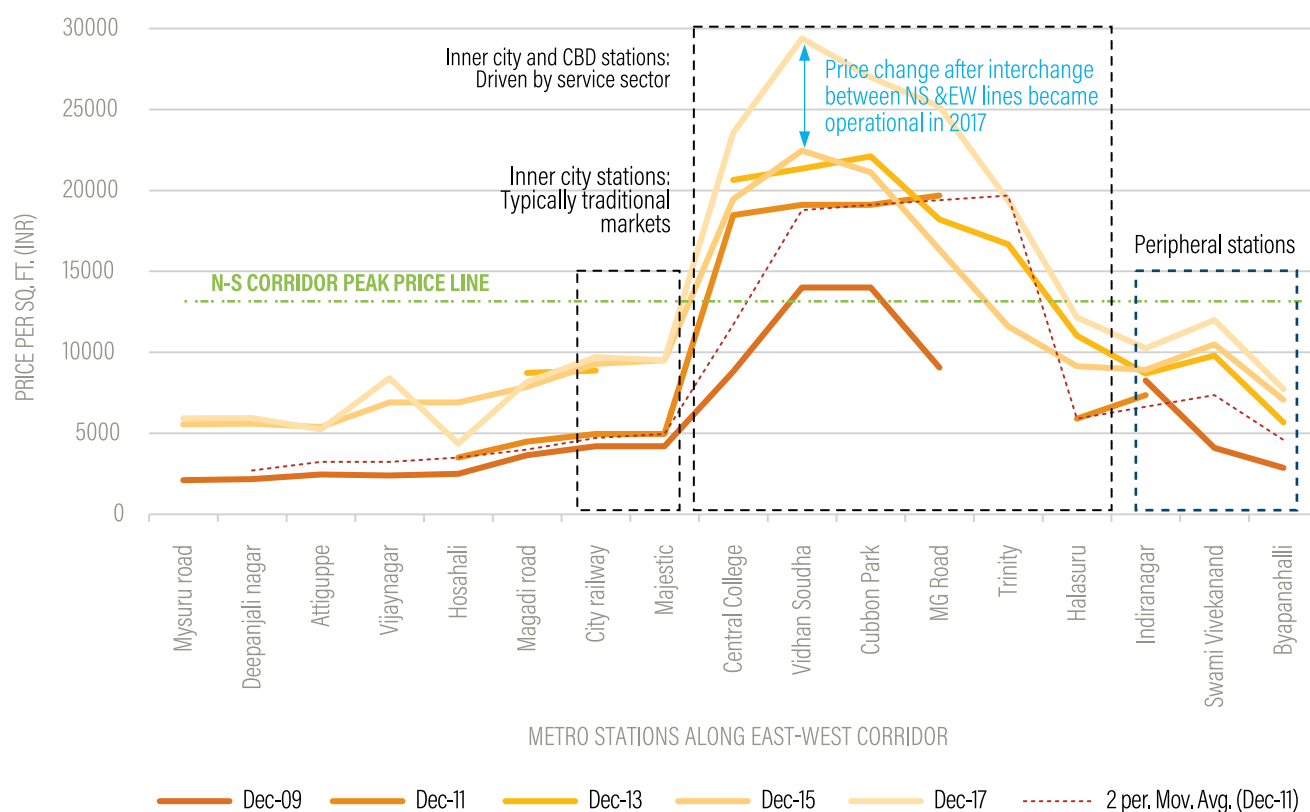


The average appreciation of residential space along the metro stations has been significantly higher than the city average of 9.3 percent annually. Along Phase 1, the compounded annual growth rate (CAGR) of residential property prices on the North-South corridor ranges from 6 to 20 percent. On the East-West corridor, the CAGR ranges between 7 to 13 percent. Data from our survey reveal that the metro has helped boost property values even in areas where prices were far below the market average until metro stations were made operational. In areas such as KR Market, National College, and Lalbagh, the price tripled by 2017, the year when metro stations between Mantri Square to Yelachanahalli were opened to the public (Figure 5).

Property prices in the CBD of Bengaluru, which is represented by Trinity, MG Road, and Cubbon Park metro stations, are the highest. The CBD area is unique

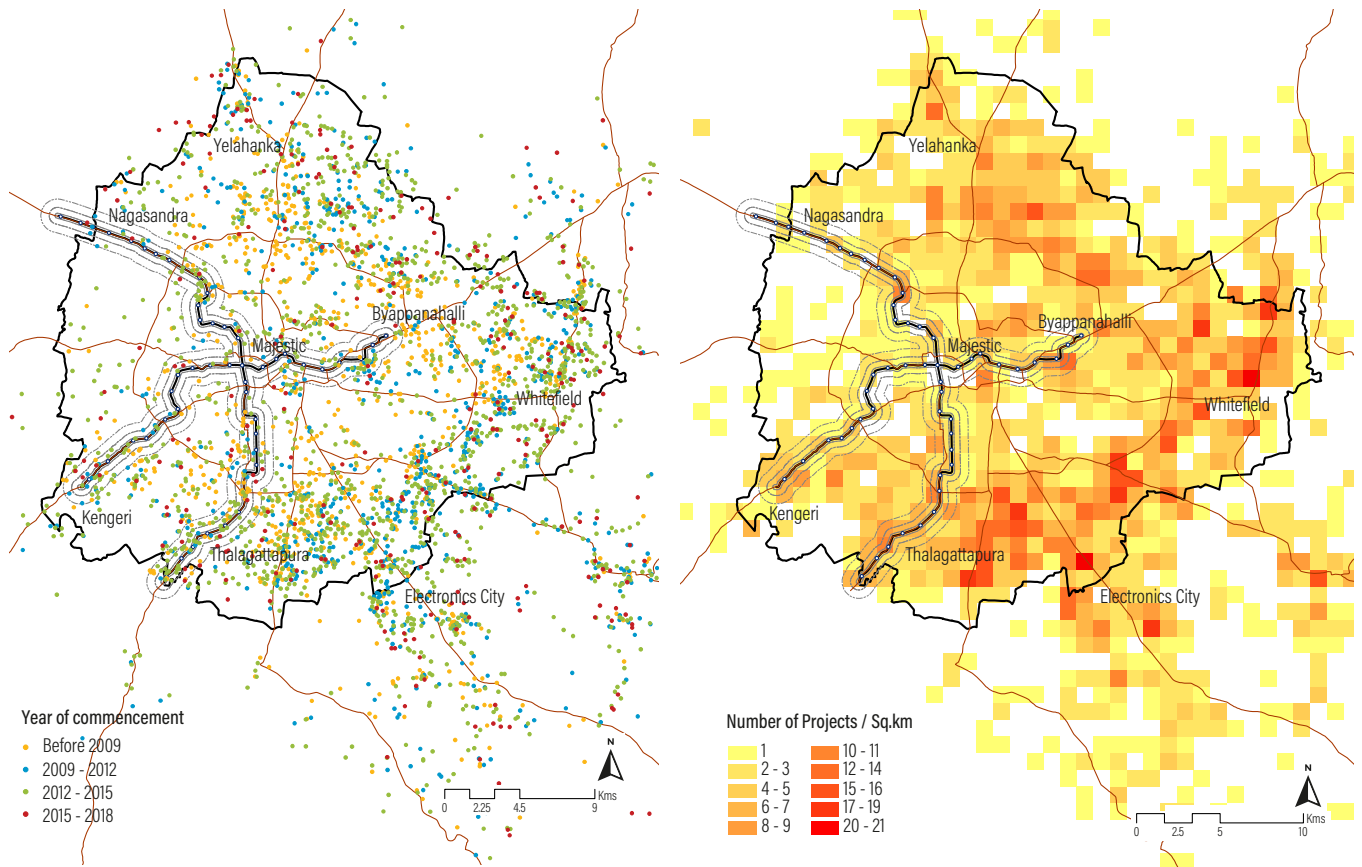
because unlike other inner-city business districts, it is driven by a service sector economy that attracts high volumes of commuters from all over the city, every day. We were able to observe a leap in property prices between 2013 and 2017 after the Majestic Interchange Metro Station, which connects the metro stations in the CBD with the wider metro network of the city, was operationalised in 2016 (Figure 6). The CBD area is adjacent to old city areas such as KR Market and Majestic that were originally planned with plotted housing, but were subsequently upgraded with infrastructure that can accommodate the service sector growth (Deb et al. 2020). Interventions in this area have included upgrading non-motorized transportation (NMT) infrastructure such as pedestrian walkways and rentable electric bikes.

Figure 6 | Annual Real Estate Price Appreciation along the East-West Corridor of Phase 1



Source: WRI India authors.

Figure 7 | Location of Multi-family Housing Projects in Bengaluru between 2008 and 2018



Source: WRI India authors.

Despite the metro infrastructure and a healthy property market in the core city areas, new constructions are emerging in the periphery. The two maps in Figure 7 depict the density and year of construction of formal multi-family residential projects. These are constructions that were completed or started between 2009 and 2018. We see from the maps that the lion's share of the housing projects is located in Bengaluru's periphery in areas beyond the Outer Ring Road, especially along the southern and southeastern parts of the city. The Metro Phases 2A and 2B have been planned in these areas to improve accessibility. New developments in the peripheral areas, however, will need far more than metro rail infrastructure if they are to become catchment areas for optimum value capture.

8. EXISTING CHALLENGES FOR LVC

We conducted an evaluation of two metro stations as case studies. We wanted to collect and document evidence of how the MRT has had a positive impact on property prices and real estate development in both inner-city areas and the urban periphery. We found that market-led responses to gaps in infrastructure and policy have not been sufficient to drive built-up densification. Our discussions with subject and field experts gave us an understanding of the challenges

of coordination, finance, and planning that the city government agencies responsible for service delivery are faced with and that limit them from intervening effectively. In this section, we assess how Bengaluru's current planning and governance framework undermines the potential for LVC.

8.1 LVC Potential Remains Untapped Due to Weak Governance

Implementation of LVC in Bengaluru has been slow and uncoordinated: Urban planning in the city offers incentives for TOD, but implementation efforts are split across different agencies that are not mandated to work with each other. BDA prepares the city's master plan, whereas the TOD policy and LVC mechanisms are developed by BMRCL. Other agencies providing water supply, electricity, and local roads, budget and implement their own plans. These agencies often do not synchronize their efforts with BMRCL or BDA. This fragmentation delays public service delivery, which discourages real estate investments and stunts the potential for value capture. The roadblocks to implementation mean that despite government approval of LVC mechanisms for selected areas along metro corridors in 2011, the proposals for value capture have not yet been operationalized.

Lack of “visible” transit-oriented area improvements impedes the potential for LVC:

Apart from the metro service itself, there has been little or no improvement in access to infrastructure and public services within station areas. Residents do not see any tangible improvement of their neighborhoods. Without improvements such as local roads and non-motorized infrastructure, the metro itself becomes less accessible, thus discouraging real estate investments. Station Accessibility Plans led by GoK's Directorate of Urban Land Transport (DULT) is a positive step in the right direction. The project includes measures for improving access to metro stations, infrastructure to support the feeder network, and amendments to Development Control Regulations to incorporate TOD principles. Presently, these envisioned projects are pending

due to lack of funds. Without clear and measurable improvements, citizens are reluctant to pay for LVC.

Infrastructure gaps limiting TOD around metro stations: Our analysis of Indiranagar and Thalagattapura found that despite TOD incentives, developments are low rise in character. Developments with high-density build-up remain unfeasible in most areas as there is inadequate infrastructure for public transport, roads, electricity, water supply and sanitation, and public open spaces. On the other hand, infrastructure provision to the largely empty expanses of the sprawling peripheries will prove to be a costly affair for the government. With developments shifting toward the periphery in the last decade, it has become increasingly important to service and provide for these areas in the plans for compact development.

8.2 Gaps in Urban Planning Framework Are an Impediment to Successful TOD and LVC

Development projects are unable to consume additional FAR due to missing links between planning and land markets: Offering more development rights does not necessarily play out in favor of LVC without adequate consideration of how land markets work. The experts we consulted point out that an increase in real estate supply through higher FARs does not automatically translate into consumer demand. This discrepancy discourages developers from investing more, hampering LVC gains from developments. On the flip side, landowners who are willing to redevelop plots and take advantage of a higher FAR are restricted by small plot sizes and insufficient road widths. In Indiranagar, for instance, despite the regulations allowing free FAR of 4 within 150 m around the metro station since 2009, most development projects are struggling to achieve a FAR of 2.

Blanket regulations without flexibility as per local context undermines LVC and creates illegality: The provision of blanket Premium FAR without considering other enabling regulations, such as station area typology or their carrying capacities, gives rise to several problems. In high-demand areas with

good market appetite, there is a clear lack of enabling regulations related to setback, height, parking, and open space requirements. Inadequate incentives for plot amalgamation and redevelopment may inhibit FAR consumption and lead to violations that make properties illegal, which hinder LVC. By contrast, in high-demand areas with adequate carrying capacities, blanket FAR may restrict development potential and lead to the suboptimal use of MRT infrastructure.

Absence of TOD in inner-city areas would drastically limit LVC potential in the future:

Draft RMP 2031 has planned to encourage development in areas outside of Bengaluru's Outer Ring Road. On the other hand, it limits the TOD incentives of allowable FARs in the central areas of Bengaluru, which currently house a substantial portion of existing and proposed metro rail networks. If the draft RMP 2031 is implemented in its current form, the already weak planning framework for TOD would be diluted even further. Approximately 50 percent of the MRT station areas could become a lost opportunity for potential LVC.

8.3 Resentment Toward LVC Mechanisms

Residents' opposition to Premium FAR to prevent over-densification and ensure a healthy urban environment:

The reduction of the Base FAR and introduction of the Premium FAR has met with criticism and stiff opposition from the real estate industry, citizen groups, and experts alike. Citizen forums have threatened to approach the courts if the government persists with the Premium FAR proposal (DH News Service 2017). Critics of Premium FAR argue that over-densification can hamper the real estate market by increasing supply more than the actual demand and can exert more stress on the already low level of services of networked infrastructure. The general apprehension is that relaxation of regulations such as open space requirements, setbacks, and ground coverage may inhibit a healthy urban environment by compromising norms of fire safety, natural light, and ventilation.

Developer opposition to Premium FAR, which discourages profits from sale of Transfer of Development Rights (TDR):

Real estate developers are concerned that the Premium FAR would compete with and hurt the already weak TDR market (Bharadwaj 2017). The TDR price in Bengaluru is two times the guidance value of the land forfeited, whereas the Premium FAR is only half the guidance value of the proposed built-up. The exact formula for the cost of TDR versus the Premium FAR, though, is yet to be decided. Despite this, from the news coverage on the topic, there seems to be a clear preference among real estate developers and citizens for making the TDR market work, rather than the Premium FAR, as the latter does not offer additional benefits (Bharadwaj 2017; ET Bureau 2017; Rao 2017).

Consumer concern of “unaffordable” real estate prices restraining implementation of LVC:

Real estate developers contend that reducing the Base FAR and charging the Premium FAR will make real estate even more expensive and unaffordable. The premiums paid by developers are ultimately passed on to the end customer, increasing property costs and rental prices (Magic Bricks 2017). With real estate prices rising in station areas, Premium FAR may end up increasing the prices in the vicinity of station areas. This would displace low-middle-income groups, who, in fact, depend on and use public transit. According to our analysis, it is uncertain if the TDR strategy would add to a healthy real estate market or succeed in earning more revenue for the government, without being able to achieve TOD goals.

Lack of citizen trust on reinvestment of LVC revenues impedes Betterment Levy:

When BMRCCL disclosed its plan to charge Betterment Levy on new and existing nonresidential properties, there was substantial pushback from the public. Citizens argued that the MRT was not a development they had asked for. Some resident groups from existing properties along the metro corridor held the MRT construction responsible for disrupting neighborhood livability and demanded compensation. Others pointed out that they already pay for the “betterment” or rise in property values in

the form of higher property taxes. Any other gains are only realized when a property is sold, leased, or rented out, in which case they pay income taxes. This lack of willingness on the part of residents' groups to pay additional fees is rooted in the city's past. Even prior to the MRT, charging Betterment Levies has not been adequately followed up with visible improvements in the local areas. This opposition will pose difficulties for the government when it attempts to implement LVC.

8.4 Lack of a "Benefit Districts" Framework

LVC mechanisms are not always designed to return a minimum share of revenue for improving the areas within the TOD influence zone. The exclusive use of these funds for the upkeep of a designated area is known as a Benefit District approach. Delineating TOD zones as Benefit Districts would help build citizen trust and improve willingness to pay the levied fees and charges for LVC.

Uncertainty of spending for local area

improvements: At present, public agencies are at liberty to spend their revenues to improve any part of the city under their jurisdiction. Plowing back revenue into the improvement of areas along the metro corridor is not guaranteed. Ring-fencing of funds could help overcome this by ensuring that all revenues collected using LVC tools in a station area or corridor are utilized for the various components of TOD. These include pedestrian and other NMT infrastructure, feeder services, and affordable housing as well as the maintenance of public spaces in that area. Tax Increment Financing (TIF) is a popular ring-fencing tool wherein special districts such as TOD areas are designated for investment using future revenues (Schneider 2019). However, some experts believe that the governance, monitoring, and finance systems in India have not evolved to an extent where this can be explored without adaptation.

Ambiguity in institutional roles and

responsibility: The implementation of value capture mechanisms along Bengaluru Metro would help public

agencies utilize the funds for discharging their own roles and responsibilities and for delivering better services to TOD areas in the future. In addition to BMRCL, BDA, and BBMP, funds will be shared by Bengaluru Water Supply and Sewerage Board (BWSSB). Optimizing the potential for LVC will require agencies to agree on a dedicated system backed by legal provisions to decide how the funds will be pooled and distributed.

9. ILLUSTRATING THE IMPACT OF MRT IN TWO STATION AREAS TO EXPLORE LVC POTENTIAL

For our case study of two metro stations, we selected Indiranagar as being representative of the inner city and Thalagattapura as representative of the peripheral environment and conditions. Our analysis of these two station areas found that desirable outcomes such as densification and redevelopment of TOD areas are dependent on zoning regulations, plot sizes, and the status of public infrastructure within station areas. As the specific LVC mechanisms proposed by BMRCL are linked to built-up areas of projects, developments with a higher FAR would mean more revenue. As per the TOD policy, developers are entitled to build up to a FAR of 4. In both the selected station areas, we discovered that a FAR of 4 remains unachievable for most projects. We observed that an overall improvement of public infrastructure and flexibility in zoning regulations can help increase development potential in the metro station areas, and therefore benefit LVC. Table 4 presents an overview of the characteristics of and findings from the two station areas.

Table 4 | **Comparative Overview of Indiranagar and Thalagattapura Station Areas**

PARAMETERS	INDIRANAGAR	THALAGATTAPURA
Location	Inner city	Urban periphery
Predominant land use	Mixed residential	Residential and vacant plots
Land-use transformation	Residential to commercial	Agriculture to residential
Density character	High density, low rise, densely built	Low density, sporadic high-rise, vacant
Metro status	Operational (since 2011)	Operational (since 2021)
Impact of metro	Increased footfalls, which is beneficial for commercial activities	Residential developments
Real Estate demand rise	Yes (mostly for commercial and residential)	Yes (predominantly for residential)
Plot amalgamation	Yes (very less)	Yes (very less)
Plot characteristics	Small plot sizes, densely built fabric	Mix of plot sizes, sparsely built fabric
Problems or limitations	No “visible” local area improvements	Fragmented developments, missing supporting infrastructure
Densification limited by	Zoning regulations	Lagging public service delivery

Source: WRI India authors.

9.1 Indiranagar: An Intermediate Station in the City Core

Metro rail has been functioning in Indiranagar since the first stages of its inception in the city in 2011. The Indiranagar Metro Station is located near the CBD and is well connected to the rest of the city by arterial roads. Predominantly a residential neighborhood, Indiranagar is situated on the East–West corridor of Phase 1 of Bengaluru Metro. It was developed between the 1960s and 1980s with plotted individual residences connected by a grid of streets and small

pockets of open spaces. More recently, since the mid-2000s, some micro- and small-scale businesses have emerged in the neighborhood, catering mainly to IT and other service industries. These commercial enterprises are concentrated along the main roads of Indiranagar. Medical and educational institutions are also located in the neighborhood. Such socioeconomic opportunities in the area draw footfalls from different parts of the city, now connected by the MRT.

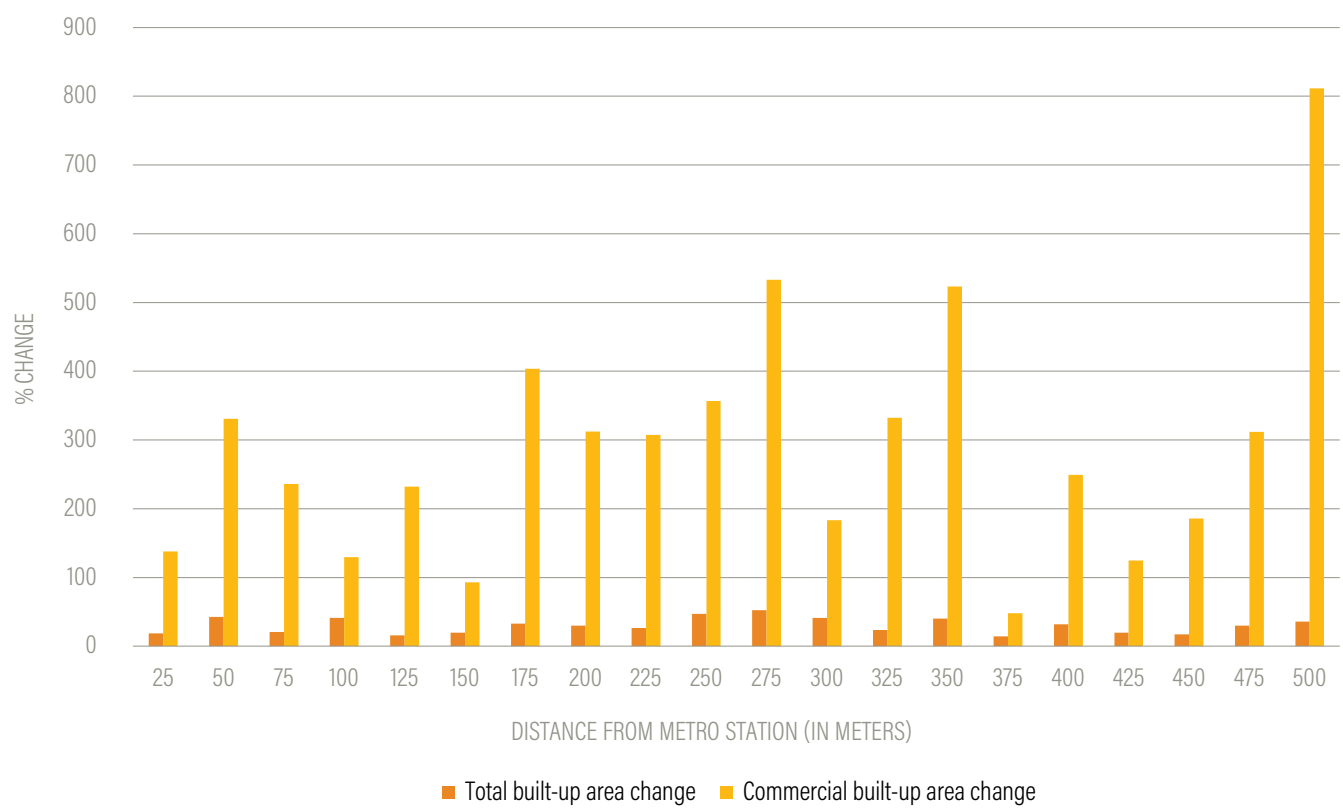
Between 2011 and 2018, the ridership of the metro increased from 28,000 to 340,500, with Indiranagar

attracting 17,700 average daily footfalls in 2018. This makes it the third busiest metro station in Bengaluru (Philip 2018). Through change detection analysis using satellite data and WRI India’s ground surveys of all 3,230 plots within the station area, about 30 percent of the plots were found to be redeveloped or retrofitted with a substantial extension of their built space during the period 2004 to 2018. Most of this redevelopment was to aid the transformation to a commercial area. We observed that improved connectivity has facilitated the transformation of Indiranagar from a residential neighborhood to a commercial center and led to a steep increase in property values in the area.

Impact of metro on commercial activities:

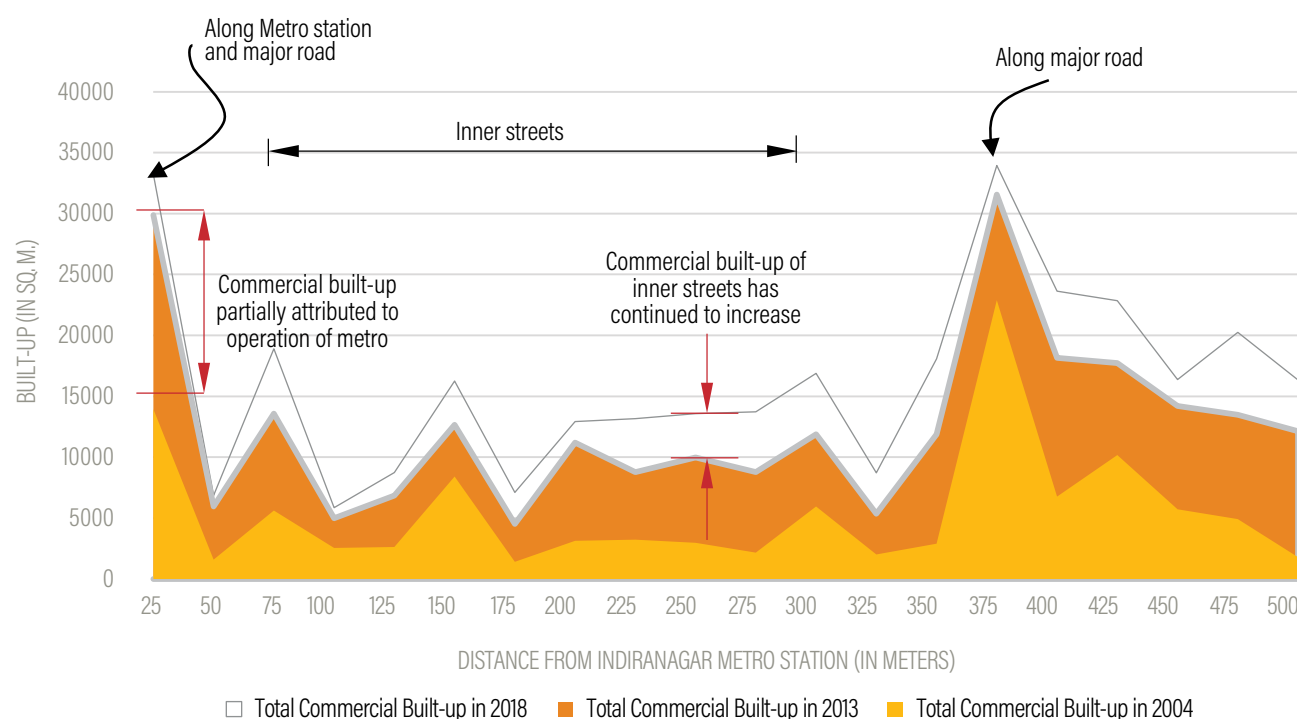
Increased footfall due to metro connectivity coupled with the commercializing trait of Indiranagar has enhanced business opportunities in the locality. It is estimated that during 2004 to 2018, the commercial built space within a 500 m radius around the Indiranagar Metro Station increased by more than 325 percent (see Figure 8). Two major arterial roads—the 100 feet Indiranagar Road and the CMH Road—are now vibrant commercial corridors in the city. They are known for their lifestyle-oriented retail outlets housing popular international labels, showrooms, salons, and high-end restaurants.

Figure 8 | Comparison of Percentage Increase in Built-Up to Percentage Change in Land Use from Residential to Commercial around Indiranagar Metro Station between 2004 and 2018



Source: WRI India authors.

Figure 9 | Commercial Built Space in 2004, 2013, and 2018 with Reference to Distance from Indiranagar Metro Station



Source: WRI India authors.

Trends in Figure 9 show a considerable increase in commercial built space, particularly between 2013 and 2018, after the metro started operating in the area. The two peaks of the upward spikes in the graph with a gap of 300 m between them denote that the

intensity of commercialization is higher along the major roads—which is typical in Bengaluru. The graph also notes rising commercial activities in the inner streets—which is specific to Indiranagar. Between 2004 and 2018, we found a 23 percent increase in the

Table 5 | Price Change of Residential Projects in Indiranagar between 2009 and 2017

DISTANCE FROM METRO (IN METERS)	TOTAL UNITS	NUMBER OF PROJECTS	PRICE CHANGE 2009-2011 (IN %)	PRICE CHANGE 2012-2014 (IN %)	PRICE CHANGE 2015-2017 (IN %)
0-150	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
150-300	16	1	NA	NA	NA
300-500	64	3	12.87	0.00	1.15
500-800	156	9	0.93	2.11	1.60
800-1,000	140	7	0.68	0.97	0.12
1,000-2,000	196	3	0.00	16.16	0.00

Note: Table shows price change for only multi-family dwellings by formal builders within 2 km of the Indiranagar Metro Station.

Source: WRI India authors.

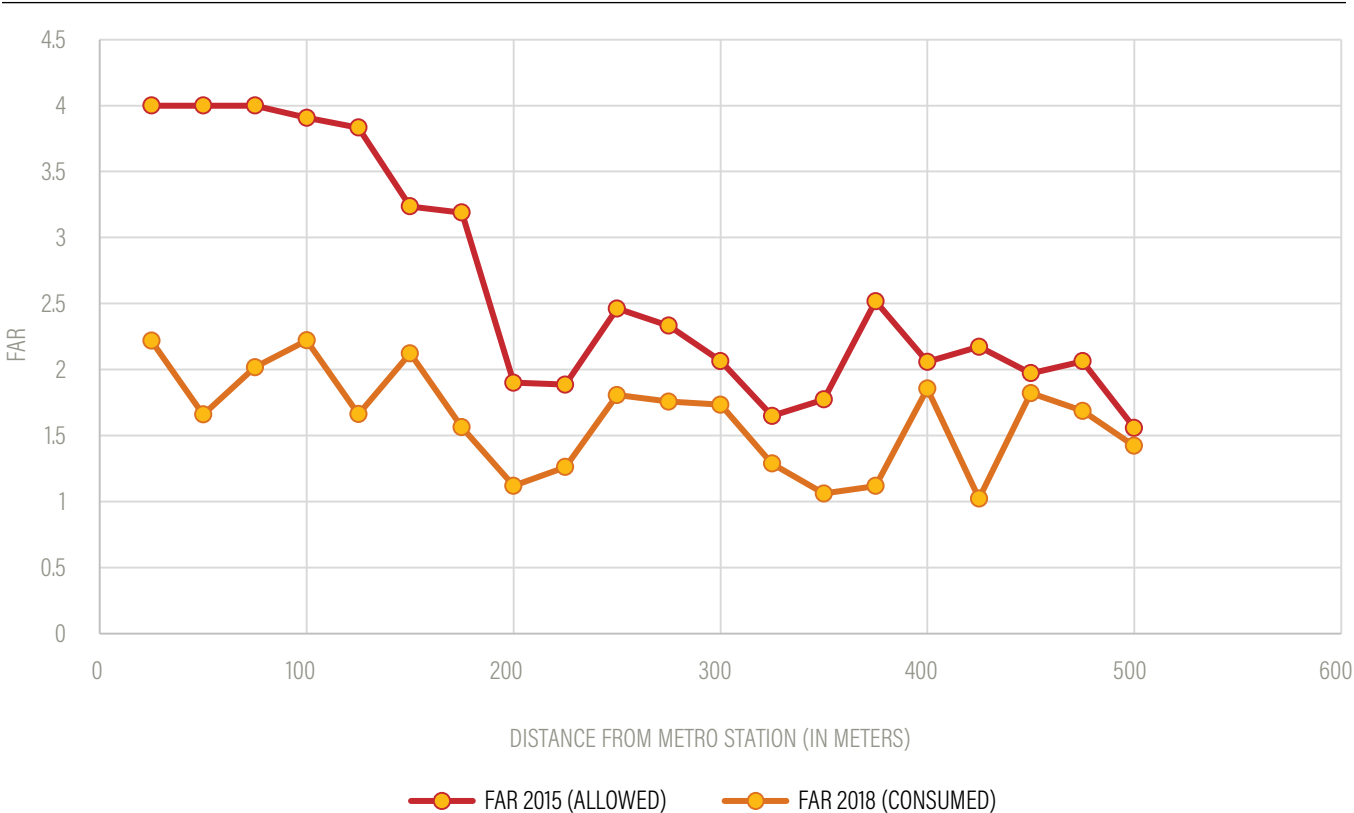
total built-up area within approximately 150 m of the metro station. Within this, the share of commercial areas has increased by 238 percent during the same period—naturally, without government incentives.

Impact of metro on property prices: The metro infrastructure has increased property values in Indiranagar. Our survey of formal large-scale multi-family residential projects within 2 km of the Indiranagar Metro Station revealed a peak price change of about 13 percent during 2009–11, which can be attributed to speculation on metro operations in 2011 (see Table 5). This is in consonance with citywide trends. However, most such projects have been constructed beyond 150 m due to practical constraints that inhibit large-scale construction adjoining the metro corridor. We also found that the area within 150 m is densely built, with small-scale projects that benefit from metro construction as property prices in any given area typically

follow the trends of large projects in Bengaluru.

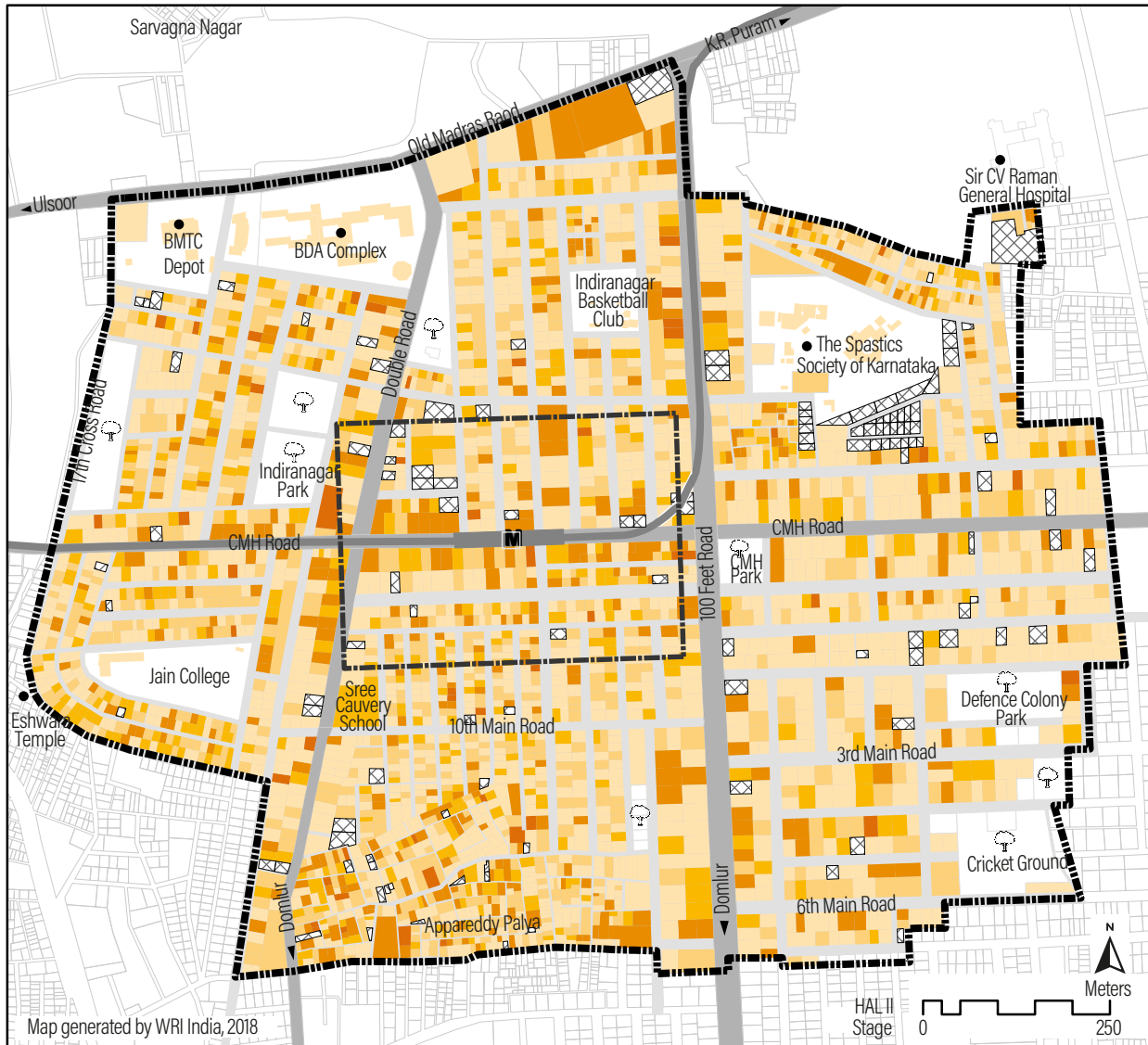
TOD regulations and real estate response: In Indiranagar, the incentive for TOD is only partially utilized. Currently, a total of 260 plots are located within 150 m from the boundary of the Indiranagar station. These plots are eligible for a maximum FAR of 4 as per TOD regulations in RMP 2015. However, our survey reveals that only 4.6 percent of these plots have managed to construct FAR above 3.5. Extending this analysis to all properties within 500 m reveals that based on the bylaws, development projects would be able to construct FARs of 1.5 to 4, depending on the individual plot considerations (see RMP 2015 zoning regulations by [BDA 2007]). However, as Figure 10 shows, a considerable amount of FARs allowed by current regulations remains underutilized. As the gross floor space consumed stands at 40% of the allowed regulations, there remains an additional building potential of 60%.

Figure 10 | **Current Market Appetite to Consume Additional FAR Allowed for TOD along Indiranagar Metro Station (Comparison between FAR Consumed in 2018 and Proposed in RMP-2015)**



Note: FAR = Floor area ratio.
Source: WRI India authors.

Figure 11 | Plot-Wise Consumed FAR in Indiranagar in 2018



CONSUMED FAR (2018)

LEGEND

Floor Area Ratio (FAR)

< 1.5

1.5 - 2.25

2.25 - 3.25

3.25 - 4.0

> 4.0

Vacant Plot

Plot Boundary

Metro Line

Study Area Boundary

150m radius from metro station

Indiranagar Metro Station

Public Parks / Play Grounds

Note: FAR = Floor area ratio.

Source: WRI India authors.

Figure 11 displays our plot-wise analysis of consumed FARs in Indiranagar for 2018.

Small plots and practical regulatory constraints hamper TOD incentive utilization: Development projects are unable to consume the FAR of 4 as small plot sizes are left with little buildable space after following regulations imposed by Bengaluru’s building bylaws. Predominantly, plot sizes in Indiranagar are very small as more than half the plots (66 percent) are less than 250 sq. m in area. This is partly because of the traditional urban fabric typical to inner-city areas in Bengaluru as they were originally developed this way with narrow streets, often less than 12 m in width,

prior to the RMP 2015 regulations coming into force. Today, the narrow streets prevent plots from building higher as per city zoning regulations, which demand wider roads abutting plots. Development projects in small plots are unable to reach an FAR of 4 as they are required to follow the minimum height and setback regulations that the city imposes for maintaining adequate natural light, ventilation, and fire safety in the buildings. Due to these constraints, only 70 plots within the current TOD zone have undergone redevelopment or modification to increase floor space, and fewer than 20 plots are close to achieving the allowed FAR of 4 under the TOD regulations. Under such practical constraints, the incentives, which are limited to

Figure 12 | Amalgamations in Indiranagar Helped Achieve Higher FAR



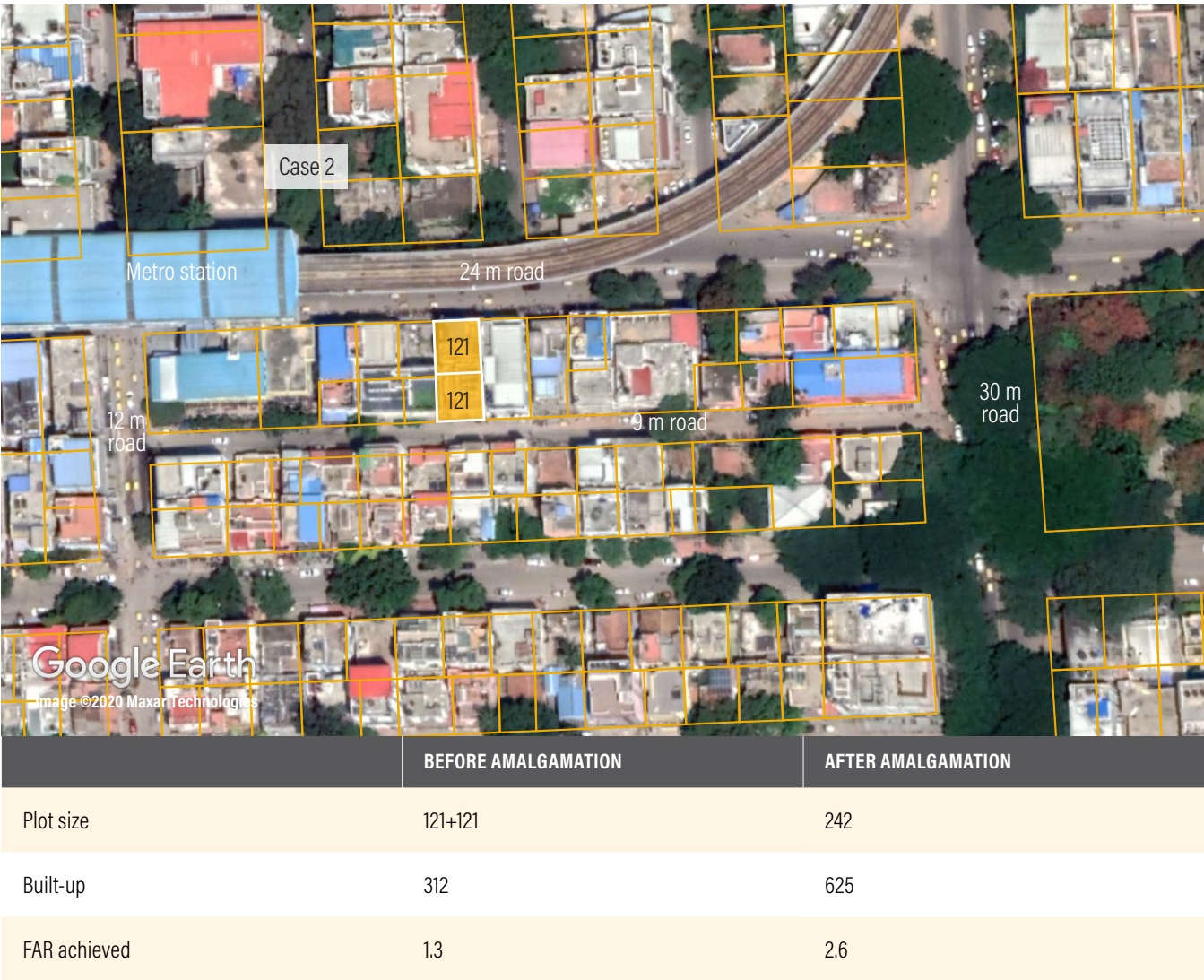
Note: FAR = Floor area ratio. Plot measurements are in square meters.
Source: WRI India authors.

only 150 m of the station area, are unlikely to yield desirable outcomes for TOD. This will also hamper the deployment of LVC mechanisms, which are dependent on redevelopment and higher built-up density.

Amalgamation as a response to small plots for achieving higher FARs: To achieve higher FARs in Indiranagar, private developers and landowners are partnering to amalgamate plots, to implement larger

development projects. This method, however, fails where plot sizes are very small and have dispersed ownership. Since there are very few or no occurrences of amalgamation identified within the 150 m distance from Indiranagar station, our study looked at five different cases within 500 m distance of the station that involved amalgamation of two plots (Figures 12 and 13). We found that two out of five cases achieved higher FARs of up to 3.6 after plot amalgamation.

Figure 13 | **Small Plots Near Indiranagar Metro Station That Did Not Achieve Maximum allowable FAR Despite Amalgamation**



Note: FAR = Floor area ratio. Plot measurements are in square meters.
Source: WRI India authors.

In the remaining three out of five instances where the plot sizes were below 250 sq. m, despite amalgamation of two plots the redeveloped buildings struggled to achieve a FAR of 2 (Figure 14). We deduced that offering additional FARs has not

been enough to encourage plot amalgamation. For effective value capture, this points to, first, a need for increasing the TOD influence zone and, second, incentivizing amalgamations within the TOD zones.

Figure 14 | Small Plots in Indiranagar That Did Not Achieve the Allowable FAR of 4 Despite Amalgamation



	CASE 3		CASE 4		CASE 5	
	Before Amalgamation	After Amalgamation	Before Amalgamation	After Amalgamation	Before Amalgamation	After Amalgamation
Plot size	215+235	450	190+175	365	140+250	390
Built-up		830		424		1,304
FAR achieved		1.85		1.16		3.34

Note: FAR = Floor area ratio. Plot measurements are in square meters.
Source: WRI India authors.

9.2 Thalagattapura: A Station Area in the Urban Periphery

Thalagattapura station is located toward the southern end of the North-South Phase 1 corridor at around 16 km from the center of the city. The station has not been

opened to the public yet but is set to be operational soon (*The Hindu* 2017). Largely agricultural and with a lack of urban infrastructure, Thalagattapura is a typical station area located in the urban periphery.

As of today, there are only a few developments within a 500 m radius around the planned metro station of

Figure 15 | Consumed FAR around Thalagattapura Metro Station 2015



CONSUMED FAR (2015)

LEGEND

Floor Area Ratio (FAR)

Less than 1.5

1.5 - 2.25

2.25 - 2.7

2.7 - 4.0

Vacant Plot

Plot Boundary

Metro Line

Study Area Boundary (1 Km radius)

Thalagattapura Metro Station

Public Parks / Play Grounds

Note: FAR = Floor area ratio.

Source: WRI India authors.

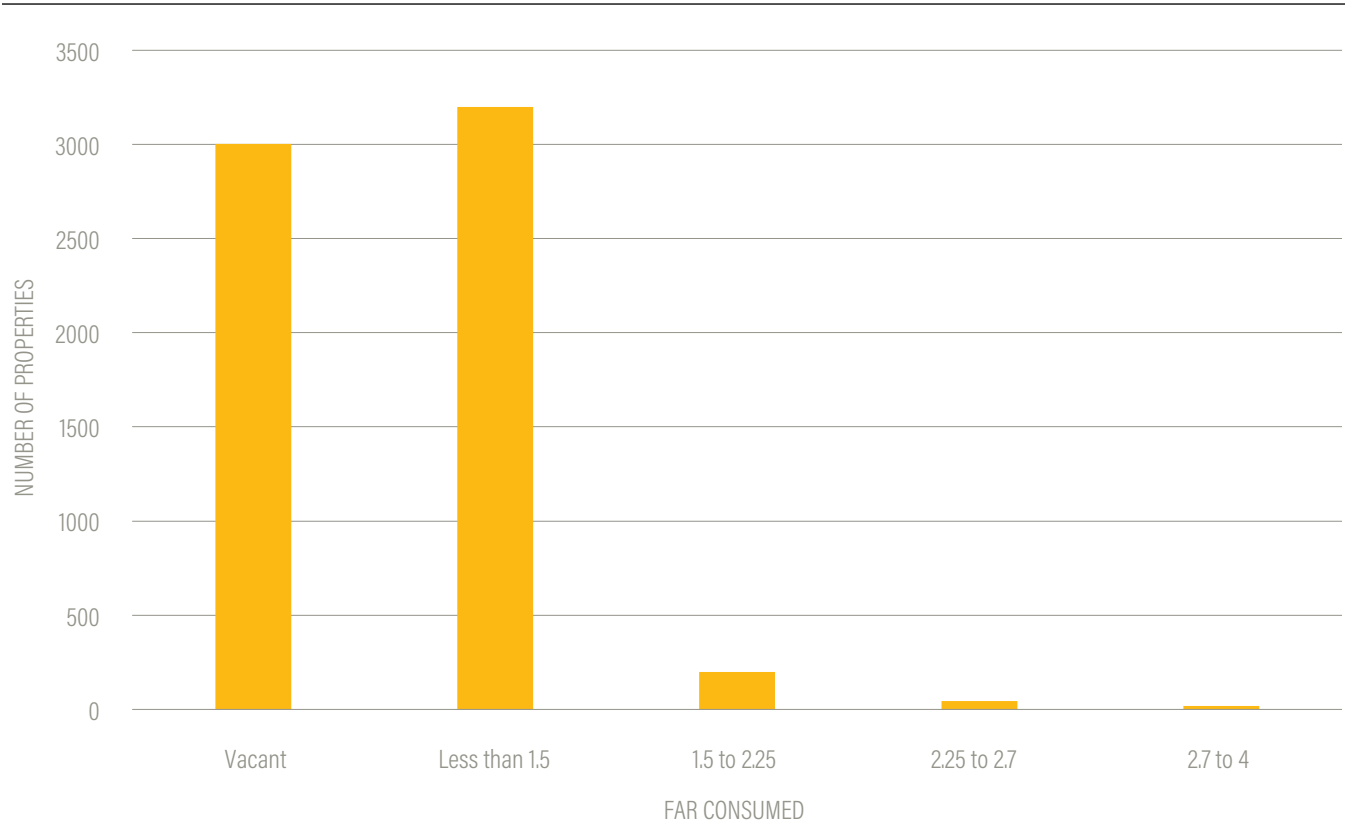
Thalagattapura. We felt it necessary to extend our study to a 2 km radius to understand the real estate market in the area. Although nearly half the plots within a radius of 2 km remain vacant in the area, the emerging real estate growth here is caused by speculation on the upcoming metro connectivity (Figure 15). This is reflected in the form of land-use change from rural to urban (residential, commercial, and industrial), which has occurred only during the last decade. Presently, a large number of plots in Thalagattapura are still agricultural. With the current trend of residential and commercial developments in the area, we can reasonably predict more rural to urban land-use conversions in the future.

Impact of metro on real estate developments:

The prospects of metro rail have led to a slow transformation of the real estate market through

low-rise developments in Thalagattapura. The area predominantly comprises individual plotted residences, often without access to networked infrastructure such as public roads, water supply, and sanitation. Our survey, charted as Figure 16, reveals that approximately 90 percent of all 6,450 properties within a 2 km distance from Thalagattapura Metro Station have FARs less than 1.5, which is characterized as low rise. More recently, a limited number of high-rise multi-family dwelling projects have been constructed, demonstrating a potential change in the real estate market of Thalagattapura, a trend that is expected to continue. This growing real estate market triggered by metro rail has good implications for LVC. That said, the present state of public infrastructure is relatively poor or absent, thus discouraging high-intensity real estate investments.

Figure 16 | Low FAR Consumption Characterizes Development in Thalagattapura



Note: FAR = Floor area ratio. Calculated for 2 km radius around the metro station.
Source: WRI India authors.

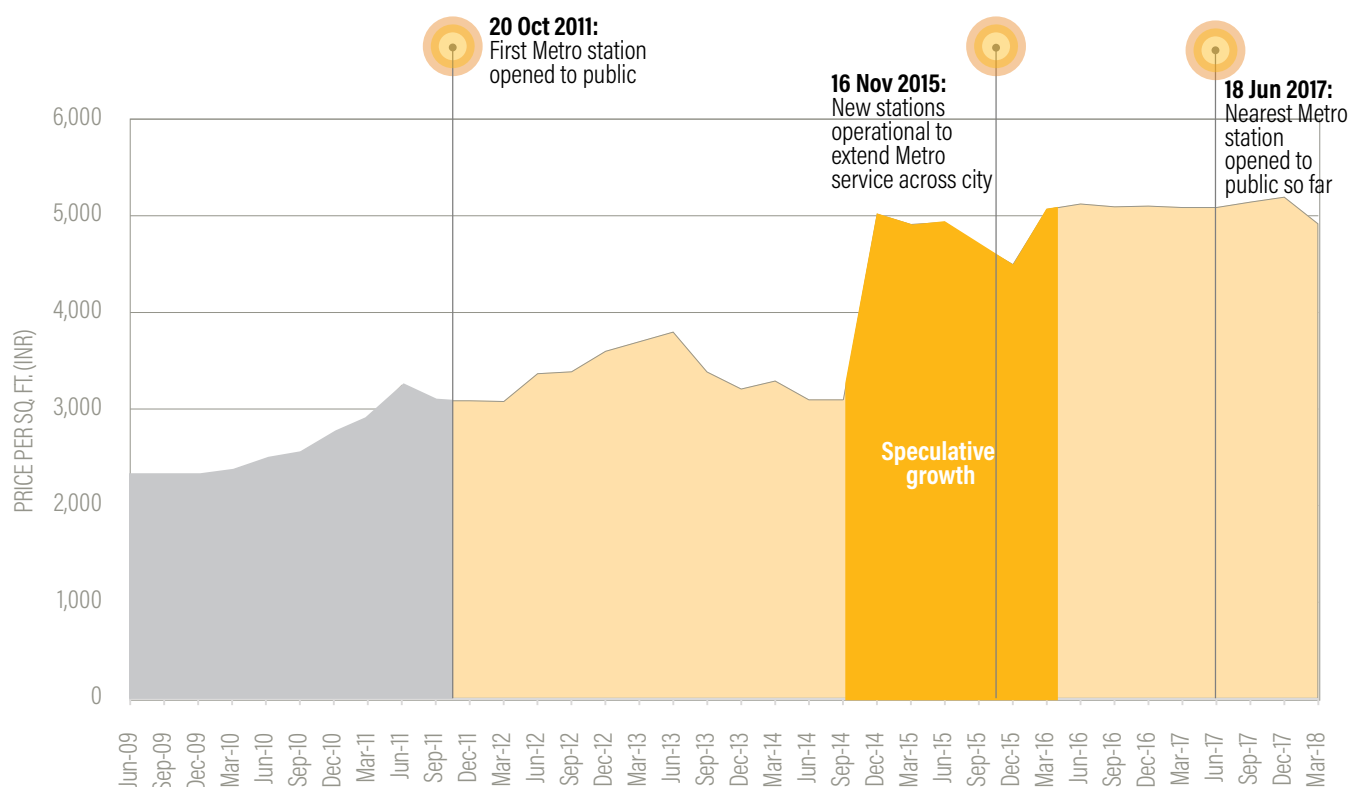
Impact of metro on property prices: Our comparison of real estate prices along the metro corridor across the city has shown that the highest proportion of increase occurred in residential prices along the peripheral stations, especially in the southern part of the city, where the Thalagattapura station is located (see Section 7). Property price trends in Figure 17 for Thalagattapura between 2009 and 2017 registered a steep increase with the growth of the metro rail network. The residential market has grown at a CAGR of 9 percent. Notably, property prices saw little growth when the metro rail was launched in the city, but soared to 40 percent before the nearby metro stations became operational.

Amalgamation as response to small plots: As with trends in the inner-city area of Indiranagar, amalgamation in Thalagattapura too has been a market response to utilize the TOD incentive. Our study notes

that 74 percent of the plots in Thalagattapura are less than 250 sq. m in area, which prevents them from utilizing the FAR of 4. Unlike the Indiranagar scenario, it has been easier for developers to combine land parcels and construct large enclaves in Thalagattapura, as about half of these plots are vacant. In the projects we surveyed, three to seven plots had been amalgamated in order to utilize the allowed FAR. Cases 6 and 7 that we investigated (Figure 18) are multi-family housing complexes that have come up within a 500 m distance from the Thalagattapura Metro Station.

With better accessibility, Thalagattapura is likely to attract more development (Figure 19). However, without incentives for amalgamation, real estate investments are ad hoc and slow, undermining the performance and potential of the upcoming transit infrastructure as well as LVC.

Figure 17 | Price Rise of Residential Properties in Thalagattapura Metro Station Area



Source: WRI India authors.

Figure 18 | Amalgamation of Plots within 500 m of the Metro Station in Thalagattapura



	CASE 6		CASE 7	
	Before Amalgamation	After Amalgamation	Before Amalgamation	After Amalgamation
Plot size	538+127+76	741	1,754+119+153+144+123+192+205+150+263+299+281+298	3,981
Built-up	Vacant	2,456	Vacant	10,212
FAR achieved	0	3.31	0	2.56

Note: FAR = Floor area ratio. Plot measurements are in square meters.

Source: WRI India authors.

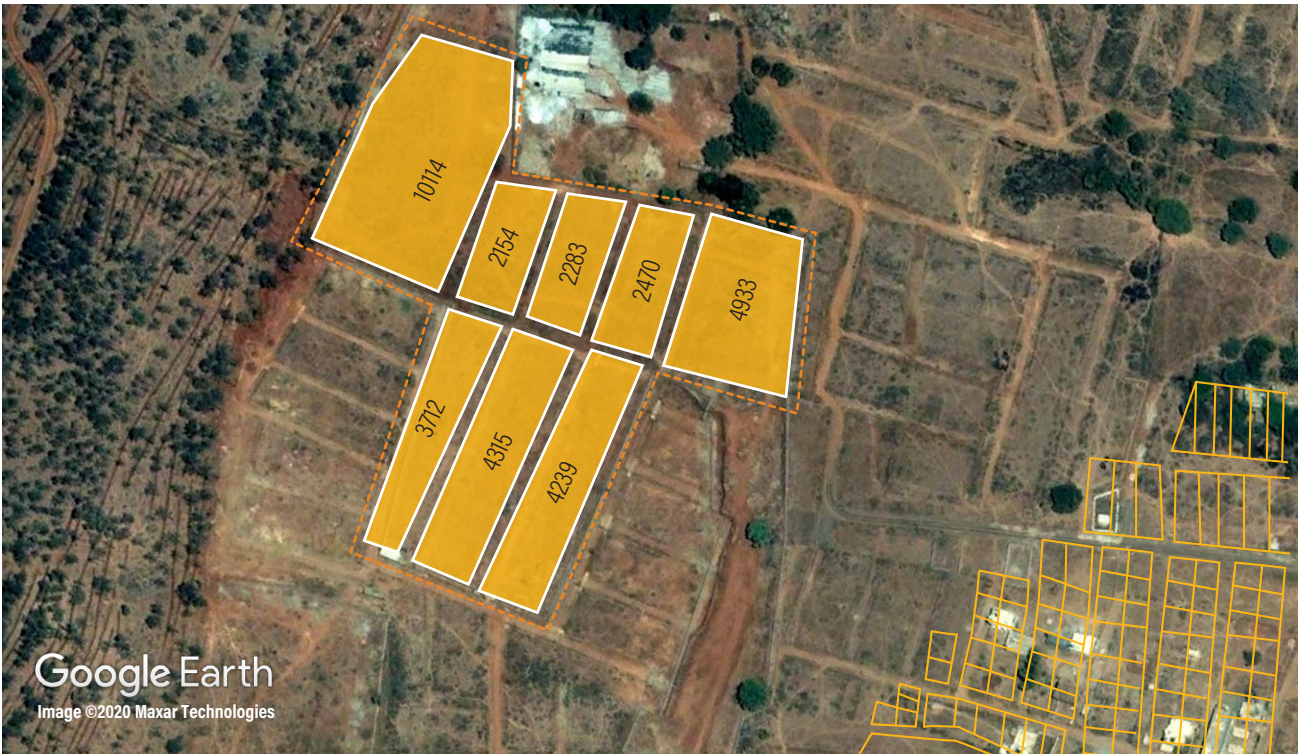
Figure 19 | **The Trend of Amalgamation is Also Prevalent among Small Layouts with Very Small-Sized Plots Demarcated for Individual Housing Units in Thalagattapura That Has Been Driven by Speculation**



	BEFORE AMALGAMATION	AFTER AMALGAMATION
Plot size	140 x 5	700
Built-up	Vacant	1,920
FAR achieved	0	2.75

Note: FAR = Floor area ratio. Plot measurements are in square meters.
Source: WRI India authors.

Figure 20 | **Fragmented Development Not in Sync with Adjacent Uses Leading to Structural Problems in Peripheral Areas**



Note: FAR = Floor area ratio. Plot measurements are in square meters.
Source: WRI India authors.

Fragmented large developments as an outcome of unregulated development in peripheral areas:

In the absence of a local area planning mechanism, fragmented large enclaves have led to a patchy and haphazard development pattern in the periphery. Amalgamations have given rise to large-scale developments in Thalagattapura that are not connected to each other or to their surroundings, creating islands of infrastructure that are privately provisioned (Figure 20). With the growing fragmentation of built landscape in Thalagattapura, it will become more complicated and costly for the government to provision infrastructure in the future. This is almost certain to result in a suboptimal outcome for the real estate market and decimate LVC potential. In addition, without visible improvements in connectivity and infrastructure access, it will be difficult for the government to establish a rationale for imposing LVC upon the citizens. There is an urgent need to plan the urban peripheral areas for overall improvement by augmenting the network infrastructure in an integrated manner.

10. OPPORTUNITIES: TOOLS, PROCESSES, AND INSTITUTIONAL FRAMEWORKS

We identified several LVC mechanisms that can help BMRCL fund the planned metro rail infrastructure through contributions from LVC, among other sources of finance. We found that there is a potential for higher returns if LVC funds are used for overall development of TOD areas, alongside the implementation and expansion of the MRT. Ensuring that LVC funds are spent for improvement of TOD areas, along with an improvement in the governance structure for dealing with funds, can enhance the

potential for tapping into the growing real estate demand along the metro corridors. In this section, we look at some of the opportunities for optimizing LVC through implementing TOD in Bengaluru.

10.1 Establishing the Unified Metropolitan Transport Authority

Unified Metropolitan Transport Authority (UMTA) for driving institutional coherence:

The establishment of a UMTA can help prioritize and coordinate different transport proposals and projects in the city to achieve integrated land use and transport planning. In the current structure of governance, where land use planning, and transportation are vested with different agencies, the role of mass transit in land development is not adequately recognized. The UMTA can empower BMRCL by prioritizing its role in planning processes, to focus on projects and schemes that support TOD. Learnings from previous experiences of delegating certain agencies in the city demonstrate that it is imperative for any “driver” agency to be empowered with the required legal and financial capabilities for effective implementation.

The UMTA can be empowered through the “Urban Transport Fund (UTF)” recommended by both GoI and GoK:

Creating a dedicated fund such as the UTF can ease fund management, and help the government prioritize reinvestments into the TOD communities. This, in turn, will help implement LVC smoothly, as funds from beneficiary contributions can be effectively utilized for local area improvements and service delivery and serve to build public trust. GoK approved the creation of a UTF for Bengaluru in 2010. However, although funding for TOD from different sources such as grants, borrowings, and LVC are being sought, the pooling of these resources by implementing the UTF has not been explored sufficiently. A larger pool of funds would enhance the capacity of the government to execute large-scale and more complex, integrated interventions such as land readjustment (Banerjee et al. 2019) that can yield positive results for LVC and TOD. Such projects have the potential to improve the infrastructure

penetration levels of an area significantly and allow for the levying of external development charges.

Linking usage of UTF with TOD projects:

The UTF is meant to be specifically used for urban transport projects, including their capital and operational expenditure. We were able to arrive at the following options for optimum utilization of the UTF. Our recommendations include, but are not limited to, the following:

- Funding of capital investments in bus stops, BRT corridors, metro rail infrastructure, waterways transport, procurement of rolling stock, NMT infrastructure, parking facilities, procuring new technologies for energy-efficient vehicles, and upgrading to intelligent transport systems
- Subsidizing urban transport operations—especially subsidies for elderly, women, students, and physically challenged; inter-modal fare rationalization
- Funding UMTA's operations, preparation of Comprehensive Mobility Plans, conducting urban transport studies and preparatory studies, and capacity building.

Notably, many of the usages identified above could be considered TOD-related projects. Hence, we posit that the UTF could be a vital link to coordinate funds generated through LVC for TOD. Current LVC models under discussion by BMRC and other agencies focus on generating funds solely for implementing the metro project. By linking LVC with the UTF, the funds raised from value capture could be utilized for various other transit-oriented area improvements.

10.2 Localized Mechanisms and Tools for Enhancing LVC

LVC policies are best selected and initiated

from the project conception stage: Indiranagar is an inner-city area that developed several decades ago and is currently transiting into a redevelopment cycle propelled by accessibility to metro rail connectivity. The provisions for TOD in Indiranagar have not been fully realized even over a period of nine years. This clearly

demonstrates the need for additional interventions, possibly through a combination of various regulations. The delay in operationalizing LVC has led to the government losing out on developments that have occurred up to now. The interim announcement (of the Premium FAR) has led to resentment among residents and created opposition against the government. This indicates that timely enforcement would allow maximum benefits to be reaped from implementing LVC. We found that selecting and implementing LVC mechanisms after infrastructure projects have been formulated has cost the city the strategic advantages of financial structuring based on local opportunities.

Regulating and facilitating land-use transformations in TOD areas can yield

higher LVC: With increased citywide accessibility, certain inner-city areas along the metro corridor are transforming from residential to commercial hubs. Commercial taxes paid by these developments contribute to higher revenues generated by the municipal corporation when compared to residential taxes. Regulating and enabling commercial activities in areas such as Indiranagar by permitting mixed-use developments would increase revenues from TOD areas. Similarly, stations on the outskirts would bring in conversion charges for rural to urban land-use transformation. In the absence of government incentives such as infrastructure upgradation and revision of permissible uses in the master plan, market-led processes have been slow.

Integrated planning in the periphery can help

achieve higher FARs: Peripheral station areas such as Thalagattapura have a high supply of housing stock within the metro corridors. Multi-family dwellings are being constructed here for large communities but with privately provisioned services. Their fragmented pattern of development often destroys connectivity by breaking up walking paths and gating roads. In the absence of public infrastructure and planning, these developments are also often not integrated with the transit infrastructure and are low-rise in character, leading to unsustainable urban sprawl. Such characteristics are often not addressed in TOD policy frameworks and, without local-level planning, lead to suboptimal outcomes of built-up densification. Planning

development in these areas with a view to organized infrastructure penetration can help achieve higher FARs and efficient land usage around metro stations.

Incentivize amalgamation for higher FARs and area improvements: Amalgamation of plots helps achieve higher FAR in Indiranagar and Thalagattapura, creating an opportunity for value capture. However, in both cases, the majority of the plot sizes are so small that an amalgamation of two plots may still be insufficient to utilize TOD incentives. The reconstituting of plots is fraught with difficulty due to the different lifecycles of buildings and a lack of willingness on the part of landowners to invest in change. This discourages developers from investing in the area for redevelopment. When amalgamations are incentivized and appropriately controlled, they can support redevelopment and bring multiple benefits such as improvement in living spaces, expanded penetration of road networks, more open spaces, better access to utility networks, pedestrian-friendly streets, and enhanced building frontage. Such improvements in the area strengthen the social contract between the government and residents, making public acceptance of levying LVC easier.

Expanding the TOD zone from 150 m to 500 m will allow the government to implement LVC for all properties that benefit from being located within walking distance of metro stations: From data insights we received from BMRCL for its Phase 2 Metro construction, the total estimated revenue from implementing the Premium FAR (considering that all the properties within 150 m from the metro will utilize the maximum allowed FAR of 4 and assuming 20 percent of the 2018 guidance value as premium) would be about INR 319.5 crores (approximately 45 million USD). This is roughly equivalent to the cost of constructing a 1 km stretch of the elevated metro line. However, the citywide real estate trends along the metro corridor as well as our case studies of two metro station areas led us to conclude that properties well beyond 150 m have benefited from metro connectivity. Our findings make a case for extending the TOD boundary to at least an easy walking distance of 500 m for optimizing LVC.

10.3 Strengthening Financial Framework for Operationalizing LVC

Government can use LVC to address specific issues depending on local contexts: Although the city has offered incentives and planned LVC with the help of blanket rules along the TOD corridor, the influence of the MRT varies depending on the area. If left solely to market forces, some areas may benefit more than others. The government needs to take the lead to improve less advantaged areas and make them attractive for investment. Adopting strategic approaches to bridge inadequacies in infrastructure will help tap into the unrealized potential for LVC along the TOD corridor. For instance, the government could prioritize basic infrastructure provision to peripheral stations that have more potential for development intensity as opposed to city core areas, which are already built. To identify such opportunities, the city needs to adopt localized solutions that incorporate the views and needs of diverse stakeholders.

Investment of LVC revenues needs to be inclusive and transparent: BMRCL's proposed LVC policies state the intention of sharing the generated revenue with other government agencies and stakeholders. In order to be effective, revenue sharing must be allocated in a need-based manner among all agencies involved in service delivery and land development. Ensuring transparent expenditure of funds collected through LVC would allow for public evaluation and building community trust that is essential for any sustainable implementation of LVC. The formulation of institutional and financial frameworks with dedicated targets, so that the funds collected through LVC are allocated for specific improvements, is another vital requisite. This will follow when LVC revenues are reinvested in the development of the station area along with enhancing the MRT infrastructure. A win-win situation should be created for all stakeholders by providing incentives to participate in, and benefit from, the LVC process.

Partial ring-fencing of LVC revenues can help finance local area development: Creating Benefit Districts to partially ring-fence the finance generated through LVC is one way to generate cross-funding for

strategic local development projects such as access to transit, water, and parks for residents of a particular district. LVC revenues from high-performing areas can be used to implement strategic projects in other low-performing areas, thus creating more equal access to infrastructure along the TOD corridor.

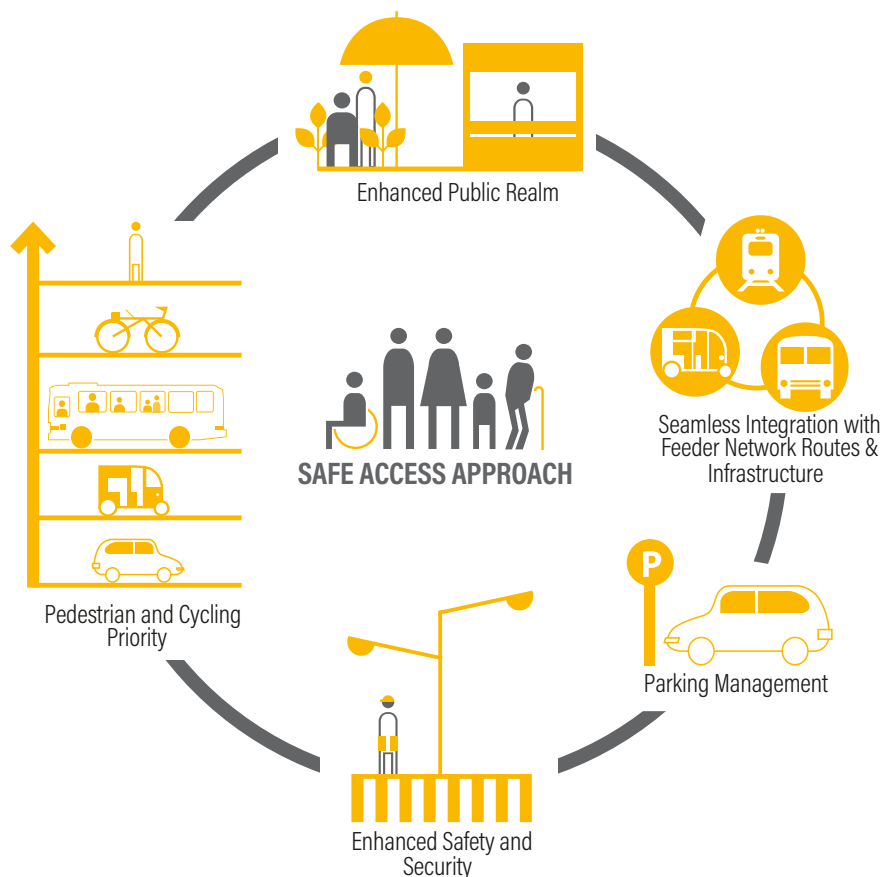
Leverage PPP: There has been successful involvement of the private sector in projects where the advantages for all the parties are clearly identifiable, such as funding stations in lieu of naming rights or commercial spaces. However, the government agencies involved in such collaborative projects need to ensure that the solutions are for public good and all stakeholders receive balanced benefits. To achieve this, the agencies need to be empowered and equipped to negotiate with private partners and manage opinions and consensus to benefit all.

10.4 Implementing Visible Changes in TOD Areas for Enhancing LVC

Creating visible improvements in the areas where land value is to be captured: People appreciate improvements in infrastructure and services that touch their everyday life. When citizens are able to appreciate the benefits, they are more willing to pay extra charges toward LVC and funding TOD.

Move beyond provisioning for built-up to enhancing accessibility to mass transit: A reorientation of policies toward enhancing connectivity to metro stations would play a key role in not only the efficient usage of mass transit but also toward sustainable urban form. Improvements such as augmentation of feeder transport services, multi-modal integration, safe NMT infrastructure, mixed-

Figure 21 | **Framework for Safe Access to Mass Transit**



Source: WRI India authors.

use urban form, enhancing public spaces, parking management, active street edges, amenities supply and utilities infrastructure, and universal accessibility will serve to enhance the public realm. Providing safe and convenient access can create visible change and increase the use and value of the MRT. We would like to put forward the idea that ridership of the metro is an indirect but critical factor in determining LVC. Figure 21 highlights WRI India's own guidelines outlining six principles for enabling safe and pedestrian-friendly access around the transition to public transport.

11. THE WAY FORWARD

In Bengaluru, TOD and LVC are being planned for implementation as separate efforts. TOD offers a value creation framework for the communities around station areas, which enhances the potential for LVC. TOD and LVC deployed in tandem can become a synergistic value creation and value capture mechanism. Synchronizing finance and urban planning processes can boost the outcomes of success. The evidence we gathered through our evaluation of Bengaluru's MRT demonstrates ample potential and opportunities for this. As a way forward, in this section we discuss policy requisites and strategies for using LVC as a mechanism to enable TOD, and vice versa.

11.1 Reorientation of Policies to Synergize LVC and TOD

Current approaches to LVC and TOD are set to create suboptimal conditions for LVC. Due to practical constraints, the incentives for higher FAR continue to remain unutilized. The lags between transit delivery, public services, and land development (public and private agencies) have created inefficient urban planning frameworks for delivering TOD. Our two case studies of Indiranagar and Thalagattapura demonstrate that planning in the city needs to link transit infrastructure provision and land markets within the TOD zone.

Infrastructure cannot be an afterthought of organic development. Land development and redevelopment will not work if left solely to market forces, and needs to be incentivized or regulated. Current policies can be reoriented in at least three ways to create a favorable environment for implementing LVC, as detailed below:

- **Transition from siloed planning of land use and infrastructure to integrated urban planning using TOD Policy and RMP 2031:** For LVC to be effective, there needs to be a total development of TOD zones. This calls for synchronous land-use planning and infrastructure delivery. Plans and projects are all prepared at the city level by different agencies that are not mandated to coordinate with each other. This limits the field of vision at the planning stage and therefore restricts the development of areas along the MRT. Bengaluru's land-use master plan for 2031 and prospective TOD policy for the MRT are being prepared separately by BDA and BMRCL. Collaboration between the two agencies to incorporate the TOD policy in the RMP 2031 would help align the limited resources of the city toward prioritizing common goals and provide legal backing for the implementation of TOD in Bengaluru.
- **Transition from laissez-faire to government regulating and participating in the market with adequate incentives that help achieve TOD principles:** The existing incentive of a higher FAR of 4 for development projects along the MRT in Bengaluru has not been enough for market forces to deliver the development of transit-supported, high-density, mixed-use areas. To help overcome this barrier, the government needs to engage more in regulating the market with a variety of additional incentives. Flexibility in zoning regulations and incentives for amalgamation of plots are needed for developments to be able to achieve higher densities. Appropriate incentives to help achieve desirable TOD can enhance the LVC potential in inner-city areas as well as in areas on the periphery. The government should also participate in redevelopment processes in collaboration with private developers and citizens to ensure maximum synergies between TOD and LVC.

- **Transition from funding transit infrastructure augmentation to financing local area development along the MRT:** Currently, prospective revenue from proposed LVC mechanisms is being thought of only in terms of financing the metro infrastructure. A short-term view would result in the city missing out on the possibility of using this source of funds for various other transit-oriented improvements that can help LVC in the long term. Enhancing connectivity to metro stations, creating a vibrant and safe public realm, and augmenting the networked infrastructure are efforts that would transcend the improved usage of mass transit to enable an overall sustainable urban form. These are all tangible improvements that will allow citizens to experience, appreciate, and build trust in the use of additional revenue by the government.

11.2 Strategizing for Value Capture and Value Creation

Public-transit-intensive areas are precious urban spaces in a city as they serve, or have the potential to serve, large sections of the population; greater accessibility and mobility help communities live, work, and access amenities and recreation. They are also characterized by multiple functions and a very high footfall of users. The conditions in the station area surroundings also have a considerable impact on the popularity of the mass public transit. Therefore, these need special attention in terms of infrastructure, services, funding, and operation and maintenance than the rest of the areas and need to be identified as such. Value capture should go hand in hand with value creation. The following are pointers on how to achieve this coherence:

- **Willingness to learn and adapt:** Most successfully implemented international cases show that a shift in strategies is required to continue to be successful in business. Organizational agility supported by leadership needs to ensure that the overall objectives are not compromised while constantly re-strategizing solutions for changing circumstances.
- **Create quick wins to stay motivated:** Choose the right pilot projects, take strategic decisions that would most probably succeed, and distribute risks. For instance, to offset possible investment risks, peripheral station areas where development is predominantly through predictable greenfield real estate development could be packaged with areas with uncertain returns. Typically, developers always look for options with maximum profits; however, in the long run, public demand could shape and drive developer willingness to go the extra mile to contribute toward TOD.
- **Secure public participation and enhance confidence:** Conscious efforts are required to address citizen reservations against LVC and reassure them through transparent implementation and demonstration of local area improvements. This would lead to worthwhile gains as sustainable development is most effectively achieved by securing the confidence of the community. Community participation and partnership in development will optimize the impact and outcomes of TOD and LVC.

11.3 Scale Up TOD Using LVC across the City

There needs to be a well-thought-out scale-up strategy for using LVC to expand TOD. The status of proposals for LVC by BMRCL reveals that some value capture mechanisms are already approved by the government. However, they are yet to be applied due to various legal and institutional hindrances. The following policy directions could be considered to formulate strategies:

- **Formulate robust LVC policies from the perspective of clear horizon and approach for loans:** A combination of long-term loans and sound LVC policies has helped several cities successfully implement public-transit-related projects. However, formulating LVC policies need to be supported by clear institutional roles and responsibilities.
- **Induce changes in planning and plan implementation processes to benefit the metro and LVC:** Creating a cohesive ecosystem of policies remains a major challenge in Bengaluru.

There is a lack of common priorities among the various agencies involved in planning, development, and services provisioning. Therefore, continuous engagement with the responsible agencies is needed to ensure that urban planning processes and implementation of LVC tools are specifically directed at local area improvement. For instance, land readjustment, which is a very important process that could support implementation of the metro, is often not attempted due to varied priorities and lack of coordination of the agencies involved.

- **Introduce greater flexibility in institutional powers at the city level:** Typically, local government agencies in India are less empowered to take decisions and often have to expend a high proportion of their energy to conform with bureaucratic norms. Unlike successful global examples of empowered transit agencies, BMRCL is limited by a lack of flexibility in earning and spending funds and in its capacity to manage them. However, such empowerment also demands transparency for public scrutiny. Building capacities into such implementing agencies can then become key to their success.

- **Institute local area plans:** A multi-scale planning process will allow plans to be reflective of the demands of various localities as well as the interests of the larger metropolitan region. Provisioning ward-level plans through the RMP 2031, with wards forming the planning district boundaries, will make it more feasible for communities to see local-level priorities reflected. Delineating functions across various levels of government and empowering the lowest level of political authority (the municipal corporation) to make decisions can address the institutional, planning, and policy shifts required to translate benefits to local areas and neighborhoods.

In conclusion, this practice note illustrates the ways in which TOD and LVC are linked. It also points to future research directions that can help understand the synergistic link and its implications more accurately. There is a definite case for a future study on how the forthcoming city master plan and TOD policy will impact LVC.

The opposition to proposed LVC mechanisms has raised questions on the equity implications of applying LVC along the Bengaluru Metro corridors (a forthcoming WRI India paper seeks to explore this in greater detail). Another important aspect from an equity and real estate adjustment standpoint is examining whether the housing markets in Bengaluru—and especially around the metro—are aligned with market demand. For instance, is there a demand for smaller affordable housing units while the market is providing larger premium stock?

Finally, in addition to the LVC mechanisms discussed in this paper such as the Premium FAR, Betterment Levy, leasehold agreements, and joint development, it is worth exploring how LVC might play out for the other value capture instruments that BMRCL is considering and whether these need to be contextualized for success.

LIST OF INTERVIEWS

1. Mr. P.S. Kharola, MD
2. Mr. Vasanth Rao, Chief PRO and GM (Finance), Bengaluru Metro Rail Corporation Limited (BMRCL)
3. Mr. Jaisimha, Deputy Director, Town Planning, Bengaluru Development Authority (BDA)
4. Mr. Balasubramanya, Advisor (Finance), BDA
5. Mr. Shamanth Kuchangi, Technical Head, Directorate of Urban Land Transport (DULT)
6. Mr. Girish K. S., Local Director, Strategic Consulting, JLL
7. Prof. Ravikant Joshi was interviewed by WRI India team on Land Value Capture in 2017
8. Prof. Sanjeev Chandorkar of Tata Institute of Social Sciences (TISS) was interviewed by WRI India team on Land Value Capture in 2017

REAL ESTATE DATA SOURCE

Liasis Foras (<https://www.liasisforas.com>)

CONVERSION RATES

1 Indian Rupee = 0.014 USD

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ABOUT THE STUDY

This study responds to a request for preparing a preliminary report to understand impacts of an ongoing Metro Rail project on potential Land Value Capture (LVC) mechanisms from the Asian Development Bank (ADB). The practice note is intended to help local governments understand steps they can take to tap potentials for ensuring long-term sustainability of funds invested in the metro infrastructure. The way forwards proposed in this paper focus on policy reorientations to create synergy between Transit-Oriented Development (TOD) and LVC, as well as strategies which can help implementation and scaling-up of these mechanisms across the city. Despite the study's focus on Bengaluru, the authors believe the analysis and findings shared in this paper are relevant for other Indian cities which are retrofitting metro rail transit systems over an already existing dense built-up fabric, and hope that it will serve as a tool and motivation for adopting necessary institutional change.

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