JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PROJECT FOR CAPACITY ENHANCEMENT FOR TRANSIT ORIENTED DEVELOPMENT IN THE PHILIPPINES

STRATEGIC TOD GUIDELINES

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Abbreviation List

AEMS	Area Energy Management System
AI	Artificial Intelligence
AIST	Advanced Industrial Science and Technology
ATR	Kementerian Agraria dan Tata Ruang
AusAID	Australian Agency for International Development
BAU	business-as-usual
BCDA	Bases Conversion and Development Authority
BGC	Bonifacio Global City
BP	Business plan
BPN	Badan Pertanahan Nasional
BRT	Bus Rapid Transit
CASBEE	Comprehensive Assessment System for Built Environment Efficiency
CBD	Central Business District
CCA	Climate Change Act
CCTV	Closed-Circuit Television
CDA	Comprehensive Development Areas
CDP	Comprehensive Development Plan
CLUP	Comprehensive Land Use Plan
CP	Conceptual Plan
CTC	Commuter Town Center
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DEPDev	Department of Economy, Planning, and Development
DGCS	Design Guidelines, Criteria & Standards
DHSUD	Department of Human Settlements and Urban Development
DILG	Department of the Interior and Local Government
DOF	Department of Finance
DOTr	Department of Transportation
DPWH	Department of Public Works & Highways
DSG	Design and Standard Guidelines
EDSA	Epifanio de los Santos Avenue
EIA	Environmental Impact Assessment
FAR	Floor Area Ratio
FTI	Food Terminal Inc.
GAD	Gender and Development
GFA	Gross Floor Area
GIS	Geographic Information Systems
HLURB	Housing & Land Use Regulatory Board
HOV	High-Occupancy Vehicle
IATCTP	Inter-agency Technical Committee on Transport Planning
InfraCom	Infrastructure Development Committee
IRR	Implementing Rules and Regulations
IT	Information Technology
JDAs	Joint Development Agreements
JET	Jica Expert Team
JHC	Japan Housing Corporation

JICA	Japan International Cooperation Agency
JPY	Japanese Yen
JR	Japan Railway
KOIL	Kashiwa-no-ha Open Innovation Lab
KPI	Key Performance Indicator
LEED	Leadership in Energy and Environmental Design
LGC	Local Government Code
LGU	Local Government Unit
LLC	Limited Liability Company
LOS	Level of Service
LoT	Internet of Things
LPTRP	Local Public Transport Route Plan
LR	Land Readjustment
LRT	Light Rail Transit
LTFRB	Land Transportation Franchising and Regulatory Board
LVC	Land Value Capture
M&E	Monitoring and Evaluation
MAX	Metropolitan Area Express
MCW	Magna Carta of Women
MICE	Meetings, Incentives, Conferences, and Exhibitions
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MM	Minato Mirai
MMDA	Metropolitan Manila Development Authority
MMDC	Metro Manila Development Council
MMSP	Metro Manila Subway Project
MMUTIS	Metro Manila Urban Transportation Integration Study
MRT	Mass Rapid Transit
MTA	Metropolitan Transportation Authority
MTR	Mass Transit Railway
MTRC	MTR Corporation
MUCEP	MMUTIS Update and Enhancement Project
NAIA	Ninoy Aquino International Airport
NB	Northbound
NBCP	National Building Code of the Philippines
NCR	National Capital Region
ND	Neighborhood Development
NGA	National Government Agency
NGO	Non-Governmental Organization
NHA	National Housing Authority
NHSB	National Human Settlements Board
NMT	Non-Motorized Transport
NSCR	North-South Commuter Railway
NSCRx	North-South Commuter Railway Extension
NSS	National Spatial Strategy
NTP	National Transport Policy
NYC DOT	New York City Department of Transportation
O&M	Operation and Maintenance
PCEF	Passenger Car Equivalent Factor

PCU	Passenger Car Unit
PDCA	Plan-Do-Check-Act
PDP	Philippine Development Plan
PDX	Portland
PHP	Philippine Peso
PIB	Project Implementation Body
PIBs	Project Implementation Bodies
PIP	Public Investment Program
PMO	Project Management Office
PPAs	Programs, Projects, and Activities
PPP	Public-Private Partnership
PUD	Planned Unit Development
PUV	Public Utility Vehicle
PWD	Persons with Disability
RA	Republic Act
RDCom	Regional Development Committee
RLUC	Regional Land Use Committee
RM	Results Matrix
ROW	Right of Way
SB	Southbound
SD	Special Destination
SIA	Social Impact Assessment
SLEx	South Luzon Expressway
SMART	Specific, Measurable, Achievable, Relevant, Time-bound
SMU	Special Mixed-Use Zone
SPUR	Special Planned Unit Redevelopment Zone
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TDM	Travel Demand Management
TDR	Transfer of Development Rights
TFDS	Transit Facility Design Standards
TIA	Traffic Impact Assessment
TIF	Tax Increment Financing
TMG	Tokyo Metropolitan Government
TMO	Town Management Organization
TOD	Transit-Oriented Development
TODCUP	Project for Capacity Enhancement for Transit Oriented Development in the Philippines
TOD-OZ	Transit-Oriented Development Overlay Zone
TRIP	Three-Year Rolling Infrastructure Program
TX	Tsukuba Express
UDC	Urban Development Corporation
UDCK	Urban Design Center Kashiwa-no-ha
UDHA	Urban Development and Housing Act
UGB	Urban Growth Boundary
UN	Urban Neighborhood
UNDP	United Nations Development Programme
UP-NCTS	University of the Philippines - National Center for Transportation Studies
UP-SURP	UP School of Urban and Regional Planning
UR	Urban Renaissance

URA	Urban Renewal Authority
UREIA	Urban Regeneration Emergency Improvement Area
UV	Utility Vehicle
V/C Ratio	Volume to Capacity Ratio
VCR	Volume Capacity Raio
X-SWOT	Cross-SWOT
ZO	Zoning Ordinance

PREFACE

The TOD Guidelines have been developed as a part of the Project for Capacity Enhancement for Transit Oriented Development in the Philippines (TODCUP). TODCUP is a technical cooperation project between the Japan International Cooperation Agency (JICA) and the Bases Conversion and Development Authority (BCDA).

The primary goal of TODCUP is to enhance the TOD planning and implementation capacity of BCDA and other relevant agencies, focusing on the areas along the Metro Manila Subway Project (MMSP) corridor. The project outputs are as follows:

Output 1	To foster BCDA's and relevant organizations' understanding on TOD and to implement coordination framework for TOD promotion
Output 2	To formulate TOD Conceptual Plans (CPs) and identify the necessary arrangement to realize the plans for the target corridor and the target station areas
Output 3	To develop TOD Business Plans (BPs) for model sites consistent with TOD Conceptual Plans

This TOD Guidelines document has been developed as a part of Output 1 of TODCUP which focuses on fostering a shared understanding of TOD and establishing a coordination framework among key stakeholders. The formulation of these guidelines involved close collaboration between BCDA, the JICA Expert Team, relevant agencies, including the Department of Human Settlements and Urban Development (DHSUD), the Department of Transportation (DOTr), the Department of Public Works and Highways (DPWH), the Metropolitan Manila Development Authority (MMDA), and Local Government Units (LGUs).

The TOD Guidelines are expected to serve as a reference for the following stakeholders:

DHSUD	To develop national TOD policies and guidelines.
LGUs	To integrate TOD concepts and implementation procedures into their Comprehensive Land Use Plans (CLUPs) and Zoning Ordinances (ZOs).
National Government Agencies	To implement coordinated actions that support TOD promotion.

The TOD Guidelines are organized into five chapters:

Chapter 1: Introduction	Overview of TOD principles, significance, and objectives.
Chapter 2: TOD Conceptual Plan Formulation	Objectives and methodologies for developing TOD Conceptual Plans.
Chapter 3: TOD Projects Overview	Introduction to key TOD project types, including urban development, transportation development, and environmental management projects.

Chapter 4: International Experiences of TOD	Case studies from Japan and other countries showcasing best practices in TOD.
Chapter 5: Proposals for TOD Implementation Mechanism	Recommendations for institutional coordination and implementation frameworks to support TOD in the Philippines.

By providing a structured approach to TOD planning and implementation, these guidelines aim to support policymakers, urban planners, and stakeholders in creating sustainable, transit-oriented communities that enhance connectivity, economic growth, and quality of life in the Philippines.

1 INTRODUCTION

This chapter defines Transit-Oriented Development (TOD), emphasizing its role in integrating urban growth with transport infrastructure. It outlines TOD's core goals, key components, and implementation scales, highlighting its potential to reduce congestion, enhance accessibility, and promote sustainable development. The chapter also examines Metro Manila's urban challenges, the MMSP's TOD opportunities, and the classification of Urban and Suburban TOD, setting the foundation for later discussions.

Chapter Overview

1.1 Basic Principle of TOD

1) **Necessity of Urban and Transport Integrated Development:** Explains the importance of integrating urban development with transport infrastructure to maximize the benefits of railway investment and create well-connected, sustainable communities.
2) **Overall TOD Goal:** Introduces the three main objectives of TOD: improving mobility and accessibility, promoting compact and energy-efficient urban areas, and fostering economic opportunities.
3) **TOD Components:** Describes the nine key elements of TOD, including density, mixed-use development, public space, public transportation, active transport, and affordable housing, which contribute to vibrant and sustainable urban environments.
4) **Coverage and Scale of TOD:** Explains the different scales of TOD implementation—corridor, station area, and project site—and their roles in integrating urban growth with transit infrastructure.

1.2 TOD related Institutional Framework in the Philippines

1) **Policies, Laws and Regulations:** include related laws related to urban development, transportation development, environmental and social considerations, etc.
2) **Main National Government Agencies for TOD:** roles and responsibilities of NGAs
3) **Land Development Planning Process in Metro Manila:** follows a multi-tiered structure that aligns national directives with local development objectives.
4) **Land Value Capture applicable in the Philippines:** includes land and property tax which will increase thanks to socio-economic activities through TOD activities and projects.

1.3 Significance and Rationale of TOD in Metro Manila

1) **Main Urban Issues in Metro Manila:** Discusses the key challenges of Metro Manila, including severe traffic congestion, vulnerability to natural disasters, and the shortage of affordable housing, and how TOD can address these issues.
2) **Urban Structure with Railway Network in Metro Manila:** Explores how Metro Manila's urban form is evolving, with railway corridors shaping new growth patterns and supporting more efficient, transit-oriented development.
3) **Challenges and Potentials of TOD along MMSP:** Identifies key challenges, such as improving intermodal connectivity and station area development, while highlighting TOD opportunities along the Metro Manila Subway Project (MMSP).

1.4 TOD Station Typology

Introduces the classification of TOD stations into Urban TOD and Suburban TOD, explaining their distinct characteristics and roles within Metro Manila's railway network.

1.1 Basic Principles of TOD

1) Necessity of Urban and Transport Integrated Development

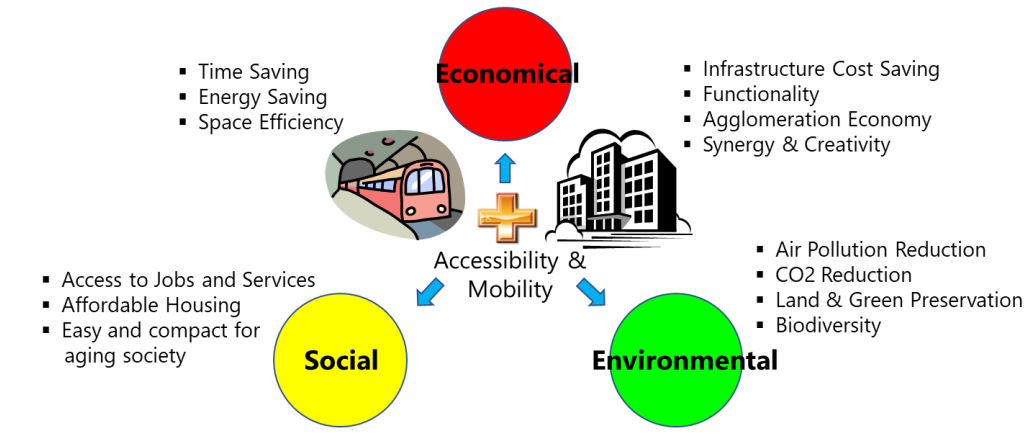
"TOD (Transit Oriented Development) is the concept of urban development integrated with public transport development, *which was originally proposed by the American urban planner to develop a mixed-use and walkable community within walking distance."*[1]

Urban railway development, such as Mass Rapid Transit (MRT) and Light Rail Transit (LRT), offers various benefits, including easing traffic congestion and saving both travel time and costs. Given the significance impact of railway development may cause, these benefits should be maximized and shared among various stakeholders, such as the government, private sector, and communities. (Figure 1.1).

For railway developments to contribute not only to transport development but also to socio-economic development and environmental management, urban and transportation development along and around railway stations must be well integrated and managed. Thus, TOD should be considered upon developments of urban railways.

While TOD has been widely promoted in conjunction with urban railways due to their high capacity and structuring effect on cities, the TOD concept is equally applicable to other forms of public transportation, including PUV terminals and jeepney routes.

Regardless of the mode, the fundamental principle of TOD remains the same: integrating land use and public transport to achieve efficient urban structure, and promoting a modal shift from private vehicle use to public transport, which can lead to increased ridership, improved public transport operation, and an overall enhancement of public transport service quality. Through these mechanisms, TOD contributes to the creation of compact, accessible, and livable urban areas. Therefore, TOD should be considered not only for railway developments but also in the planning and improvement of other public transport corridors.



Source: World Bank

Figure 1.1 Benefits from TOD

[1] "a mixed-use community within an average 2,000-foot walking distance of transit stops and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car"., "The Next American Metropolis", Peter Calthorpe, 1993

2) Overall TOD Goals

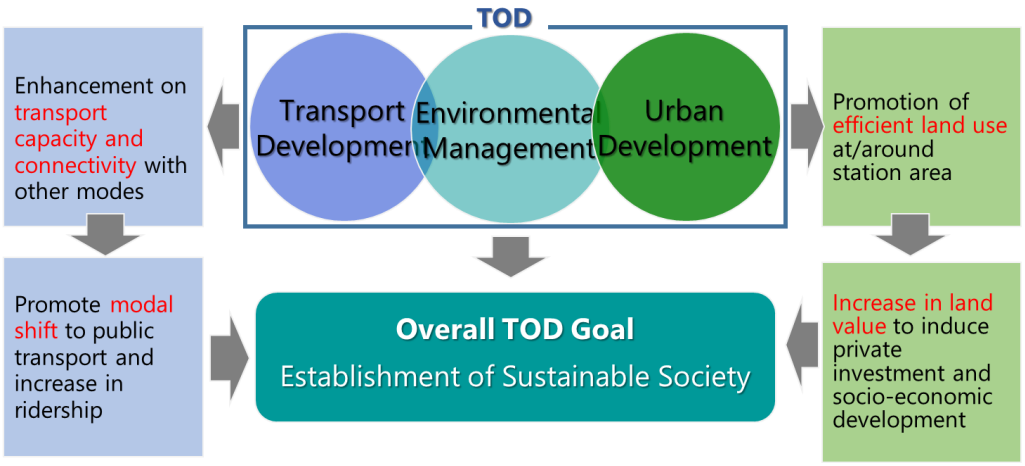
TOD mainly consists of three aspects: transport development (mobility and accessibility), environmental management (compact development and energy efficiency), and urban development opportunities. (Figure 1.2)

Achieving these aspects in a synchronized manner can realize the overall goal of TOD in the establishment of a sustainable society.

(i) Ensure ***mobility*** of the people and ***accessibility*** to services and activities

(ii) Promote ***compact and energy-efficient*** urban area

(iii) Enhance ***urban development opportunities*** at and around the stations



Source: JICA Expert Team

Figure 1.2 Overall TOD Goal

3) TOD Components

TOD is composed of various urban infrastructure, services, and planning items, including elements of urban development, transportation development, and environmental management. In principle, there are nine elements as follows: (Figure 1.3)

(i) **Density.** Higher population and building density around transit stations support public transportation efficiency, reduce car dependency, and promote walkability.

(ii) **Mixed-use Development.** Integrating residential, commercial, office, and recreational spaces reduces travel distances, encourages walking and cycling, and enhances economic vibrancy.

(iii) **Public Space.** Well-designed parks, plazas, and pedestrian-friendly streets improve quality of life, encourage social interaction, and enhance urban livability.

(iv) **Public Transportation.** Reliable, accessible, and well-integrated transit options (bus, rail, etc.) form the backbone of TOD, reducing reliance on private vehicles and lowering emissions.

(v) **Active Transport.** Infrastructure for walking and cycling (wide sidewalks, bike lanes, crossings) ensures first- and last-mile connectivity, promoting a healthier lifestyle and reducing congestion.

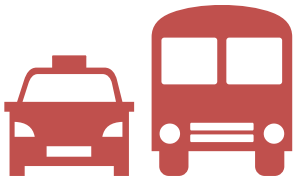
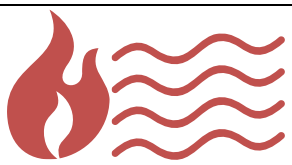
(vi) **Traffic Management.** Measures such as reduced parking, congestion pricing, and traffic calming prioritize pedestrians, cyclists, and transit users over cars, improving safety and efficiency.

(vii) **Community Identity.** Preserving local culture, history, and architectural character fosters a sense of belonging, making TOD areas attractive and unique.

(viii) **Resiliency.** Designing for climate adaptation, disaster preparedness, and sustainable resource use ensures long-term viability and environmental sustainability.

(ix) **Affordable Housing.** Ensuring housing options for various income levels prevents displacement, supports social equity, and allows diverse communities to benefit from transit access.

Each of these elements plays a crucial role in making TOD areas vibrant, sustainable, and inclusive.

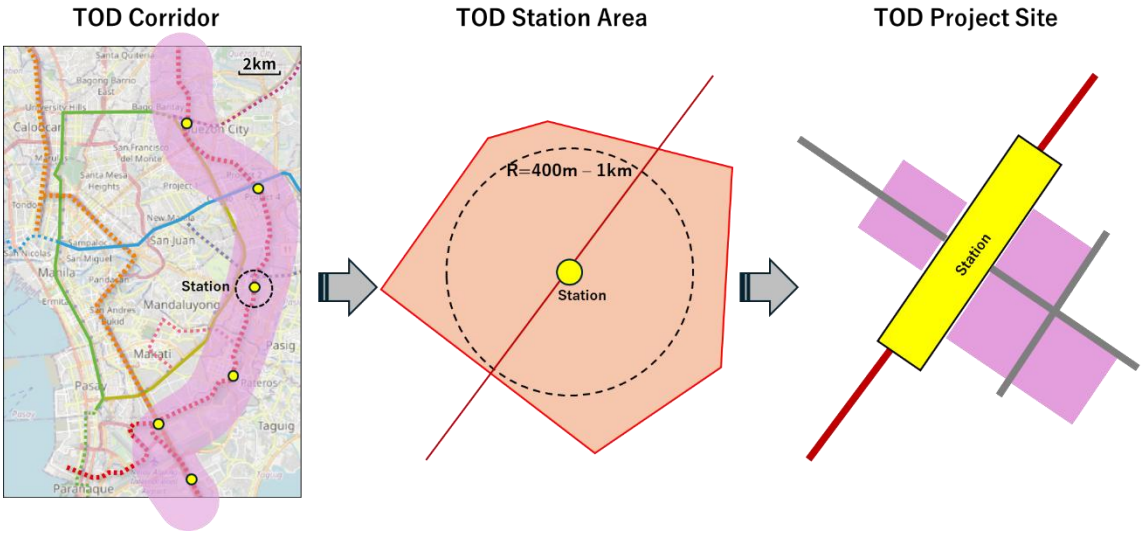
		
Density: Compact urban area	***Mixed-Use Development***: Commuting and living	***Public Space:*** Amenity and community space
		
Public Transport: Feeder services with intermodal facility	***Active Transport:*** Comfort for pedestrian and bicycle	***Traffic Management:*** Private vehicle restriction
		
Community Identity: Landmark of local communities	***Resiliency:*** Disaster resilient from flood and fire	***Affordable Housing:*** Convenient living spaces

Source: JICA Expert Team based on the World Bank

Figure 1.3 TOD Components

4) Coverage and Scale of TOD

While TOD implementation methodologies are operationalized on individual parcels or streets within station areas, planning must be conceptualized at multiple interrelated scales. TOD at different scales is classified into (i) corridor, (ii) station area, and (iii) project site level. (Figure 1.4)



Source: JICA Expert Team

Figure 1.4 Scales of TOD

Objectives, coverage, planning contents, and TOD image of each TOD scale are as follows:

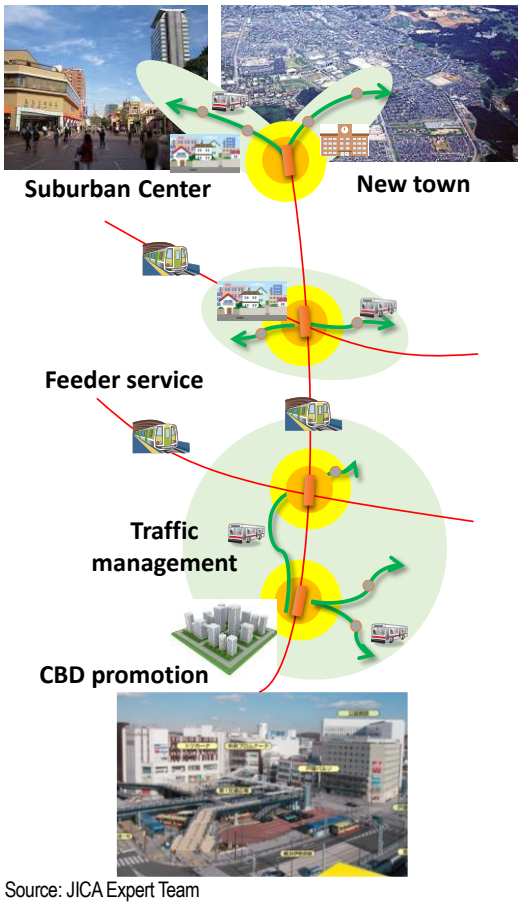
(i) TOD Corridor

Objectives: TOD corridor planning aligns with city and regional urban and transportation development strategies to promote socio-economic growth and increase railway ridership.

Coverage: Extends along the railway line and outward to the limits of feeder service coverage, including key transit nodes, intermodal facilities, and major urban centers or suburban new towns. (Figure 1.5)

Planning Contents: Key elements include railway connectivity between central business districts (CBDs) and suburban centers, expanded station catchment areas through feeder services, and intermodal facility development.

Relevant Plans: CLUP, and urban transportation network plans.



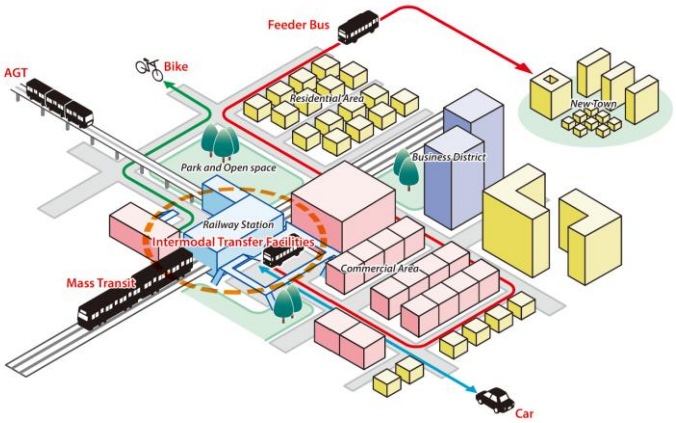
Source: JICA Expert Team

Figure 1.5 Image of TOD Corridor

(ii) TOD Station Area

Objectives: The TOD Station Area promotes accessibility, mobility, economic growth, and resilience by shaping the entire station environment.

Coverage: Covers the full station area within walking distance (0.4–1 km radius, or a 5–10 minute walk). (Figure 1.6)



Source: JICA Expert Team

Figure 1.6 Image of TOD Station Area

Planning Contents: Various urban facilities are included such as an intermodal transfer facility, parks, commercial and business facilities, residential apartments, and others. Access roads and sidewalks are provided connecting to the station.

Relevant Plans: Zoning Ordinance, road development plans, affordable housing development plans, disaster risk reduction plans.

(iii) TOD Project Site

Objectives: The TOD project site focuses on specific developments within the station area, ensuring they align with the broader TOD strategy.

Coverage: Site-specific developments, typically individual lots or small clusters of parcels, directly adjoining or within a short walk of the station. (Figure 1.7)

Source:
https://www.mori.co.jp/en/projects/toranomonhills_area/toranomonhills_stationtower/

Figure 1.7 Image of TOD Project Site – Toranomon Hills Station Tower –

Planning Contents: Various mixed-use facilities, intermodal transfer facilities, and access roads are developed and integrated with the station.

Relevant Plans: Zoning Ordinance, road development plans, detailed plan of urban development projects.

1.2 TOD related Institutional Framework in the Philippines

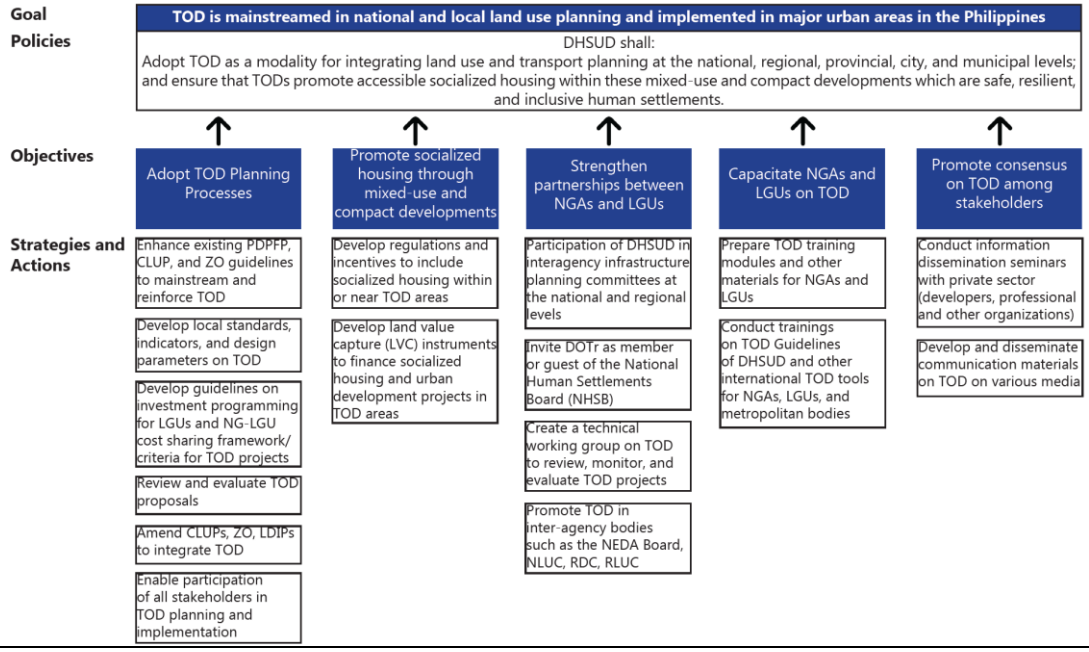
1) Related Policies, Laws and Regulations

(i) Policies, Laws and Regulations

TOD planning related laws include mainly those related to urban development, transportation development, housing development, and environmental and social considerations.

Table 1.1 Planning related Policies & Laws

Policies & Laws	Main Contents and Relevant with TOD
Civil Code of Philippines of 1949 (R.A. No. 386)	The Civil Code of the Philippines governs property rights, contracts, and succession. The said law includes provisions on **property acquisition and development, legal frameworks for contracts, and urban planning and zoning laws**, all of which are essential across different stages of TOD planning.
National Building Code of the Philippines (NBCP of 1977, aka P.D. No. 1096)	Applies to the design, construction, use, and maintenance of public and private buildings. It includes provisions for **zone classification, floor area ratio (FAR), lot area, building height, light and ventilation, setback, parking, sanitation, and building projection over public streets**, which are applicable for TOD planning, as well.
Batas Pambansa Blg. (National Law No.) 220 *(1982)*	It promotes private sector development of **affordable housing** for average and low-income earners in urban and rural areas. It sets rules and standards for such projects, ensuring minimum safety, health, and ecological requirements, which can help develop affordable housing in TOD areas.
Accessibility Law (B.P. Blg. 344) *(1983)*	Ensures the rights of people with disabilities to fully participate in society and access the same opportunities as other citizens. The law's Implementing Rules and Regulations (IRR) set **minimum standards** and provisions for making public buildings, facilities, and utilities **accessible to differently-abled individuals**. As TOD aims to create inclusive communities, this law is also applied to TOD planning.
Local Government Code (LGC) of 1991 (R.A. No. 7160)	The LGC authorizes LGUs to formulate their land use plans, development plans and ordinances. Thus, it is in the **LGU's power** to implement TOD-related initiatives within their jurisdictions. In addition, this means that collaboration with the LGU's is essential in the realization of TOD plans.
Urban Development and Housing Act (UDHA) of 1992 (R.A. No. 7279)	The UDHA aims to address issues related to **housing, urban development, and land use** by encouraging sustainable and inclusive urban planning. The act also provides incentives to private developers who participate in social housing development. Moreover, it includes provisions on land use, planning, zoning, and community engagement to ensure that the public has access to basic services, which is fundamental for TOD planning.
Magna Carta of Women (MCW) (R.A. No. 7910) *(2009)*	Mandates **the adoption of gender mainstreaming** by all government departments, agencies, universities, corporations, and LGUs. It aims to promote women's rights and eliminate gender discrimination in various aspects of governance, which also needs to be considered in TOD planning. In addition, guidelines in the MCW will aid in ensuring that women and gender-inclusive facilities will be present within TOD areas.
Climate Change Act (CCA) of 2009 (R.A. No. 9729)	Mandates LGUs to play a crucial role in the country's **climate change strategy** by integrating sustainable development practices in their land use and development plans, which is in line with the component of TOD principles.
National Disaster Risk Reduction and Management Act (R.A. No. 10121) *(2010)*	Emphasizes the government's commitment to **integrating disaster risk reduction and climate change** into various development processes, which support the environmental aspect of TOD.
Balanced Housing Development Program (R.A. No. 10884) *(2016)*	Enhances the Balanced Housing Development Program of UDHA. This Program mandates owners and/or developers of subdivision and condominium projects to allocate a minimum of 15% of the total subdivision area or project cost for **socialized housing**. Alternatively, a minimum of 5% of the condominium area or project cost may be allocated for condominiums. This program can help TOD areas become accessible across all income levels if socialized housing provision is enforced within development areas or certain restrictions in terms of socialized housing development location.
National Transport Policy (NTP) *(2017)*	Formulated by the Department of Economy, Planning, and Development (DEPDev (formerly NEDA)) to help achieve the Transport Vision of a "safe, secure, reliable, efficient, integrated, intermodal, affordable, cost-effective, environmentally sustainable, and people-oriented national transport system that ensures improved

Policies & Laws	Main Contents and Relevant with TOD
	quality of life of the people." NTP also clearly promotes TOD together with non-motorized and active transportation and public transportation usage.
Transit-Oriented Development (TOD) Policy Framework *(2023)*	The framework, formulated by the Department of Human Settlements and Urban Development (DHSUD), aims to **mainstream TOD in national and local land use planning** by 2028 in the Philippines. Additionally, DHSUD will ensure that **TODs promote accessible socialized housing in safe, resilient, and inclusive mixed-use developments**. To achieve this, the policy outlines five key objectives: (i) TOD planning processes, (ii) socialized housing development, (iii) capacity development, (iv) partnership between National Government Agencies and LGUs, and (v) consensus building among TOD stakeholders. This policy is the basis of the entire TOD plans and projects. 

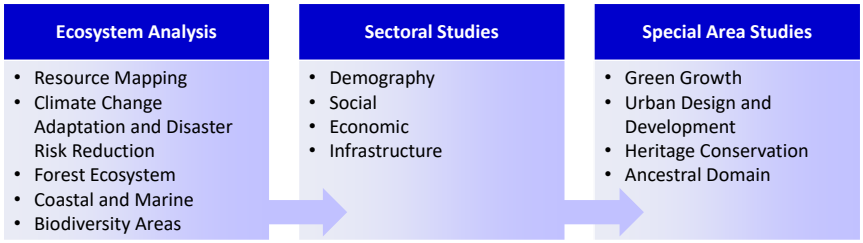
Source: JICA Expert Team

(ii) Guidelines and Manuals

There are also several guidelines and manuals related to TOD planning and implementation.

Table 1.2 TOD related Guidelines and Manuals

Guidelines & Manuals	Description
CLUP Guidebook 2014	An integrated guidebook that captures the whole planning process from organizing to monitoring and evaluation categorized into three volumes: Volume 1: The Planning Process, Volume 2: Sectoral Studies and Tools for Situational Analysis, and Volume 3: Model Zoning Ordinance. The following references likewise complement the guidebook: • Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in Comprehensive Land Use Plan (Project Climate Twin Phoenix: Housing & Land Use Regulatory Board (HLURB) / Climate Change Commission / United Nations development Programme (UNDP) / Australian Agency For International Development (AusAID)), approved by HLURB in February 2014, and • A Guide to Comprehensive Land Use Data Management (HLURB CLUP Guidebook 2007, Volume 3). As one of the main implementing bodies of TOD is LGUs, TOD plans need to be incorporated in the CLUP. The current guidebook already mentioned TOD, but the importance of TOD and its planning and implementing methodologies also need to be explained in these guidebooks. The major sections of Volumes 1 and 2 are shown below.

Guidelines & Manuals	Description
	Volume 1  **Volume 2** 
Highway Safety Design Standards *(2012)*	The standards of road safety planning and design activities as well as in road safety maintenance activities, are provided therein. The revised manuals comprise of: • Part 1 – Road safety design including standards and guidelines for safety planning, safety design, and for road safety risk assessment. • Part 2 – Road signs and pavement markings including standards and guidance for the installation and use of regulatory signs, guide signs, express way signs, traffic instruction signs, hazard markers & pavement markings. Similar to the Design Guidelines, Criteria & Standards (DGCS), these standards should also be applied for planning road infrastructures in TOD area.
Design Guidelines, Criteria, and Standards (DGCS, 2015) of the Department of Public Works & Highways (DPWH)	The official guide for the designs of DPWH. The DGCS was prepared to specify the design policies, standards, and procedures that are used by DPWH and by consultants engaged by DPWH. The DGCS should be applied for planning road infrastructures in the TOD area.
Local Public Transport Route Plan (LPTRP) Manual *(2017)*	The manual is designed for corridor-focused transportation route planning. It aims to guide LGUs in determining the appropriate public transportation routes within their localities based on passenger demand and corresponding public transport services. This manual helps to plan future public utility vehicle (PUV) routes for TOD areas.
Guidelines on the Design of Bicycle Facilities along National Roads *(2020)*	The guidelines provide a uniform design of bicycle facilities in order to achieve a consistent approach that will meet the needs and safe access of bicyclists and other road users. The proposed designs include bicycle lanes, relevant signages and bicycle parking facilities. This guideline helps to promote bicycle usage in TOD areas.
DOTr -Transit Facility Design Standards (TFDS) *(2024)*	This Design Standards serves to elevate the Philippines' passenger transportation facilities to global standards, ensuring a comfortable, accessible, safe, sustainable, and affordable transportation system. TFDS covers the facilities for all public transportation sectors including railway and road-based public transportation. This Design Standards helps to design station plazas and walkways in TOD areas.
Harmonized Gender and Development (GAD) Guidelines *(3rd edition, 2016)*	Promotes the twin goals of gender equality and women empowerment. The guidelines consist of three parts: • Part 1 – Focuses on a core set of requirements in the form of questions that apply to project development, regardless of sector or project type. • Part 2 – Deals with GAD guidelines for developing certain types of projects or projects in a particular sector.

Guidelines & Manuals	Description
	• Part 3 – Presents GAD checklists for the management, implementation, and monitoring and evaluation of development projects. These guidelines can be implemented to ensure that TOD areas will have gender-inclusive facilities such as universal comfort rooms and breastfeeding rooms for mothers.

Source: JICA Expert Team

2) Main National Government Agencies for TOD

Regarding TOD implementation, LGUs control urban developments while the following national government agencies are involved in line with original responsibilities and mandates of agencies.

Table 1.3 Role-sharing of Relevant Agencies for TOD

Agency	Role-sharing
DHSUD	DHSUD, established under RA 11201, oversees housing, human settlement, and urban development. TOD, a planning strategy promoting public transit and livable communities, aligns with DHSUD's mission. It's tasked with formulating national TOD frameworks, policies, and standards, as well as monitoring their implementation. DHSUD, empowered to administer government lands and engage in partnerships, collaborates with relevant agencies like DOTr, DPWH, and LGUs to implement TOD plans and advance urban development.
DEPDev	DEPDev is the government's independent planning body tasked with coordinating development plans and policies. It ensures that any national TOD framework aligns with established priorities and coordinates with other government initiatives. Working with DHSUD and relevant agencies, DEPDev may integrate TOD into national policies and plans to promote inclusive and sustainable urban development.[2]
DOTr	DOTr is the government's main authority for transportation development and regulation. It guides both public and private investment in intermodal transportation. This includes formulating national policies, coordinating infrastructure projects with DPWH, and issuing permits for land and rail transportation services. Given that TOD integrates land use and transportation planning for sustainable urban development, DOTr collaborates closely with DHSUD, DPWH, and other relevant agencies to ensure efficient integration of transportation and urban development in TOD frameworks, prioritizing accessibility and promoting public transit, walking, and cycling.
DPWH	DPWH is the government's main agency for engineering and construction, handling roads, bridges, and public works projects aligned with national goals. It enforces safety standards and plans projects in coordination with approved government plans. Given the complexity of TOD implementation, which involves integrating land use, transportation, and infrastructure, DPWH collaborates with DHSUD and DOTr to plan and maintain public works within TOD frameworks, ensuring efficient and quality construction in line with established standards.
MMDA	MMDA, established by RA 7924, coordinates and regulates metro-wide services[3] in Metro Manila while respecting the autonomy of local government units in local matters. MMDA plays a crucial role in planning and executing inclusive and resilient TODs in Metro Manila, coordinating with DHSUD, DOTr, DPWH, DEPDev, and LGUs. It ensures alignment with national TOD policies and oversees efficient delivery of metro-wide services to promote sustainable urban development through integrated land use and transport planning, urban design, and infrastructure implementation.
BCDA	TOD aims to promote sustainable urban development, fostering economic and social growth. BCDA, mandated to drive development from its properties, is empowered to plan, develop, and execute TOD projects to promote sustainable urban development fostering economic and social growth, especially within properties transferred under relevant legislation. Additionally, BCDA is well-equipped to implement TOD plans through Public-private partnership (PPP) contracts, leveraging its institutional capacity to encourage private sector involvement in redeveloping military land for productive use, while adhering to PPP regulations.

Source: JICA Expert Team

[2] The National Transport Policy (NTP) formulated by NEDA and adopted in 2018 includes TOD as a means to achieve inclusive mobility and accessibility.

[3] The services of MMDA include: a. Development planning, b. Transport and traffic management, c. Solid waste disposal and management, d. Flood control and sewerage management, e. Urban renewal, zoning, land use planning, and shelter services, f. Health and sanitation, urban protection, and pollution control, and g. Public safety.

3) Land Development Planning Process in Metro Manila

The land development planning process in the Philippines follows a multi-tiered structure that aligns national directives with local development objectives.

a) At the national level: DHSUD and DEPDev provide overarching policy guidance through frameworks such as the National Spatial Strategy (NSS) and the Philippine Development Plan (PDP). These national instruments shape the direction of urban growth, infrastructure investments, and regional integration.

b) In Metro Manila: Land development planning operates within both local and metropolitan governance systems. Each of the 17 LGUs is responsible for preparing its own CLUP, Comprehensive Development Plan (CDP), and Zoning Ordinance (ZO), following technical guidelines issued by DHSUD. These documents establish land use classifications, set development priorities, and identify infrastructure programs at the city or municipal level. Once prepared, CLUPs and CDPs must conform to regional and national frameworks, and are approved by the Sangguniang Panlungsod (local council). NGAs have followings tasks:

- DHSUD Regional Office and MMDA provide technical reviews to CLUPs and CDPs.
- MMDA plays a crucial role in coordinating regional planning across LGUs. While MMDA does not supersede local land use plans, it facilitates cross-jurisdictional initiatives—such as traffic management, flood control, and infrastructure coordination—that require metropolitan-level integration. The Metro Manila Development Council (MMDC), a policy-making body under MMDA, performs planning and review functions for major infrastructure and regional development programs.
- National infrastructure agencies such as DOTr and DPWH lead large-scale transport projects like MMSP and NSCR. These projects significantly influence land development patterns, requiring LGUs to harmonize their local plans through active inter-agency coordination.

c) At the site level: Land development is guided by instruments such as Planned Unit Development (PUD) schemes and Subdivision or Development Permits, which are reviewed and approved by local planning and zoning boards. These processes typically involve public consultations, social and environmental impact assessments, and coordination among multiple agencies to ensure alignment with broader urban development objectives.

4) Land Value Capture applicable in the Philippines

Land and property tax, specifically real property tax, is a key source of local government revenue in the Philippines, as outlined in the Local Government Code of 1991 (Republic Act No. 7160). The code empowers LGUs to impose and collect real property tax on real properties within their jurisdiction. The real property tax as below are expected to be captured as a land value capture (LVC) which will increase thanks to urban development and socio-economic activities through TOD activities and projects.

- Land and Property Tax, supported by provisions on Real Property Tax under RA 7160
- Betterment Charges and Special Assessments, known as Special Levies under RA 7160
- Leasing, promoted as an economic activity when LGUs establish local economic enterprises in line with RA 7160

In addition to them, Joint Development, regulated as PPPs under RA 11966 is also a method of enjoying LVC.

1.3 Significance and Rationale of TOD in Metro Manila

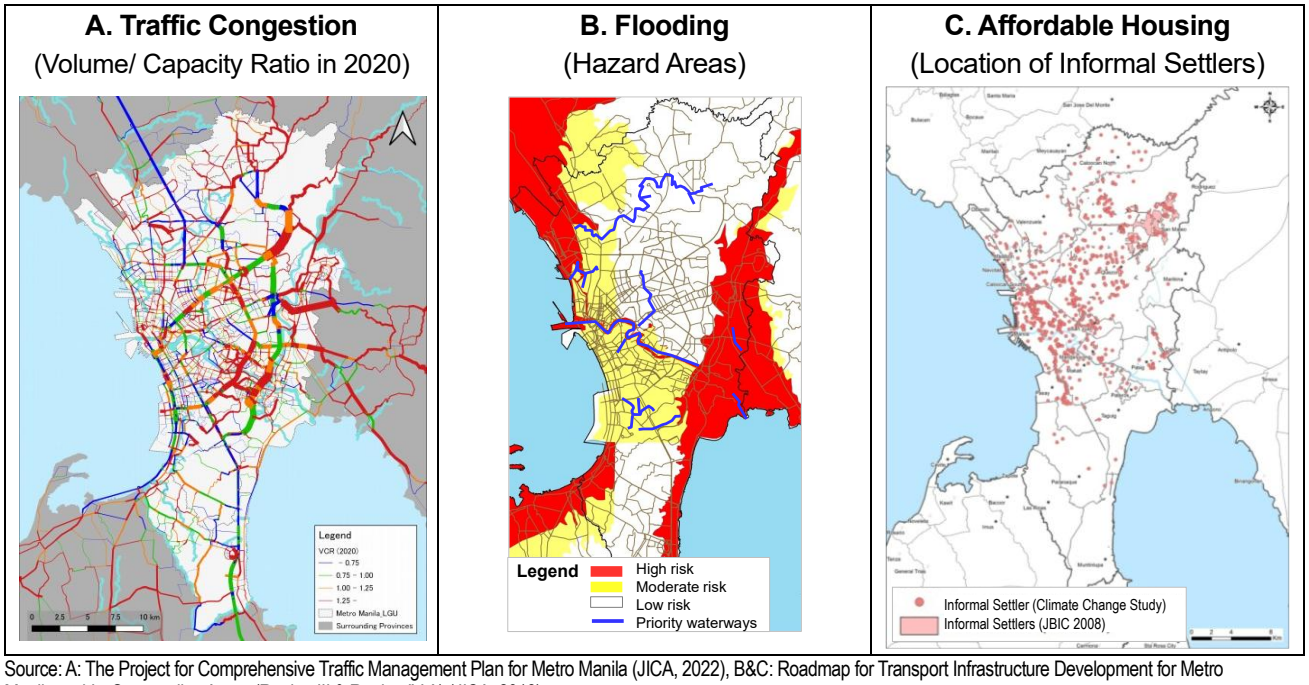
1) Main Urban Issues in Metro Manila

Metro Manila, as the Philippines' primary urban center, faces complex urban challenges that hinder its sustainable development and livability. These issues include severe traffic congestion, vulnerability to natural disasters, and a critical shortage of affordable housing (Figure 1.8). Addressing these interconnected problems requires integrated urban planning approaches, such as TOD, to create resilient, accessible, and inclusive communities.

(i) **Traffic Congestion.** Metro Manila experiences chronic traffic congestion, which significantly affects quality of life, economic productivity, and environmental sustainability. The overreliance on private vehicles, coupled with inadequate public transportation systems, leads to severe road congestion. Limited road capacity, inefficient traffic management, and insufficient pedestrian and cycling infrastructure exacerbate the problem. Commuters face long travel times, high travel costs, and exposure to air and other forms of pollution. Due to the rapid urbanization in Metro Manila, current traffic conditions could be even worse. Integrating land use with efficient public transportation through TOD can help reduce dependency on private vehicles, promote modal shifts, and improve mobility.

(ii) **Vulnerability to Natural Disasters.** Metro Manila is highly vulnerable to natural disasters, including earthquakes, typhoons, floods and landslides. Its geographical location, combined with rapid urbanization and inadequate disaster-resilient infrastructure, increases the risks to lives, properties, and economic activities. Poorly planned urban areas often lack sufficient open spaces, effective drainage systems, and resilient buildings, making them more susceptible to disaster impacts. TOD offers opportunities to integrate disaster risk reduction measures into urban development, such as designing resilient transportation systems, creating accessible evacuation routes, and incorporating green spaces to enhance urban resilience.

(iii) **Lack of Affordable Housing.** The shortage of affordable housing in Metro Manila contributes to the proliferation of informal settlements, often located in hazardous areas with limited access to basic services. High land costs, speculative real estate markets, and insufficient public housing programs make it challenging for low- and middle-income families to secure decent housing near employment centers. This leads to longer commutes, increased travel costs, and social inequality. TOD can address this issue by promoting mixed-use, high-density developments near transit hubs, encouraging inclusive housing policies, and ensuring equitable access to affordable housing within well-connected urban areas.

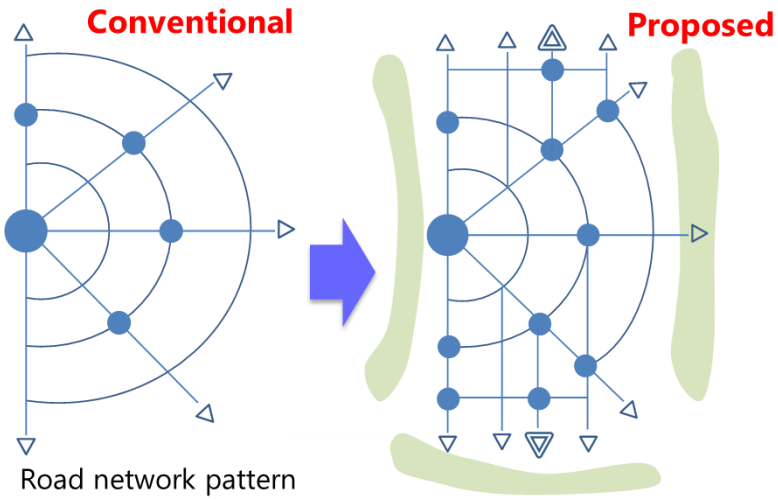


Source: A: The Project for Comprehensive Traffic Management Plan for Metro Manila (JICA, 2022), B&C: Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas (Region III & Region IV-A) (JICA, 2018)

Figure 1.8 Main Urban Issues in Metro Manila

2) Urban Structure with Railway Network in Metro Manila

The urban structure of Metro Manila has evolved in response to rapid urbanization, population growth, and expanding economic activities. Historically characterized by a radial-circumferential pattern centered around Manila City, the region is now transitioning towards a more integrated and sustainable urban form (Figure 1.9). The development of the railway network plays a pivotal role in shaping this transformation, supporting new growth patterns and enhancing connectivity across the metropolis. The following development directions reflect the ongoing shift in Metro Manila's urban structure:



Source: Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas (Region III & Region IV-A) (JICA, 2018)

Figure 1.9 Urban Structure of Metro Manila

(i) **Shift from Radial/Circumferential to Ladder Form.** The region is transitioning from a radial-circumferential layout to a ladder-shaped structure, where railway corridors act as vertical spines, improving connectivity and reducing congestion.

(ii) **Transition from High-Density City Center to Suburban Areas.** Railway expansion supports the shift of high-density residential areas from the overcrowded city center to suburban locations, easing urban pressure while maintaining accessibility.

(iii) **Development of Peri-Urban/Suburban Areas.** Improved rail connectivity fosters growth in peri-urban and suburban areas, promoting balanced regional development and reducing reliance on Metro Manila's core.

(iv) **Development of Sub-centers.** Sub-centers are being developed as new economic hubs outside the city center, with rail networks enhancing access and supporting polycentric urban growth.

(v) **Recovery of Green Space.** Urban planning now emphasizes reclaiming green spaces, with railway corridors offering opportunities for linear parks and green infrastructure to improve urban resilience.

(vi) **Redevelopment/Retrofitting of City Center Areas.** Aging city center areas are being redeveloped with a focus on modern infrastructure, mixed-use developments, and enhanced accessibility through improved rail connections.

3) Challenges and Potentials of TOD along MMSP

MMSP presents both significant challenges and promising opportunities for implementing TOD. Addressing the challenges is crucial to maximizing the potential of TOD, which can promote sustainable urban growth, enhance mobility, and improve the quality of life in Metro Manila.

TOD challenges along MMSP are as follows.

(i) **Provision of Convenient Transfer Facilities to Other Railway Lines and Feeders.** Ensuring seamless connectivity between MMSP and other railway lines, as well as feeder transportation services, remains a challenge. Inadequate integration between different transit modes can result in inefficient transfers, discouraging public transportation use. Effective TOD requires well-planned intermodal facilities to support smooth, accessible, and time-efficient transfers.

(ii) **Improving the Walking Environment.** Many areas around MMSP stations lack pedestrian-friendly infrastructure, with narrow sidewalks, poor lighting, and limited safety features. Enhancing the walking environment is essential for TOD, as it improves accessibility, encourages non-motorized transportation, and supports vibrant station areas.

(iii) **Promotion of Station Area Development.** Despite the strategic locations of MMSP stations, surrounding areas may face challenges in realizing their full development potential. Constraints such as fragmented land ownership, outdated zoning regulations, and limited private sector participation can hinder the creation of dynamic, mixed-use station areas that embody TOD principles.

(iv) **Promotion of Railway Use.** Encouraging greater railway usage requires overcoming public preference for private vehicles and addressing concerns about safety, reliability, and convenience. TOD must be supported by policies and incentives that promote public transportation as the preferred mode of travel, complemented by attractive, transit-oriented communities.

TOD potentials in MMSP are as follows:

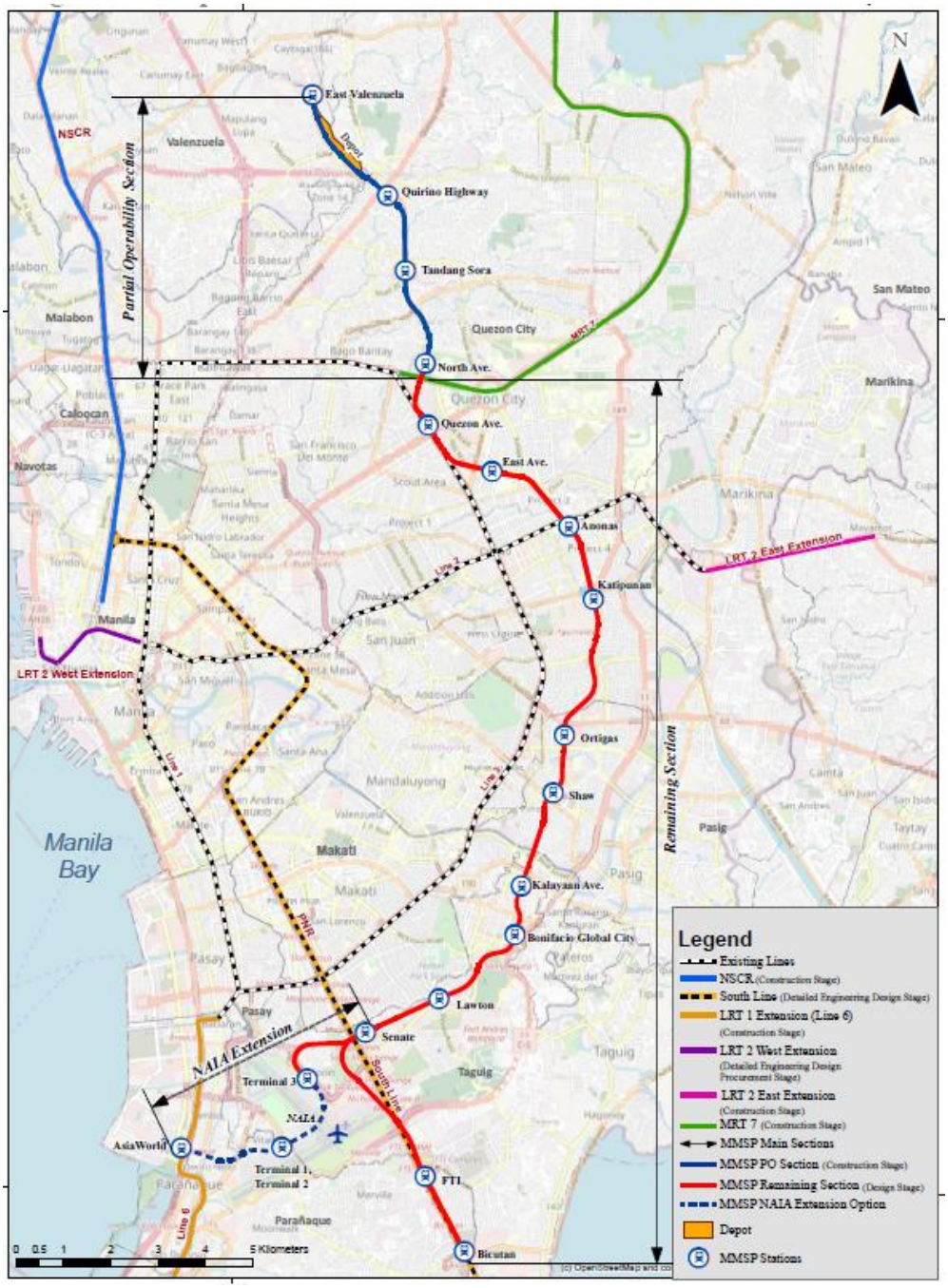
(i) **Integrated Development in CBDs.** The MMSP passes through key CBDs, offering opportunities for integrated development that connects commercial, residential, and institutional uses with high-capacity transit. This fosters economic growth, reduces commuting times, and enhances the efficiency of urban spaces.

(ii) **Promotion of Suburban Development.** MMSP enhances access to suburban areas, making them more attractive for residential and mixed-use developments. This can alleviate

congestion in Metro Manila's core, promote balanced regional growth, and support the creation of new, well-planned urban communities.

(iii) **Utilization of Government Land.** Government-owned land along the MMSP corridor offers strategic opportunities for TOD. Utilizing these assets can accelerate development, reduce land acquisition costs, and ensure that public interests—such as affordable housing and public spaces—are prioritized in station area planning.

(iv) **Utilization of Station Construction Sites.** The construction of MMSP stations provides opportunities for integrated TOD planning from the outset. Station sites can be designed to accommodate mixed-use developments, public amenities, and transportation hubs, maximizing land value and ensuring that urban growth aligns with sustainable mobility objectives.



Source: DOTr

Figure 1.10 Alignment and Station Locations of MMSP

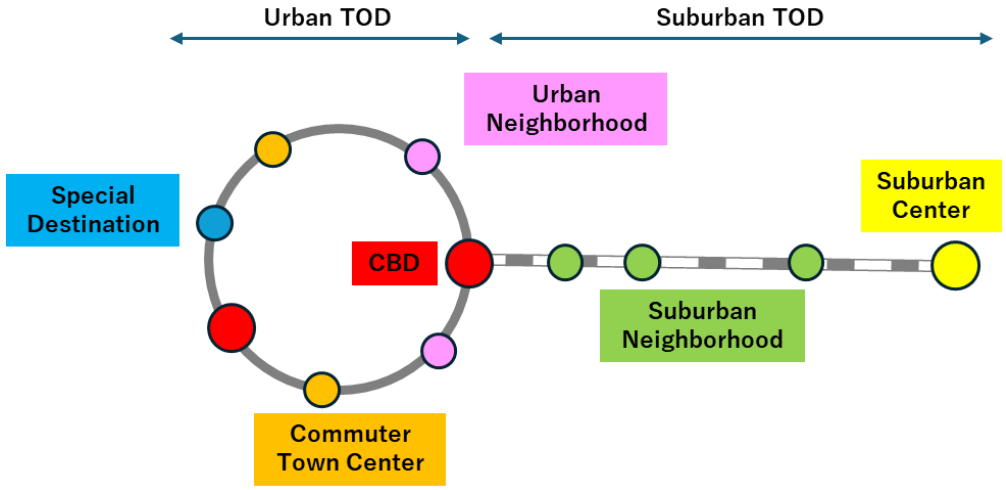
1.4 TOD Station Typology

TOD will contribute to forming an urban structure along the railway network, which is categorized as “Urban TOD” and “Suburban TOD.” (Figure 1.11):

Urban TOD: High-density, mixed-use development around terminal stations in urban areas, integrating stations with the surrounding city.

Suburban TOD: Development along suburban railway corridors, primarily in residential areas and brownfield sites, integrating transit with surrounding communities.

The purpose of assigning TOD station typologies is to establish a functional hierarchy of stations along the railway corridor. This helps define the distinct role of each station—such as business center, residential hub, or intermodal gateway—so that urban functions are strategically distributed. Rather than treating each station in isolation, this corridor-based planning approach ensures coordinated development and maximizes the economic and social utility of the railway network.



Source: JICA Expert Team

Figure 1.11 TOD Typology

In the case of the MMSP railway network, most of the urban railway stations, especially those on LRT1, LRT2, MRT3, and MMSP, fall under Urban TOD since they are located in or around CBDs of Metro Manila (within 25 km of the center). On the other hand, some railway lines, such as the North-South Commuter Railway (NSCR) and the MRT7, will extend beyond Metro Manila, with station areas categorized as Suburban TOD.

Table 1.4 Urban TOD Station Typology and Characteristics

Typology	Central Business District (CBD)	Urban Neighborhood (UN)	Commuter Town Center (CTC)	Special Destination (SD)
Urban Function	• Center of the primary economy with regional scale services • A mixed-use and high-intensity area with commercial and business	• Center of the secondary economy with city-scale services • A mixed-use and mid to high-intensity area with commercial and retail services	• Center of local economy with neighborhood-scale services • A mixed-use function and medium intensity for retail and public services	• Station adjoining facilities with a special function, such as airport, university, and institutional facilities
Accessibility	• High accessibility of and direct transfer between railways, public utility vehicles (PUVs) • Elevated and underground station access for pedestrians	• High accessibility for PUVs and pedestrians	• Medium accessibility for PUVs and pedestrians by sharing road space	• Seamless connection between station and special facilities
Environment	• Provision of urban green and open space vertically and horizontally • Provision of disaster prevention spaces and facilities • Involvement of private sectors in area management	• Provision of urban green and open space • Provision of disaster prevention facilities • Involvement of local entities and communities in area management	• Utilization of open space for public use • Strengthening disaster prevention capacity • Involvement of local communities in area management	• Provision of open space for visitors/ employees/ students • Provision of disaster prevention spaces and facilities
MMSP Stations	North Ave., Quezon Ave., Ortigas, BGC, Senate-DepEd	Anonas, Shaw Blvd., Kalayaan Ave., Lawton, FTI	East Valenzuela, Quirino Highway, Tandang Sora, East Ave., Camp Aguinaldo	NAIA T3
Development Image in Japan	 Toranomon, Tokyo, Japan	 Nakano, Tokyo, Japan	 Musashi-koyama, Tokyo, Japan	 Haneda Airport, Tokyo, Japan

Source: JICA Expert Team, Mori Building Co., Ltd., Google Maps

Table 1.5 Suburban TOD Station Typology and Characteristics

Typology	Suburban Center	Suburban Neighborhood
Urban Function	• Middle dense • High mixed use • Housing development including affordable housing	• Less dense • High residential
Accessibility	• High accessibility for PUVs connecting to suburban residential area	• High accessibility for PUVs connecting to station • Safe and visible pedestrian routes
Environment	• Provision of urban green and open space • Provision of disaster prevention facilities • Involvement of local entities and communities in area management	• Utilization of open space for public use • Strengthening disaster prevention capacity • Involvement of local communities in area management
NSCR Stations	Bicutan, Malolos, Angeles	Meycauayan, Sucat
Development Image in Japan	 Totsuka, Kanagawa, Japan	 Tama Plaza, Kanagawa, Japan

Source: JICA Expert Team, Yokohama City, MLIT

2 TOD CONCEPTUAL PLAN FORMULATION

This chapter guides the planning process for TOD Conceptual Plans, providing key principles and methodologies to develop station areas that promote walkability, multimodal connectivity, and vibrant public spaces. It serves as a guide for policymakers, urban planners, and stakeholders to ensure that TOD implementation is coordinated, effective, and responsive to local urban development needs.

Chapter Overview

2.1 Objectives to Formulate TOD Conceptual Plans

Explains the purpose of TOD conceptual plans in guiding integrated urban and transport development, ensuring efficient land use, and enhancing accessibility around transit stations.

2.2 TOD Influence Areas

Defines the spatial extent of TOD influence, including the role in shaping land use, density, and infrastructure investments.

2.3 Key Components of Conceptual Plans

Outlines the essential elements of a TOD conceptual plan, such as land use zoning, transport infrastructure, pedestrian networks, mixed-use development, and public spaces.

2.4 TOD Conceptual Plan Formulation Procedures

Describes the step-by-step process of preparing TOD conceptual plans, including data collection, stakeholder coordination, land use planning, transport integration, and policy alignment.

2.5 Traffic Impact Assessment

Explains the importance of evaluating traffic conditions and transport demand in TOD areas to ensure efficient mobility, minimize congestion, and enhance transit accessibility.

2.6 Social and Environmental Considerations

Explain how social equity, environmental sustainability, and disaster resilience are integrated into TOD planning through assessments, stakeholder engagement, and mitigation strategies.

2.7 Public Involvement

Highlights the role of community engagement in TOD planning, ensuring inclusivity through public consultations, stakeholder workshops, and participatory decision-making processes.

2.1 Objectives to Formulate TOD Conceptual Plans

The formulation of TOD conceptual plans is a critical step in ensuring that urban areas are developed sustainably, efficiently, and in an integrated manner. The primary objectives of formulating these plans include the following:

(i) **Promote Sustainable Urban Growth:** TOD conceptual plans aim to guide the development of compact and walkable communities that have reduced reliance on private vehicles. Focusing on mixed-use developments near transit hubs help minimize urban sprawl and promote environmentally sustainable growth patterns.

(ii) **Enhance Accessibility and Mobility:** One of the key objectives of TOD is to improve accessibility between public transport systems and essential services. Conceptual plans should identify areas where critical transit infrastructure can be expanded or optimized, ensuring that a greater portion of the population can easily access public transportation networks.

(iii) **Encourage Land Use Efficiency:** TOD conceptual plans focus on maximizing the efficient use of land by promoting higher-density developments around transit stations. This approach ensures that valuable land resources are used effectively, supporting the growth of vibrant, multi-functional communities.

(iv) **Foster Economic Development:** A well-formulated TOD conceptual plan can drive economic growth by attracting investments in residential and commercial real estate. The plans can promote the creation of transit-friendly environments through the stimulation of local economies, generation of jobs, and increase property values for transit-adjacent areas.

(v) **Improve Quality of Life:** The objectives of TOD planning extend to the social well-being of residents. By providing safer, more convenient mobility options, reducing traffic congestion, and fostering mixed-use communities, TOD contributes to improved quality of life, including better access to housing, education, healthcare, and recreational opportunities.

(vi) **Ensure Inclusivity and Equity:** A successful TOD conceptual plan should prioritize social equity by integrating affordable housing options and community services. The plans should cater to diverse populations, ensuring that the benefits of TOD are accessible to all socio-economic groups.

(vii) **Facilitate Integration of Policies and Stakeholder Interests:** Effective TOD conceptual plans align with national, regional, and local policies on urban development, transportation, and environmental sustainability. The planning process should also consider the interests of various stakeholders, including government agencies, local communities and commuters, private developers, and transit operators.

2.2 TOD Influence Areas

The concept of TOD influence areas is essential for understanding the spatial reach of TODs. These areas are categorized into three distinct levels, each with a specific scope and focus, ensuring that the benefits of TOD extend beyond the immediate vicinity of transit stations and contribute to broader urban planning efforts. (Table 2.1)

Table 2.1 Planning Levels of TOD Influence Areas

	Description	Goal and Key Aspects
Level 1: Along Corridor	At the highest level, the TOD influence area spans along the entire transit corridor. This area covers a broader zone that includes the major routes for public transportation, such as railways, buses, jeepneys, and other PUVs. The influence of TOD at the corridor level focuses on integrating land uses that support high mobility and connectivity, such as commercial centers, office spaces, and mixed-use developments well-served by the transit network.	To ensure that development patterns along the corridor align with transportation routes, promoting density and accessibility across multiple neighborhoods and districts. Key aspects are: ● Incorporating major transit routes or corridors. ● Encouraging development that is closely connected to the transportation infrastructure. ● Fostering high-density, mixed-use urban growth along key transport corridors.
Level 2: Around Station (Within Walking Distance, 800 m Radius)	The second level of TOD influence is focused on individual transit stations. This area typically extends within an 800 m radius (roughly a 10–15 minute walk) from transit stations and is the core area for concentrated development.	To create vibrant, walkable neighborhoods well-connected to public transportation networks, facilitating easy access to stations and surrounding amenities. Key aspects are: ● Focusing on areas within walking distance of transit stations. ● Promoting high-density, pedestrian-friendly mixed-use developments. ● Ensuring easy access to transit services, making commuting and local mobility more convenient.
Level 3: At Station	The third level of TOD influence is the immediate area directly around the transit station, which is typically a small, high-density zone adjacent to the station, where major transit infrastructures, such as the station entrance and intermodal connections, are located. Development in this area is designed to maximize accessibility and convenience for transit users. This zone is ideal for high-rise buildings, commercial centers, and services catering directly to passengers, such as retail outlets, offices, and transit-related facilities.	To create a seamless transition from transit to other modes of transport while providing services that enhance the transit experience. Key aspects are: ● Focusing on the immediate vicinity of the transit station, including the station entrance. ● Encouraging high-density developments serving directly transit users, such as retail, offices, and public amenities. ● Prioritizing accessibility, convenience, and intermodal connectivity.

Source: JICA Expert Team

2.3 Key Components of Conceptual Plans

The TOD Conceptual Plan involves several key components that collectively enhance the livability, functionality, and sustainability of urban spaces. These components ensure the effective integration of transportation, urban planning, and community needs. Below are the essential elements of a TOD conceptual plan:

(i) **Intermodal transfer facilities (station plazas, pedestrian facilities, etc.):** To maximize the utilization of public transportation and access using active transport (i.e., cycling and walking), well-designed intermodal transfer facilities with consideration of the various mobility challenges of commuters with appropriate wayfinding signages are essential.

(ii) **Open space/Parks:** The creation of mini-parks and open spaces within the transportation system enhances the urban amenities of the area. These spaces provide essential recreational areas, improve air quality, and contribute to the overall well-being of residents and commuters. In addition, open spaces in TOD areas can serve as a critical function during emergencies, including natural disasters.

(iii) **Feeder services:** Efficient, barrier-free, and affordable feeder services should be provided beyond the walkable distance of the TOD area. These services provide first and last-mile solutions, ensuring that commuters can easily access the transit network, even those living outside the immediate station area.

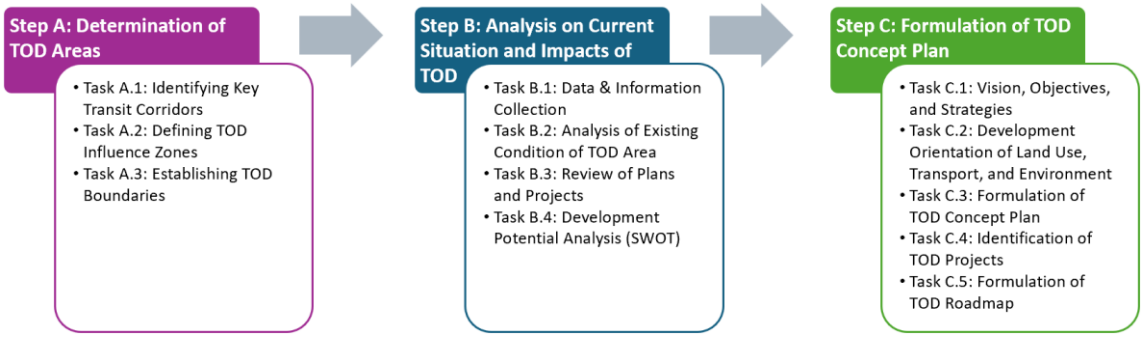
(iv) **Area management:** Effective area management ensures the long-term success and sustainability of a TOD area. This includes the ongoing maintenance of public spaces, the management of commercial and residential spaces, and the coordination of services within the TOD area. Area management also involves the collaboration of public and private sector stakeholders to ensure that the objectives of TOD are met and that the zone remains a vibrant, functional, and inclusive environment for all users.

(v) **Traffic management:** Effective traffic management is critical in a TOD area to ensure smooth circulation for all transportation modes. It involves implementing measures including traffic signal optimization, parking management, and safe pedestrian crossings. The goal is to reduce congestion, promote the use of public transportation, and create an environment prioritizing walking and cycling.

(vi) **Disaster management:** Disaster management is a key aspect of TOD planning to ensure the resilience of the development in the face of natural or man-made disasters. The TOD area should incorporate disaster risk reduction and management strategies, such as flood mitigation measures, emergency evacuation routes, and safe spaces for communities during emergencies. Infrastructure should be designed to withstand extreme weather events, and disaster preparedness plans should be regularly updated in collaboration with local authorities.

2.4 TOD Conceptual Plan Formulation Procedures

Formulating a TOD conceptual plan can be streamlined into three essential steps. Each step builds upon the previous one, ensuring a comprehensive approach that aligns with urban development goals and transportation needs. (Figure 2.1)



Source: JICA Expert Team

Figure 2.1 TOD Conceptual Planning Process

Step A: Determination of TOD Areas

In this first step, the focus is on identifying and defining the boundaries of TOD areas, including:

Task A.1: Identifying Key Transit Corridors

What to do: Identify the primary transit corridors that will serve as the backbone for TOD. Analyze existing and planned transit infrastructure, such as rail lines, bus rapid transit systems, and other mass transit modes. Focus on corridors with high ridership potential, accessibility, and connectivity to major urban and economic centers.

Why this matters: Transit corridors form the foundation of TOD. Selecting the right corridors ensures that investments in transit-oriented developments are maximized, fostering efficient urban mobility and unlocking economic opportunities. Additionally, properly chosen corridors align with regional growth strategies, improving access to jobs, services, and housing.

Task A.2: Defining TOD Influence Zones

What to do: Define zones where TOD principles will be implemented, focusing on areas around transit stations (typically within an 800-meter radius) and along transportation corridors. Include multiple levels of TOD influence (e.g., corridor-level, station area, and station-specific zones).

Why it matters: Establishing TOD influence zones clarifies the spatial scope for planning and investment. It helps prioritize areas for mixed-use development and ensures that these areas are walkable, accessible, and integrated with the transit network. Clear influence zones guide local governments, developers, and communities in aligning their efforts with TOD goals.

Task A.3: Establishing TOD Boundaries

What to do: Distinctly delineate the boundaries of TOD influence areas using GIS tools and spatial analysis. Align boundaries with transportation networks and assess factors consisting of land use compatibility, development potential, and urban growth capacity.

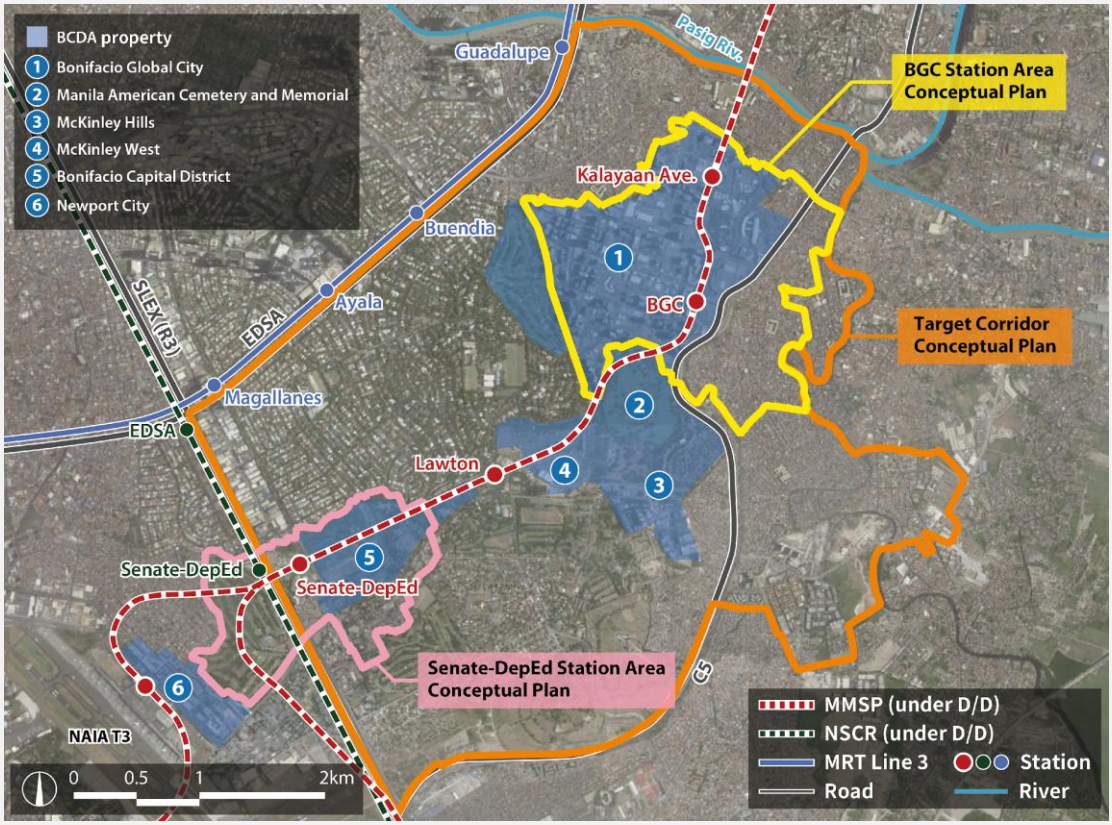
Why it matters: Precise boundaries create a clear framework for decision-making, ensuring consistency across planning efforts. They help avoid conflicts in land use, optimize resource allocation, and ensure that development within TOD areas supports sustainable, compact, and

mixed-use growth. Well-defined boundaries also provide clarity of administrative boundaries and key stakeholders, reducing ambiguity in planning and implementation processes.

Box 2.1 TOD Areas of TODCUP

The TOD areas for TODCUP were defined around four MMSP stations: Kalayaan Avenue, BGC, Lawton, and Senate-DepEd stations. These areas were delineated at both the corridor and station area levels. The corridor-level TOD area extends approximately 2 km from the stations, reflecting the coverage of feeder services. The station-level TOD area, on the other hand, encompasses an 800 m radius around each station, which is considered a walkable distance.

The actual boundaries were determined based on administrative divisions. For the corridor level, additional considerations included the presence of major transportation networks such as EDSA, C5, Pasig River, and South Luzon Expressway (SLEx).



Step B: Analysis of the Current Situation and Impacts of TOD

This step involves a comprehensive analysis of the existing conditions within the TOD areas to understand the potential impacts of TOD, as well as identify key opportunities and challenges. The following tasks are integral to this analysis:

Task B.1: Data & Information Collection

What to do: Collect comprehensive data, including demographic, land use, transportation, and environmental information, to understand the existing conditions in the TOD area. Examples of target data and information are shown in Table 2.2.

Why it matters: Reliable and accurate data is critical for informed decision-making. This task ensures that the analysis and planning process is grounded in factual, up-to-date, and context-specific information. It provides the foundation for all subsequent tasks and identifies initial gaps or opportunities.

Table 2.2 Examples of Target Data and Information and Possible Surveys to be Conducted

Data and Information Collection	Surveys and Interviews
• Demographic data (e.g., population and socio-economic profiles) • Land use data • Transportation data (e.g., transit infrastructure, traffic volume) • Environmental data (e.g., air quality, green space, disaster risk areas) • Social infrastructure data (e.g., education and healthcare facilities, public parks) • Economic data (e.g., retail and commercial activities, property values) • Utilities and infrastructure data (e.g., water supply, drainage, wastewater system) • Policy and regulatory frameworks (e.g., local development plans, zoning) • Existing projects and programs • Feedback from stakeholders	• Interview survey (income level, urban facilities and infrastructure, traffic condition and mode, environmental issues, etc.) • Transport/ Road and urban facility map within walking distance • Traffic volume count survey

Source: JICA Expert Team

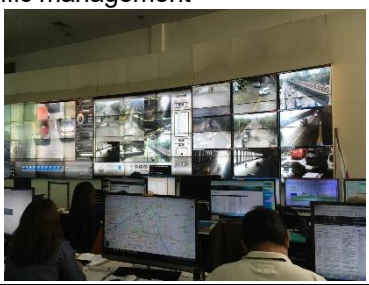
Task B.2: Analysis of Existing Condition of TOD Area

What to do: Assess the current conditions within the identified TOD areas (Table 2.3):

1. **Infrastructure Assessment:** Examine existing transportation systems, utilities, and public spaces to evaluate their adequacy and functionality.
2. **Land Use Assessment:** Understand current land use patterns and explore opportunities for redevelopment or optimization.
3. **Mobility and Accessibility:** Evaluate the ease of movement for pedestrians, cyclists, and transit users and identify barriers to improving connectivity.
4. **Social and Environmental Conditions:** Assess quality of life, public services, and environmental sustainability.

Why it matters: This analysis reveals the strengths and deficiencies of the TOD area, providing actionable insights to enhance its functionality and sustainability. Addressing these factors ensures the TOD plan responds effectively to existing conditions while leveraging available resources.

Table 2.3 Example of Existing Condition Analysis

	Advantages	Disadvantage
Infrastructure	Monitoring and command center for traffic management 	Narrow or no sidewalk 
Land Use	Integrated development of rail station, PUV terminal, and mixed-use building 	High-density development with narrow roads and no open spaces 
Mobility and Accessibility	Share cycle port providing alternative travel mode 	Traffic Congestions 
Social and Environment	A public park for residents including children 	Designated emergency assembly point in the middle of an intersection 

Source: JICA Expert Team

Task B.3: Review of Plans and Projects

What to do: Examine policies, plans, and projects that could impact on the TOD area (Table 2.4):

1. **Alignment with Broader Goals:** Ensure the TOD plan supports regional or national objectives, such as sustainability, housing, and transportation targets.
2. **Local Development Plans:** Examine how existing frameworks affect TOD implementation.
3. **Ongoing or Proposed Projects:** Assess compatibility with planned initiatives, such as infrastructure improvements or housing developments.

Why it matters: Reviewing plans ensures coordination and avoids conflicts with other initiatives. It helps identify opportunities for synergy and ensures that the TOD plan aligns with broader urban and regional development strategies.

Table 2.4 Example of Targeted Plans and Projects to be Reviewed

Type of Plans	Type of Projects
(a) National Level Plans (National Development Plan, National Physical Framework Plan, etc.) (b) Regional Level Plans (Regional Development Plan, Regional Physical Framework Plan, etc.) (c) Provincial Level Plans (Provincial Development Plan, Provincial Physical Framework Plan, etc.) (d) Local Level Plan such (CLUP, Comprehensive Development Plan (CDP), Local Public Transport Route Plan, etc.)	1) Road (new road, widening, parking, etc.) 2) Public transport (bus terminal, railway station, LRT, bus rapid transit (BRT), etc.) 3) Housing (high-rise apartments, detached housing area, etc.) 4) Urban infrastructure (water distribution system, drainage, sewerage, waste management system, parks, green infrastructure, etc.) 5) Public service facilities (hospitals, schools, parks, etc.) 6) Commercial and business (shopping centers, supermarkets, offices, amusement or recreation areas, etc.) 7) Industrial facility/ Zone (relocation and redevelopment, new development)

Source: JICA Expert Team

Task B.4: Development Potential Analysis

What to do: Conduct a SWOT analysis to evaluate the TOD area's potential:

1. **Strengths:** Highlight existing assets, such as proximity to transit hubs and infrastructure.
2. **Weaknesses:** Identify limitations, such as poor connectivity or environmental risks.
3. **Opportunities:** Explore growth and redevelopment potential, including partnerships and underutilized land.
4. **Threats:** Recognize risks like regulatory barriers, market conditions, or climate vulnerabilities.

Why it matters: A SWOT analysis provides a strategic overview of the TOD area's potential, enabling planners to prioritize interventions and focus on high-impact opportunities. This analysis ensures that TOD implementation is both feasible and resilient to challenges.

Box 2.2 SWOT Analysis for BGC Station Area by TODCUP

For the BGC Station Area, SWOT analysis was conducted in three categories: Overall area, BGC, and East of C-5, considering the latter.. Then, a cross-SWOT (X-SWOT) was conducted to compare internal strengths and weaknesses with external opportunities and threats to formulate development strategies.

Strengths	Weaknesses
BGC • Strategically located between EDSA and C-5. • Offers innovative and planned developments. • Provides live, work, play, and learn environment. • Adequate infrastructure and utilities. • Efficient pedestrian network. • Responsive estate management services. **East of C-5 (East Rembo & Pembo)** • Located next to BGC and C-5 • Potential TOD Users	**Overall** • Insufficient pedestrian crossing facilities over C-5. **BGC** • High traffic congestion during peak hours • Insufficient shade for pedestrians **East of C-5 (East Rembo & Pembo)** • Insufficient disaster preparedness for flooding and earthquakes. • Insufficient public open spaces. • Limited public transportation services and narrow roads.
Opportunities	**Threats**
Overall • MMSP and NSCR will improve connectivity to and from NAIA and Clark International Airport. **BGC** • Increase in land values and foot traffic due to urban and transportation development. **Outside BGC (East Rembo & Pembo)** • Increase in socio-economic activities.	**Overall** • Increase social and economic gaps between BGC and East of C-5. **BGC** • Increase in vehicular traffic and traffic accident risks. • Limited investment opportunities due to absence of proper development incentives and control. **East of C-5 (East Rembo & Pembo)** • Located on the West Valley Fault. • Lack of updated masterplan

Step C: Formulation of TOD Conceptual Plan

This final step of the TOD conceptual plan development shifts the focus from analysis to action. The goal is to formulate a concrete, strategic, and integrated TOD conceptual plan that outlines the vision, land use, transportation infrastructure, and specific TOD projects needed to transform the area. The process is divided into five key tasks:

Task C.1: Vision, Objectives, and Strategies

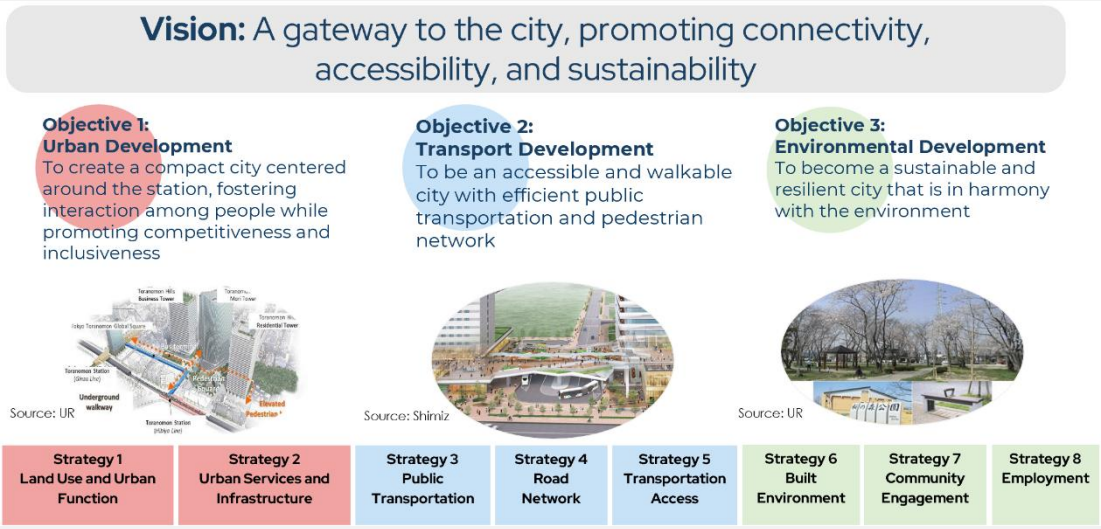
What to do: Define the overarching vision, specific objectives, and strategic approaches for the TOD:

1. **Vision:** Develop a long-term vision that reflects desired outcomes for the community, transportation systems, and environmental sustainability.
2. **Objectives:** Establish measurable goals, such as improving public transit accessibility, fostering economic growth, reducing congestion, and creating vibrant, walkable neighborhoods.
3. **Strategies:** Identify strategies to achieve the objectives, including infrastructure improvements, policy reforms, and incentive programs.

Why it matters: Clear vision and actionable objectives direct TOD planning, ensuring alignment with community needs and sustainable urban development principles. Strategies translate goals into practical actions, fostering stakeholder collaboration and guiding resource allocation.

Box 2.3 Vision, Objectives, and Strategies for BGC Station Area by TODCUP

Considering the uniqueness and development issues of the BGC Station Area, the vision and objectives are set as below. Each objective comprises two to three strategies.



Task C.2: Development Orientation of Land Use, Transport, and Environment

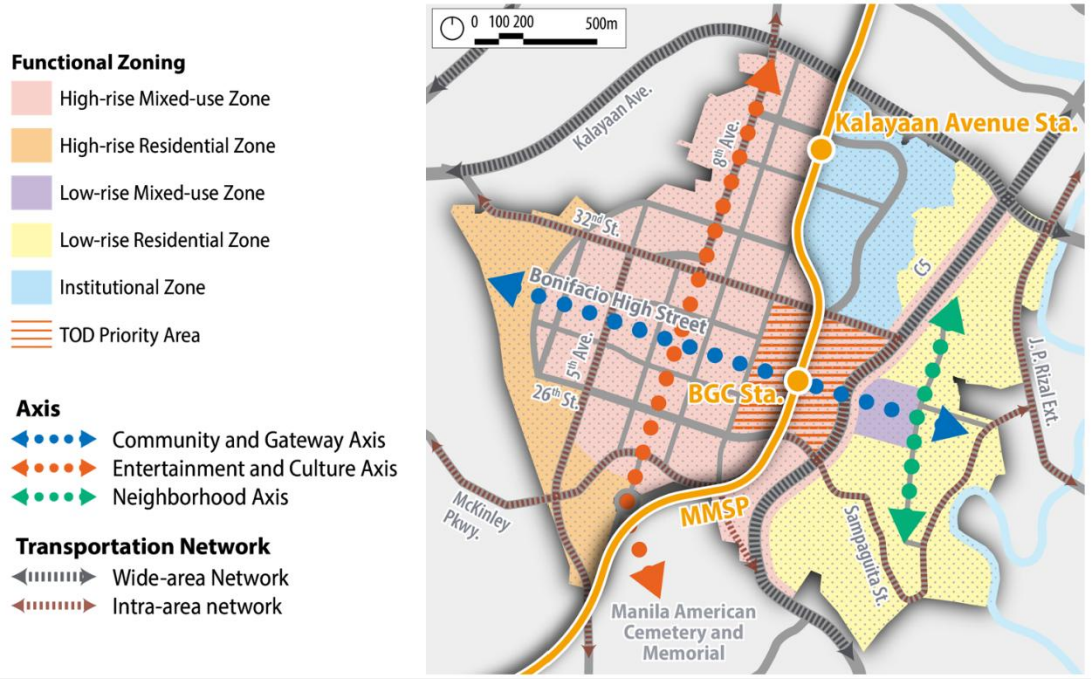
What to do: Align land use, transportation, and environmental considerations to achieve the TOD vision:

1. **Land Use Orientation:** Promote high-density, mixed-use development near transit hubs, ensuring zones are designated for residential, commercial, and recreational uses.
2. **Transport Orientation:** Integrate various transportation modes, enhance transit services, and improve pedestrian and cycling infrastructure.
3. **Environmental Orientation:** Implement sustainable design principles, such as green spaces and disaster resilience measures.

Why it matters: Aligning these three elements ensures that TOD areas are well-planned, efficient, and sustainable. This task creates synergies between land use and transportation while minimizing environmental impacts and fostering livable urban spaces.

Box 2.4 Development Orientation of BGC Station Area by TODCUP

Development orientations of the BGC Station Area are composed of functional zoning, axis, and transportation network. Land use orientation is shown in the functional zoning and axis, transportation orientation in the axis and transportation network, and environmental orientation in the functional zoning.



Task C.3: Formulation of TOD Conceptual Plan

What to do: Create a detailed conceptual plan based on earlier analyses and strategies:

1. **Master Plan Layout:** Design spatial layouts, including transit stations, mixed-use zones, public parks, and pedestrian pathways.
2. **Infrastructure Planning:** Identify necessary infrastructure, such as transport networks and utilities, and plan for public amenities that enhance livability.
3. **Connectivity and Accessibility:** Promote seamless connections between transit modes and integrate surrounding neighborhoods into the network.

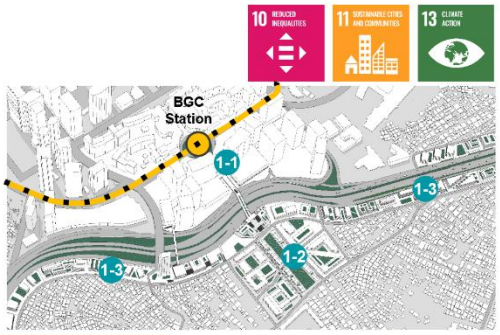
Why it matters: The TOD Conceptual Plan, serving as the blueprint for future development, ensures that projects are cohesive, functional, and aligned with the TOD vision. By prioritizing connectivity and livability, the plan maximizes the benefits of TOD for residents and businesses.

Box 2.5 TOD Conceptual Plan of BGC Station Area by TODCUP

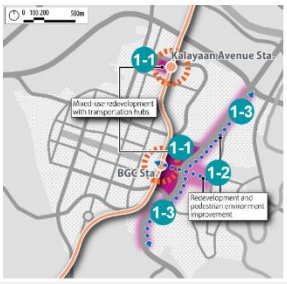
For TODCUP, each strategy is detailed with descriptions, target images, action items, location maps of action items, and related Sustainable Development Goals. The schedule and implementing agencies are also identified for each action item to delineate the responsibilities of agencies.

Strategy 1 : Develop a mixed-use area around the station which caters to the needs and interests of diverse groups of people inside and outside BGC

The diverse mix of residential, commercial, and cultural elements attracts people from various backgrounds of people contributing to a vibrant and socially rich environment.



No.	Action	Schedule	Implementing Body	
			Main	Secondary
1-1	Redevelop the areas in front of Kalayaan Ave. Station and BGC Station Integrating them with the TOD area and possible sites for transport hubs	Short-Medium	BCDA/ Private	-
1-2	Redevelop C-5 roadside creating a safe and comfortable pedestrian environment, revitalizing the areas	Medium-Long	DPWH/DOTr	LGU/ MMDA/ Private
1-3	Develop a Mixed-use community center in Pembo/East Rembo area with a vibrant commercial street	Long	LGU/Private	LGU/ Private



Task C.4: Identification of TOD Projects

What to do: Identify and evaluate specific projects to implement the TOD plan:

1. **Project Identification:** Prioritize key projects, such as transit stations, intermodal hubs, and residential/commercial developments, across short-, medium-, and long-term horizons.
2. **Feasibility and Impact Assessment:** Evaluate the viability and impacts of each project, considering environmental, financial, and social factors.
3. **Project Phasing:** Develop a phased implementation approach, starting with critical infrastructure and expanding to complementary projects.

Why it matters: This task ensures that TOD implementation is practical and impactful. Prioritizing projects and assessing their feasibility allows for efficient allocation of resources while proactively addressing challenges.

Task C.5: Formulation of TOD Roadmap

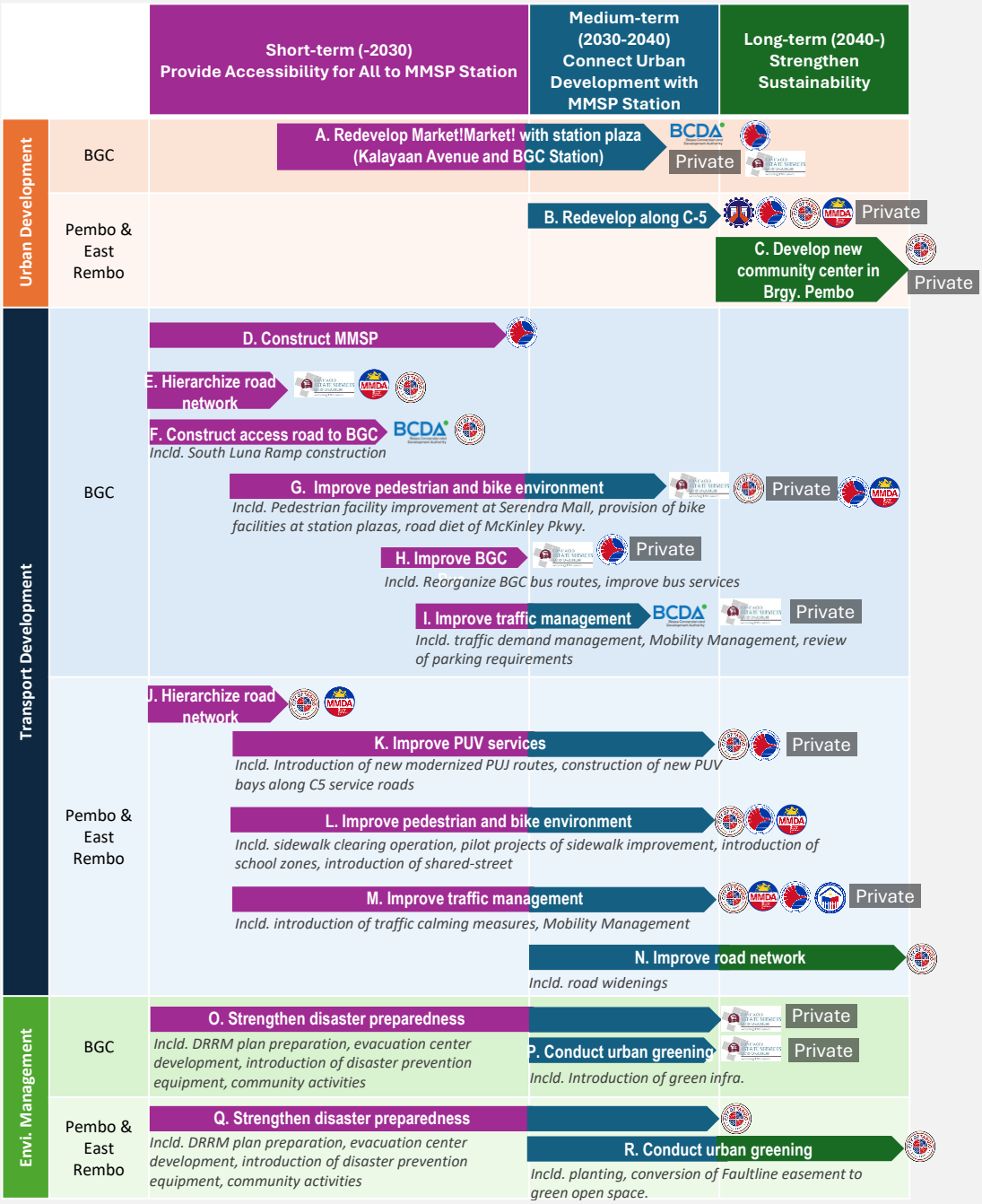
What to do: Develop a comprehensive roadmap for TOD implementation:

1. **Implementation Phases:** Define clear phases, timelines, milestones, and responsibilities for each development stage.
2. **Monitoring and Evaluation:** Establish mechanisms to track progress using key performance indicators (KPIs) related to transportation, land use, environmental sustainability, and social equity.

Why it matters: A well-structured roadmap provides clarity and accountability, ensuring that TOD plan remains on track. Monitoring and evaluation allow for adjustments based on real-world challenges or opportunities, ensuring the plan's long-term success.

Box 2.6 TOD Roadmap of BGC Station Area by TODCUP

For the BGC Station Area, action items are aggregated as programs, as some action items are interrelated. The roadmap must be reviewed and revised periodically to reflect the actual situation in the future.



Note: E&J Hierarchize road network is to reclassify roads based on actual use and urban function.

2.5 Traffic Impact Assessment

The **Traffic Impact Assessment (TIA)** is an essential process to evaluate the potential effects of a proposed development on the transportation network within its impact area. While TIAs are typically conducted for developments that generate significant traffic, they are especially valuable in the context of TOD.

Modifications to a transportation network system during construction or operational phases can influence its overall performance. Assessing these impacts is crucial to ensure that TOD development aligns with the principles of efficient, sustainable, and safe urban mobility.

A TIA for TOD development provides insights into three key areas of impact:

1. **Impacts on general traffic of the TOD.** The introduction or expansion of TOD developments may affect traffic flow and contribute to congestion, particularly at critical intersections or along key corridors. Identifying and addressing potential bottlenecks or traffic-related issues is essential during the construction phase and after the TOD system becomes operational. Effective mitigation strategies, such as signal optimization, intersection redesign, or alternative routing, should be proposed to manage these impacts.
2. **Impacts on the operations of the transport-feeder system.** A well-functioning transport-feeder system is central to TOD's success. The TIA should examine how traffic management strategies influence feeder services, including bus, jeepney, or shared transport operations. Ensuring seamless integration between feeder systems and the primary transit modes can enhance accessibility and reduce travel times. Additionally, the TIA should propose measures to improve safety, minimize conflicts between various road users, and reduce the risk of road crashes.
3. **Impacts on modal shifts resulting from TOD-aligned access improvements and active transport promotion.** TOD developments often include enhancements to pedestrian and cycling infrastructure, as well as improved access roads and public spaces, all of which support active transport and first- and last-mile connectivity. The TIA should assess how these improvements influence travel behavior, including potential shifts from private vehicle use to walking, cycling, or public transport. Evaluating changes in mode share and accessibility helps ensure that infrastructure investments effectively support sustainable mobility goals, improve user experience, and reduce car dependency.

How to Conduct a TIA

Conducting a TIA involves a systematic approach to understanding and mitigating traffic impacts. Below are the key steps involved:

1. **Define the Scope of the TIA.** Identify the boundaries of the study area, focusing on the TOD influence zones. Specify the type of impacts to be assessed, including general traffic, feeder systems, and pedestrian or cycling infrastructure.
2. **Data Collection.** Gather baseline data on current traffic conditions, including vehicle volumes, peak hours, intersection performance, and public transport usage. Additionally, collect data on land use, population, employment, and trip generation for the TOD area.
3. **Traffic Demand Analysis.** Estimate the additional traffic demand generated by the TOD development, considering factors such as population density, land use mix, and projected transit ridership. Beyond forecasting private vehicle trips, the analysis should account for potential modal shifts to public transport, walking, and cycling as a result of TOD-oriented

infrastructure and policies. Conduct sensitivity analyses to assess how variations in travel behavior, land use intensity, or transit service levels could influence overall traffic demand and network performance. This helps planners anticipate a range of scenarios and develop more resilient, TOD-aligned transport solutions.

4. **Network Capacity Assessment.** Analyze the capacity of the transportation network to accommodate the projected demand. Evaluate intersection performance, roadway congestion levels, and transit service reliability.
5. **Impact Analysis.** Assess how the TOD development will affect traffic flow, transit operations, and overall network performance. Identify potential bottlenecks, safety risks, and conflicts among road users.
6. **Develop Mitigation Measures.** Propose strategies to address identified impacts, such as traffic signal optimization, intersection redesign, feeder system enhancements, and improved pedestrian and cycling facilities. Ensure measures align with the broader goals of TOD, including sustainability and accessibility.
7. **Document Findings.** Prepare a comprehensive report detailing the findings of the TIA, including identified impacts, proposed mitigation measures, and their feasibility. Include visualizations such as traffic flow diagrams, maps, and projected network performance metrics.
8. **Stakeholder Consultation.** Engage relevant stakeholders, including local government units, transit operators, and community representatives, to ensure that proposed measures address their concerns and priorities.

Detailed methodologies on the conduct of TIA can be found in the TIA Guidelines developed by the University of the Philippines - National Center for Transportation Studies (UP-NCTS) as commissioned by JICA in 2001. In addition, the preliminary TIA for BGC Station Area is provided in the ***Appendix A***.

2.6 Social and Environmental Considerations

Integrating social and environmental considerations into the TOD Conceptual Plan ensures that development is inclusive, sustainable, and resilient from the outset. At the planning stage, TOD projects must address social equity, environmental sustainability, and disaster preparedness to create livable and accessible urban spaces while minimizing negative impacts.

Key Considerations and Components

1. **Social Considerations.** At the TOD conceptual planning stage, social considerations should focus on ensuring equitable access, preventing displacement, and fostering community participation.
    - **Affordable Housing and Livelihood Protection:** TOD should promote affordable housing options near transit hubs while ensuring that lower-income residents are not displaced due to rising property values. Strategies such as inclusionary zoning and public rental housing should be explored.
    - **Accessibility and Social Equity:** TOD should provide barrier-free urban environments to support persons with disabilities, senior citizens, women and children, and low-income populations.
    - **Community Integration and Participation:** Early engagement with local communities ensures that social needs and local priorities are reflected in TOD planning, fostering inclusive urban development.
2. **Environmental Considerations.** Environmental sustainability should be embedded in TOD planning to minimize ecological impact and enhance urban resilience.
    - **Climate Resilience and Disaster Preparedness:** TOD planning should integrate flood control measures, seismic resilience, and emergency evacuation routes to mitigate disaster risks.
    - **Air Quality and Green Infrastructure:** TOD should promote tree-lined streets, urban parks, and pollution reduction strategies to enhance air quality and public health.
    - **Sustainable Land Use and Resource Efficiency:** The TOD concept should encourage compact, high-density, mixed-use development that optimizes land use while reducing carbon emissions.

How to Conduct Social and Environmental Considerations

To systematically integrate social and environmental considerations into TOD conceptual planning, the following steps should be undertaken at different stages of the planning process:

1. Identifying Social and Environmental Priorities

Timing: Before the TOD conceptual plan formulation (Pre-Planning Stage)

Objective: Identify key social and environmental factors that will influence TOD development.

Process: Conduct baseline studies on existing urban conditions, including population demographics, environmental risks, and social vulnerabilities.

2. Stakeholder Engagement and Public Participation

Timing: During TOD conceptual plan formulation (Conceptual Planning Stage)

Objective: Gather input from local communities, government agencies, and private sector

stakeholders to align TOD development with public needs.

Process: Conduct community consultations, focus group discussions, and surveys to identify concerns and expectations. Ensure transparency through public hearings and feedback mechanisms.

3. **Conducting Social Impact Assessment (SIA)**

   Timing: Before TOD zoning and land use designation (Conceptual Planning Stage)

   Objective: Assess the potential social impacts of TOD development, including housing affordability, accessibility, and displacement risks.

   Process: Identify vulnerable populations, evaluate potential livelihood impacts, and develop mitigation strategies such as relocation assistance or inclusionary zoning policies.

4. **Conducting Environmental Impact Assessment (EIA)**

   Timing: Parallel to SIA, before finalizing TOD zoning and land use regulations

   Objective: Ensure that TOD development minimizes environmental impact while incorporating sustainability measures.

   Process: Assess climate risks, air pollution, and land use compatibility. Propose strategies such as green building, water management systems, and eco-friendly transportation solutions.

5. **Integrating Social and Environmental Measures into the TOD Conceptual Plan**

   Timing: Finalization of TOD Conceptual Plan (Post-Assessment Stage)

   Objective: Reflect findings from SIA and EIA into the TOD conceptual plan to balance urban growth, transportation accessibility, and environmental protection.

   Process: Adjust land use plans to allocate space for affordable housing, green infrastructure, and disaster-resilient public spaces.

6. **Establishing a Monitoring and Evaluation Framework**

   Timing: At the approval stage of the TOD Conceptual Plan

   Objective: Track TOD sustainability performance and ensure compliance with social and environmental commitments.

   Process: Develop KPIs such as affordable housing targets, public space ratios, climate resilience measures, and air quality improvements. Establish mechanisms for periodic reviews and adjustments. (see Table 5.3 Examples of KPI to Measure Effectiveness of TOD for detail)

2.7 Public Involvement

Public involvement is key to the effective implementation of TOD in the Philippines, as this requires a shifting mindset and the adoption of coordination mechanisms. Several government agencies are involved in the various facets of land use and transportation planning, regulation, and taxation in the Philippines, and the following explains the involvement on the national level.

Key Stakeholders

Several government agencies play vital roles in the different aspects of land use and transportation planning, regulation, and taxation in the Philippines. (Table 2.5)

Table 2.5 Key Stakeholders and their Roles

Key Stakeholders	Roles and Responsibilities
Department of Economy, Planning, and Development (DEPDev)	・ Responsible for socio-economic planning. ・ Monitors the implementation of TOD policies, plans and programs by implementing agencies (DOTr, DPWH, DHSUD and LGUs). ・ Facilitates the integration of TOD into the Philippine Development Plan and regional plans.
DOTr	・ Plans, develop, and maintain the country's transportation systems, including rail, bus, and other transit modes. ・ Plays a key role in ensuring that TOD principles are embedded in transport projects.
DHSUD	・ Oversees housing, human settlements, and urban development. ・ Promotes policies that ensure housing affordability and inclusivity in TOD zones.
DPWH	・ Responsible in the development and maintaining the national highway network. ・ Ensures that transport infrastructure integrates seamlessly with TOD projects.
Department of Finance (DOF)	・ Formalities revenue policies to ensure funding of critical government programs that promote welfare among the people and accelerate economic growth and stability. ・ Provide guidance on the viability of land value capture (LVC) as a tax-based form of infrastructure financing.
Department of the Interior and Local Government (DILG)	・ Charged with the general supervision over local governments and the promotion of local autonomy and community empowerment and monitor compliance thereof. ・ Ensure the appropriate implementation of Special Planning Units in the CLUP and CDP.
MMDA	・ Oversees the traffic management within national roads, radial roads, and identified Mabuhay Lanes. ・ Reviews the CLUPs and Zos of the LGUs in Metro Manila, together with the DHSUD. ・ Provides technical assistance on the relocation of affected households (e.g. public consultation, general assembly, transportation, clearing manpower) in coordination with the DHSUD and the LGUs.
LGUs	・ Responsible for preparing CLUPs, CDPs, and Zoning Ordinances. ・ Administers land and property taxes and facilitates TOD implementation at the local level.

Source: JICA Expert Team

Mechanisms for Public and Stakeholder Involvement

To ensure an inclusive TOD development process, mechanisms for stakeholder engagement and public participation must be implemented. These mechanisms should aim to foster collaboration, transparency, and shared ownership of TOD initiatives:

1. **Consultative Workshops:** Organize workshops with stakeholders, including representatives from national agencies, LGUs, local businesses, civic organizations, and community groups, to discuss TOD goals, strategies, and project plans.
2. **Public Hearings and Feedback Mechanisms:** Conduct public hearings to inform residents and businesses about proposed TOD projects. Provide platforms for stakeholders to voice their concerns and offer suggestions.
3. **Stakeholder Coordination Committees:** Establish committees comprising representatives from key agencies, LGUs, and private sector partners. Use these committees to facilitate cross-sectoral collaboration and resolve conflicts.
4. **Community Engagement Activities:** Engage the community through surveys, focus group discussions, and informational campaigns. Highlight the benefits of TOD, such as improved mobility, reduced traffic, and enhanced quality of life, to build public support.
5. **Public-Private Partnerships:** Encourage private sector participation in TOD projects by involving developers, transport operators, and investors. Foster partnerships to co-develop infrastructure, housing, and commercial facilities.

3 TOD PROJECT FORMULATION

This chapter introduces the key components and considerations for TOD projects, focusing on urban development, transportation development, and environmental management. It provides an overview of the types of projects that support TOD and highlights essential factors to ensure their successful implementation. By presenting these project components, this chapter serves as a reference for policymakers, urban planners, and stakeholders in designing and executing TOD projects that foster sustainable, efficient, and well-integrated urban environments.

Chapter Overview

3.1 TOD Project Formulation Process

This section explains the planning steps for a TOD project in a specific site to guide planners on how to formulate a comprehensive TOD project in an integrated manner.

3.2 Urban Development Project

1) **Mixed-use Development**: Describes strategies for integrating residential, commercial, office, and recreational spaces around transit hubs to create vibrant, walkable communities.
2) **Residential Facility Development**: Explores approaches to residential development in TOD areas, including high-density housing, affordable housing integration, and ensuring livability through proper planning.
3) **Public Facility Development around Stations**: Covers the provision of essential public facilities such as parks, plazas, community centers, and public services to enhance accessibility and urban livability in TOD zones.

3.3 Transportation Development Project

1) **Intermodal Transfer Facility**: Details the planning and design of intermodal hubs that facilitate seamless connections between various transport modes, improving transit efficiency.
2) **Feeder Service**: Discusses the role of feeder transport systems, including bus and shuttle services, in expanding the accessibility of TOD areas beyond station catchment zones.
3) **Active Transport**: Focuses on pedestrian and bicycle-friendly infrastructure, ensuring safe and convenient non-motorized mobility options within TOD environments.
4) **Signage (Way-finding System)**: Explains the importance of clear and user-friendly wayfinding systems to enhance navigation for pedestrians, cyclists, and transit users in TOD areas.
5) **Barrier-free Routes**: Covers universal design principles in TOD, ensuring accessibility for people with disabilities, elderly individuals, and other vulnerable populations.
6) **Traffic Management**: Discusses strategies for managing road traffic in TOD zones, including congestion control measures, parking policies, and pedestrian-priority street designs.

3.4 Environmental Management Project

1) **Disaster Prevention**: Addresses the integration of disaster risk reduction measures in TOD planning, including flood mitigation, seismic resilience, and emergency evacuation planning.
2) **Environmental Improvement**: Explores sustainable urban development initiatives such as green spaces, air quality improvement, and energy-efficient building designs to enhance environmental quality in TOD areas.
3) **Area Management/Community Involvement**: Emphasizes the role of local communities in TOD implementation, covering stakeholder engagement, participatory urban management, and long-term area maintenance strategies.

3.1 TOD Project Formulation Process

To formulate a comprehensive TOD project at and around a station, the following steps are taken (Figure 3.1):

Step 1: Profiling of Project Area: Study the current uses of the site, relevant plans and projects to be coordinated, etc., and laws and regulations to comply with.

Step 2: Visioning and Strategizing: Write a vision statement presenting a future image of the areas at and around a station and formulate strategies to achieve that vision.

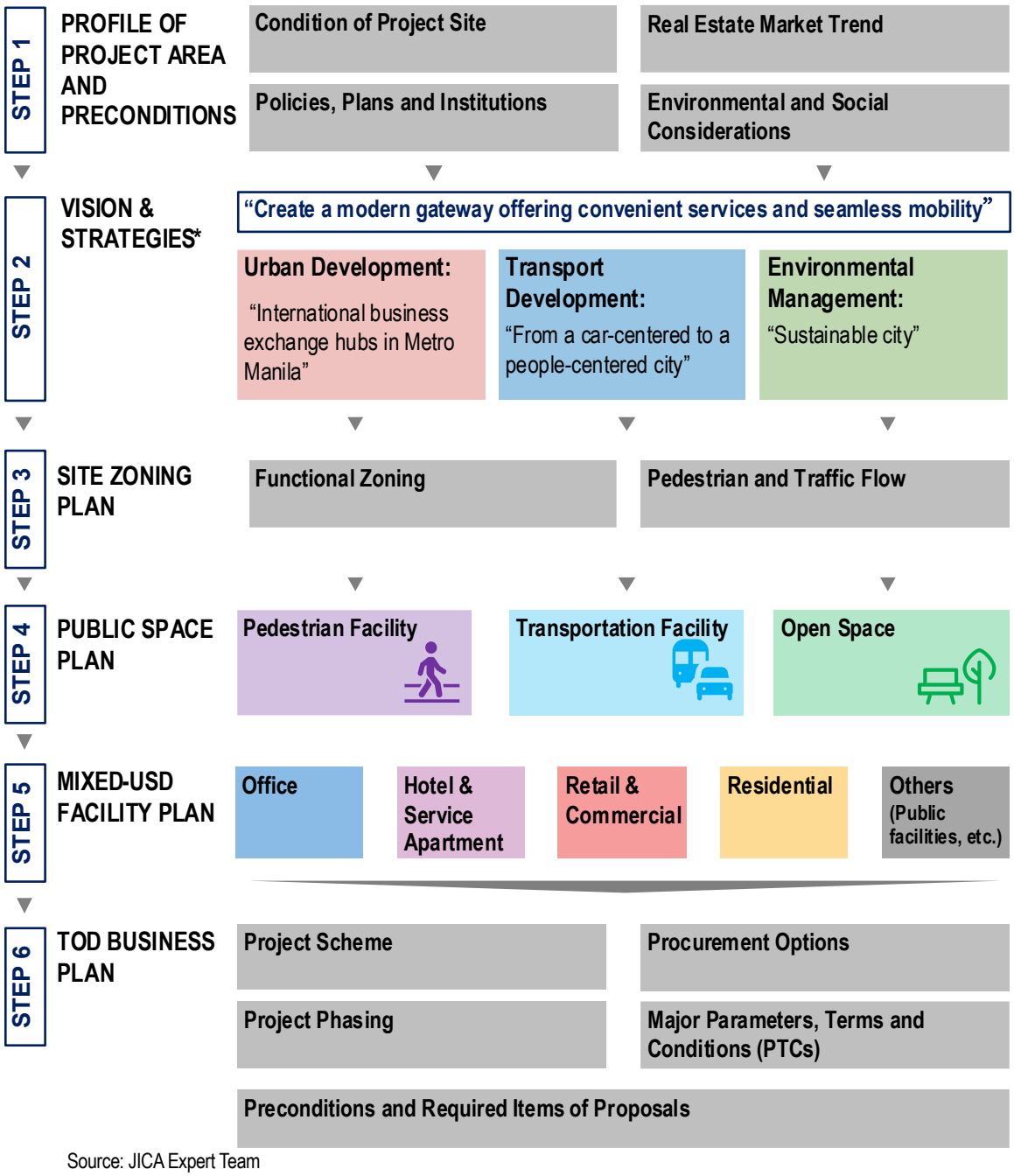
Step 3: Site Zoning Planning: Design an overall spatial structure of the project site to connect and integrate various urban functions.

Step 4: Public Space Planning: Prioritize accessibility and safety by providing pedestrian-friendly public spaces, transportation facilities, and open spaces.

Step 5: Mixed-use Facility Planning: Attract commuters, visitors, and local communities by developing office, commercial, and residential facilities connected to the station.

Step 6: Business Planning: Formulate a project implementation plan that includes: (i) a TOD project purpose and development policy, (ii) legal basis, (iii) project scheme, (iv) consideration of a phased development, (v) procurement method, (vi) financial analysis, and (vii) preconditions of a TOD project as requirements for bidding.

It should be noted that the planning steps mentioned above are not independent of each other; they should be followed one after the other, especially Step 3 TOD site zoning plan, Step 4 public space plan, and Step 5 mixed-use facility plan. The overall spatial and facility layout plan should be adjusted to ensure that public spaces are provided for accessibility and safety, which are priority concerns for a TOD project.



Source: JICA Expert Team

Figure 3.1 Overall Formulation Process for a TOD Project

1) Step 1: Profiling of Project Area

To formulate a comprehensive TOD project in a specific project site based on local characteristics, the current conditions and existing plans at and around the station are studied and the prerequisites for the TOD project are identified.

(i) **Project site condition analysis:** to identify the issues and the expected roles and functions of the TOD project within a region and station area, information about the following items are collected, and constraints and potentials are analyzed:

- **Physical conditions:** land use and zoning, road network, public transport network and facilities, infrastructure and utilities, open spaces.
- **Socio-economic conditions:** population, location of urban facilities, market trends (development trends, real market information, land prices, etc.).

(ii) **Project Prerequisites:** to identify the legal requirements of the TOD project to ensure that the project proposal plan complies with them.

- Construction and opening schedule for urban railway facilities (right of way, construction scope, etc.).
- Current land use and utilization status of the project area (confirmation of land rights, tenants, etc.).
- Relevant legal frameworks (laws/standards, CLUP/ZO, compilation of related guidelines).
- Regulatory content for the project area (floor area ratio, height limit, setbacks, parking requirement, etc.).

Box 3.1 Profile of the BGC TOD Project

The BGC Station is located at the eastern side of Bonifacio Global City (BGC), which is expected to be one of the busiest stations with a forecast of 200,000 daily passengers by 2045. BGC is one of major CBDs in Metro Manila, where BCDA plans, implements and operates various urban developments with private companies. Inside BGC, urban planning and development activities should be in compliance with the Design Standard and Guidelines (DSGs) prepared by BCDA, in addition to the CLUP of Taguig City.

The project site, covering 9.7 hectares of land owned by BCDA, is adjacent to the BGC Station of the Metro Manila Subway Project (MMSP). The project site is surrounded by the following roads: Mckinley Parkway, 32nd Street, 26th Street, and C5 which are considered as main thoroughfares for the area. Currently, a private developer operates commercial and transportation facilities on the site under a lease agreement with BCDA, which shall end in 2027. Across C5 to the east out of BGC, the low-rise residential areas of Pembo and East Rembo are situated.

As a first step in formulating the TOD project plan, the following items are studied:

(i) **Project location:** the location of the site at the regional level.

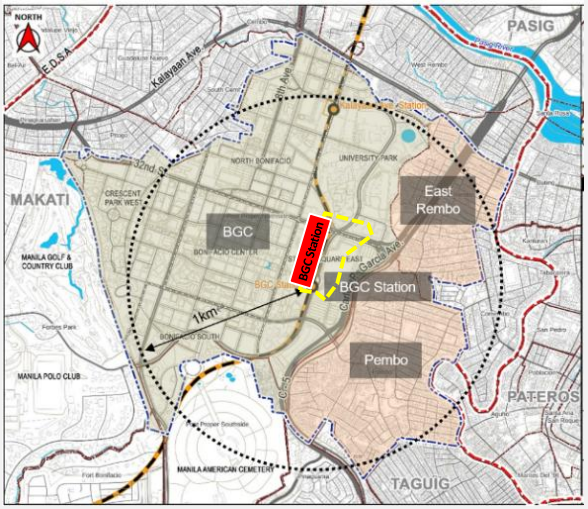
(ii) **Current situation of project site:** conditions in the site (land use, ownership, existing facilities, operation condition, etc.).

(iii) **Current situation of BGC station area:** population, topography, land uses, major urban facilities, parks and open spaces, transportation, public utilities, and natural disasters.

(iv) **Real estate market trend:** sales and rental prices of properties by facility type (residential, retail, office) and by segment (high-end, upper-middle, middle, etc.), land prices, occupancy/ vacancy rates, major development projects in/around the station area.

(v) **Upper-level policies and plans:** national policies, CLUPs, sector plans, guidelines, and regulations.

(vi) **Environmental and social considerations:** stakeholders, environmental and social considerations.



BGC Station Area

BGC Subway Station and TOD Project Site

Source: JICA Expert Team based on information from BCDA and DOTr.

2) Step 2: Visioning and Strategizing

It is expected that the proposed TOD project will contribute to different aspects of community life, such as social, economic, transportation, and environment, and these will be measured by various indicators.

Table 3.1 Expected Development Impacts of TOD Projects

Aspect	Indicator
Socio-economic	・ Increase in the number of residents ・ Increase in the number of visitors and tourists ・ Provision of various types of housing ・ Promotion of investment and business opportunities for the private sector ・ Increase in opportunities for community development (inclusiveness)
Economy	・ Increase in land and property values ・ Increase in GFA ・ Increase in the number of various commercial, business, and service facilities ・ Increase in opportunities to apply smart technologies
Transportation	・ Improvement of accessibility, mobility, and safety at and around the station ・ Increase in the number of PT passengers (subway) and services as a result of the modal shift ・ Improvement of pedestrian environment
Environment	・ Contribution to the development of a carbon-neutral society and climate change response ・ Improvement in disaster risk reduction and preparedness ・ Increase in open/green spaces

Source: JICA Expert Team

To maximize the expected development impacts brought about by a TOD project, a TOD vision should be formulated.

To achieve the TOD vision, strategies on (i) urban development, (ii) transportation development and (iii) environmental management are planned.

Box 3.2 Vision and Strategies for the BGC TOD Project

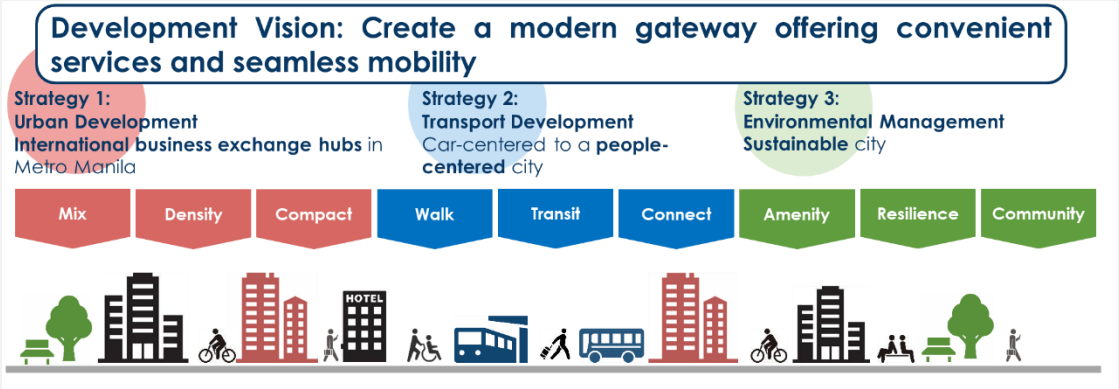
The project site is one of the most internationally competitive areas in the Philippines. As competition among cities intensifies, it is important for Taguig City and BGC to increase the latter's international profile by attracting foreign companies and promoting investment through the creation of international business bases.

The vision for the BGC TOD Project Site is: **"Create a modern gateway offering convenient services and seamless mobility"**. To achieve this, the following three strategies are proposed:

Strategy 1 Urban Development: "International business exchange hubs in Metro Manila"

Strategy 2 Transport Development: "From a car-centered to a people-centered city"

Strategy 3 Environmental Management: "Sustainable city"



Source: JICA Expert Team

Vision and Strategies for the BGC TOD Project

3) Step 3: Site Zoning Planning

To materialize the TOD principle of enhancing mobility, accessibility, socio-economic development, and environmental sustainability, a zoning plan is formulated which includes a functional zoning (office and retail, residential, etc.), as well as a traffic and pedestrian flow. In this step, the location of intermodal transfer facilities and open spaces are identified and overlaid on the site's zoning plan.

The following key elements should be considered in the zoning of the project site:

(i) Establish a well-connected pedestrian network to ensure smooth and direct access from the station.

(ii) Provide adequate open spaces near station entrances and exits to allow for safe, comfortable gathering areas.

(iii) Strategically locate transportation nodes and boarding/alighting facilities with consideration for both vehicle and pedestrian flows.

(iv) Ensure seamless access from outside the TOD site to promote regional integration and urban railway ridership.

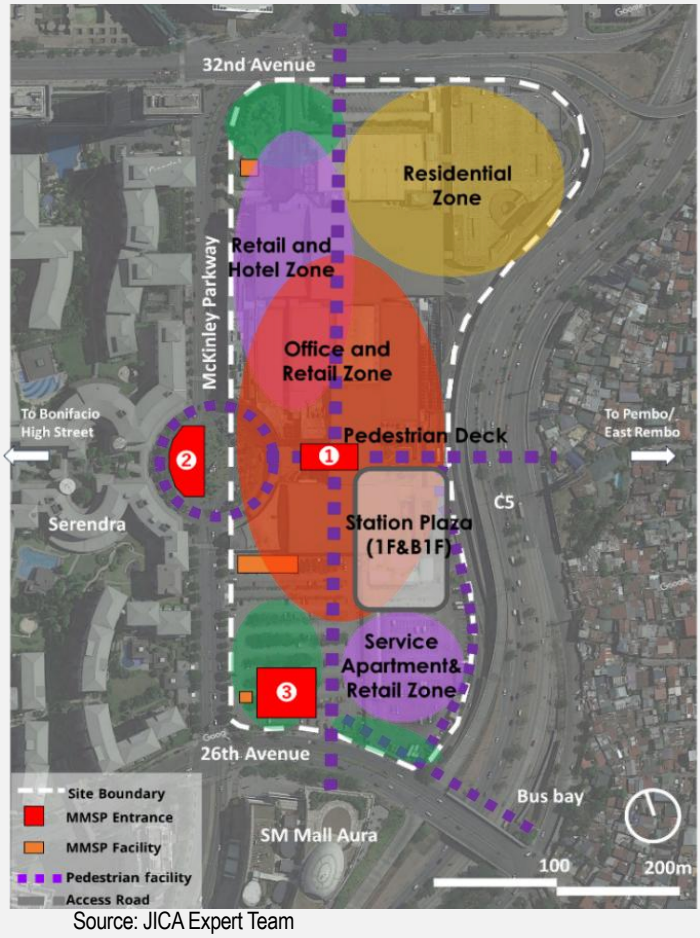
(v) Integrate commercial and business facilities directly with the station to stimulate commuting and recreational demand.

(vi) Promote nighttime activities and safety by developing residential and accommodation facilities.

Box 3.3 Site Zoning Plan for the BGC TOD Project

To realize the TOD vision of the project, i.e., "Create a modern gateway offering convenient services and seamless mobility," the site zoning plan prioritizes a pedestrian-oriented design and mixed-use development. These core strategies aim to attract a diverse range of visitors and encourage public transportation ridership, contributing to a sustainable modal shift.

To enhance site accessibility and mobility, the zoning process begins with the designation of public facilities. The layout for mixed-use facilities will then be developed, taking into account the locations and functions of these public spaces. In line with the TOD principles, no internal roads will be constructed within the project site, thereby promoting walkability and creating a safe, pedestrian-focused environment.



Source: JICA Expert Team

Proposed Zoning Plan for the BGC TOD Project

4) Step 4: Public Facility Planning

Although the project is primarily a private sector-led mixed-use development, the quality of TOD can be significantly enhanced through appropriate planning and the integration of public facilities. Three core public facility types are essential to realizing the TOD vision (Figure 3.2).

(i) **Pedestrian Facilities:** Provide walking spaces to ensure safe and convenient access to all areas within and outside the site, such as wide sidewalks, underground and elevated walkways. Pedestrian flow must be separated from vehicular traffic.

(ii) **Transportation Facilities:** Provide PT terminals to support seamless connections between the station and surrounding areas, such as station plazas (see section 3.31) Intermodal Transfer Facility for details).

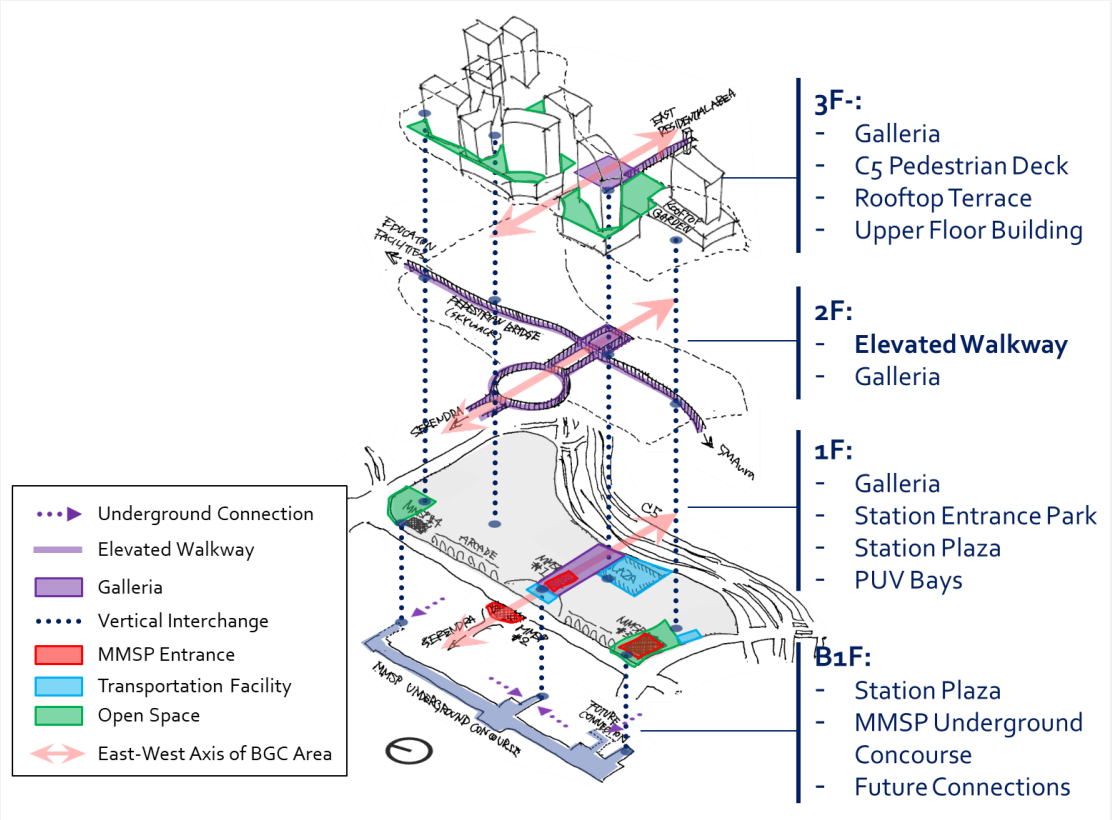
(iii) **Open Spaces:** Provide open spaces around station entrances, as well as pedestrian and transportation facilities, that incorporate urban greenery and offer venues for leisure, public gathering, and disaster preparedness with toilets and water well for emergencies.

Source: JICA Expert Team

Figure 3.2 Functions of Public Spaces in TOD

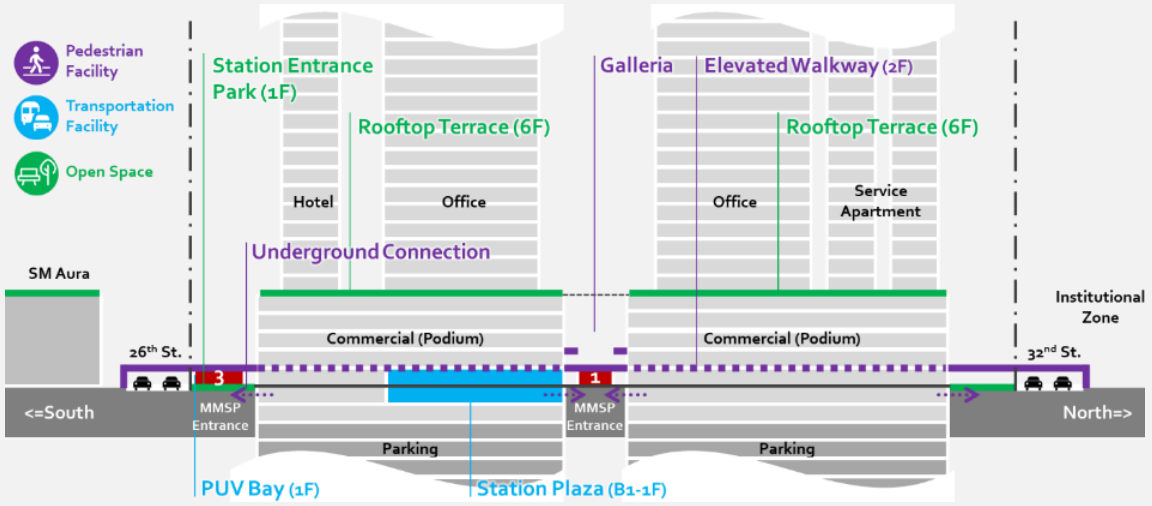
Box 3.4 Public Space Plan for the BGC TOD Project

The public spaces in the BGC TOD project was planned and laid out within the project site. To address the site's limited area while ensuring the provision of essential public functions, the design utilizes multiple levels, including ground level, elevated pedestrian decks, and rooftop spaces. This approach allows for the creation of diverse and interconnected open spaces while maximizing the buildable area for private development.



Source: JICA Expert Team

Diagram of the Public Space Network for the BGC TOD Project



Source: JICA Expert Team

Diagram of the North-South Section of Public Spaces

5) Step 5: Mixed-use Facility Layout Planning

The facility plans for mixed-use developments aim to create an attractive, vibrant, and inclusive station area that balances diversity and cohesion. The facilities include commercial and business establishments for shoppers and office workers, hotels and service apartments catering to both domestic and international visitors, and high-quality residential spaces offering scenic views and convenient access. These facilities are seamlessly connected via a pedestrian deck to ensure a people-centered, transit-oriented development.

The core facilities of mixed-use developments are concentrated around the station plaza and pedestrian connections to the station (Table 3.2).

Table 3.2 Considerations in Facility Layout Planning

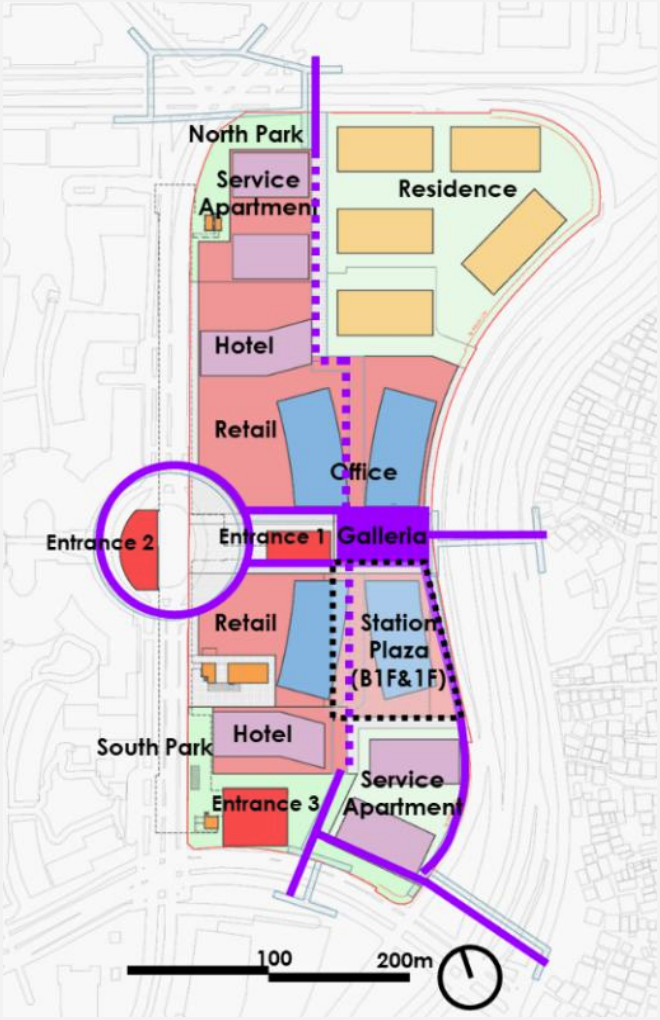
Facility Type	Consideration of Layout Plan
Office buildings	Offices are located next to station or near station via pedestrian facilities to ensure direct access with enough space from station to office buildings for commuters
Retail and commercial facilities	Commercial facilities, such as supermarkets, convenience stores, and shopping malls, are located adjacent to the station (including on underground floors) to improve convenience for station users, including commuters, residents, and visitors.
Residential buildings	Apartments and condominiums are located near a station to ensure comfort at the same time separation from commercial and office buildings.
Public service facilities	Public service facilities, such as public administration facilities, hospitals and clinics, and nurseries, are provided to serve the convenience of station and facility users, including local communities.

Other facilities	Hotels, service apartments, amusement cnd enters (theaters, cinemas, etc.), and business support facilities (MICE, etc.) are developed according to local characteristics and market needs.

Source: JICA Expert Team

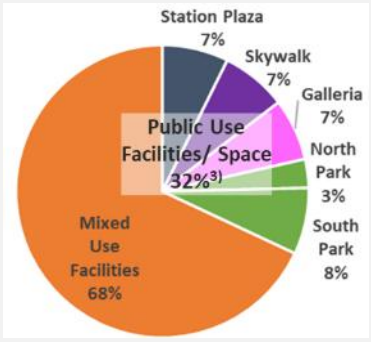
Box 3.5 Mixed-use Facility Layout Plan for the BGC TOD Project

The mixed-use facilities, including offices, retail, hotel, serviced apartments, and residences, is strategically distributed according to the site's zoning plan, development feasibility, and projected profitability. Approximately a third of the total land area is allocated to public spaces and facilities, including the station plaza, pedestrian decks, the galleria, and parks. While the station plaza, skywalk, and galleria will be physically located within mixed-use buildings, they serve as public amenities.



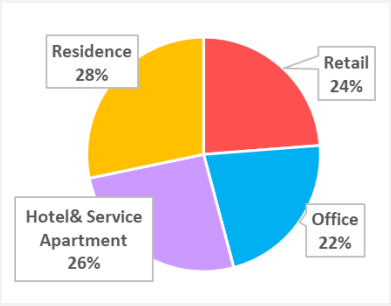
Source: JICA Expert Team

Facility Layout Plan for the BGC TOD Project



Source: JICA Expert Team

Land Share of Public Use Facilities/ Space (Total: 9.7ha)



Source: JICA Expert Team

GFA Share of Mixed-use Facilities (Total: 1.1 mil m2)

6) Step 6: Business Planning

The business plan to realize a TOD project examines the implementation structure, business scheme (PPP, joint venture with the government, private sector, etc.), and division of roles. Feasibility is confirmed through project cost estimations and financial analysis. Based on these elements, bidding documents to select an operator are prepared.

When implementing through a public-private partnership, the division of roles can be structured as shown in the diagram below. The project must be structured based on relevant laws, including the PPP Act, and the roles and responsibilities of the public and private sectors (land rights, facility development costs, operational management structure, etc.) must be clearly defined in advance.

The following items are included as components of a TOD business plan:

(i) **Project Purpose and Development Policy:** The fundamental principle of TOD projects is to help promote urban rail use by ensuring convenience and comfort (public interest) through mixed-use development in and around the stations, while also securing profitability (private interest). As a development based on public transportation, government involvement in the utilization/provision of public land, infrastructure development, institutional frameworks, etc. and private sector participation in fundraising and development/operational expertise, etc. are crucial. This section clarifies the project's purpose and development policy in line with these fundamental TOD principles.

(ii) **Legal Basis:** Clarification of the legal basis for advancing the project through public-private collaboration, including the PPP Act, as well as enabling legislation and guidelines of relevant government agencies.

(iii) **Project Scheme:** Based on the above conditions, the legal framework (public solicitation or private proposal), bidding method, project scope, contract type, contract period, procurement process, risk allocation, etc. are elaborated on.

(iv) **Consideration of a Phased Development:** Large development blocks or scales are divided into multiple blocks and a phased development by block is considered. This reduces the burden of initial development funding and risks. In the first phase, the focus is on essential public facilities for TOD (transportation hubs, pedestrian facilities, open spaces) and limited-scale development. This ensures necessary urban functions are secured by the time rail service commences. Subsequent development can then expand in response to increased urban rail demand and local needs.

(v) **Procurement Method:** For blocks exceeding a certain size or with diverse facility uses, either a single block-wide bid or separate bids for each block within the divided area should be conducted. The characteristics and considerations for each method are indicated in Table 3.3.

(vi) **Financial Analysis:** Financial analysis evaluates project profitability, supports the assessment and selection of bid packages, and verifies revenue-sharing agreements between the government and the private sector in PPP/JV cases, thereby verifying the financial feasibility of the project.

Table 3.3 Characteristics and Considerations for the Procurement Method

Type	Characteristic	Consideration
Full-scale bidding package of the whole project site	A master developer is selected, and the same operator undertakes the long-term development of the entire block. Operations are conducted under an umbrella agreement as a master contract development plan via a contractual joint venture.	Key advantages include the integration of planning, construction, and maintenance; continuity in circulation planning; and reduced burden in bidding procedures (only one bidding round required). Because of high project costs and extended project timelines to materialize a full-scale TOD project, a developer needs to be capable with sufficient experience, technical expertise, and financial strength

		to fulfill the coordination role as master developer. Under the master developer's umbrella, various developers and investors can participate in individual development projects (residential development, commercial development, etc.) to join the block development project
Individual bidding for each block of a project site	By keeping the block size and business scope small to medium scale, operators will be selected based on the specific business requirements. In the case of phased development, operations will commence with a block of 1st phase, with development in other blocks following several years later.	By limiting the scope and scale of each project and reducing various risks, it becomes easier to facilitate participation from various developers, including small and medium-sized enterprises, and to flexibly implement phased development. To ensure the integrity of the block (development concept, continuity of facilities and circulation routes, etc.), it is necessary to monitor individual projects in parallel. It is a burden to prepare and conduct multiple bidding packages.

Source: JICA Expert Team

Based on a TOD business plan, bidding is carried out to select the best proposal for the TOD project to ensure public benefit and private profit. For this, the following planning conditions are required for a TOD project proposal:

(i) **Stakeholder Coordination:** Since a TOD project is a trigger project as a part of overall station area development, required stakeholder coordination are listed: (a) close coordination with relevant projects especially urban railway construction project, (b) collaboration with relevant NGAs/ LGUs to implement infrastructure development in a seamless manner around a station, and (c) the participation of surrounding communities to meet their needs and expectations is required from planning, implementation to management.

(ii) **Vision and Strategies:** The TOD project plan should comply with the vision and strategies for urban development, transportation development, and environmental management specified by the client, while adhering to TOD principles. Where no existing TOD vision or strategy exists, proposals should be based on relevant TOD policies (e.g., DHSUD's TOD guidelines) and higher-level plans for the station area (e.g., CLUP).

(iii) **Public Benefit (Provision of Public Infrastructure):** Intermodal transfer facilities, pedestrian facilities, and open space are essential to ensure mobility and accessibility. By having the developer construct these facilities as part of the TOD project and opening them to the public, the project helps increase the usage of and the visitors to TOD facilities. Public facilities, such as station plazas, pedestrian amenities, and open spaces, will be developed to ensure access, convenience, and comfort. To ensure block integrity, it is desirable that these

be developed as part of the mixed-use development (as public servie facilities) and maintained as public facilities.

(iv) **Key Regulations:** All planning and design for a TOD project must comply with Philippine laws and regulations, the site's CLUP, and related rules and guidelines.

Table 3.4 Planning Conditions for a TOD Project Proposal

Stakeholder Coordination	Coordination with stakeholders is required. For example: (a) LGUs to ensure alignment with their TOD vision, (b) DOTr to promote urban railway usage through accessible station design, (c) DPWH for infrastructure development coordination, (d) MMDA for traffic management, and (e) local communities to foster public participation throughout project formulation, implementation, and management.	
Vision and Strategies	The project proposal must align with the proposed TOD vision and strategies (sample of BGC-BP as below) • **Vision:** *Create a modern gateway offering convenient services and seamless mobility* • **Strategy 1** *Urban Development: "International business exchange hubs in Metro Manila" for international competitiveness* • **Strategy 2** *Transport Development: "From a car-centered to a people-centered city" for accessibility and mobility* • **Strategy 3** *Environmental Management: "Sustainable city" for resilience and sustainability*	
Public Benefit (Provision of Public Infrastructure)	As a public benefits*, a station plaza, pedestrian network, and open space* around station entrances shall be planned, constructed, and managed. The technical requirements are as follows:	
	Station Plaza	• The station plaza should be located at *XXXX.* • The minimum required area is *XX* ha. • The plaza may be integrated into a mixed-use building directly connected to the station.
	Pedestrian Network	• Pedestrian networks should be developed both vertically (at-grade, underground, and elevated) and horizontally to enhance pedestrian mobility and connectivity.
	Open Space	• Open spaces around station entrances should be developed to ensure adequate circulation space for passengers. • Disaster prevention facilities shall be installed within the open space areas. • Rooftop green space shall be developed to promote urban greenery.
Applicable Regulations	The plan should comply with relevant laws, regulations, and approved plans (e.g., CLUP/ ZO). Special conditions to relax regulations such as the relaxation of parking requirements, FAR bonus, etc.	

Source: JICA Expert Team

3.2 Urban Development Project

1) Mixed-use Development

The fundamental idea of TOD is to create commercial and mixed-use developments around railway stations, making them key destinations for business and commercial activities while also increasing the proportion of residential use to increase railway ridership. By promoting mixed-use development in both city centers and suburban areas, the population density in city center will decrease, while suburban centers will experience an increase, particularly in their nighttime population.

Key Considerations:

1. **Typology of Regional Characteristics:** The type of mixed-use facilities in a TOD area is planned based on factors such as demographic composition, market conditions, regional characteristics, and urban policies. TOD can be categorized into three main types:
   - TOD in CBDs: Designed to attract high-value commercial and business activities, including office spaces, shopping centers, hotels, service apartments, supermarkets, amusement facilities, and underground parking.
   - TOD in Urban Neighborhoods: Focused on providing local communities with offices, shopping centers, supermarkets, and entertainment facilities.
   - TOD in Commuter Town Centers: Aimed at supporting local trading and social activities, including offices and supermarkets for the surrounding residential population.
2. **Facility Types and Locational Strategy**: TOD developments feature a diverse mix of commercial and business facilities to attract commuters, residents and visitors. Key facilities are strategically placed near railway stations to encourage commuting and shopping via public transportation while increasing the daytime population, especially in city centers.
3. **Target Groups:** While private developers may see high profits from mixed-use developments, TOD areas should cater to diverse range of income groups, not just high-income residents. A mix of income levels and age groups should be considered to encourage a balanced community that supports working, commuting, living, and recreation throughout the day and night.

2) Residential Facility Development

The integration of railway infrastructure and residential developments has led to the creation of new suburban towns along railway lines in view of the enormous demand for housing caused by urbanization in metropolitan areas worldwide,

This suburban expansion helps address urban challenges by (i) reducing overcrowding in city centers through population redistribution, (ii) utilizing underdeveloped land to increase land value, and (iii) increasing railway ridership to encourage public transportation use for commuting.

Source: https://www.ur-net.go.jp/toshisaisei/comp/planning.html

Figure 3.3 Tama New Town

New town development is a key suburban TOD model aimed at mitigating excessive population concentration in urban areas while fostering integrated growth between railways and surrounding communities.

However, while TOD typically promotes high-density, mixed-use developments, housing affordability remains a critical issue, particularly near major transit stations where land values rise significantly. To promote equitable TOD, affordable housing options must be incorporated within TOD zones and nearby transit-connected areas.

Box 3.6 Case Study of New Town Development

Tama Den-en-toshi has been developed since the 1960s by integrated development of residential areas and railways.

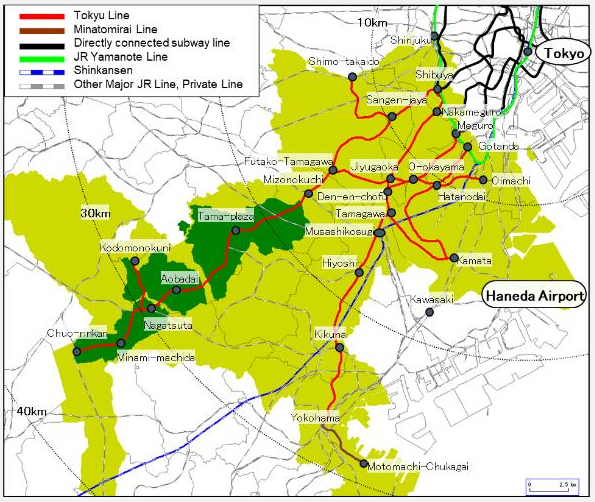
The population along the line was initially planned at 400,000, but, as of March 2020, it is home to 633,000 people, making it one of the largest urban development projects by a private sector in Japan.

Many of the areas along the railway line were developed through land readjustment projects, and the railway company, Tokyo Kyuko Dentetsu Kabushiki Kaisha (now Tokyu Corporation and Tokyu Railways Co., Ltd.), was responsible for fund-raising and operations related to the implementation of the project. In addition to building necessary public facilities such as roads and parks, the railway company has been actively involved in the development of commercial facilities around major stations, such as the opening of hospitals and other infrastructure necessary for daily life, and the opening of universities and other educational facilities, thereby improving the convenience of the area along the line.

As a result of these efforts, Tama Den-en-toshi continues to develop as an attractive city and has succeeded in continuously increasing the population along the railway line.

Source: Japan's TOD Guidebook, MLIT of Japan, 2021

Service Coverage of Tokyu Railway Network (light green) and Location of Tama Denen Toshi (dark green)



Tama Den-en-toshi Area along Tokyu Den-en-toshi Line

Source: Tokyu Corporation (left), Japan's TOD Guidebook, MLIT of Japan, 2021 (right)

Key Considerations:

1. **Maximize Value of Residential Development:** Given the high capital cost of railway infrastructure, funding is secured not only from railway operations but also through residential development. Increasing the number of residents along railway corridors enhances both real estate value and railway ridership, creating a financially sustainable TOD model.

   To ensure that TOD benefits all income groups, affordable housing should be integrated into residential developments through:

   - Inclusionary zoning policies, requiring a portion of new housing developments to be designated for low- and middle-income families.
   - FAR bonuses and tax incentives for developers who incorporate affordable housing within TOD Zones.

- Mixed-income developments, combining market-rate and affordable units to promote socio-economic diversity.

2. **Creating a Livable Environment along Railway Lines:** A well-planned urban structure is essential for livability, ensuring balanced development and access to essential services. Public infrastructure projects, such as land readjustment initiatives seen in Japan, play a crucial role in optimizing land use, improving station area development, and establishing a well-balanced urban environment.

   To further promote affordability, LGUs should:

   - Encourage transit-adjacent affordable housing, ensuring that affordable units are located within a single transit ride from major TOD hubs.
   - Leverage public land for affordable housing development, particularly near transport corridors where government-owned properties can be utilized for mixed-income housing projects.
   - Develop government-supported rental housing, prioritizing essential workers, low-income households, and transit-dependent populations.

Box 3.7 Public Rental Housing by Urban Renaissance Agency in Japan

The Urban Renaissance (UR) Agency is a government-affiliated organization in Japan responsible for urban redevelopment and public rental housing projects. Established in 2004, it succeeded the Japan Housing Corporation (JHC, founded in 1955) and the Urban Development Corporation (UDC, formed in 1981), consolidating efforts to address housing shortages, urban renewal, and disaster recovery.

1. Rental Model Instead of Sales

Unlike traditional public housing programs that eventually sell units to tenants, UR keeps ownership and provides rental housing to:

(i) **Prevent Land Speculation:** If sold, housing units could be resold at market prices, making them unaffordable in the long run.
(ii) **Maintain Sustainable Urban Growth:** UR retains control over urban housing, allowing redevelopment and adjustments to changing urban needs.
(iii) **Reinvest in Maintenance & New Developments:** Rental income is used to fund ongoing maintenance, upgrades, and future projects.

This ensures continued access to affordable housing in key urban areas, especially near transit hubs, where land values tend to rise over time.

2. Land Used by UR for Public Rental Housing

UR strategically utilizes various types of land to develop affordable, transit-oriented rental housing, ensuring efficient urban growth and accessibility. Key land sources are:

(i) **Government-Owned Land:** UR repurposes former public housing estates, underutilized state-owned land, and sites near railway stations to maintain long-term affordability and prevent speculation.
(ii) **Redeveloped Land from Urban Renewal Projects:** Aging residential districts, post-war housing complexes, and disaster recovery sites are modernized into high-density, mixed-use rental communities.
(iii) **Railway & Infrastructure-Linked Land:** Former rail yards, depot sites, and spaces near elevated highways are converted into compact, transit-oriented housing.
(iv) **Privately-Owned Land Acquired for Redevelopment:** UR partners with private developers and landowners to assemble land for rental housing in high-demand areas.

3. Uniqueness of UR Rental Housing

UR's rental housing differs from traditional public housing by offering long-term affordability, TOD integration, and a self-sustaining financial model. Key features include:

(i) **No Income Restrictions:** Unlike typical public housing, UR units are open to middle-income households, young professionals, retirees, and families without income limits.

(ii) **TOD-Integrated Housing:** Built near railway stations, UR developments promote public transit use, walkability, and mixed-use communities.

(iii) **High-Quality, Well-Maintained Housing:** Regular maintenance, redevelopment, and modern amenities provide stable, high-standard urban living.

(iv) **Urban Renewal & Disaster Recovery:** UR plays a crucial role in revitalizing aging districts and providing emergency housing after disasters.

4. Current Challenges of UR Rental Housing

While UR has successfully provided affordable, transit-oriented rental housing, it faces several challenges in maintaining and expanding its housing stock in response to demographic, economic, and urban development trends as below.

(i) Aging buildings require costly renovations and redevelopment.

(ii) Maintenance costs are rising, impacting financial sustainability.

(iii) High demand in cities vs. declining demand in rural areas requires strategic housing supply adjustments.

(iv) Demographic shifts demand more senior-friendly and flexible housing options.

(v) Balancing financial sustainability and affordability while expanding TOD rental housing remains difficult.

Example of UR Rental Housing

Name: Green Maison Toyogaoka

Location: Tama New Town in Tokyo

Access to Rail Station: About 20 mins on Foot or 10 mins by bus

No. of Unit: 897

Floor Plan: 2DK - 4DK

Floor Area: 47 – 89m2

Source: https://www.ur-net.go.jp/chintai/kanto/tokyo/20_2710.html

3. **Expanding Transportation and Pedestrian Network around Stations:** To improve accessibility, it is essential to expand walkable areas and develop efficient feeder transport networks, including buses, monorails, and shared mobility solutions. This is particularly important for suburban TOD areas, where greater connectivity enhances station accessibility and promotes public transit use.

   For affordable housing developments located beyond immediate walking distance from stations, the following last-mile solutions are proposed:

   - Dedicated shuttle services, connecting residential areas to transit stations.
   - Expanded cycling and pedestrian pathways, making non-motorized transport a viable alternative.
   - Flexible on-demand transit services, improving accessibility for lower-income households who rely on transit for daily commutes.

3) Public Facility Development around Stations

TOD-based housing developments must include essential public services and facilities, such as schools and parks, to accommodate growing populations Local governments proactively plan public facilities within walking distance of stations, with development costs shared between public and private sectors to meet efficiently.

1. **Strategic Distribution of Public Facilities within Walking Distance:** Public facilities, including schools, universities, hospitals, government offices, and cultural centers, are strategically placed around stations to enhance residents' quality of life and encourage public transportation use. In Japan, the Land Readjustment scheme is frequently applied to allocate land for public facility development. While public facilities are primarily the responsibility of local governments, private developers may also contribute to address the needs of mixed-use and residential developments.

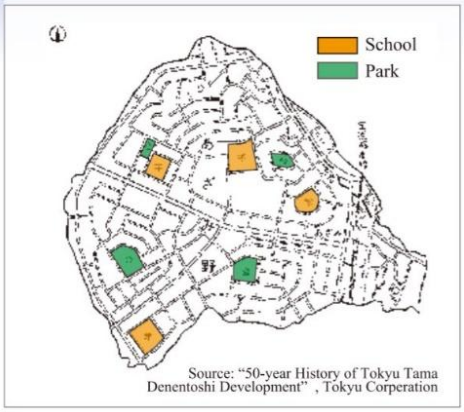
Box 3.8 Case Study of Guideline on Public Facility Development

While it was necessary to provide public services and facilities such as schools and parks to meet demands of increasing population by housing development, these urban facilities were not developed enough till 1965, and the Cities would face financial collapse if no actions were taken.

To request developers of large-scale urban development for providing public lands of schools, roads, parks, waterworks, etc. "General Guideline on Housing Land Developments" was formulated in 1968. This guideline was a planning standard which Yokohama City applied to appraise development plans by developers.

Based on the guideline, plans of public facilities which were not designated under the Urban Planning Act such as schools and parks are appraised, and the City requested developers to share costs of these facilities or to provide public lands for them.

In sum, Land Formulation Guideline was effectively applied to set rules between the City and developers to secure public facilities and lands and to guide urban development properly to meet planning standards.



Source: "50-year History of Tokyu Tama Denentoshi Development" , Tokyu Corperation

Project Name: Land Readjustment Project in Motoishikawa Ohba Area
Period: 1969~1977
Area: 179.7ha
Implementation body: cooperative composed of a developer and land owners of the area
Application of Guideline: cost sharing or land contribution for school, park, road for public use

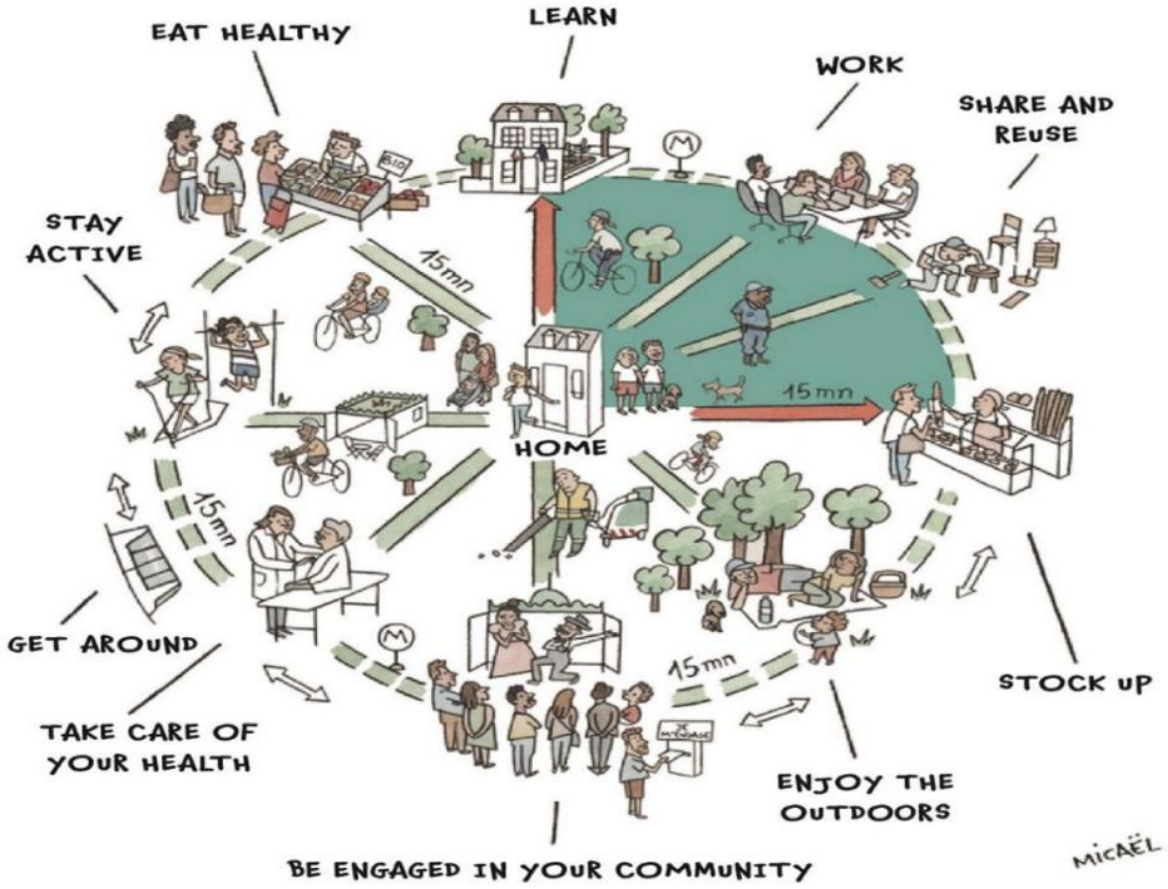
Source: Building a Global Model of Sustainable City Management –Case of YOKOHAMA-, City of Yokohama, 2013

2. **Neighborhood Planning and the "15-Minute City" Concept:** The "15-minute City" concepts, as implemented in Paris, can be applied to TOD planning. This approach ensures that residents can access essential service, such as housing, employment, education, and recreation, within a 15-minute walk or bike ride. (Figure 3.4)

   Applying this model to TOD promotes self-sustaining communities around stations by integrating key functions within an 800m to 1km radius, considering the local situation of Metro Manila. Neighborhood development should prioritize:

   - Basic infrastructure improvements to support residential and mixed-use areas.
   - Enhanced urban facilities, including schools, hospitals/clinics, and retail spaces.
   - Non-Motorized Transport (NMT)-friendly environments to improve walkability.
   - Recreational areas, such as parks and open spaces, for community well-being.

By incorporating these elements, TOD fosters socially and economically sustainable urban neighborhoods, reducing dependence on cars and enhancing overall urban livability.



Source: Micael; Paris en commun

Figure 3.4 Paris' 15-Minute City Concept

3.3 Transportation Development Project

Transportation development projects are integral to the successful implementation of TOD, as they directly impact the mobility, accessibility, and livability of TOD areas. These projects aim to create a seamless, multimodal transportation network that connects residents and commuters to key destinations while prioritizing sustainability, safety, and inclusivity. Below are six critical components of transportation development projects, along with their importance and key considerations for implementation:

1) Intermodal Transfer Facility

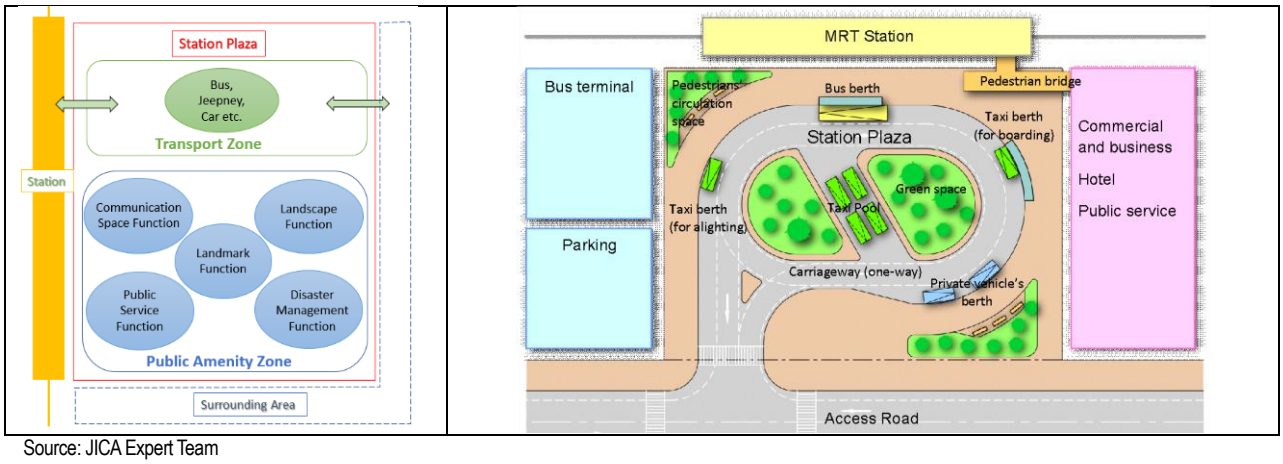
Intermodal transfer facilities are essential for ensuring seamless connectivity between various modes of transportation, such as trains, buses, jeepneys, and active transport modes. By reducing transfer times and improving the overall efficiency of the transportation system, these facilities encourage public transit usage and enhance commuting experience. Key components of intermodal transfer facilities include station plazas, typically located in front of station entrances, and PUV stops positioned along PUV routes.

Key Considerations on Intermodal Transfer Facility Development

1. **Location and Accessibility:** Facilities should be strategically located near major transit hubs to maximize convenience.
2. **Design and Functionality:** Ensure the design allows for smooth, safe, and efficient movement of all people and vehicles, with clear wayfinding and minimal transfer distances.
3. **Amenities and Services:** Provide essential services such as ticketing counters, restrooms, waiting areas, and retail options.
4. **Integration with Urban Fabric:** Integrate with the surrounding environment, including pedestrian-friendly pathways and connections to adjacent developments.

Station Plaza

A station plaza typically consists of two main zones: transport and public amenity (Figure 3.5). Each zone serves specific functions and has distinct impacts.



Source: JICA Expert Team

Figure 3.5 Zoning of Station Plaza (left) and Image of Station Plaza Layout (right)

Transport Zone. The transport zone facilitates safe and convenient transfer for people between different transportation modes (e.g., jeepney to railway, private car to bus). A well-designed transport zone minimizes congestion around stations, thereby avoiding exacerbation of traffic

issues. Insufficient space or inadequate facilities in this zone could deter people from using public transportation systems, such as railways, due to discomfort or inconvenience.

Public Amenity Zone. The public amenity zone has five primary functions:

(i) **Communication Space Function:** The station plaza provides areas for people to rest, gather, and interact, enhancing the station's role as a social hub. Not only does this boost ridership but also improves the environment within the TOD catchment area.

(ii) **Landscape Function:** The station plaza enhances the surrounding environment and harmonizes with it through landscaping elements like trees, fountains, and symbolic furniture. The streetscape can be enhanced by regulating the height, size, and façade of buildings around the plaza.

(iii) **Public Service Function:** The station plaza offers public services and facilities, such as information centers, public toilets, and information boards. These facilities should be tailored to the unique characteristics and needs of the surrounding area.

(iv) **Disaster Management Function:** In disaster-prone or densely populated areas, the station plaza serves as a critical space for temporary evacuation, rescue operations, and emergency medical services during events such as floods, earthquakes, or fires.

(v) **Landmark Function:** A station plaza serves as a prominent landmark, reflecting the identity and vibrancy of the community it serves. By fulfilling the above functions, the plaza becomes a defining feature of the area.

Box 3.9 Case Study of Station Plaza

The Kawasaki Station East Exit Plaza is a major transportation hub in Kawasaki City, Japan, located at the intersection of several key railway lines, including the JR East Keihin-Tohoku Line, Tōkaidō Line, Nambu Line, and Keikyū Line. Serving around 300,000 passengers daily and over 10 million annually, it caters to commuters, students, tourists, and shoppers who visit the nearby commercial and retail areas.

The plaza's redevelopment in the 2000s aimed to improve transportation efficiency, alleviate congestion, and create a more integrated urban space. Before this, the plaza had limited functionality, lacking the necessary infrastructure to support the growing number of users. Now, spanning 1.5 hectares, the plaza features expansive pedestrian areas, a pedestrian deck that connects directly to the "Atre Kawasaki" station building, and designated areas for buses and taxis to ensure smooth transit. The plaza also includes green spaces, resting areas for pedestrians, and dedicated bicycle parking, contributing to the overall user experience and enhancing the surrounding urban environment.

Source: Kawasaki City (https://www.city.kawasaki.jp/shisei/category/54-12-2-2-8-0-0-0-0-0.html)

PUV Stops

The PUV stop is a dedicated area for public transport vehicles, such as jeepneys, buses, or UV Express vans, to pick up and drop off passengers safely and efficiently. As a critical component of intermodal transfer facilities, the PUV bay essentially facilitates seamless connections between public transportation modes and enhances commuter experience.

There are three types of PUV stops: PUV bay, PUV bulb, and curbside stop type.

PUV Bay. This type of stop is a designated off-road area where PUVs can pull out of the main traffic flow to pick up and drop off passengers. PUV bays are ideal for locations with high passenger volumes, such as near transit stations or busy commercial areas. By keeping public vehicles out of the roadway, PUV bays help reduce congestion, enhance passenger safety, and allow for smoother traffic flow.

PUV Bulb. The PUV bulb is an extended curb area that protrudes into the road, creating a dedicated space for PUVs to stop without blocking the main traffic lanes. This design minimizes the distance pedestrians must cross to board or alight from a vehicle, improving safety and accessibility. PUV bulbs are common in urban areas with narrow streets or where curbside space is limited.

Curbside Stop. Curbside stops are simple, on-street stopping points along the edge of a road where PUVs can briefly halt for passenger boarding and alighting. These stops are most suitable for low-traffic areas or routes with lower passenger volumes. While curbside stops are cost-effective and require minimal infrastructure, careful planning is needed to prevent traffic disruptions, especially on busy roads.

Box 3.10 Case Study of PUV Stops

PUV Bay

In Singapore, bay-type bus stops are a common feature, particularly on major roads where buses need to pull off to avoid blocking traffic and to provide space for passengers to board and alight.

Photo Source: https://www.sgcarmart.com/news/gallery.php?AID=7687&CUR=2&TYPE=news

PUV Bulb

The New York City Department of Transportation (NYC DOT) and the Metropolitan Transportation Authority (MTA) introduced bus bulbs to improve bus service efficiency, pedestrian safety, and street usability.

Photo Source: https://medium.com/frontier-group/from-the-bus-stop-to-the-fast-lane-how-cities-can-speed-up-buses-improve-ridership-f96d473c1cc7

Curbside Stop

In Japan, the straight-type bus stop is by far the most widely used due to its practicality, cost-effectiveness, and ease of implementation across a variety of road types and urban settings. It is typically found in residential, suburban, and even some urban areas.

Photo Source: https://www.city.hiroshima.lg.jp/uploaded/attachment/25118.pdf

2) Feeder Service

Feeder services, such as shuttle buses or smaller public vehicles, enhance first-mile and last-mile connectivity, ensuring commuters can access transit hubs efficiently. They extend the reach of transit systems into neighborhoods and areas beyond walking distance from stations.

Roles and Responsibilities of Agencies Involved in Feeder Services:

Feeder service planning and operations involve multiple stakeholders:

- **LGUs:** Typically regulate and oversee operations of tricycles and local shuttle services within their jurisdiction.
- **Land Transportation Franchising and Regulatory Board (LTFRB):** Issues franchises and sets service standards for buses, jeepneys PUJs, and UV Express.
- **DOTr:** Provide overall guidance and integration with national transport systems.

Clear delineation of responsibilities is essential to ensure operational efficiency, regulatory compliance, and user-focused service.

Key Considerations:

1. **Routing and Frequency:** Design routes to connect underserved areas to transit hubs with reliable and frequent services.
2. **Capacity and Vehicles:** Use appropriately sized vehicles to match demand while minimizing environmental impacts.
3. **Affordability:** Keep fares affordable to encourage usage by diverse population groups.
4. **Integration with Main Transit:** Synchronize schedules with mainline transit services to decrease waiting times.

Box 3.11 Portland's MAX Light Rail and Feeder Bus System

Portland, Oregon, has developed an integrated transit system centered around the MAX Light Rail, complemented by an extensive feeder bus network. This system enhances connectivity between suburban areas and the city center, promoting sustainable transportation.

- **Park-and-Ride Facilities:** Suburban commuters can park their cars at designated lots and transfer to the MAX Light Rail, reducing congestion in the city.

- **Seamless Integration with Buses:** TriMet, the regional transit authority, ensures that buses align with light rail schedules, minimizing waiting times.

- **Unified Fare System:** Passengers can use a single fare system, including mobile ticketing, for both buses and trains.

- **Bicycle-Friendly Infrastructure:** The system incorporates bike racks on buses and designated bike spaces on trains to encourage multimodal transport.

Portland's model demonstrates how a well-planned feeder system can support transit-oriented development (TOD) and improve urban mobility.

Photo Source: https://trimet.org/home/

3) Active transport

Active transport options, such as walking and cycling, are essential for creating livable, sustainable urban environments. They promote health, reduce traffic congestion, and lower greenhouse gas emissions while enhancing accessibility to transit stations and local destinations.

Key Considerations:

1. **Infrastructure Development.** Design walkways, footpaths, and cycle lanes separate from vehicular traffic to ensure safety. Incorporate pedestrian-friendly infrastructure such as benches, lighting, shaded areas, and accessibility features for person with disabilities (PWDs). Integrate footbridges, underground walkways, and pedestrian pathways to provide seamless movement across busy streets and intersections.
2. **Safety and Accessibility.** Ensure clear and safe pathways with minimal obstacles to prevent accidents and enhance pedestrian/cyclist comfort. Provide adequate signage and wayfinding systems to guide users through pedestrian and cycling routes.
3. **Connectivity and Continuity.** Develop a connected network of pathways linking residential areas, commercial hubs, transit stations, and recreational spaces. Ensure the continuity of routes to avoid interruptions, especially near intersections and transit facilities.
4. **Environmental Sustainability.** Incorporate green infrastructure such as landscaped walkways and bio-swales to manage stormwater and improve the urban environment.
5. **Design for Inclusivity.** Design infrastructure accommodating all users, including the elderly, children, and PWDs.
6. **Maintenance and Upkeep.** Implement regular maintenance practices for walkways, cycle paths, and other active transport facilities to ensure their long-term usability and safety.

Walkway

A walkway is a designated path primarily designed for pedestrians to travel safely and efficiently between destinations. Walkways are vital in promoting active transportation and enhancing connectivity within urban areas.

To develop walkways, consider the following:

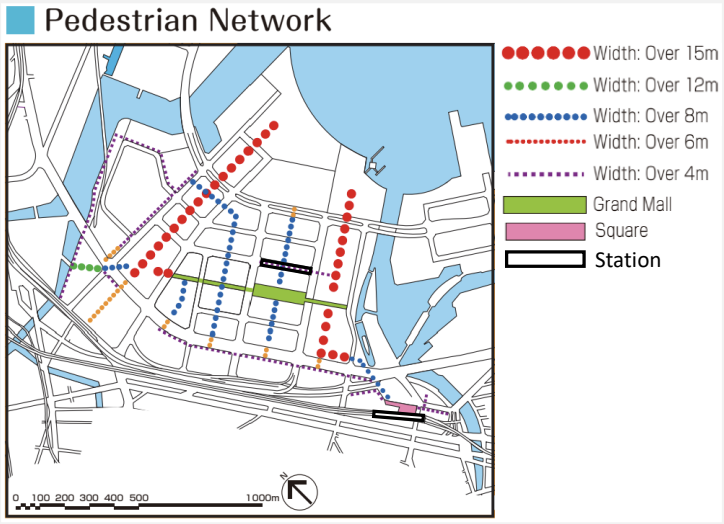
- Ensure pathways are smooth, wide, and easily accessible for individuals with mobility challenges.
- Integrate walkways seamlessly with residential areas, commercial hubs, transit stations, and parks.
- Implement safety features such as lighting, secure crossings, and clear signage at intersections and crossings.
- Incorporate green elements such as shaded sections, landscaping, and stormwater management systems.

Box 3.12 Pedestrian Space Creation in Minato Mirai, Yokohama

Minato Mirai, Yokohama, is a waterfront urban area designed with a strong focus on walkability and pedestrian-friendly spaces. Several key strategies have been implemented to enhance the pedestrian experience while integrating public transportation and green spaces. Key features include:

- **Connected pedestrian network** with elevated walkways and car-free zones.
- **Green corridors and public spaces**, like Grand Mall Park and waterfront promenades.
- **Waterfront accessibility**, with scenic pedestrian paths along the bay.
- **Public transport integration**, ensuring smooth multimodal connections.
- **Traffic-calming measures** to enhance pedestrian safety and walkability.

Minato Mirai successfully balances urban development with pedestrian comfort, creating a vibrant and accessible environment.



Source: https://www.ymm21.jp/upload/Info86.pdf

Source: https://www.mjd.co.jp/projects/27812/

Source: https://www.nagisashiki.com/nipponmarumemorialpark/

Footbridge/Pedestrian Deck

A footbridge or pedestrian deck provides a crossing for pedestrians over obstacles such as roads, rivers, or railways, ensuring safe and efficient movement without interference from vehicle traffic.

To develop footbridges or pedestrian decks, consider the following:

- Ensure the structure is wide enough to accommodate high foot traffic and allow for natural flow.
- Include ramps or elevators to ensure inclusivity for all users, including PWDs.
- Integrate footbridges with surrounding pedestrian infrastructure, such as walkways and nearby transit facilities.
- Design bridges that harmonize with the urban landscape and include safety measures such as handrails and lighting.

Box 3.13 Case Study of Pedestrian Deck – Osaki Station -

Osaki Station, located in Shinagawa, Tokyo, serves approximately 200,000 passengers daily and is in a vibrant business district undergoing continuous redevelopment. Well-connected by four JR lines, it provides excellent access to various areas of Tokyo and beyond.

The pedestrian deck at Osaki Station plays a crucial role in the area's urban redevelopment, aiming to ease traffic congestion and improve pedestrian safety. It was created as part of a larger initiative to enhance connectivity between the station and surrounding office and commercial buildings.

Spanning over 200 meters, the deck links the station's main entrances to nearby facilities. It features barrier-free elements, including elevators and ramps, ensuring accessibility for people with disabilities and those with strollers. With walkways ranging from 5 to 7 meters wide, the deck also includes green spaces and rest areas, offering a comfortable environment for pedestrians. Its design seamlessly integrates with the surrounding buildings and urban landscape.

Source: https://shinagawalocation.jp/location/index.html?search=%E5%A4%A7%E5%B4%8E%E9%A7%85

Underground Walkway

An underground walkway offers pedestrian pathways below the surface, often used to cross beneath streets, railway tracks, or other obstacles. It provides a safe and comfortable route away from traffic.

To develop walkways, consider the following:

- Ensure well-lit, ventilated spaces to provide a comfortable environment and reduce the risk of accidents.
- Include emergency exits, clear signage, and accessible pathways for emergencies.
- Provide ramps, elevators, and clear pathways for PWDs.
- Design visually appealing spaces to ensure regular maintenance to avoid flooding or structural issues.

Box 3.14 Case Study of Underground Walkway

Meiji-Jingumae Station (Harajuku) is an underground station served by the Tokyo Metro Chiyoda Line and Fukutoshin Line, with an average daily ridership of approximately 121,000 passengers. The station features well-designed and spacious underground pathways that provide seamless access to the Harajuku and Omotesando areas, as well as Meiji Shrine. The underground passageways connect the platforms of the Fukutoshin Line and Chiyoda Line, optimizing pedestrian flow for commuters and visitors.

Along the underground passageways, there are various shops and facilities that enhance convenience and the overall experience for passengers. These include small cafés, bakeries, convenience stores, and souvenir shops catering to tourists. Additionally, there are kiosks selling snacks and beverages, fashion boutiques, and accessory stores reflecting the vibrant Harajuku style. Services such as ATMs, lockers, and rest areas are also available, making the station an ideal hub for both commuters and visitors.

The pathways are equipped with clear signage, making navigation easy even for first-time visitors. Additionally, the station is designed with barrier-free features, including elevators and escalators, to accommodate wheelchair users and strollers.

Source: JICA Expert Team

4) Signage (Way-finding System)

Signage plays a vital role in guiding, informing, and regulating the movement of people and vehicles within a TOD area. Clear and effective signage enhances navigation, safety, and overall user experience.

There are various types of signage, including:

- **Identification Signs**: Used to mark transit stations, pedestrian pathways, and key landmarks.
- **Directional Signs**: Help guide users toward destinations such as entrances, exits, transfer points, and facilities.
- **Information Signs**: Provide essential information, such as schedules, maps, and public service details.
- **Regulatory Signs**: Communicate traffic rules, safety regulations, and parking guidelines to ensure compliance and safety.

Identification Signs	Directional Signs	Information Signs	Regulatory Signs
			

Source: JICA Expert Team

Figure 3.6 Example of Signages

Key Considerations:

1. **Clarity and Design:** Use universally recognizable symbols and multilingual text where necessary.
2. **Placement and Visibility:** Position signs in easily visible and strategically located areas, such as station entrances, intersections, and key decision points.
3. **Consistency:** Ensure uniform design standards across the entire TOD area to maintain coherence.
4. **Real-Time Updates:** Incorporate digital signage where feasible to provide real-time information on schedules, delays, and other updates.

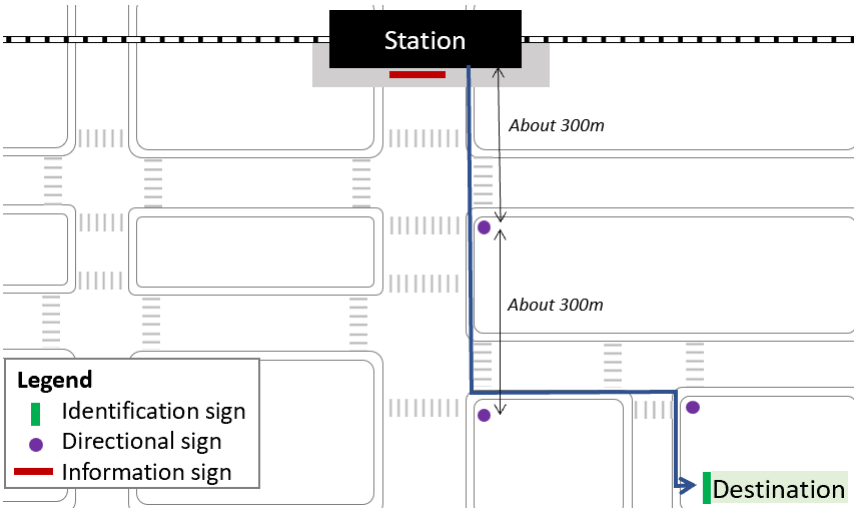
Specific Placement:

(i) Identification signs are installed at the entrance of facilities.

(ii) Directional signs are placed at intersections and along tourist/visitor routes, recommended every 300–500 m along straight roads.

(iii) Information signs are mainly installed at the starting point of action, such as the entrance and exit of a station.

(iv) Regulatory signs are strategically placed where they can clearly communicate based on their purpose.



Source: JICA Expert Team

Figure 3.7 Image of Signage Placements

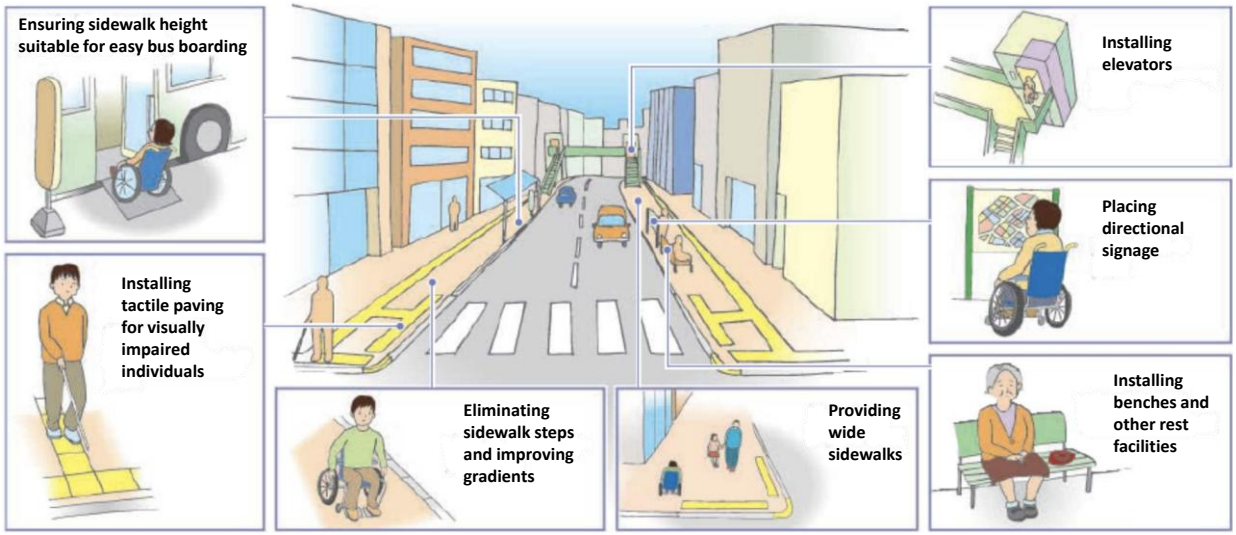
5) Barrier-free Routes

Barrier-free routes ensure inclusivity by enabling access for people with disabilities, older adults, and parents with strollers. It aligns with TOD's goal of fostering equitable and accessible communities.

Key Considerations:

1. **Universal Design:** Incorporate features like ramps, elevators, tactile paving, and wider pathways to accommodate diverse users.
2. **Compliance with Standards:** Adhere to national and international accessibility standards and guidelines.

   Maintenance: Regularly inspect and maintain barrier-free infrastructure to ensure usability and safety.
3. **Connectivity:** Design routes that connect seamlessly to transit hubs, public spaces, and key facilities such as healthcare centers and schools.



Source: The Barrier-Free New Law: Aiming for the Realization of a Universal Society (MLIT of Japan)

Figure 3.8 Elements of Barrier Free Route

Box 3.15 Town Watching (On-site Inspection) Approach in Japan

In Japan, the "Town Watching" method is widely used to assess and improve barrier-free accessibility in urban areas. This on-site inspection survey involves local stakeholders—such as city officials, transport operators, urban planners, and persons with disabilities—walking through public spaces to identify accessibility challenges and propose improvements. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has issued the Implementation Manual of Town Watching to provide guidelines for conducting effective accessibility assessments.

Key features of this approach include:

- First-hand identification of barriers such as uneven sidewalks, inadequate ramps, and poorly located pedestrian crossings.
- Community participation, ensuring diverse perspectives from people with mobility challenges.
- Real-time documentation and feedback, leading to immediate, practical solutions for improving pedestrian environments and public transport access.

Applying the Town Watching method in TOD planning ensures that barrier-free routes are effectively integrated into station areas and surrounding developments. Conducting regular on-site accessibility audits allows urban planners and policymakers to make data-driven improvements that enhance mobility for all users, particularly seniors and persons with disabilities.

The examples of check items on site are as below.

1. Pedestrian Pathways	・ **Sidewalk width**: Is it wide enough for wheelchairs and strollers? (≥1.5m recommended) ・ **Surface conditions**: Are there cracks, uneven surfaces, or obstructions? ・ **Slope and gradient**: Are slopes gentle and within accessibility standards? (≤1:12 slope ratio) ・ **Drainage issues**: Are there puddles or slippery surfaces due to poor drainage?
2. Crosswalks and Intersections	・ **Presence of pedestrian crossings**: Are they clearly marked and located near desire lines? ・ **Traffic signals with audio cues**: Are there sound signals for visually impaired users? ・ **Curb ramps**: Are curb cuts properly aligned with crossings and sufficiently wide? ・ **Crosswalk timing**: Is there enough time for slower pedestrians to cross safely?
3. Public Transport Access	・ **Station entrances and exits**: Are they accessible without stairs or with ramps/elevators? ・ **Platform gaps**: Are there minimal gaps between platforms and transit vehicles?

	· **Bus stops**: Are bus boarding areas designed for wheelchair users? Are there tactile guide paths?
4. Facilities and Street Furniture	· **Rest areas**: Are there benches and shaded areas for resting? · **Wayfinding signage**: Is signage clear, bilingual, and placed at an appropriate height? · **Lighting**: Are pathways and crossings well-lit for night-time safety? · **Obstructions**: Are there utility poles, advertising boards, or parked bikes blocking the way?
5. Safety and Security	· **Traffic speed near pedestrian zones**: Are speed limits enforced? Are there speed bumps? · **Visibility**: Can pedestrians, including children and wheelchair users, be seen by drivers? · **Surveillance and emergency access**: Are there CCTV cameras or emergency call stations?
6. Community Feedback	· **User experience surveys**: Are pedestrians, especially persons with disabilities and seniors, satisfied with accessibility? · **Local resident input**: What additional improvements do daily users suggest?



Source: Kashiba City Town Watching https://www.city.kashiba.lg.jp/uploaded/attachment/5950.pdf

6) Traffic Management

Effective traffic management ensures the smooth flow of vehicles and pedestrians in and around TOD areas, minimizing congestion and conflicts. This enhances overall mobility and safety, which are critical for vibrant and functional urban centers.

Key Considerations:

1. **Traffic Flow Optimization:** Reduce congestion by using signal timing, roundabouts, and dedicated turning lanes.
2. **Pedestrian Priority:** Implement pedestrian crossings, speed reduction measures, and shared spaces to prioritize non-motorized users.
3. **Data-Driven Decisions:** Utilize traffic modeling and real-time data to design and manage traffic systems.
4. **Coordination with Transit Operations:** Align traffic management strategies with transit schedules and routes to minimize disruptions.

Components of Traffic Management

Specific traffic management components include the following.

- **Traffic Signals**: Control the flow of vehicles at intersections, ensuring safety and smooth traffic movement.
- **Road Markings and Signage**: Guide drivers and pedestrians, ensuring adherence to traffic rules and enhancing visibility.
- **Dedicated Lanes**: Provide separate lanes for public transport, cyclists, and pedestrians to

reduce conflicts between modes of transportation.

- **Traffic Calming Measures**: Implement design strategies to slow down traffic, such as speed bumps, chicanes, and road narrowing.
- **Parking management**: Apply structured parking policies to support TOD principles by reducing dependency on private vehicles, encouraging shared parking solutions, and integrating smart parking systems.

Traffic Calming Measures

Traffic calming refers to strategies for reducing vehicle speeds and improving safety in residential and urban areas. These measures create a safer environment for pedestrians and cyclists, promoting a more livable community.

Key Traffic Calming Measures:

- **Speed Bumps**: Low-profile bumps that slow vehicles at designated intervals.
- **Chicanes**: Curved alignments that narrow the roadway and encourage slower driving.
- **Roundabouts**: Circular intersections that reduce traffic speeds and improve traffic flow.
- **Raised Crosswalks**: Elevated pedestrian crossings that force drivers to reduce speed.

Box 3.16 Traffic Calming in New York City

In the Street Design Manual of New York City, traffic calming measures are introduced as part of the broader goal of improving pedestrian safety, enhancing mobility, and fostering more livable streets. These measures focus on slowing down traffic, improving the pedestrian experience, and promoting safer, more sustainable street environments.

Road Diet - Lane Narrowing & Lane Removal –

Lane narrowing and removals are design techniques that reduce excess lane width or repurpose underused lanes for other purposes without reducing the total number of lanes. While not specifically designed for traffic calming, both techniques offer significant traffic calming benefits.

Before

After

Raised Speed Reducer

A raised speed reducer is a roadway feature designed to deflect both the wheels and frame of a vehicle to reduce speed. The two main types are speed humps and speed cushions. Both types have proven effective in lowering vehicle speeds.

Gateway

A gateway is a combination of traffic calming and visual measures designed to slow entering vehicles and discourage through traffic. It is particularly effective at transitions to slower-speed environments, such as residential side streets and Shared Streets.

Raised Crosswalk

A raised crosswalk is a pedestrian crosswalk located at an intersection or mid-block, elevated higher than the adjacent roadway. It functions like a speed table that meets the curbs, with a full-width crosswalk typically 3 to 4.5 meters wide within the flat portion of the table.

Raised Intersection

A raised intersection is an entire intersection that is elevated above the surrounding roadway, usually raised to the height of the sidewalk. This design slows down traffic and enhances pedestrian safety by making the intersection more visible and providing a level crossing for pedestrians.

Chicane

A chicane is a series of narrowing or curb extensions that alternate from one side of the street to the other, forming S-shaped curves. This design forces drivers to navigate around the curves, discouraging or making it impossible to drive in a straight line, which effectively slows down traffic.

Neighborhood Traffic Circle

A traffic circle (or roundabout) is a raised island located in the center of a traditional intersection. It is primarily used in lower-traffic intersections to reduce vehicle speeds and improve traffic flow.

Source: https://www.nycstreetdesign.info/geometry/traffic-calming

Parking Management in TOD Area

Effective parking management is essential to balancing accessibility with sustainability in TOD areas. Unregulated parking supply can increase congestion and discourage public transit use. Well-planned parking strategies should support transit-oriented mobility while optimizing land use.

1. **Parking Demand Reduction:** TOD areas should prioritize shared parking facilities, reduced parking minimums, and transit incentives to discourage excessive private car use.
2. **Parking Maximum Limits:** Establish parking maximums instead of traditional minimum parking requirements to prevent excessive parking spaces, encourage compact development, and promote public transit use. This tool ensures that new developments allocate space efficiently while discouraging car dependency.
3. **Integration with Land Use Planning:** Encourage mixed-use developments that reduce parking needs by enabling people to live, work, and shop within walking distance.
4. **Park-and-Ride Facilities:** Designate strategic parking zones near transit hubs to facilitate commuter access while discouraging car use within the TOD zone.
5. **Smart Parking Systems:** Implement real-time parking availability information, automated fee collection, and dynamic pricing to manage demand efficiently.
6. **On-Street Parking Controls:** Utilize pricing mechanisms, time limits, and permit-based parking to prevent congestion and promote turnover in high-demand areas.

3.4 Environmental Management Project

1) Disaster Prevention

In the event of a disaster such as a flood or earthquake, large crows may gather at railway stations. Since station premises alone cannot accommodate all evacuees, it is essential to enhance disaster prevention measures across the entire area surrounding the station. This includes securing sufficient open spaces and integrating disaster prevention facilities into nearby infrastructure.

Key Considerations:

1. **Flood Prevention Measures:** Flood protection strategies, such as elevating station entrances, should be implemented not only for station buildings but also for pedestrian pathways, transportation facilities, and multi-use developments around stations.
2. **Seismic Resilience and Earthquake Preparedness:** Buildings and infrastructure in TOD areas should be designed to withstand seismic activity through reinforced structural foundations, flexible building materials, and shock-absorbing technologies. Additionally, station areas should include earthquake-resistant pedestrian bridges, flexible utility lines, and open spaces for temporary shelters to enhance community resilience.
3. **Enhancing Disaster Prevention Facilities and Functions:** Public gathering spaces must provide ample walking and waiting areas, as well as designated zones for first aid, emergency storage, and distribution of essential supplies. In addition to stocking disaster prevention warehouses, wells, and tents, facilities should incorporate multi-functional elements, such as benches that double as portable toilets and ovens, and provide emergency information via signboards for both everyday use and crisis situations. (Figure 3.9)
4. **Designating Evacuation Routes:** As a major urban hub where large crowds gather, the station must have designated evacuation routes connecting it to other public facilities serving as evacuation centers. To facilitate emergency response, trunk roads should be prioritized for emergency vehicles, with restrictions on private access during disasters.
5. **Establishing a Disaster Prevention Information System and Interagency Cooperation:** In the event of disaster, public transportation users and those in surrounding development may be unable to return home. Therefore, it is crucial to share real-time information on transit operations and damage while coordinating with key organizations, such as the police, fire department, and disaster response agencies, to ensure regional safety.

Source: Website of Yoshikawa City (warehouse), Koutou City (well, bench)

Figure 3.9 Examples of Disaster Prevention Facilities

Box 3.17 Disaster Prevention Features of Umekita Park (Grand Green Osaka)

Umekita Park which spans approximately 4.5 hectares, has been designed as a disaster prevention hub, ensuring safety and resilience in times of emergencies such as earthquakes or fires. The park includes wide open spaces capable of accommodating up to 34,000 temporary evacuees, with pathways and access points designed to facilitate smooth entry for both people and emergency vehicles.

To support disaster response efforts, the park is equipped with essential facilities, including emergency lighting and disaster prevention speakers to provide critical information during crises. Special manhole toilets have been installed to function even when regular plumbing is disrupted, and stockpiles of emergency supplies, such as food, water, and first aid kits, are available to support evacuees.

Flood control measures have also been incorporated into the park's design. Rainwater management systems, such as bio swales and infiltration trenches, help absorb excess water and reduce the risk of flooding. Additionally, firebreak greenery has been strategically placed to act as a buffer, preventing the spread of fires in the event of a disaster.

The park's infrastructure is designed to support rapid emergency response, with pathways that remain accessible even in challenging conditions. These disaster prevention features make Umekita Park not only a vital evacuation site but also a key element in strengthening Osaka's resilience against natural disasters.

Wide-open Grassy Area that can be a temporary evacuation space[1/]	**Fountain Area** that can be drained and used as a temporary evacuation space[2/]	**Manhole Toilet**[1/]	**Disaster Prevention Speaker**[2/]
			

Source: 1/ https://ur-toshikikou-gov.note.jp/n/n4a22d34d6b06
2/ https://note.jcomdolocal.jp/n/nb04a23cdf750

2) Environmental Improvement

Implementing flood control and heat island mitigation measures in station areas serves a dual purpose: enhancing disaster prevention and optimizing urban space to combat climate change. In the development and redevelopment of station areas, green spaces shall be integrated to improve the city's appeal and livability through collaboration among government, businesses, and residents.

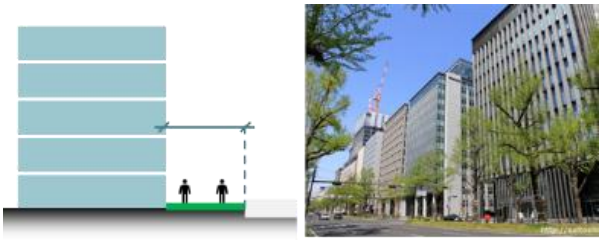
Key Considerations:

1. **Development of parks and greenways around stations:** Urban parks will be developed to support flood prevention, air purification, and climate adaptation. Roadside greening along major roads near stations will enhance environmental quality while also strengthening disaster prevention measures, such as firebreaks and flood control.
2. **Promotion of green space development:** Green infrastructure, such as rooftop gardens, vertical greenery, urban plazas, and pedestrian-friendly promenades, will be incorporated into redevelopment projects to enhance urban sustainability. These measures not only reduce urban heat island effects and improve air quality but also promote a more comfortable and livable urban environment. (Figure 3.10).
3. **Public-private collaboration for green infrastructure development:** Private developers involved in redevelopment projects will be encouraged to integrate green building technologies, passive cooling strategies, and sustainable landscaping to enhance energy

efficiency and environmental performance. This approach makes urban areas more attractive for investment and talent while contributing to carbon footprint reduction and long-term urban resilience.

4. **Energy-Efficient Building Design:** Redevelopment projects will incorporate passive design strategies, solar panels, natural ventilation systems, and energy-efficient lighting to minimize energy consumption and reduce greenhouse gas emissions. Building regulations will be updated to encourage TOD developments to adopt green building certifications and sustainable construction practices.

Setback and Planting



Source: JICA Expert Team, https://saitoshika-west.com/

Pedestrian Deck and Rooftop Greening

Source: JICA Expert Team, https://www.ldc.co.jp/ld-letter/ld-letter-vol-8/

Open Space and Planting

Source: JICA Expert Team, https://www.nomurakougei.co.jp/achievements/page/marunouchi-street-park2021-summer/

Rooftop Garden

Source: https://www.mori-hills-reit.co.jp/outline/environment_initiatives/biodiversity/tabid/391/Default.aspx

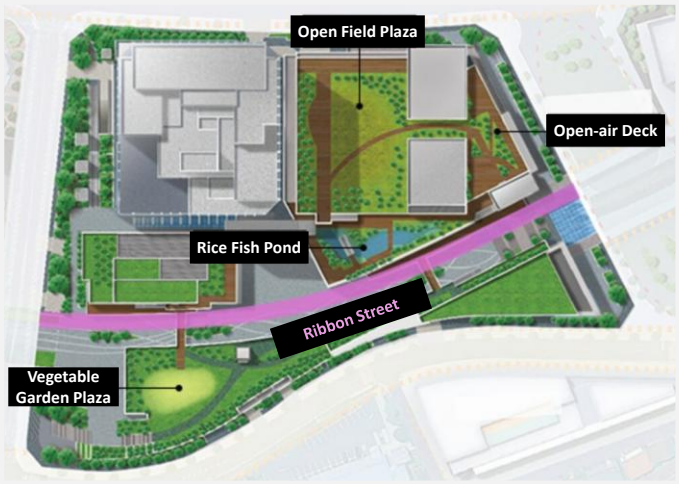
Figure 3.10 Examples of Green Space Development

Box 3.18 Roof Garden at Futako Tamagawa Rise, Tokyo

Futako Tamagawa Rise is a mixed-use development in Tokyo that exemplifies TOD principles by integrating residential, commercial, and recreational spaces with efficient public transportation access. A notable feature of this development is its expansive roof garden, which enhances urban livability and sustainability.

The roof garden provides a green oasis amidst the urban environment, offering residents and visitors a place to relax and engage in leisure activities. This space not only contributes to the aesthetic appeal of the area but also supports environmental sustainability by mitigating the urban heat island effect and improving air quality.

By incorporating such green spaces, this development promotes balanced urban lifestyle and encourages walking and community engagement, which are core aspects of successful TOD projects.



Open Field Plaza

Open-air Deck

Rice Fish Pond

Source: https://www.rise.sc/whatsrise/environment/

3) Area Management/Community Involvement

To foster a well-maintained and vibrant local environment, area management and community participation play a crucial role in efficiently operating and maintaining district infrastructure and public spaces. Encouraging proactive involvement from residents, businesses, and local organizations helps enhance the quality of life while strengthening disaster resilience.

Key Considerations:

1. **Promoting Community Activities:** Through the collaboration between the community and government, various community activities will be implemented to enhance asset value by preserving the local environment and improving disaster resilience. (Figure 3.11)
2. **Establishing Organizational Structures:** Private businesses and residents will lead the establishment of an area management organization. In commercial districts, multiple businesses will collaborate to form this organization, generating revenue through events, bus operations, and parking management, which will be reinvested into local activities. In residential areas, the organization, in partnership with the government, will oversee community initiatives and maintain parks and green spaces.

Planting and Maintenance

Source: https://inspire-hub-shinyuri.com/report/8315.html

Evacuation Drill

Source: https://www.ymm21.jp/news/press/20182_1.php

Open Market

Source: JICA Expert Team

Figure 3.11 Examples of Area Management Activities

Box 3.19 Area Management by Kashiwa-no-ha Urban Design Center (UDCK)

The Kashiwa-no-ha Urban Design Center (UDCK) was established in 2006 to promote urban development in Kashiwa-no-ha Campus, a smart city in Kashiwa City, Chiba Prefecture. It operates through collaboration among the public sector (government), private sector (businesses), and academia (universities). The area is centered around Kashiwa-no-ha Campus Station on the Tsukuba Express (TX) line, a key transportation hub that supports TOD and sustainable urban planning.

UDCK's Area Management Initiatives

UDCK works to enhance the region's value and sustainability through:

- **Managing Public Spaces:** Maintaining key areas like station roads and Aqua Terrace, improving both landscape and safety.
- **Community Building:** Organizing workshops and study sessions to connect residents, businesses, and universities, fostering collaboration.
- **Event Planning:** Hosting festivals, markets, and music events to attract visitors and strengthen community ties.

Community Cleaning

Town Planning School

Eco Tour

Organizational Structure

UDCK functions as a flexible platform without corporate status, allowing various stakeholders to collaborate. To carry out projects directly, it operates through two legal entities: Kashiwa-no-ha Urban Design Center and UDCK Town Management, both working closely together.

UDCK is jointly managed by eight key organizations involved in Kashiwa-no-ha's urban development: The University of Tokyo, Chiba University, Kashiwa City, Mitsui Fudosan, Kashiwa Chamber of Commerce and Industry, Tanaka Community Furusato Council, Kashiwa-no-ha Community Furusato Council, and Metropolitan Intercity Railway Company.

Additionally, partner organizations such as Kashiwa City Urban Development Corporation, Chiba Prefecture, AIST Kashiwa Center, and TX Entrepreneur Partners contribute to long-term development efforts. Local groups and facilities also collaborate as affiliated organizations, further expanding the network of urban development initiatives.

This collaborative approach makes UDCK a leading model for smart, sustainable city development in Japan.

Source: https://www.udck.jp/

4 LESSONS FROM INTERNATIONAL TOD CASE STUDIES

4.1 Purpose of the Case Studies

TOD has been successfully implemented in various countries worldwide, offering valuable insights into integrated urban planning, efficient land use, and sustainable mobility. By examining international case studies, we can learn from different approaches, best practices, and challenges, helping to shape more effective TOD strategies in the Philippines.

This chapter presents key TOD experiences from countries such as Japan, Singapore, and the United States, among others. These case studies highlight how TOD has been used to:

(i) **Enhance connectivity** between public transport systems and surrounding urban areas.

(ii) **Promote mixed-use developments** that integrate residential, commercial, and public spaces.

(iii) **Encourage sustainable urban mobility** through pedestrian-friendly and transit-oriented design.

(iv) **Implement effective policy frameworks** that support long-term TOD success.

In addition to the outcomes of TOD projects, this chapter also examines the institutional and governance structures that enabled successful implementation. Each case study explores:

(i) **Key implementing agencies and stakeholders** involved in TOD planning and execution.

(ii) **Institutional frameworks** and coordination mechanisms among national and local governments, transit authorities, and private sector partners.

(iii) **Policy and regulatory support** that facilitated TOD implementation, such as land use policies, zoning laws, and financial incentives.

(iv) **Funding and financing models**, including public-private partnerships and government investments.

By studying these cases, policymakers, urban planners, and stakeholders in the Philippines can identify adaptable strategies and governance models to strengthen TOD implementation. While each country operates within unique socio-economic and regulatory contexts, the fundamental principles of TOD—compact, walkable, and transit-focused urban growth—remain universally relevant.

The following case studies provide practical insights into planning, implementation, financing, governance, and institutional coordination, offering a foundation for strengthening TOD practices in the Philippines.

4.2 Contents of the Case Studies

1) TOD Typology

The selected case studies from Japan and other countries are categorized into four types based on district characteristics and key urban issues.

(A) Corridor TOD: Urban development planned along railway corridors from the initial planning stage, ensuring seamless integration of transportation and land use (e.g., Minatomirai Line, Tsukuba Express, Portland, Hong Kong).

(B) CBD TOD: Urban redevelopment projects in CBDs, incorporating intermodal transportation functions and mixed-use development to enhance socio-economic competitiveness (e.g., Toranomon, Umekita).

(C) Built-up Area TOD: Redevelopment initiatives in existing urban areas aimed at upgrading station environment and enhancing urban livability (e.g., Nakano, Totsuka, Futako Tamagawa, Tama Plaza).

(D) Suburban Area TOD: Development of suburban centers that offer convenient accessibility and a well-balanced mix of residential and employment opportunities (e.g., Kashiwanoha Campus, Nagareyama Otakanomori).

2) Structure of Case Study Sheets

Each TOD case study includes following key components:

(i) Basic information: General details such as location, area characteristics, daily ridership, population, project area, and key project implementation bodies (PIBs)

(ii) Project Background: Development challenges and significant turning points that led to project initiation.

(iii) Possible Lessons Learned for the Philippines: Key insights and strategies that can be adopted align with current urban and regulatory frameworks of the Philippines

(iv) Project Overview: Historical context, objectives, and general outlines of the project.

(v) Project Components: Key initiatives and institutional mechanisms that facilitate TOD implementation.

(vi) Role of Stakeholders: Responsibilities and coordination among key PIBs and relevant stakeholders.

(vii) Private Sector Participation in Public Infrastructure: Private sector contributions to public infrastructure development and any associated incentives to encourage investment.

A summary of the key objectives, characteristics, and lessons from the case studies is provided below.

(A) Corridor TOD

(1) Urban Railway Development with CBD (Minatomirai Line)

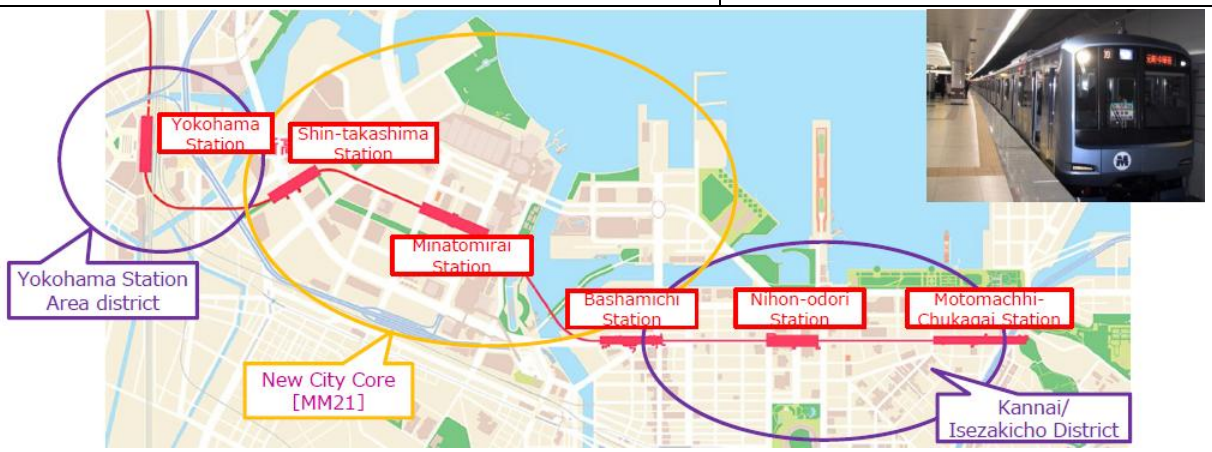
PIB: City Government

Objectives: To enhance urban connectivity and integrate dispersed urban functions across multiple stations, a subway line was constructed, and a new central business district (Minato Mirai 21 (MM21)) was developed through land reclamation and a land readjustment project.

Key Characteristics: Private companies partially funded subway construction using the beneficiary-pays principle. MM21 became a vibrant subcenter attracting business, commercial, and tourism activities for domestic and international visitors.

Lessons Learned: (i) Strategic subcenter development focused on employment, commerce, and tourism, (ii) Effective coordination among multiple implementation bodies with diverse funding sources, and (iii) Successful application of private-sector financing for public infrastructure development

Minato Mirai 21 District



Route Map of Minatomirai Line (Length: 4.1km)

(2) Integrated Urban Railway and Suburban Area Development (Tsukuba Express/ TX)

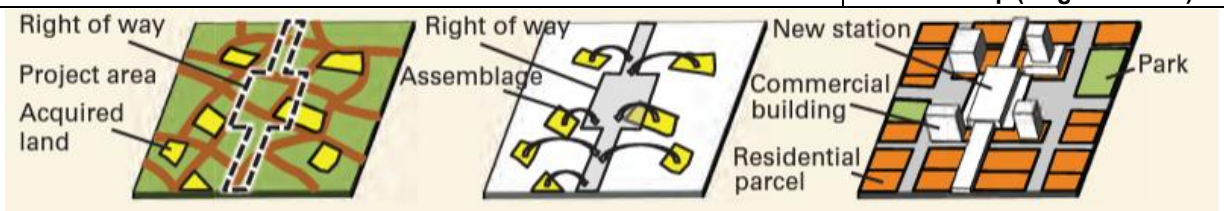
PIB: Local Governments, UR

Objectives: To promote suburban and urban development alongside railway construction, relieving city center of overcrowding while increasing railway transport capacity.

Key Characteristics: Under the Housing and Railway Act, land readjustment projects were implemented, including prior land acquisition for railway development, ensuring well-planned station areas with transport facilities and public infrastructure.

Lessons Learned: (i) Strengthening institutional frameworks for integrated railway and urban development, (ii) Securing railway land through land readjustment and land swapping, and (iii) Promoting commercial, business, and academic development along the railway corridor

Route Map (length: 58.3km)



Land Readjustment Scheme for Pre-phasing Railway Lands

(3) Transformation with Light Rail and Urban Growth Boundaries (Portland)

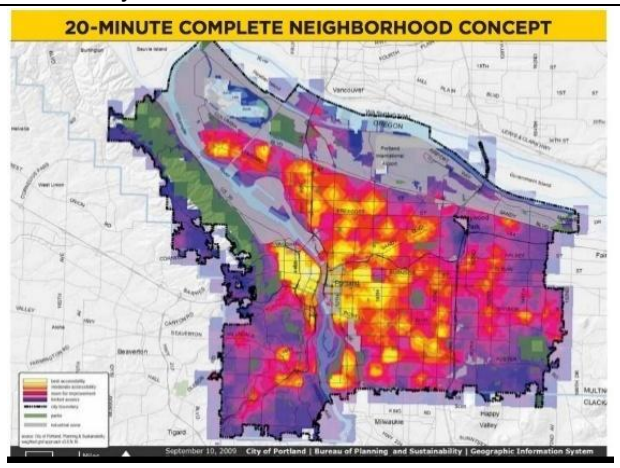
PIB: City Government

Objectives: To promote downtown development through metro expansion, transit integration, community engagement, and the creation of vibrant, walkable neighborhoods.

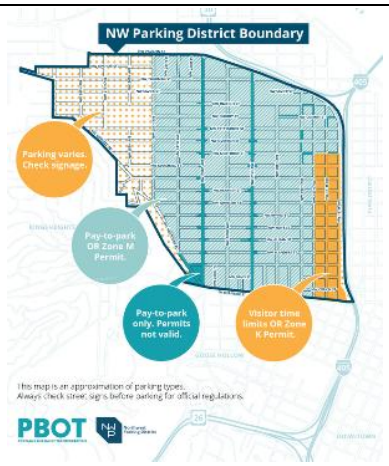
Characteristics: Portland implemented Tax Increment Financing (TIF) to capture land value from property tax revenue, affordable housing policies, the “20-Minute Neighborhoods” initiative for walkability, and parking maximums to prioritize public transport.

Lessons Learned: (i) Strong regional governance and coordination, (ii) Integrated land use and transport planning, (iii) Strategic public transit investments, (iv) Active community engagement and public involvement, and (v) Focus on livability and sustainability

Portland City



"20-Minute Neighborhoods" Initiative



Parking Maximums

(4) Rail + Property Model (Hong Kong)

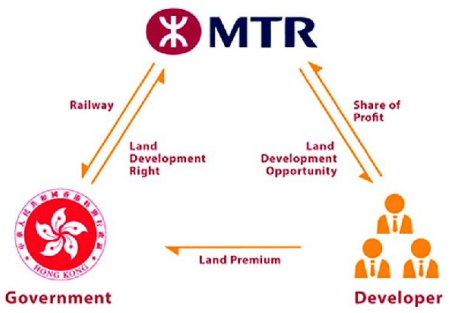
PIB: MTR Corporation

Objectives: To expand the railway network while promoting high-density, mixed-use developments around transit hubs.

Characteristics: MTR Corporation applies the Rail + Property (R+P) model, integrating commercial and residential developments, affordable housing, smart mobility, and mixed-use planning to maximize transit-oriented growth.

Lessons Learned: (i) Successful implementation of the R+P model through public-private collaboration, (ii) High-density, mixed-use, and TOD-supportive land use planning, (iii) Seamless multimodal integration and pedestrian-friendly design, and (iv) Adoption of smart mobility solutions and sustainable urban development

Key Development and Redevelopment Areas



R+P Model

Kai Tak Redevelopment

(B) CBD TOD

(5) Mixed-use Development Combined with New Subway Station in Tokyo (Toranomon)

PIB: Private Company, UR

Objectives: To enhance urban functions as an international business hub and intermodal transfer point through the development of a new subway station.

Characteristics: Seamless public-private collaboration enabled integrated urban and transport projects. Private developers led urban redevelopment, including public infrastructure, while UR coordinated and facilitated project integration.

Lessons Learned: (i) Coordinated and specialized urban development projects, and (ii) Flexible urban development regulations to support large-scale redevelopment

Toranomon District

Underground Section Image of Subway Station and Buildings

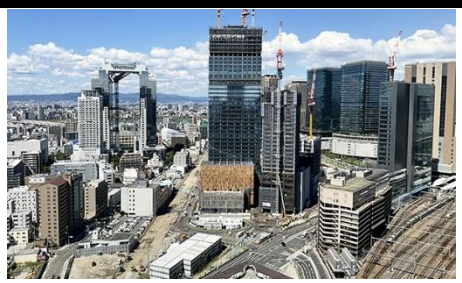
(6) Large-scale Mixed-use Development of the Former Freight Station Site at Osaka Station North District (Umekita)

PIB: City Government, UR

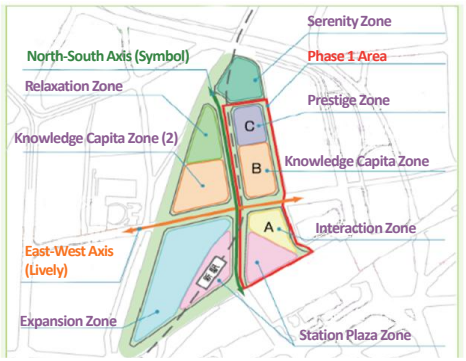
Objectives: To develop an internationally competitive station area by transforming a former rail yard into a mixed-use district integrating transportation, commercial, and business functions.

Characteristics: A PPP project involving the national government, city, UR, railroad operators, and private sector to create a vibrant business district with enhanced pedestrian spaces and public open areas.

Lessons Learned: (i) Long-term, consistent national support for strategic urban hubs, (ii) Advanced infrastructure development through public-private collaboration, (iii) Area management by stakeholders to sustain urban vibrancy



Umekita District



Land Use Zoning

Land Readjustment Project

Umekita Park

(C) Built-up Area TOD

(7) Station Area Grand Design for Integrated Urban Development Projects (Nakano)

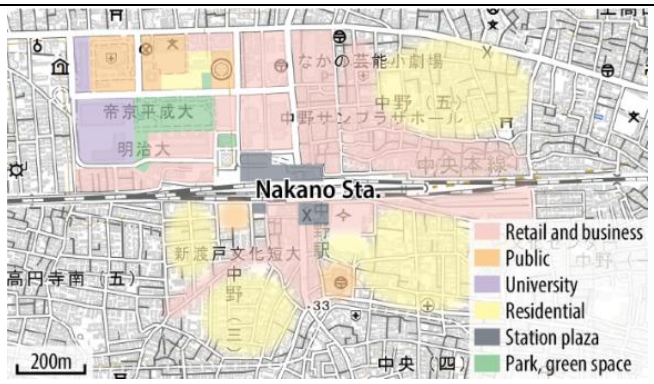
PIB: City Government

Objectives: To transform the station area into an activity center that drives Tokyo's new energy by developing various hubs, spaces, and networks under a unified Grand Design of the city.

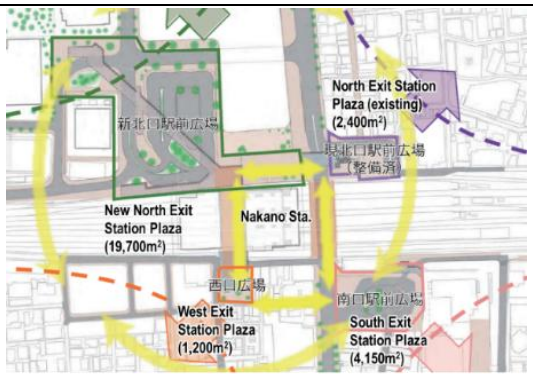
Characteristics: Over 10 urban development projects, including urban redevelopment and land readjustment, are being carried out under a cohesive and consistent framework, ensuring integrated growth.

Lessons Learned: (i) Development of an overall master plan with periodic revisions, and (ii) Coordinated execution of multiple projects based on a unified vision

Nakano Station Area



Land Use Zoning



Station Plaza and Passage

(8) Comprehensive Land Readjustment and Urban Redevelopment Projects (Totsuka)

PIB: Ward Government

Objectives: To enhance the urban environment of the station area by implementing multiple redevelopment projects that address disaster vulnerability and improve accessibility in a dense urban setting.

Characteristics: A parallel approach was adopted, combining an urban redevelopment project to upgrade commercial and public facilities and a land readjustment project to strengthen the road network and station connectivity.

Lessons Learned: (i) Development of public and commercial facilities for station convenience, (ii) Enhancement of the transport hub function, and (iii) Consensus-building with property owners through structured project methods

Project Location Map of Totsuka Station Area

Urban Redevelopment Project of West Gate Area

Land Readjustment Project

(9) Pedestrian and Nature-Oriented Urban Redevelopment (Futako Tamagawa)

PIB: Private Company

Objectives: To develop a regional commercial and residential district by enhancing transportation connectivity, disaster resilience, and business functions while leveraging the area's natural landscape.

Characteristics: A pedestrian-oriented urban district was created, featuring seamless connectivity between the station, commercial and business facilities, a station plaza, and disaster prevention parks along the scenic Tama River.

Lessons Learned: (i) Separation of pedestrian and vehicular traffic for improved safety and walkability, (ii) Open mall-style facility layout for accessibility and urban vibrancy, and (iii) Development of a disaster prevention park integrated with public spaces

Pedestrian Street along Open-Mall

Urban Redevelopment Project (Futako Tamagawa Rise)

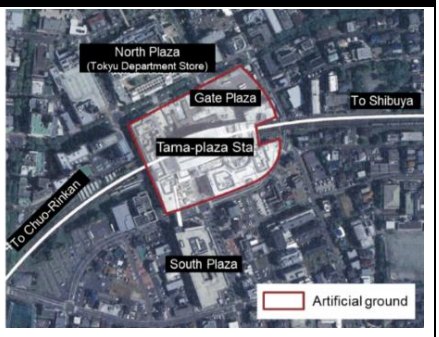
(10) Integrated Development of Pedestrian Spaces and Urban facilities above the Railway (Tama Plaza)

PIB: City Government, Private Company

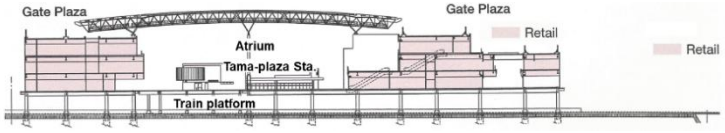
Objectives: To enhance the station's functionality as a suburban hub along the Den-en-toshi Line through integrated station, transportation, and urban space development.

Characteristics: A District Plan and Urban Development Agreement were formulated through collaboration between landowners and local government. A seamless station area was developed with artificial ground structures and commercial facilities, optimizing the use of railway land.

Lessons Learned: (i) Connecting station areas across the railway for improved accessibility, (ii) Stakeholder collaboration for coordinated urban planning, and (iii) Community-driven Urban Development Agreement ensuring long-term sustainability



Project Location Map of Tama Plaza Station Area

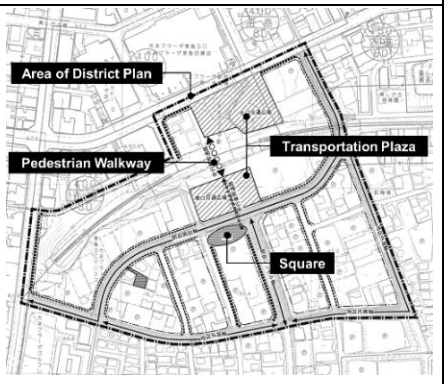


Cross Section of Tama Plaza Station and Commercial Facilities

Station

Station Plaza

Plaza with Mall



District Plan

(D) Suburban Area TOD

(11) Suburban Hub for Smart City Development through Public-Private-Academic Collaboration (Kashiwa-no-ha Campus)

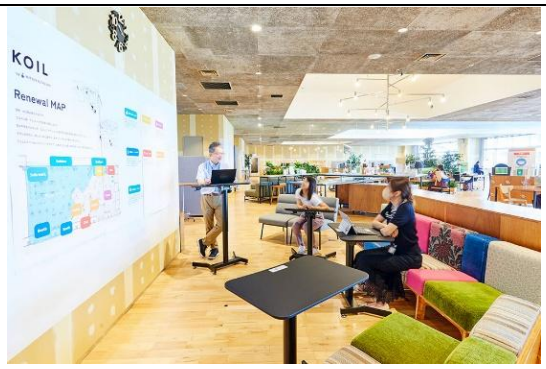
PIB: Government, Private Sector, University

Objectives: To develop a smart city along the Tsukuba Express corridor, integrating international academic research, next-generation environmental technologies, and urban innovation.

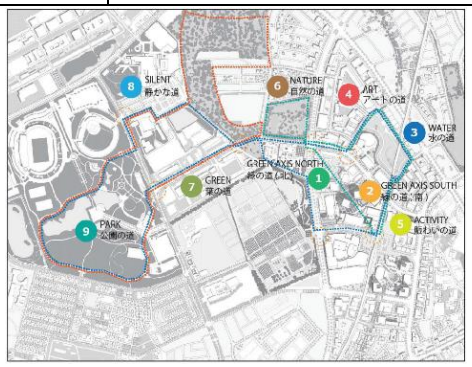
Characteristics: The Urban Design Center Kashiwa-no-ha (UDCK) was established as a platform for open innovation, fostering collaboration among public, private, and academic sectors. The Kashiwa-no-ha Urban Design Strategy was formulated to guide sustainable, walkable urban development.

Lessons Learned: (i) Integrating suburban hubs with railway infrastructure to enhance accessibility, (ii) Fostering industrial clusters by leveraging the railway corridor, and (iii) Public-private-academic collaboration for long-term, community-driven development

Kashiwa-no-ha Campus Station Area



Open Innovation Hub



Walkable Design Guideline

(12) Suburban Railway Development with TOD (Nagareyama Ohtaka no Mori)

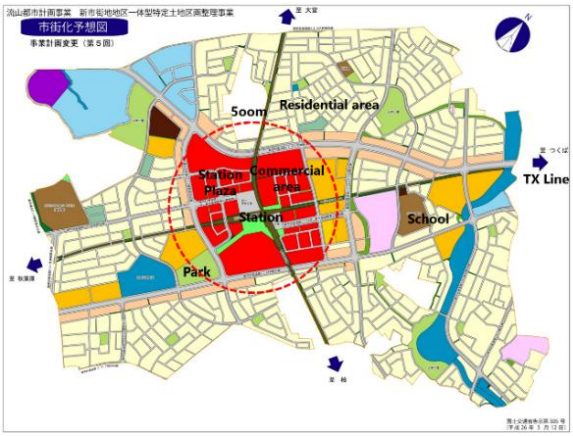
PIB: City Government

Objectives: To establish a new urban center in Nagareyama by developing a well-planned residential area around railway stations, leveraging its proximity and connectivity to the city center.

Characteristics: Following the Housing and Railway Law, an integrated land readjustment project was carried out, enabling pre-purchase of land for railway infrastructure and public facilities to ensure a well-coordinated urban development.

Lessons Learned: (i) Integrating land use and transport planning to support railway development, (ii) Developing public infrastructure to enhance urban services and amenities, and (iii) Building consensus with property owners to facilitate project implementation

Nagareyama Ohtaka no Mori Station Area



Land Use Plan

Station and Pedestrian Plaza

5 PROPOSED MECHANISMS FOR TOD IMPLEMENTATION

This chapter outlines the proposed institutional mechanism for the effective and collaborative implementation of TOD. It focuses on three key aspects: (i) TOD coordination mechanism, (ii) institutional arrangements for TOD, and (iii) a strategic pathway for ensuring sustainable TOD.

Chapter Overview

5.1 Proposed Mechanisms for TOD Coordination

1) **Roles and Responsibilities of Key Organizations:** Defines the key agencies and stakeholders involved in TOD implementation, outlining their specific roles in planning, financing, regulation, and governance.
2) **TOD Coordination Mechanism:** Explores inter-agency collaboration frameworks to facilitate effective TOD planning and execution, ensuring seamless integration between transport, land use, and urban development sectors.
3) **Establishment of a TOD Governance and Institutional Framework:** Proposes a structured governance model for TOD, detailing institutional arrangements, decision-making structures, and long-term management strategies.

5.2 Proposed Arrangements for TOD Institutionalization

1) **Institutionalizing TOD in Local Land Use and Development Planning:** Discusses the integration of TOD principles into CLUPs, ZOs, and comprehensive development frameworks.
2) **Clarification of Public-Private Roles:** Defines the respective responsibilities of public institutions and private stakeholders in TOD projects, including investment, land acquisition, and service provision.
3) **Regulatory Framework and Incentives for TOD Development:** Explains regulatory tools such as zoning reforms, density bonuses, and tax incentives designed to promote transit-oriented development.
4) **Streamlining TOD Legal and Policy Frameworks:** Identifies legal and policy challenges in TOD implementation.

5.3 A Strategic Pathway for Ensuring Sustainable TOD

1) **Land Value Capture (LVC) as a Financial Mechanism:** Explores how land value appreciation near transit hubs can be leveraged to fund TOD-related infrastructure and services.
2) **Implementation of Transit-adjacent Affordable Housing Policies:** Discusses strategies to ensure housing affordability near transit nodes.
3) **Coordination between TOD and Relevant Urban Development Initiatives:** Examines how TOD can be aligned with broader urban development programs.
4) **Monitoring and Evaluation (M&E) of TOD Projects:** Proposes KPIs and monitoring mechanisms to assess TOD effectiveness over time.
5) **Stakeholder Engagement and Collaboration:** Highlights the importance of involving local communities, businesses, and government agencies in TOD decision-making processes.

5.1 Proposed Mechanisms for TOD Coordination

Effective TOD implementation requires strong institutional coordination among national and local agencies, the private sector, and communities. However, several challenges hinder seamless coordination:

(i) **Fragmented Governance Structure:** Multiple agencies with overlapping mandates create inefficiencies and a lack of coordinated planning.

(ii) **Lack of a Dedicated Coordinating Body:** No single agency oversees TOD initiatives across different levels of government, leading to inconsistent strategies.

(iii) **Limited Local Government Capacity:** Many LGUs face technical and financial constraints that hinder effective TOD integration into planning frameworks.

(iv) **Weak Public-Private Collaboration:** Limited coordination between the government and private sector delays investments and project execution.

(v) **Inconsistent Policy Implementation:** National TOD policies are inconsistently applied at the local level due to varying regulatory interpretations and weak enforcement.

To address these challenges, this section outlines institutional mechanisms for strengthening TOD governance, clarifying stakeholder roles, and ensuring systematic implementation at national and local levels.

1) Roles and Responsibilities of Key Organizations

TOD requires a strong institutional framework with clearly defined roles for national and local government agencies, as well as the private sector and other stakeholders. TOD is not just about constructing transport infrastructure; it integrates urban planning, zoning, land use management, and public-private partnerships to create vibrant, walkable, and transit-accessible communities (Table 5.1):

1. **National Government Agencies** play a critical role in formulating policies, providing technical and financial support, and ensuring that TOD initiatives align with broader national development goals. The key responsibilities of national agencies include:

   (i) **Developing and implementing TOD policies and guidelines** to provide a regulatory framework for TOD integration into land use and transport planning.

   (ii) **Providing financial (and non-financial) incentives, support mechanisms and conducive settings** that encourage private sector participation and assist LGUs in implementing TOD projects.

   (iii) **Coordinating inter-agency collaboration** to ensure consistency in TOD strategies across different sectors, including transport, housing, urban development, and economic planning.

   (iv) **Monitoring and evaluating TOD outcomes** to ensure that investments in TOD infrastructure and policies contribute to sustainable urban development.

   It is expected that each national agency has a distinct role as below, by referring the TOD Guidelines for TOD policy, plan and project formulation, implementation and monitoring, as well as provision of technical and financial assistances by NGAs including trainings for LGUs.

Table 5.1 Expected Roles/Actions of National Government Organizations for the Promotion of TOD

Organization	Expected Roles/Actions for the Promotion of TOD
DEPDev	• Oversees inter-agency coordination and policy alignment with national development priorities. • Provide national government agencies (NGAs) and LGUs with a platform to conduct and discuss TOD matters
DHSUD	• Leads urban planning and land use policy integration with TOD principles. • Coordinates inter-agency collaboration, integrating TOD into broader economic and infrastructure strategies by aligning relevant programs, projects, and activities (PPAs) with the Public Investment Program (PIP), the Three-Year Rolling Infrastructure Program (TRIP), and other PPAs. • Incorporate TODCUP outputs/lessons in the TOD Policy, TOD Guidelines, CLUP Guidebook, etc. • Promote affordable housing development along railways by National Housing Authority (NHA)
DOTr	• Ensures transport infrastructure planning aligns with TOD principles. • Plan and implement transportation projects including active transport infrastructure, support station plaza development • Promote TOD projects at and around stations in collaboration with DHSUD, NHA, other NGAs, LGUs and private companies
BCDA	• Promote TOD projects within BCDA properties in collaboration with the private sector • Ensure that proposed TODs align with relevant plans and policies.
DPWH	• Supports TOD through road network improvements and active transport infrastructure. • Implement transportation-related infrastructure projects
MMDA	• Implement transportation projects including active transport infrastructure, plan traffic management around stations in Metro Manila. • Provide assistance to LGUs in mainstreaming TOD principles in the formulation/updating of their CLUP through their visioning workshops.
DOF and DBM	• Manage TOD financing mechanisms, incentives, and public investments. • Provide guidance on the viability of land value capture (LVC) as a tax-based form of infrastructure financing.
DILG	• Supervise over local governments and the promotion of local autonomy and community empowerment • Assure TOD-related projects are well within the respective LGU plans and programs
PPP Center	• Facilitates public-private partnerships for TOD-related projects.

Source: JICA Expert Team

2. **LGUs** play a frontline role in implementing TOD at the city and municipal levels. Their responsibilities include:

   (i) **Integrating TOD principles** into ZOs, CLUPs, and CDPs, aligned with national development policies and plans set by agencies such as DHSUD and DOTr.

   (ii) **Designating TOD zones** near transit hubs and ensuring proper land use regulations to support high-density, mixed-use development.

   (iii) **Implementing PPP projects** that are supportive of the overall TOD initiative in their respective localities

   (iv) **Providing local incentives and infrastructure investments** to support TOD and attract private sector participation.

(v) **Reviewing and approving TOD plans and projects** by the private sector within their jurisdictions.

(vi) **Engaging with local communities and stakeholders** to ensure that TOD developments align with local needs and priorities.

(vii) **Coordinating with the national government on Monitoring and Evaluation (M&E)** for large-scale TOD projects.

3. **Communities and Residents** need to be involved actively for TOD success. Their roles include:

   (i) **Participating in TOD planning and decision-making processes** to ensure developments align with local needs.

   (ii) **Supporting the creation of vibrant public spaces** through community-led initiatives and activities.

   (iii) **Promoting sustainable mobility choices** by utilizing walking, cycling, and public transport options.

4. **Private Sector** plays a crucial role in TOD implementation through financing, real estate development, and transit operations. Key contributions include:

   (i) **Developing and managing mixed-use projects** that enhance urban accessibility and livability.

   (ii) **Investing in public infrastructure** such as transit stations, pedestrian pathways, and commercial hubs.

   (iii) **Collaborating with the government through PPPs** to ensure TOD projects are financially sustainable and pursuant to the developmental objectives of government.

   (iv) **Conducting area management activities,** such as maintaining common spaces and organizing events, to enhance the overall attractiveness and long-term value of the area.

5. **Public Transportation Operators** ensure efficient mobility within TOD zones. Their responsibilities include:

   (i) **Providing high-quality, reliable, and accessible transit services** that serve as the backbone of TOD developments.

   (ii) **Implementing mobility management strategies** to encourage a shift from private vehicle use to public transportation.

   (iii) **Integrating smart mobility solutions** such as real-time travel information and fare integration to improve commuter experience.

6. **Academia and Research Institutions** contribute to TOD policy development through:

   (i) **Conducting research on TOD impacts, best practices, and innovative solutions** to enhance planning strategies.

   (ii) **Providing capacity-building programs and training** for government agencies and stakeholders involved in TOD implementation.

   (iii) **Developing data-driven approaches** to inform evidence-based TOD policies and investments.

2) TOD Coordination Mechanism

The successful implementation of TOD requires a structured coordination mechanism that guides TOD projects from policy formulation to execution and monitoring. This mechanism involves four key phases, each requiring inter-agency collaboration (Figure 5.1) :

(i) **Policy Formulation and Regulatory Oversight:** DHSUD and DOTr lead TOD policy development, ensuring alignment with national urban and transport policies. DEPDev coordinates inter-agency collaboration, integrating TOD into broader economic and infrastructure strategies by aligning relevant programs, projects, and activities (PPAs) with the Public Investment Program (PIP), the Three-Year Rolling Infrastructure Program (TRIP), and other PPAs. LGUs receive policy guidance on how to incorporate TOD into their local development plans (CLUPs, CDPs, and ZOs).

(ii) **TOD Planning and Zoning:** DHSUD and MMDA provide technical guidance to LGUs for TOD planning, zoning regulations, and mixed-use development strategies. DOTr ensures that TOD principles are integrated into transport infrastructure planning to improve multi-modal connectivity. LGUs identify and designate “TOD Overlay Zones”, ensuring mixed-use, high-density development near transit hubs (refer to ***5.2 1)*** Institutionalizing TOD in Local Land Use and Development Planning). For areas outside Metro Manila, the Department of the Interior and Local Government (DILG) and the Regional Land Use Committees (RLUCs) play key roles in reviewing and endorsing local land use plans, ensuring consistency with national policies and regional development frameworks.

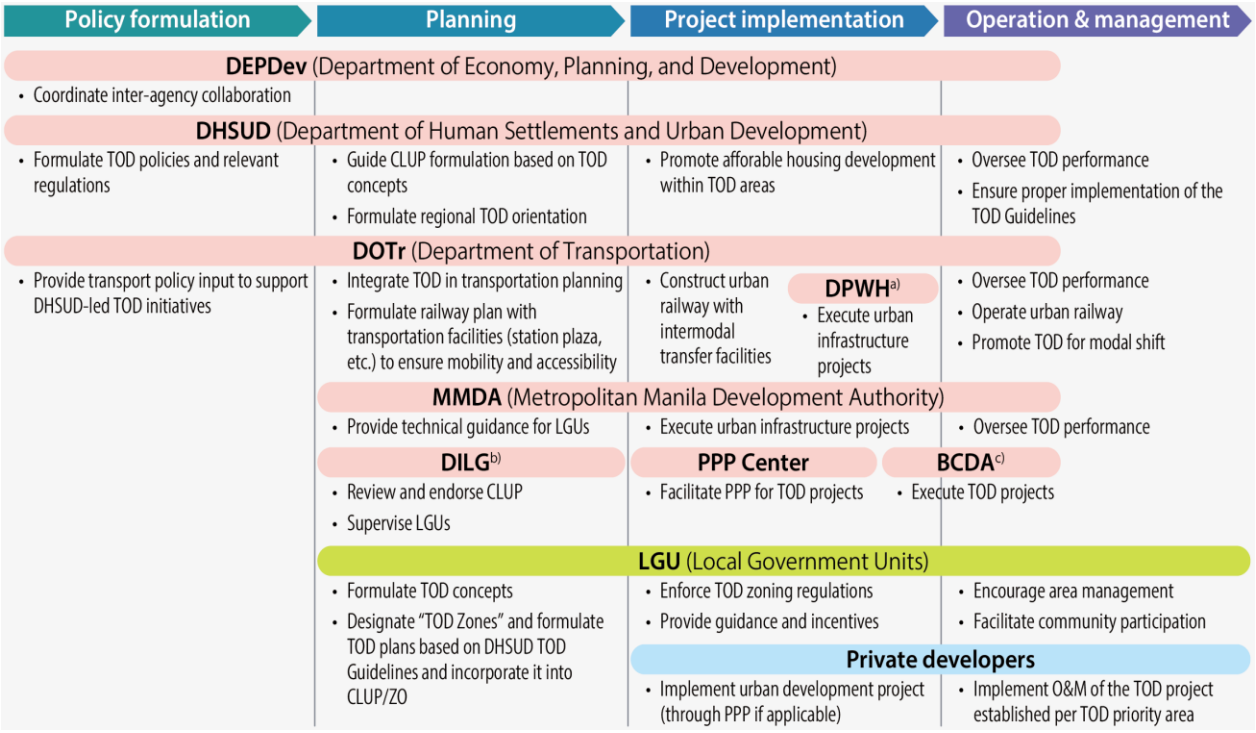
(iii) **Project Implementation and PPPs:** LGUs enforce TOD zoning regulations and issue development permits. DOTr, DPWH, DILG, MMDA, BCDA, other NGAs and private developers execute urban infrastructure projects such as pedestrian pathways, station plazas, and public spaces. The PPP Center facilitates the development and due diligence of projects that involve private sector participation, develop appropriate transaction structures and oversee agreements for mixed-use TOD projects.

(iv) **Financial mechanisms:** DOF and DBM establish financial mechanisms including tax incentives, subsidy for infrastructure, LVC mechanisms, etc.

(v) **Operation and Maintenance (O&M) Coordination:** In relation to its mandate, DHSUD, DOTr and DEPDev oversee TOD performance at the national level, ensuring policy compliance and infrastructure efficiency. LGUs manage TOD areas, maintain public spaces, and ensure transit accessibility. Public transportation operators integrate smart mobility solutions, optimize routes, and ensure seamless transit operations.

To realize the proposed TOD coordination mechanism, proposed actions by each stakeholder are listed as follows:

- Incorporate the TODCUP TOD Strategic Guidelines into DHSUD TOD Guidelines
- Integrate TOD principles in the formulation and implementation of CLUPs and related plans by LGUs
- Implement urban railway developments with intermodal transfer facilities aligned with TOD through DOTr initiatives
- Implement road and infrastructure improvements in and around station areas by DPWH, MMDA, and LGU
- Promote the affordable housing development with convenient access to stations through initiatives by DHSUD, LGUs, and private companies
- Support and invest in TOD project implementation through BCDA and other relevant agencies



Source: JICA Expert Team

Figure 5.1 Proposed Main TOD Coordination Mechanism

3) Establishment of a TOD Governance and Institutional Framework

To institutionalize TOD governance, dedicated coordinating bodies should be established at both national and local levels to strengthen policy implementation, stakeholder coordination, and project oversight.

(i) **National-Level Coordination**: To oversee TOD implementation and policy alignment at a national level, rather than creating a new entity, it will be effective and flexible to set up the TOD working group by using existing mechanisms such as Inter-agency Technical Committee on Transport Planning (IATCTP) of the Infrastructure Development Committee (InfraCom) under DEPDev.

(ii) **Local-Level Coordination:** These committees, established within LGUs such as Project Management Office (PMO) attached to the relevant department in the LGU will be organized per TOD project, station area, or corridor. To implement and monitor TOD plans and projects, following framework are proposed: (a) to establish local TOD coordination committees within LGUs, (b) to integrate TOD principles into local development plans, designate TOD zones, and engage key stakeholders (communities, private developers, national level agencies, etc.), and (c) to provide technical supported through DHSUD, DOTr and MMDA for land-use planning and transit integration.

By leveraging existing national mechanisms and strengthening local coordination, this governance framework will enhance TOD implementation efficiency. Strengthening collaboration among government agencies, LGUs, private developers, and communities will be key to achieving well-integrated, sustainable, and socially inclusive TOD developments.

5.2 Proposed Arrangements for TOD Institutionalization

Despite growing recognition of the benefits of TOD, the formulation and implementation of TOD plans and projects remain ineffective due to several institutional and regulatory gaps. The key challenges include:

(i) **Institutionalization of TOD Concepts:** Clear regulations and frameworks are needed to facilitate TOD implementation, particularly in built-up areas with limited land availability.

(ii) **Clarification of Public-Private Roles:** Clearly defining the responsibilities of government agencies and private sector players will enhance coordination and project execution.

(iii) **Maximizing Private Investments:** Incentivizing private sector participation is essential to delivering TOD-related public infrastructure and services efficiently.

(iv) **Legal and Regulatory Frameworks:** Comprehensive policies, laws, and regulations must be introduced to support integrated urban (re)development alongside transportation infrastructure.

To address these challenges, the following institutional mechanisms and planning strategies are proposed.

1) Institutionalizing TOD in Local Land Use and Development Planning

Currently, many cities and municipalities face challenges in aligning land use regulations with transit investments, resulting in fragmented urban growth. For TOD to be successfully implemented, it must be embedded in local land use and development planning frameworks including TOD concept, and land use plan integrated with zoning and public infrastructure.

Under the current urban planning system, zoning (allowed uses), land use intensity control such as maximum Percentage of Lot Occupancy (PLO), Maximum Floor Area Ratio (FAR)[4] and Building Height Limit (BHL) are designated in the Zoning Ordinance (ZO). In some special zones[5], it is required to be compliant with other laws and regulations.

DHSUD and LGUs must embed TOD in CLUPs, CDPs, and ZOs to establish clear policies for transit-oriented growth. Around the station area within walking distance, mixed-use zones and residential zones are accumulated, and public infrastructure such as trunk road, station plaza, park are planned under the CLUP and ZO.

To realize and institutionalize TOD at the local level based on current planning system, the following approaches are encouraged:

(i) **Integrated Land Use and Transport Planning in CLUP and ZO based on TOD Concept:** Inside a station area within a walking distance, land use is properly regulated including mixed-use zones adjoining the station, residential zone with proper road network, public facility zone including intermodal transfer facilities, school, hospital, park and open space. For this, it is indispensable to formulate a CLUP in line with the TOD concept which land use and transport are integrated, and to designate ZO with hierarchical and mixed zoning with proper public facilities around the station (Box 5.1 for reference).

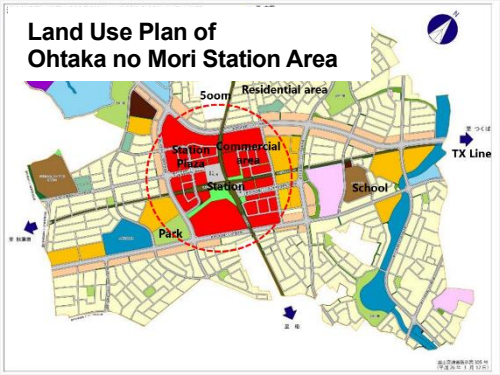
[4] Transfer of Development Rights (TDR) is designated in CLUP/ZO as a zoning technique that can redirect future development potential from one location to another in a way that is fair and equitable to the involved property owners.

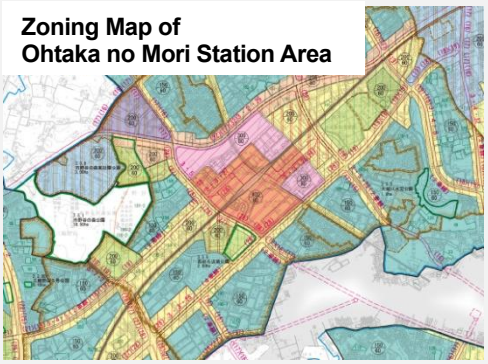
[5] For example, a whole area of BGC is designated as “Urban Core Zone”, which need to be compliant with the National Building Code (NBC), the Design Standard and Guidelines and relevant regulations by BCDA.

Box 5.1 Land Use Plan and Zoning around the Station in Japan

In Japan, based on the TOD concept in the City Master Plan, land use zoning and public infrastructures are designated in the Urban Plan with legal basis.

- In the land use plan of the city master plan (like CLUP in the Philippines), land use and transport development orientation is indicated. Commercial and business functions are encouraged adjoining to station, and residential areas with public facilities and road network around the station are developed.
- In the legislated zoning map of the urban plan (like ZO in the Philippines), land use zoning and location of public facilities are overlayed. For this, public facilities are planned to meet demands based on zoning, and the Right of Way (ROW) for public facilities such as roads, station plazas, and public facilities such as park and school are secured and construction activities are restricted out of this purpose.





Source: Nagareyama City, Chiba Prefecture, Japan

(ii) **Designation of TOD Project Site as Planned Unit Development (PUD) and Station Area as TOD Overlay Zone:** To facilitate TOD projects flexibly with conformity of TOD concept, Planned Unit Development (PUD) regulations and Transit-Oriented Development Overlay Zones (TOD-OZ) in the current zoning system should be formally designated to encourage mixed-use, high-density development, in line with guidance and incentives to promote TOD. (Figure 5.2, Box 5.2 for refence).

- Designation of PUD aims to permit greater flexibility in land use regulations, thereby allowing the developer to use a more creative approach in the development of land.
- Designation of TOD Overlay Zones aims to facilitate and coordinate for planning and implementation of various TOD projects within a walking distance including intermodal transfer facilities and pedestrian facilities, as well as urban development projects.

Section 34. Planned Unit Development Projects

Proposed Planned Unit Developments (PUD) projects shall be accompanied by Comprehensive Development Master Plans (CDMPs) showing, at the minimum, proposed land uses, building density and bulk, road network layout, road and sidewalk section details, and master layouts of all utilities such as those for potable water, storm drainage, sewerage, power supply, telecommunication and solid waste management.

CDMPs shall also be provided with Deed Restrictions where, upon approval of the Zoning Administrator/Zoning Officer or LZBA, as the case may be, proof of compliance of future projects on the said PUD site shall form part of the requirements for Locational Clearance.

Section 13.8. Transit-Oriented Overlay Zone (TOD-OZ)

Objectives

The Transit-Oriented Overlay Zone covers all properties having a radial distance of one kilometer (or as declared by the LGU) from the (City/Municipal) Multi-Modal Terminal. The objectives of these regulations are:

- To facilitate the development of a walkable and compact urban center thereby reducing opportunities for urban sprawl
- To encourage the use of public vehicles thereby reducing vehicular traffic volumes

Allowable Uses

- Allowable uses shall be as provided in the applicable Base Zone subject to the following additional regulations.

Building Density and Bulk Regulations

- Buildings that provide ground level commercial spaces shall be provided with a density bonus equivalent to additional (xx) storeys from the Building Height Limit provided in the Base Zone; and
- Buildings that provide ground level commercial spaces and (xx) percent ground level landscaped open space accessible to pedestrians shall be provided with a density bonus equivalent to additional (xx)storeys from the Building Height Limit provided in the Base Zone.

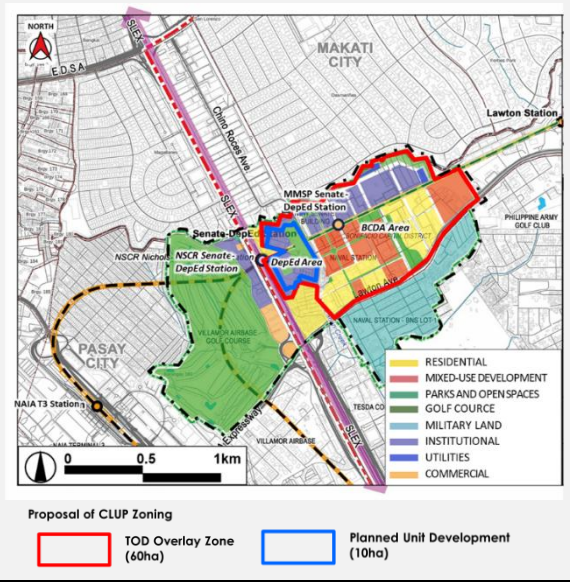
Source: CLUP Guidelines by DHSUD (under revision)

Figure 5.2 Definition of PUD and TOD-OZ in the CLUP Guidelines

Box 5.2 Proposed Designation of PUD and TOD-OZ in Senate-DepEd Station Area by TODCUP

In the TOD Conceptual Plan of Senate-DepEd Station Area, it is proposed to designate "TOD Overlay Zone" and "Planned Unit Development" in the Zoning Ordinance.

- Proposed "TOD Overlay Zone" covers urban development project areas in BCDA-owned land and in DepEd-owned land.
- Proposed "Planned Unit Development" Zone covers a land lot owned by DepEd.



Source: JICA Expert Team

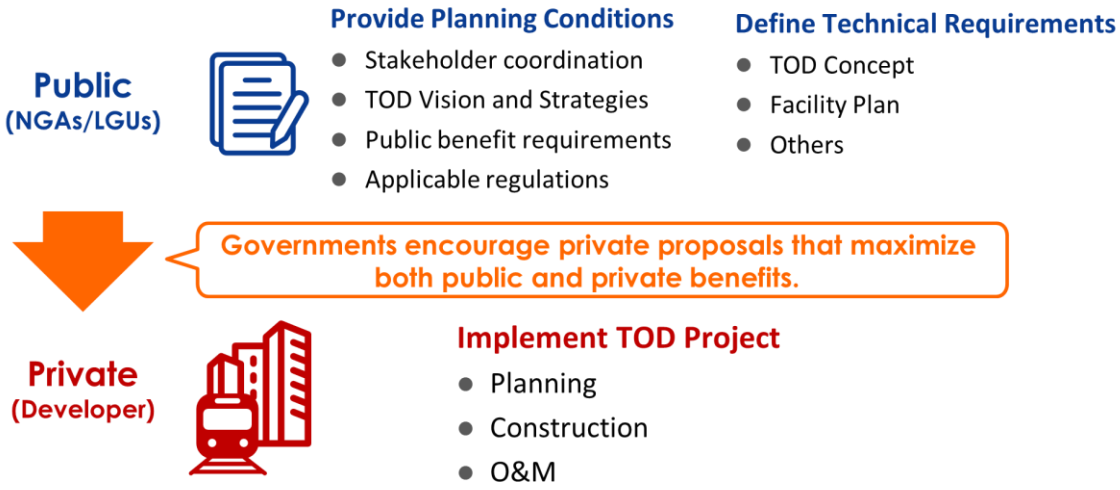
(iii) **Aligning TOD with Transportation and Infrastructure Plans:** DOTr and LTFRB must integrate TOD into mobility plans, PUV route planning, and active transport networks. Local transport master plans which LGUs or DOTr/ LTFRB formulate should include first-mile/last-mile strategies to ensure seamless connectivity to transit hubs.

(iv) **Strengthening Local Government Capacity for TOD Implementation:** DHSUD, DILG, and DEPDev should provide technical assistance to LGUs. Capacity-building programs for LGUs should focus on TOD zoning, infrastructure financing, and private sector engagement strategies.

2) Clarification of Public-Private Roles

A well-defined collaboration framework between the public and private sectors is essential for the successful implementation of TOD. While government agencies provide the policy direction, regulatory environment, and infrastructure investments, the private sector contributes capital, technical expertise, and project execution capacity. The lack of clear public-private engagement has led to inefficiencies, delays, and misaligned priorities in TOD implementation.

To enhance coordination and execution, the following strategies should be adopted:



Source: JICA Expert Team

Figure 5.3 Public and Private Roles for PPP TOD Project

(i) **Strengthening Public-Private Partnerships (PPPs) for TOD.** The private sector is a key player in TOD, particularly in financing, real estate development, and service provision. To encourage greater private sector participation, the government should establish structured PPP models tailored to TOD, including:

- **Joint Development Agreements (JDAs):** Public and private entities shall collaborate under pertinent laws on PPPs with shared or allocated risks and benefits that are mutually agreed. Examples include mixed-use developments integrated with transit hubs
- **Land Value Sharing Mechanisms:** Private developers shall contribute to TOD-related infrastructure (e.g., pedestrian pathways, transit connections) in exchange for density bonuses or land use rights.

- **Infrastructure Financing Through PPPs:** LGUs and national agencies can leverage private financing for station-area improvements, multi-modal hubs, and public amenities. The PPP Center should provide technical assistance in structuring such agreements.

(ii) **Defining Government and Private Sector Responsibilities.** To ensure efficient implementation, TOD requires a clear division of responsibilities:

- **Public Sector (DHSUD, DOTr, LGUs, DEPDEV, DPWH):** Develop policies, guidelines, and zoning regulations that enable TOD. Provide funding support for transport infrastructure and public spaces. Ensure transparency in land use decisions and project approvals. Establish a predictable regulatory environment to attract private investment. Where necessary, take responsibility for preparing essential utilities and developing non-revenue-generating assets within TOD areas to reduce financial burdens on private developers and ensure a well-functioning urban environment.
- **Private Sector (Developers, Investors, Transit Operators, Businesses):** Finance and construct TOD-aligned developments. Improve connectivity by integrating private developments with transit infrastructure. Provide community amenities and public spaces as part of mixed-use projects. Innovate in areas such as smart mobility, green building designs, and shared transport models.

(iii) **Creating a Transparent Incentive Framework for TOD Development.** To encourage private sector participation in TOD, the government should offer clear and predictable incentives, including:

- **FAR Bonuses for Public Contributions:** Developers who invest in TOD-related infrastructure (e.g., pedestrian walkways, transit access points) receive additional development rights.
- **Fast-Tracked Approvals and Regulatory Support:** LGUs should streamline approval processes for TOD projects, including rezoning and construction permits.
- **Tax-Based Incentives:** LGUs and national agencies should explore property tax reductions, exemption periods, or impact fee waivers for developers who contribute to TOD-aligned urban growth.
- **Public Land Leasing for TOD Projects:** Government-owned land near transit hubs can be leased to private developers at competitive rates, ensuring long-term revenue generation for the public sector while facilitating mixed-use TOD projects.

(iv) **Institutionalizing TOD Coordination between Public and Private Sectors.** To strengthen collaboration, national and local agencies should:

- Establish a TOD Investment Facilitation Unit under DHSUD or the PPP Center to guide private sector engagement in TOD projects.
- Require public consultation processes to ensure TOD developments align with local needs.
- Create regular reporting mechanisms where private developers report project progress to TOD governance bodies at the national and local levels.

3) Regulatory Framework and Incentives for TOD Development

A supportive regulatory framework and financial incentives are essential to encourage TOD investment and promote sustainable development. At present, national-level incentives for TOD remain limited, and existing policies do not fully address the regulatory needs of transit-oriented

projects. Some local initiatives, such as Makati's FAR incentives for TOD-related projects and BCDA's DSG incentives, serve as models but need to be expanded and standardized at the national level. (Table 5.2)

Table 5.2 Example of Incentives Introduced in the Philippines

Case 1: Incentives by Makati LGU (Zoning Ordinance)

SECTION 41. Additional FAR Provisions. Additional FAR beyond the prescribed allowable maximum can be availed through a combination of the following development modes, provided that the additional FAR will not exceed 25% of the maximum allowable:

Transfer of Development Rights (TDR) through private transactions. The maximum allowable gross floor area (GFA) for any building on a lot may be increased by transfer to such lot (hereinafter referred to as the Recipient Lot) of GFA.

TDR through the City Government. The city government can use TDR as a tool to preserve and improve heritage sites/structures, enhance and then maintain the character of the riverside zone, and relocate people from potential danger sites while simultaneously directing development to appropriate locations. Likewise, the city may utilize other sources of GFA for other developers needing additional FAR.

TODs. In all commercial zones (C-1, C-2, C-3, C-4, SMU, SPUR), a building or structure within a 400-meter radius from an existing commuter rail/ferry station may apply for additional FAR under TOD. For every 200 m length a building owner or developer builds and maintains at their cost, a direct and elevated covered walkway from his building to the transit station, one FAR may be rewarded. The length should be within a maximum 600 m walking distance.

Bonus Incentives. Bonus incentives, which may take the form of either an additional increase in the allowable FAR or other incentives, may be made available to developments that provide facilities and amenities that are of public benefit and deemed desirable by the city. These facilities or amenities shall be in the form of:

a. network of green and open spaces,
b. development employing land readjustment scheme,
c. public art/heritage facilities,
d. iconic spaces/landmarks, and
e. green architecture and technology certified by a reputable and recognized third party.

Case 2: Incentives by BCDA (DSG of Bonifacio Global City Big Delta, Expanded Big Delta and Portion of North Bonifacio)

SECTION 2: Architecture and Urban Design. Some areas in the building may be eligible for bonus FAR. Those eligible must be critical to the day-to-day functioning of Bonifacio Global City and the well-being of the community that both work and live within it. These areas should facilitate either the public pedestrian movement or other public activities. The Declarant, at his sole discretion, will determine where such bonuses will be given.

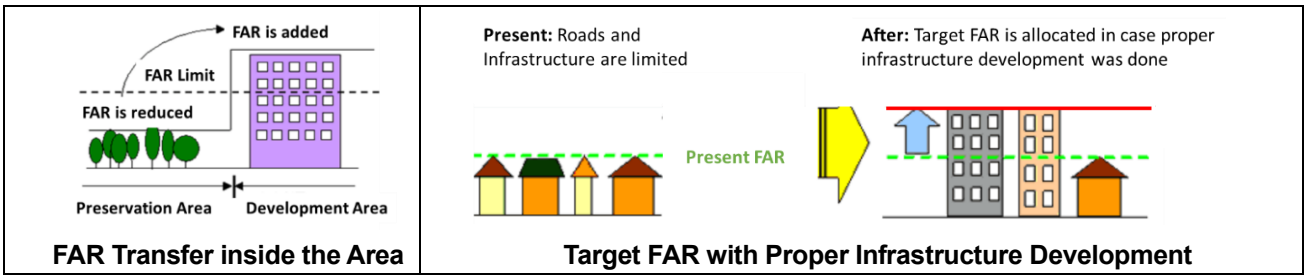
Source: Makati City ZO, BCDA DSG

Key recommendations for strengthening the regulatory and incentive mechanisms include:

1. **Zoning and Land Use Reforms to Support TOD:** DHSUD and LGUs should revise zoning regulations to encourage high-density, mixed-use developments in TOD Zones. Reduce parking minimums and promote non-motorized transport to align with TOD principles. Apply TOD Overlay Zones (TOD-OZ) and Planned Unit Development (PUD) zoning to allow flexible land use near transit hubs.

2. **Incentivizing TOD Development:** To attract private sector investment, LGUs and national agencies should provide a mix of fiscal and non-fiscal incentives:

   - **Deregulation and Expeditated Permitting:** LGUs should streamline zoning approvals and fast-track TOD project permits. Incentive programs for TOD-friendly development should be standardized nationwide.
   - **FAR Adjustments & Bonuses:** In many TOD cases worldwide, FAR bonuses incentivize developers to contribute public infrastructure (e.g., pedestrian paths, transit facilities). However, in the Philippines, where FAR is already high, bonuses may be ineffective. Lowering baseline FAR in TOD zones would make this incentive more meaningful. Additionally, strategic FAR allocations should be linked to road and transit improvements. (Figure 5.4)
   - **Transfer of Development Rights (TDR):** DHSUD and LGUs should allow TDR from heritage zones or environmentally sensitive areas to TOD Zones. TDR frameworks should ensure balanced urban growth without overburdening transit capacity.
   - **Tax Incentive.** Property tax reductions for TOD projects that include mixed-income housing or public amenities. Exemptions from development impact fees for projects that align with TOD zoning objectives.
   - **Public Land Leasing for TOD Projects:** Government-owned land near transit hubs should be leased to private developers at competitive rates. PPPs should facilitate long-term leasing agreements that prioritize mixed-use development.



FAR Transfer inside the Area | **Target FAR with Proper Infrastructure Development**

Source: JICA Expert Team

Figure 5.4 FAR Transfer

Box 5.3 Incentives and Public Contribution Facilities of Special Development District in Tokyo

To designate the special development district around major stations in Tokyo, Tokyo Metropolitan Government stipulates a guideline of incentives by government and public contribution facilities which private developers develop for public purpose.

Incentives by Government:

- Land use area to be induced (only when exception of land use is needed)
- Highest Limit of FAR (More than 400% and lowest limit)
- Highest Limit of Building coverage area ratio
- Highest limit of building area
- Highest limit of building area
- Restriction of wall position of the building

Public Contribution Facilities by Private Developers:

- **Plaza/ pedestrian facilities** (e.g., community road, public plaza, Pedestrian space inside the private land, Pathway (including underground), Pedestrian deck)

- **Transport facilities** (e.g., taxi stand/bus stop, car parking/ bicycle parking, station plaza, elevator/escalator for entrance and exit, supplemental ticketing gate, expansion of concourse, interior/ lighting, multi-functional toilette)
- **Disaster prevention facilities** (e.g., storage of disaster stockpiles, rainwater reservoirs, Temporal evacuation shelters/ plazas, storage of water, food and temporal toilette, disaster prevention related information)
- **Urban service and community facilities** (e.g., housing/ apartments, theater, conference center, museum, tourist information center, local community facility, business support facility, information facility, medical facility, nursery, supermarket, educational facility, hotel)
- **Environment and landscape facilities/ indicators** (e.g., setting up the target of CASBEE standard, renewing and installing district heating and cooling facility, setting up a target of green coverage ratio, setting up a target of unit reduction consumption of CO_2, planting surround the site, paving work, underground maintenance, underground wires, provision of open space outside of the site, conservation /utilization of historical building)

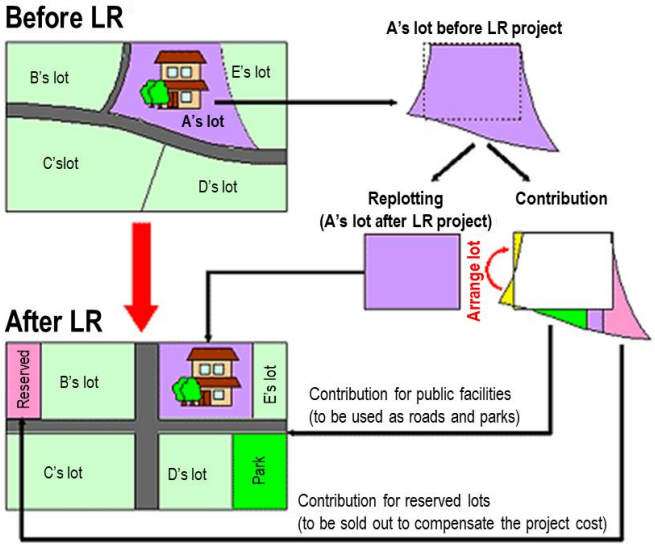
Source: website of Tokyo Metropolitan Government

3. **Applying Land Readjustment and Urban Redevelopment Schemes:** In many urban areas, fragmented land ownership and uncoordinated development hinder TOD implementation.

   Land acquisition under the Urban Development and Housing Act of 1992 (RA 7279) is the broad term for obtaining land ownership or control for various purposes, including socialized housing. The modes of acquiring lands for purposes of this Act shall include, among others, community mortgage, land swapping, land assembly or consolidation, land banking, donation to the Government, joint-venture agreement, negotiated purchase, and expropriation.

   In addition to these land acquisition schemes by NGAs and LGUs, land readjustment and urban redevelopment schemes are proposed, which LGUs can utilize to facilitate land use and infrastructure planning in an integrated manner and to realize on-site resettlement.

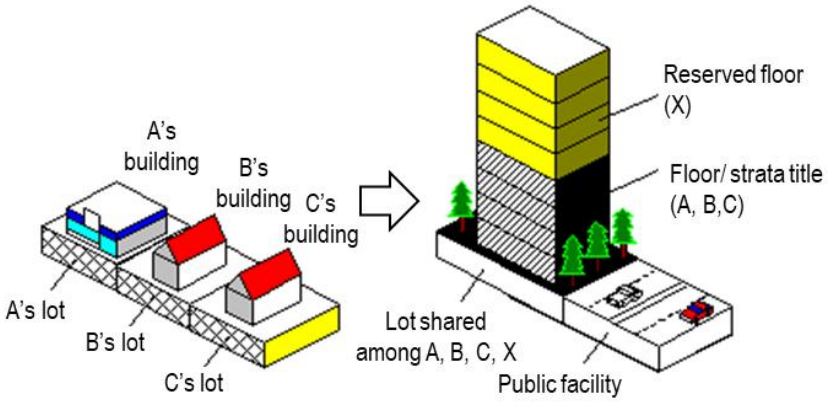
   - **Land Readjustment (LR):** Landowners contribute portions of their land for infrastructure development in exchange for reconfigured plots with higher value, ensuring on-site relocation and land title retention. (Figure 5.5)



Source: Ministry of Land, Infrastructure, Transport, and Tourism, Japan

Figure 5.5 Concept of Land Readjustment Scheme in Japan

- **Urban Redevelopment (UR).** Landowners receive equivalent floor titles in high-rise developments, allowing them to retain property value while facilitating infrastructure improvements. (Figure 5.6)



Note: "X" is a developer.
Source: Ministry of Land, Infrastructure, Transport, and Tourism, Japan

Figure 5.6 Concept of Urban Redevelopment Scheme in Japan

Under the Urban Development and Housing Act, land swapping scheme refers to a land acquisition process whereby land is exchanged for another piece of land of equal value or for shares in a government or quasi-government corporation whose book value is equal to that of the land being exchanged, for the purpose of planned and rational development and provision of social housing.

DHSUD and LGUs should develop clear policies to regulate and incentivize Land Readjustment and Urban Redevelopment projects, ensuring transparent land-sharing agreements, fair compensation models, and community participation.

For the institutionalization of the Land Readjustment project scheme, it is proposed to build upon the basic concept of the existing land swapping scheme and expand its coverage to include not only the exchange of government-owned lands but also private land parcels within the project sites.

For the institutionalization of the Urban Redevelopment project scheme, a vertical land swapping approach should be introduced, allowing the exchange of land ownership for floor ownership, rather than being limited to land-for-land exchanges.

4) Streamlining TOD Legal and Policy Frameworks

The legal and policy environment for TOD remains fragmented, with overlapping regulations and a lack of clear legislative provisions for TOD initiatives. This creates uncertainty for government agencies and private investors, leading to delays and inefficiencies in TOD implementation. To streamline the legal and policy framework, the following actions should be taken:

1. **Harmonizing TOD Policies Across Agencies:** DHSUD, DEPDEV, and DOTr should ensure national TOD policies align with existing urban development and transportation regulations to ensure coherence and eliminate inconsistencies.

2. **Amending Existing Laws to Support TOD:** Congress, in coordination with DHSUD and DOTr, should propose legislative amendments to integrate TOD-specific provisions into urban development, transportation, and housing laws, providing a clear legal basis for TOD implementation.

3. **Strengthening TOD Governance Structures:** DHSUD and DILG should establish a TOD coordinating entity within existing national and regional development bodies to oversee TOD-related policies, project implementation, and inter-agency collaboration.
4. **Clarifying Land Use and Development Rights:** DHSUD and LGUs should undertake regulatory reforms to streamline land acquisition, redevelopment mechanisms, and property rights, making it easier to assemble land for TOD projects.
5. **Standardizing TOD Development Guidelines:** DHSUD should develop national TOD implementation framework that sets clear guidelines on zoning, density regulations, infrastructure integration, and public space design.

5.3 A Strategic Pathway for Ensuring Sustainable TOD

Ensuring the long-term sustainability of TOD requires a strategic and multi-faceted approach. Beyond the integration of TOD principles into land use and planning frameworks, a combination of financial, regulatory, and governance mechanisms must be in place to support its implementation. This section outlines key strategies for strengthening TOD sustainability, ensuring social inclusivity, and fostering strong institutional collaboration.

1) LVC as a Financial Mechanism

To ensure sustainable financing for TOD, a dedicated TOD Development Fund should be created to be managed by DOF and DBM to support:

(i) **Infrastructure Investments:** Funding for pedestrian pathways, transit hubs, and public spaces within TOD Zones.

(ii) **Affordable Housing Programs:** Financial support for transit-adjacent affordable housing projects, in partnership with DHSUD, NHA, and LGUs.

(iii) **Land Acquisition & Redevelopment Support:** Assisting LGUs in acquiring strategic parcels for TOD projects, particularly in high-demand areas.

(iv) **Catalytic Investments in Early-Stage TOD Projects:** Helping fund planning, feasibility studies, and initial infrastructure improvements.

This fund should be partially financed through LVC tools (Figure 5.7), including TIF, Air Rights Sales, and Special Assessment Districts, ensuring long-term financial sustainability.

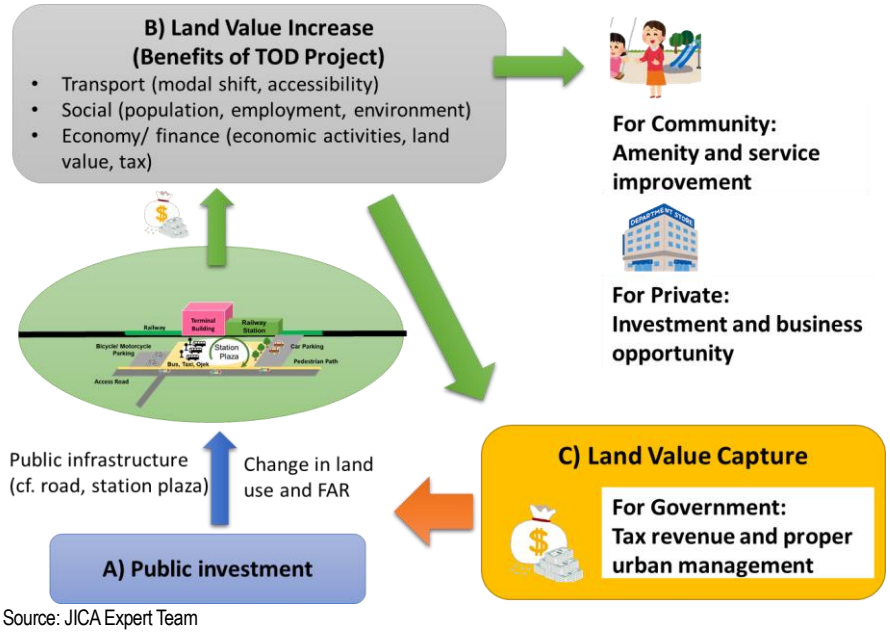
(i) **Tax Increment Financing (TIF):** LGUs led by the DOF can leverage future increases in property tax revenues within TOD Zones to finance infrastructure and public transit improvements.

(ii) **Special Assessment Districts:** LGUs, in coordination with the Department of Budget and Management (DBM), can establish districts where property owners contribute to infrastructure development through additional fees, ensuring that those who benefit from TOD projects share in the costs of development.

(iii) **Joint Development Projects:** BCDA, LGUs, and private developers should collaborate on mixed-use developments that integrate public transit improvements, ensuring a symbiotic relationship between real estate growth and transportation infrastructure.

(iv) **Air Rights and Density Bonuses:** DHSUD and LGUs should regulate and facilitate the sale of additional Floor Area Ratio (FAR) in TOD zones to generate funds for public projects, incentivizing high-density, mixed-use development.

(v) **Public Land Leasing and Development:** Government agencies such as DPWH, BCDA, and LGUs should lease or develop publicly owned lands near transit hubs for TOD-supportive uses, ensuring long-term revenue streams while promoting compact and sustainable urban growth.



Source: JICA Expert Team

Figure 5.7 Land Value Capture Mechanism

Box 5.4 Definition of LVC by the World Bank

LVC is defined as a public financing method by which governments (i) trigger an increase in land values via regulatory decisions (e.g., change in land use or FAR) and/or infrastructure investments (e.g., transit); (ii) institute a process to share this land value increment by capturing part or all of the change; and (iii) use LVC proceeds to finance infrastructure investments (e.g., investments in transit and TOD), any other improvements required to offset impacts related to the changes (e.g., densification), and/or implement public policies to promote equity (e.g., provision of affordable housing to alleviate shortages and offset potential gentrification).

The two main categories of LVC are development-based and tax- or fee-based.

- Development-based LVC can be facilitated through direct transactions of properties whose values have been increased by public regulatory decisions or infrastructure investment.
- Tax- or fee-based LVC is facilitated through indirect methods, such as extracting surplus from property owners through various tax or fee instruments (e.g., property taxes, betterment charges, special assessments, etc.).

2) Implementation of Transit-adjacent Affordable Housing Policies

To prevent displacement and ensure social inclusivity within TOD areas, policies supporting transit-oriented affordable housing should be prioritized. The rapid appreciation of land values in TOD zones can result in the exclusion of low- and middle-income households, making targeted interventions necessary. Given the high cost of land within walking distance of major transit hubs, affordable housing developments should be located in areas that are accessible via a single public transportation ride from transit stations, ensuring convenient connectivity while maintaining affordability. However, broader definitions of affordable housing should also allow for certain types of affordable housing developments within TOD Zones when feasible. Key strategies include:

1. **Inclusionary Zoning:** DHSUD and LGUs should mandate that a percentage of new residential developments in TOD Zones be designated for affordable housing, ensuring equitable access to housing opportunities within well-connected urban centers.
2. **Subsidized Housing Programs:** The National Housing Authority (NHA) should provide tax credits, reduced development fees, and financial subsidies to support affordable housing in TOD zones, facilitating diverse housing options for various income groups.

3. **PPPs:** National Government Agencies (NGAs), LGUs and the private sector should collaborate on housing projects that integrate affordable housing within mixed-use TOD developments, creating balanced urban environments.
4. **Development of Affordable Housing in Well-Connected Areas:** Instead of situating affordable housing directly adjacent to transit stations, DHSUD and LGUs should facilitate housing developments in locations with seamless first-mile/last-mile connectivity, ensuring easy access to transit without exacerbating land cost pressures near stations.
5. **Housing Cooperatives and Community Land Trusts:** LGUs, in collaboration with non-governmental organizations (NGOs) and housing cooperatives, should explore models such as land trusts to maintain long-term affordability within TOD zones, preventing speculative price increases that displace vulnerable populations.
6. **Government Rental Affordable Housing Utilizing Public Land:** DHSUD, LGUs, and relevant government agencies should explore the development of rental-based affordable housing on public lands near transit hubs, ensuring access to well-located, low-cost housing options while maintaining long-term affordability.

3) Coordination between TOD and Relevant Urban Development Initiatives

TOD should be fully integrated into national and local urban development strategies to maximize its effectiveness and long-term sustainability. To achieve this, TOD must align with key initiatives in climate resilience, economic development, infrastructure expansion, and urban redevelopment.

1. **Climate Resilience and Green Infrastructure Initiatives:** The Department of Environment and Natural Resources (DENR) and LGUs must ensure TOD incorporates climate-adaptive designs, sustainable drainage systems, and public green spaces. TOD projects should prioritize energy-efficient buildings, flood-resilient infrastructure, and carbon-reduction strategies.
2. **Economic Development and Employment Growth:** DEPDev, DHSUD and LGUs should select TOD focused areas as economic hubs, integrating job centres, commercial spaces, and mixed-income housing near transit stations in line with national and local urban development policies and orientations. TOD strategies must align with national investment priorities, attracting businesses and industries to high-density, transit-oriented districts.
3. **Integration with National and Local Infrastructure Plans:** DOTr, DPWH, and DEPDEV should ensure TOD aligns with major infrastructure projects, including railway expansions, expressways, and intermodal transport hubs. TOD Zones should be prioritized in government infrastructure investments to maximize economic and environmental benefits.
4. **Urban Redevelopment and Land Readjustment:** DHSUD and LGUs should integrate TOD into urban renewal programs, using land readjustment and redevelopment strategies to repurpose underutilized land. PPP models should support vertical mixed-use developments that increase density while maintaining public spaces and services.

4) Monitoring and Evaluation (M&E)

Since TOD projects require long-term planning and phased implementation, an effective Monitoring & Evaluation (M&E) framework is necessary to track their impact and inform policy adjustments.

A Plan-Do-Check-Act (PDCA) cycle should be adopted to ensure continuous monitoring, data collection, and refinement of TOD strategies with stakeholder participation (Figure 5.8).

Source: JICA Expert Team

Figure 5.8 PDCA Cycle

1. **Key Performance Indicators (KPIs):** To measure the effectiveness of TOD, KPIs should be established for each TOD conceptual plans and projects taking into consideration of local characteristics and issues, TOD objectives and projects, involving local stakeholders. In compliance with TOD principles (urban development, transport development, environmental management), KPIs are set within the coverage of TOD Conceptual Plan, projects, or within 1km radius from station which these KPIs before and after TOD application can be compared.

   For this, these KPIs should be SMART, Specific, Measurable, Achievable, Relevant, and Time-bound, to ensure effective tracking of progress and accountability (Table 5.3). Establish mechanisms for periodic monitoring, stakeholder reporting, and adaptive planning to refine strategies based on actual outcomes.

   It is recommended that these identified KPIs be anchored to the indicators included in the Results Matrix (RM) of the PDP 2022-2028 (e.g. total length of pedestrian infrastructure, public transportation modal share), to help ensure accountability and consistency in data collection and monitoring.

Table 5.3 Examples of KPI to Measure Effectiveness of TOD

TOD Principles	Effectiveness of TOD	Example of KPIs
Urban Development	• Growth in high-density mixed-use developments aligned with TOD principles. • Job creation • Business growth • Social inclusion	• Share of mixed-use land (%) • Land price (PHP/m2) • No. of visitors/customers (person/year) • No. of affordable housing units • No. of off-site resettled households due to TOD projects
Transport Development	• Increased public transit ridership and modal shift • Reduced commute times and traffic congestion • Expanded pedestrian and cycling infrastructure around transit hubs • Adoption of universal design	• Public transportation modal share (%) • Capacity of public transportation facilities (No. of berth) • Coverage of feeder transportation (No. of routes) • Average commuting time saved (min) • Traffic congestion rate (average delay per km or travel speed reduction during peak hours) • Average vehicle speed on main roads (kph) • Total length of pedestrian infrastructure (sidewalks, pedestrian bridges, etc.) (km) • Total length of cycle infrastructure (km)

TOD Principles	Effectiveness of TOD	Example of KPIs
Environmental Management	• Increased green and open spaces • Improved safety and security • Disaster preparedness • Active community participation	• Green coverage (% or m^2) • Crime incidence (No. of reported cases) • Road coverage with streetlights (%) • Capacity of disaster prevention facilities • Frequency of community-led activities

Source: JICA Expert Team

2. **Implementing Data-Driven Monitoring & Decision-Making:** LGUs should integrate Geographic Information Systems (GIS) and mobility data to track land use changes and transit accessibility. Real-time analytics should be used for transport planning, ensuring TOD projects remain commuter friendly. DHSUD and research institutions should conduct socio-economic impact assessments to measure long-term TOD success.
3. **Establishing Transparent Feedback Mechanisms:** LGUs should conduct annual stakeholder consultations, gathering input from residents, developers, and businesses. Public dashboards should display TOD performance metrics, ensuring accountability in project execution. Independent third-party audits and academic reviews should validate TOD success indicators.

5) Stakeholder Engagement and Collaboration

The success of TOD depends on the active participation of various stakeholders, including government agencies, private sector investors, local communities, and civil society organizations. Effective stakeholder engagement strategies include:

1. **Inter-Agency Coordination:** DEPDEV should facilitate collaboration between national, regional, and local government agencies to harmonize policies and streamline implementation processes.
2. **Community Participation:** LGUs should conduct public consultations, participatory planning workshops, and social dialogues to ensure TOD developments reflect community needs.
3. **Private Sector Involvement:** DHSUD, DOTr, and investment boards should encourage real estate developers and infrastructure investors to contribute to TOD initiatives through clear regulatory incentives.
4. **Academic and Research Partnerships:** Universities and research institutions should collaborate with government agencies to support evidence-based TOD planning, urban design innovation, and capacity-building initiatives.
5. **Creation of TOD Advisory Committees:** LGUs should establish multi-stakeholder advisory committees composed of government representatives, community leaders, private developers, and transport experts to provide continuous input on TOD policies and projects.

Glossary

Term	Definition
Active transport	Non-motorized modes of travel, such as walking and cycling, promoting to enhance health, reduce emissions, and improve first/last-mile access around transit stations.
Affordable housing	Residential units offered at below-market rates to ensure that lower-income households can live near public transport and employment centers. In the Philippines, socialized housings (850,000 peso/unit at minimum for low-income households of informal settlement and resettlement by infrastructure project) and economic housing (2.5 mil. peso/unit at minimum) are called affordable housings.
Barrier-free route	An accessible path designed for all users, including people with disabilities, ensuring safe and inclusive mobility to and from stations, which includes ramps, tactile paving, elevators, and clear signage.
Bus rapid transit (BRT)	High-capacity, high-frequency bus system, often operating in dedicated lanes, providing efficient transit service similar to rail-based systems.
Central business district (CBD)	The commercial and economic hub of a city, typically featuring high-density development, and serving as a hub for employment, business activities, and urban services.
Conceptual plan	A schematic or high-level plan that outlines the vision, structure, and components of a future TOD area before detailed design.
Feeder service	Transport services connecting neighborhoods or outlying areas to major transit stations, enabling convenient first-mile and last-mile access. Typically using smaller vehicles like minibuses or shuttle vans.
Floor area ratio (FAR)	The ratio of total building floor area to the size of the lot.
Gross floor area (GFA)	The total floor area within a building's external walls, used in TOD to assess density, land use, and development feasibility.
Inclusionary zoning	A policy requiring a portion of new housing in TOD zones to be affordable for low- to middle-income households.
Key performance indicator (KPI)	Measurable metrics used to track TOD success, such as increased ridership, green space, or affordable housing provision.
Land readjustment (LR) scheme	One of the implementation methods for urban redevelopment project where landowners pool plots for reconfiguration, allowing infrastructure development while retaining reallocated, value-enhanced land, by converting original lands to new lands with equivalent values.
Land value capture (LVC)	A financing mechanism where public infrastructure investment increases land values, and part of this value is recouped to fund TOD.
Level of service (LOS)	A measure of traffic conditions, such as speed or congestion, used to assess road or transit service quality around TOD zones.
Modal shift	The change in transportation mode used by travelers, such as from private vehicles to more sustainable modes like walking, cycling, or public transport.
Multimodal connectivity	Integration of different transport options (e.g., rail, bus, bike, and walk) to enable seamless, efficient transfers within TOD environments.
Non-motorized transport (NMT)	Transportation modes that do not use motors, such as walking and cycling, essential for first/last-mile connectivity in TOD.
Passenger car unit (PCU)	A metric used to express traffic volume by converting all vehicle types into equivalent passenger car numbers for analysis.

Passenger car equivalent factor (PCEF)	A numerical value assigned to different vehicle types to equate them with a standard passenger car for traffic assessment.
Peak hour	The time of day with the highest travel demand, critical for planning transit capacity and managing TOD traffic flow.
Pedestrian-oriented development	Urban planning that prioritizes walkability through human-scaled design, safe pathways, and mixed uses around transit nodes.
Planned Unit Development	A flexible zoning tool allowing mixed-use development, often applied in TOD zones to encourage integrated land use.
Strategic pathway	A coordinated set of policy, planning, and implementation strategies to guide the sustainable realization of TOD objectives.
Sustainable urban growth	Development that balances social, economic, and environmental needs, reducing sprawl and vehicle dependency through compact TOD forms.
TOD influence area	The catchment zone around a transit station, typically within 400–800 meters, where TOD principles are prioritized for land use and infrastructure.
TOD overlay zone	A special zoning district placed over existing zones to apply TOD-specific regulations such as higher density or mixed use, which is designated in the CLUP Guidelines.
TOD typology	Classification of TOD areas (e.g., urban, suburban, corridor) based on function, density, and development context to guide planning strategies.
Traffic impact assessment (TIA)	An evaluation of how proposed developments will affect surrounding traffic conditions, often required for TOD project approval.
Traffic generation	The number of trips expected from a land use or development project, influencing TOD design and transport planning.
Transfer of development rights	A tool allowing landowners to transfer unused development potential from one area (e.g., heritage zones) to TOD-designated areas.
Transit-oriented development (TOD)	A planning concept promoting compact, walkable, mixed-use communities centered around high-quality public transportation systems.
Travel demand management (TDM)	Strategies to reduce reliance on private vehicles, like parking controls, pricing, and incentives, to support TOD and reduce congestion.
Urban redevelopment (UR) scheme	One of the implementation methods for urban redevelopment projects to revitalize aging or underutilized urban areas by upgrading infrastructure, increasing density, and integrating transit accessibility, by converting original land/ floor to new floors with equivalent values.
Volume to capacity ratio (V/C Ratio)	A key metric in traffic engineering that compares road traffic volume to capacity, indicating congestion levels near TOD areas.
Zoning ordinance (ZO)	A local law regulating land use, building height, density, and use types, often modified to support TOD strategies and flexibility.

Appendix A

TOD Case Studies

1) Urban Railway Development with New CBD (Minato Mirai)

Key Words: *Land reclamation, Land readjustment, Beneficiary-to-pay principle*

Basic Information

Location: Yokohama City, Kanagawa
Area Characteristic: CBD
Night-time Pop. of MM (2024): 10,000
Day-time Pop. of MM (2024): 190,000
Daily Ridership of MM Line: 200,000 (2024)
Project Area: 186 ha
Main PIB: Yokohama City

Minato Mirai Line Route Map (total route length: 4.1km)

PROJECT BACKGROUND

Development Issues

(i) **Rapid Population Growth and Urban Sprawl:** Yokohama City's population exceeded 1 million in the 1960s, leading to further growth and uncontrolled urban expansion. This made it difficult to provide adequate urban infrastructure and services.

(ii) **Deterioration of the Urban Environment:** The rapid urbanization caused severe urban challenges known as the "five major wars": waste management, traffic congestion, environmental degradation, water resource shortages, and a lack of public land.

(iii) **Limited Financial Resources and Lack of Stakeholder Coordination:** The city's financial base was too weak to support large-scale infrastructure projects. Additionally, the absence of a long-term urban vision made it difficult to align stakeholders on the city's future development.

Turning Points

(i) **Launch of Six Large-scale Strategic Projects (1965):** To address rapid urbanization and infrastructure challenges, Yokohama City introduced the '6 Strategic Projects,' consisting of three urban development projects and three transportation projects. These initiatives worked in synergy to promote integrated urban growth, connectivity, and economic development. The Minato Mirai 21 (MM21) project was a key urban redevelopment initiative, strategically linked with transport improvements for greater impact.

(ii) **Construction of the Minato Mirai Line (decision in 1985, opening in 2004):** To integrate multiple CBDs and enhance connectivity with Tokyo, the Minato Mirai Line was developed, providing direct subway access to MM21. Previously, the district was distant from major JR stations, but the new subway station improved accessibility to the central commercial area.

(iii) **Financing through Public-Private Partnerships:** Yokohama City collaborated with the national government and private sector to secure funding for large-scale projects, ensuring efficient development and cost-sharing.

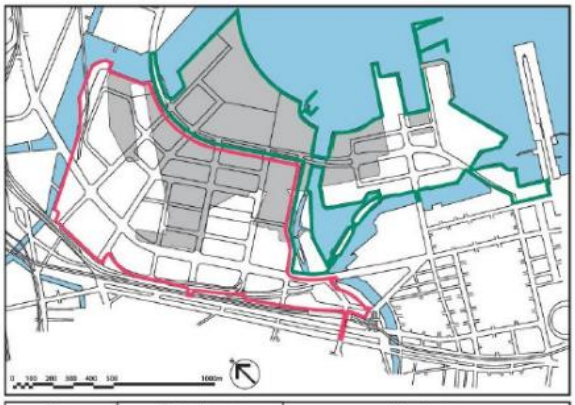
POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Creating of a Subcenter Focusing on Employment, Commerce, and Tourism:** A vibrant, all-day activity hub can be developed by integrating offices, commercial spaces, hotels, cultural and tourism facilities, and MICE (Meetings, Incentives, Conferences, and Exhibitions) venues. Supporting residential development around these areas helps attract domestic and international visitors while promoting economic growth.

(ii) **Diversified Implementation Bodies and Funding Sources:** Coordination between national and local governments and the private sector enables shared responsibility in infrastructure projects. In Minato Mirai 21, land reclamation and infrastructure were developed by the national and local governments, land readjustment projects were led by the Urban Renaissance (UR) Agency, and commercial business developments were driven by private companies.

(iii) **Private Sector Contributions to Infrastructure Development:** A win-win approach between the public and private sectors helps fund and promote public infrastructure, facilities, and open spaces. In MM21, the private sector voluntarily established development guidelines, reducing the financial burden on the local government while enhancing the urban image and corporate presence.

PROJECT OVERVIEW

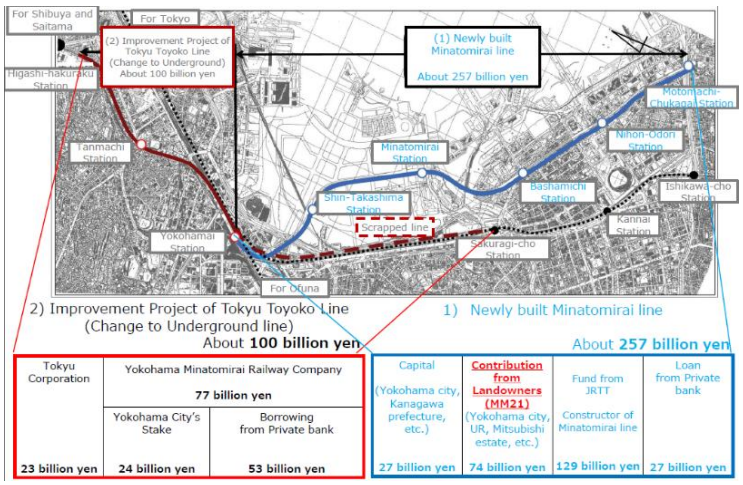


Zone	Project name	Developer
	Coastal land reclamation	Municipal government
	Land readjustment	Urban Renaissance Agency (independent administrative institution)
	Port facility improvement	Municipal government, national government

The Minato Mirai 21 Project transformed Yokohama's waterfront into a revitalized business and cultural district, attracting global firms, retail establishments, museums, MICE events, and international tourists.

The City of Yokohama led a land reclamation project, while the government and UR implemented a land readjustment project to develop infrastructure-ready land. The private sector spearheaded mixed-use developments.

The Minato Mirai Line, operational since 2004, connects major stations along Yokohama Bay, significantly improving accessibility. It should be noted that Private companies along the subway line contributed approximately 30% of the total construction cost (JPY 257 billion) under the "beneficiary-pays principle," reflecting the economic benefits of improved transit connectivity.



2) Integrated Urban Railway and Suburban Area Development (Tsukuba Express/ TX)

Key Words: *Integrated railway and urban development, Pre-purchase of public land, Coordination of long-term integrated development*

Source: UR

Basic Information

Location: North-east of Tokyo Metropolitan Area	
Area Characteristic: Suburban Center and Neighborhood	Daily Ridership of TX: 382,000 (2023)
	Project Area: app. 2,908ha (newly urbanized area along TX)
Planned Pop. along TX: 237,000	Main PIB: Local governments& UR

PROJECT BACKGROUND

Development Issues

(i) **Urgent Need for Increased Railway Capacity:** To alleviate severe congestion on the JR Joban Line connecting to Ibaraki and Chiba prefectures, a new railway connection was needed to improve access to Tsukuba Science City.

(ii) **Dedensification of Tokyo Metropolitan Area:** Urban expansion was necessary to prevent excessive population concentration in Tokyo and promote balanced regional development.

(iii) **Need of New Town Development along Railway Corridor:** A growing demand for diverse housing options across different generations and occupations called for planned new town developments around stations with commuter rail access to Tokyo.

Turning Points

(i) **Enactment of the Housing and Railway Act (1989):** This legislation provided a legal framework for integrating railway construction with residential land development, enabling local governments to systematically implement new town developments along the railway.

(ii) **Development of Tsukuba Science City:** Established in 1973 to ease congestion in Tokyo and decentralize academic and research institutions, Tsukuba Science City saw a dramatic increase in accessibility following the TX opening. This led to the emergence of new science hubs such as Kashiwa-no-ha Smart City and Akihabara IT Town, forming a knowledge-based development corridor.

(iii) **Long-term Land Readjustment Planning:** The land readjustment process spanned approximately 30 years, requiring multiple revisions to financial plans and prolonged consensus-building efforts with landowners due to economic fluctuations.

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Institutional Framework for Integrated Railway and Urban Development:** Local governments or designated urban development entities should facilitate systematic station area planning by securing land for railway infrastructure, transit hubs, access roads, and essential social facilities.

(ii) **Land Swapping for Securing Rail Corridors:** Instead of relying solely on land acquisition, railway development can be facilitated through land swapping (right conversion) with vacant land in surrounding areas to streamline project implementation.

(iii) **Encouraging Commercial, Business and Academic Growth along Railways:** Beyond residential development, station areas should attract commercial, business, academic, and R&D facilities to increase railway demand, fostering suburban growth with integrated work and living environments rather than dependency on a single urban center.

PROJECT OVERVIEW

The Tsukuba Express (TX) was developed to connect central Tokyo with Tsukuba Science City, addressing severe congestion on the JR Joban Line while providing new residential and commercial development opportunities in the metropolitan region. Opened in 2005, the railway played a key role in decentralizing Tokyo's growth and providing land for housing.

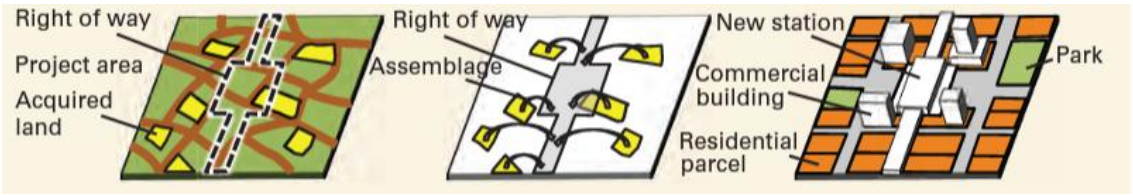
1985:	Announcement of TX construction by Transport Policy Committee
1989:	Enactment of "Act for Integrated Railway and Housing Development"
1991:	Establishment of railway company (invested by 16 local governments)
1992:	Commencement of railway construction
1997:	Commencement of new town development
2005:	Commencement of railway operation
2021:	Completion of new town development

Land Readjustment Project based on the Housing and Railway Act

Stage 1. The Right of Way (ROW) was designated to secure railway land, and the implementation body of Land Readjustment project began pre-purchasing lands.

Stage 2. Replotting was conducted, reallocating land lots from the pre-purchased land to the designated ROW.

Stage 3. Land outside the ROW was readjusted, and roads and public facilities were developed in accordance with the land use plan.



Source: UR

3) Portland's Transformation with Light Rail and Urban Growth Boundaries

Key Words: *TIF, Affordable housing, Consistent policies*

Basic Information

Location: Portland City, Oregon	Public Transport System:
Area: 375 km^2	・ MAX Light Rail: 5 lines with 97 stations
Night-time Pop. (2023): 630,000	・ Portland Streetcar: 2 lines with 13 stations
	・ Bus: more than 80 routes
Day-time Pop: N/A	Main PIB: Oregon State Government, Regional Government, Portland City Government, private sector, transport operator, community

PROJECT BACKGROUND

Development Issues

(i) **Decline of the CBD**: Suburbanization and car-centric development led to a decrease in downtown activity, leaving the area underused.

(ii) **Urban Sprawl**: Population growth increased car dependence and congestion.

(iii) **Decline of the Willamette River Waterfront**: Industrial use of the Willamette River waterfront disconnected it from downtown and hindered mixed-use development.

(iv) **Car Dependence**: Car reliance reduces walkability, increasing traffic and pollution problems.

(v) **Lack of Coordination**: Uncoordinated growth caused inefficiencies and poor infrastructure.

(vi) **Poor Public Transit**: Limited public transit options made commuting difficult without cars.

Turning Points

(i) **Urban Planning Movements (1960s–1970s)**: Urban renewal and environmental movements shifted focus toward addressing pollution, sprawl, and unsustainable growth.

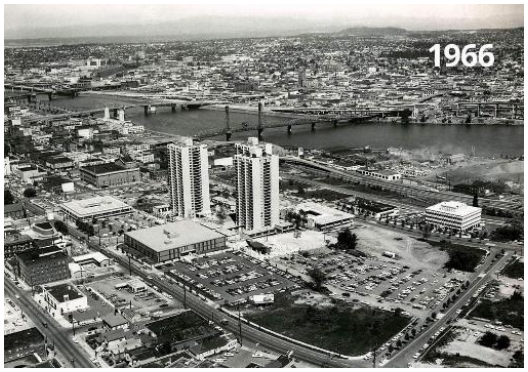
(ii) **Formulation of 1972 Downtown Plan**: The plan promoted a pedestrian-friendly, sustainable city with mixed-use development and improved public spaces.

(iii) **Creation of Metro (1979)**: Metro's creation enabled better regional coordination of growth, transportation, and land use policies.

(iv) **Introduction of Streetcar System (2001)**: Reintroducing the streetcar linked neighborhoods to downtown, supported TOD, and reduced car dependency.

(v) **Portland Plan (2012)**: The Portland Plan reinforced sustainable growth, emphasizing public transit, green space, and compact development.

Before Project (1996)



Project Ongoing (2021)

Source: Reddit. "Portland Oregon in 1966 vs Now," 2016. https://www.reddit.com/r/OldPhotosInRealLife/comments/mnxxlp/portland_oregon_in_1966_vs_now/#lightbox.

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Regional Governance and Coordination:** Metro's regional authority ensures consistent policies across jurisdictions, demonstrating the importance of coordinated planning.

(ii) **Integrated Land Use and Transportation Planning:** Portland's compact, mixed-use communities are seamlessly linked to public transit, reducing sprawl and promoting efficiency.

(iii) **Public Transit Investments:** Portland prioritized transit-oriented infrastructure, including streetcars and light rail systems, to reduce car dependency.

(iv) **Community Engagement and Public Involvement:** Portland involved communities in planning processes, ensuring public support for projects.

(v) **Focus on Livability and Sustainability:** Portland prioritizes walkability, green spaces, and sustainable growth, creating a high quality of life.

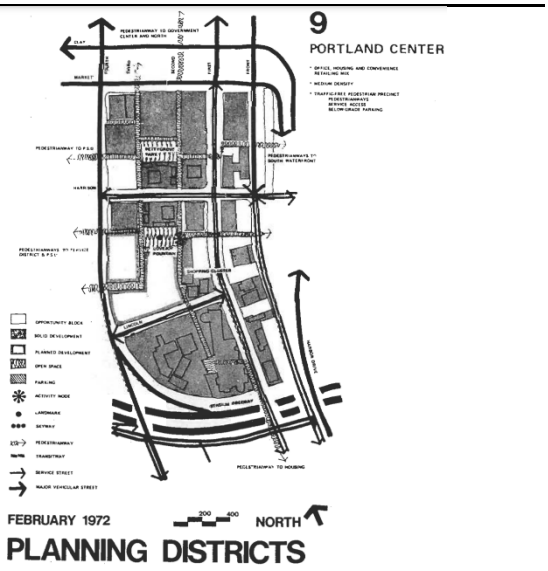
PROJECT OVERVIEW

Portland's TOD initiatives transformed the city through integrated planning and sustainable development. Guided by the 1972 Downtown Plan and supported by the establishment of the Metro, the regional government of Portland established in 1979 compact, mixed-use communities, pedestrian-friendly streets, and transit-oriented growth.

Key projects, such as the reintroduction of the 2001 streetcar, reduced car dependency and enhanced the connectivity between neighborhoods and downtown. Collaboration between regional authorities, city agencies, and private stakeholders ensured effective implementation.

Portland's TOD emphasizes transit integration, community engagement, and sustainability, creating vibrant, walkable neighborhoods and positioning the city as a global leader in urban development.

1972: Adoption of Downtown Plan
1979: Creation of Metro
1980s: Introduction of Tax Increment Financing (TIF)
1986: Opening of MAX Light Rail (Blue Line)
1990s: Urban Growth Boundary (UGB) Strengthened
2001: Reintroduction of Portland Streetcar
2004: South Waterfront Redevelopment Begins
2012: Adoption of the Portland Plan
2015: Tilikum Crossing Bridge Opens
2020: Expansion of MAX and Streetcar Networks

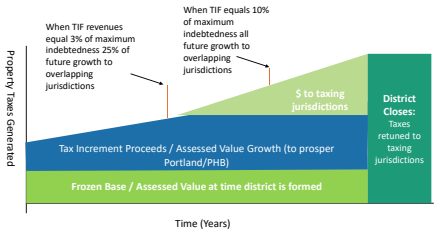


Source: "Planning Guidelines: Portland Downtown Plan," 1972.
https://web.mit.edu/nature/archive/student_projects/2007/shutsu/sustcity/files/Portland_Downtown_Plan.pdf.

TOD ELEMENTS

Tax Increment Financing (TIF)

TIF program has been a vital tool for funding urban renewal and development projects, particularly in areas targeted for TOD. TIF works by capturing the increased property tax revenue generated by new developments in designated districts and reinvesting that revenue into infrastructure and public improvements. TIF in Portland has funded various projects, including infrastructure improvements, affordable housing, and public amenities.



Source: JET prepared based on various sources

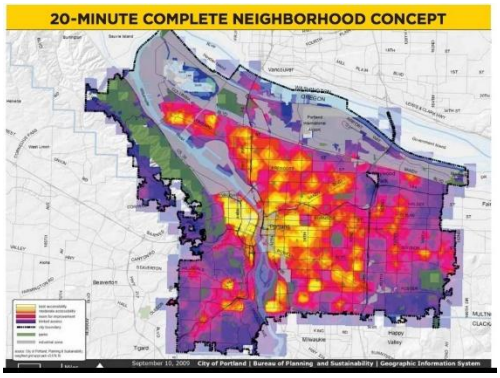
Source:
https://www.portland.gov/phb/construction/

Affordable Housing Initiatives

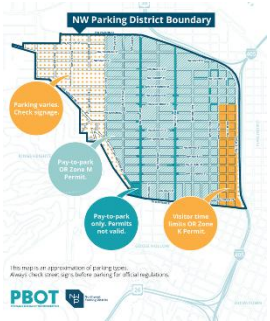
As part of its TOD efforts, Portland has made a concerted effort to provide affordable housing near transit stations, ensuring that TOD benefits all income levels. Key tools such as inclusionary zoning require new developments to include affordable housing units, while affordable housing bonds have funded the construction and preservation of affordable homes. Additionally, TIF has been used to finance affordable housing projects in high-demand TOD areas. The city has also prioritized using public land for affordable housing and supported Community Land Trusts to preserve long-term affordability. Collaborations with non-profit developers and initiatives to preserve affordable housing help prevent displacement in rapidly developing transit corridors.

"20-Minute Neighborhoods" Initiative

This initiative aims to create neighborhoods where residents can meet most of their daily needs (e.g., schools, parks, shopping, and transit) within a 20-minute walk or bike ride. By promoting mixed-use zoning, pedestrian-friendly streets, and public transit access, the city is working to develop more sustainable and connected communities through TOD principles.



Source: PlannersWeb. "Anderson-PDX-20Minute-Concept-Map." https://plannersweb.com/2013/07/distance-destinations-density/anderson-pdx-20minute-concept-map/.



Source: Portland Bureau of Transportation

Parking Maximums

Portland has adopted parking maximums, capping the number of parking spaces in new developments. This policy prevents the over-provision of parking, encouraging developers to prioritize public transit, biking, and walking. By limiting parking, the city promotes more sustainable, pedestrian-friendly environments, especially around transit hubs. Parking maximums also reduce construction costs, as developers are not required to build excess parking.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Oregon State Government ・ Provides overarching transportation policies, funding, and regulatory frameworks, ensuring that TOD aligns with broader state goals.	**Regional Government (Metro)** ・ Coordinates regional land use, transportation planning, and policies across Portland's metropolitan area to manage growth and ensure that TOD projects integrate with regional transit systems.
Portland City Government ・ Implements local policies and zoning regulations, including form-based codes and parking management, to create pedestrian-friendly and transit-oriented spaces. ・ Plays a key role in infrastructure development, public services, and community engagement.	**Transportation Operators** such as TriMet ・ Manage public transit services ・ Ensure transportation infrastructure supports TOD areas, providing access to and from key sites.
Private Sector ・ Responsible for financing, developing, and managing TOD projects.	**Community** ・ Plays a critical role in the planning process through public participation and feedback. ・ Contributes to shaping the vision for TOD areas, ensuring that development meets the community's needs while aligning with sustainability and equity goals.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: The private sector invests in public infrastructure, such as affordable housing, public spaces, pedestrian pathways, and green building initiatives, aligning with the city's urban development goals. These contributions also support job creation, energy efficiency, and reduced car dependency.

Incentives for Private Developers: In return for these investments, the private sector receives various incentives, including density bonuses, tax credits, preferential financing, reduced parking requirements, and infrastructure support.

Affordable Housing[1/]

Open Space[2/]

Pedestrian Pathways[3/]

Green Building[4/]

1/ Polyphon. "Central Eastside Lofts." https://www.polyphon.com/central-eastside-lofts.

2/ ZGF. "City of Portland, Simon and Helen Director Park." https://www.zgf.com/work/1155-city-of-portland-simon-and-helen-director-park.

3/ Tripadvisor. "Willamette River Walkway." https://www.tripadvisor.com/Attraction_Review-g52024-d3474209-Reviews-Willamette_River_Walkway-Portland_Oregon.html#/media/3474209/?albumid=-160&type=ALL_INCLUDING_RESTRICTED&category=-160.

4/ Greenroofs.com, LLC. "The Portland Building." https://www.greenroofs.com/projects/the-portland-building/ https://www.greenroofs.com/projects/the-portland-building/.

4) Rail + Property in Hong Kong

Key Words: *Rail + Property (R+P) Model, Public-Private Collaboration, Zoning, Urban Renewal*

Basic Information

Location: Hong Kong, China Area: 1,104 km^2 Night-time Population (2024): 7.53 mil.	Public Transport System: ・ Mass Transit Railway (MTR): 10 commuter lines with 99 stations, the Airport Express line, and the Light Rail with 68 stops. ・ Trams: 6 lines with 120 stops ・ Cable Cars: 1 line 2 terminals
Day-time Population: N/A	Main PIB: MTR Corporation Limited (MTRC), Hong Kong Special Administrative Region Government, Urban Renewal Authority (URA), and private sector

PROJECT BACKGROUND

Development Issues

(i) **Limited Land Supply & High Population Density:** Hong Kong's small, mountainous terrain restricted expansion, causing congestion in urban areas.

(ii) **Traffic Congestion & Car Dependency:** Rising vehicle use led to severe congestion and pollution, making road-based expansion unsustainable.

(iii) **Uncoordinated Urban Growth:** Poor integration between urban development and transport left new towns disconnected from job centers.

(iv) **Housing Shortages & Affordability Issues:** High demand and poor transit access worsened housing shortages, while speculation drove up central prices.

Turning Points

(i) **New Town Development Strategy (1970s):** New Towns (e.g., Sha Tin, Tuen Mun) were built along railway lines, integrating transport with urban growth.

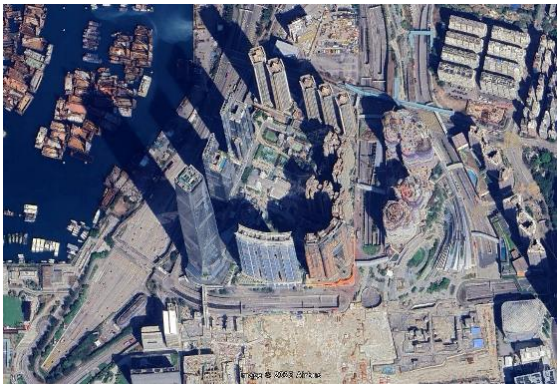
(ii) **Expansion of the MTR (1980s–1990s):** The government adopted the "Rail + Property" model, allowing MTRC to fund rail projects through property development.

(iii) **Full Adoption of TOD Principles (2000s):** MTRC's privatization in 2000 enhanced transit-real estate integration, with major TOD projects like Union Square and Lohas Park.

(iv) **Sustainability & Smart City Integration (Recent years):** TOD now incorporates green buildings, pedestrian-friendly designs, and smart mobility solutions for efficiency.

Before Project of Union Square (2000)

Current (2024)



Source: Google earth

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **R+P Model & Public-Private Collaboration:** The R+P model allows railway operators to fund projects by developing properties around stations. Strong government planning and private sector investment ensure seamless rail-connected developments.

(ii) **High-Density, Mixed-Use, and TOD-Friendly Land Use Planning:** Maximizing land efficiency through high-density, mixed-use developments around transit hubs reduce urban sprawl. Aligned zoning laws further support compact, transit-oriented growth.

(iii) **Multimodal Integration and Pedestrian-Friendly Design:** Well-connected rail, buses, ferries, and walkways ensure smooth transfers. Pedestrian-friendly infrastructure like footbridges and open plazas enhances accessibility.

(iv) **Smart Mobility and Sustainable Development:** Contactless payments and real-time transport data improve transit efficiency. Green buildings, renewable energy, and climate-resilient infrastructure ensure long-term sustainability.

PROJECT OVERVIEW

Hong Kong's TOD integrates urban planning with its extensive railway network, ensuring high-density, mixed-use developments around transit hubs. The R+P model funds railway expansion by allowing the MTR Corporation to develop commercial and residential properties near stations. This approach has enabled the construction of major TOD projects like Union Square, Lohas Park, and Tseung Kwan O, which seamlessly blend housing, offices, retail, and public spaces.

A key aspect of TOD is the inclusion of affordable and public housing near transit nodes, developed in collaboration with the Hong Kong Housing Authority and Housing Society. This ensures accessibility for different income groups while reducing car dependency. Recent initiatives focus on smart mobility, green building standards, and sustainability, reinforcing TOD's role in shaping a compact, transit-efficient, and livable city.

1972: New Town Development Strategy was introduced.

1975: MTRC established.

1979: Kwun Tong Line begins operation

1982: Government adopts the R+P model

1989: Airport Core Programme announced, including TOD projects around the Airport Express.

2000: MTRC is privatized.

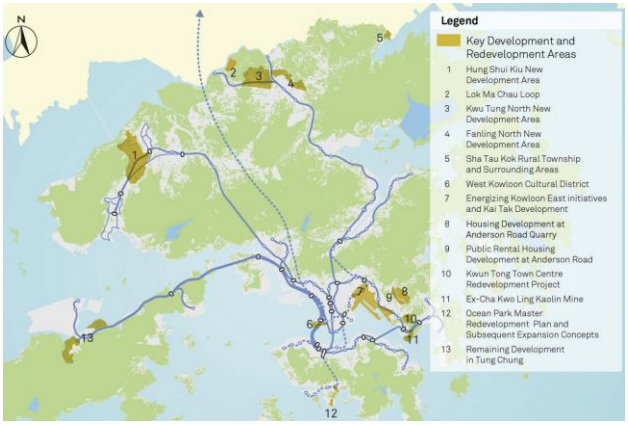
2004: Union Square (above Kowloon Station) is completed

2009: Lohas Park TOD project begins

2016: Contactless payment is fully integrated

2023: East Rail Line Cross-Harbour Extension begins operation

Key Development and Redevelopment Areas

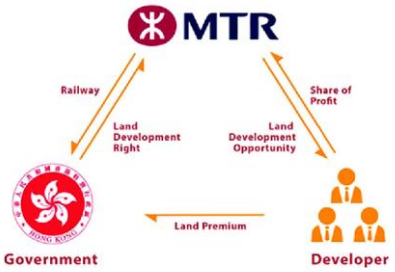


Source: "Railway Development Strategy 2014." Transport and Housing Bureau, September 2014.
https://www.tlb.gov.hk/eng/publications/transport/studies/rds2014.pdf.

TOD ELEMENTS

R+P Model

The R+P model enables the MTRC to develop commercial, residential, and retail properties around transit stations to finance railway projects. Integrating urban development with rail expansion in this model ensures financial sustainability without heavy government subsidies. Additionally, R+P developments often include public facilities, open spaces, and pedestrian networks. Examples include Union Square (Kowloon Station), Lohas Park, and Tseung Kwan O.



Source: MTR. 2015. https://www.researchgate.net/figure/MTR-and-the-R-P-model-Source-MTR-2015_fig1_327916988.

Kai Tak redevelopment

Source: Wikimedia Commons contributors, "File: Kai Ching Estate and Tak Long Estate 2017.jpg," Wikimedia Commons, https://commons.wikimedia.org/w/index.php?curid=60961716.

Comprehensive Development Areas (CDA) Zoning

Under Hong Kong's statutory planning system, CDA zoning promotes large-scale, master-planned developments around transit hubs. Developers must submit master layout plans that incorporate mixed-use functions, walkability, and seamless public transport integration before obtaining approval. This approach ensures that new developments maximize land-use efficiency, reduce congestion, and enhance public space connectivity. A key example is the redevelopment of Kai Tak.

Public-Private Partnerships (PPP) in Urban Renewal

The URA collaborates with private developers under PPP to revitalize aging districts while incorporating TOD principles. This approach encourages densification, improved connectivity, and mixed-use integration while balancing heritage preservation and modernization. Through PPPs, private developers provide funding and expertise, while the government ensures the developments align with citywide transport and housing strategies. These projects often include affordable housing, community facilities, and enhanced pedestrian networks. A key example is the redevelopment of the Kwun Tong Town Centre.

Master Layout Design

Source: Edward Sh Au. "Urban Renewal – a Case Study in Hong Kong," June 2014. https://www.fig.net/resources/proceedings/fig_proceedings/fig2014/papers/ts08f/TS08F_au_7062.pdf.

Octopus Card

Source: "Sony Corporation - FeliCa - Case Study: Hong Kong Octopus Card." https://www.sony.net/Products/felica/casestudy/article/octopus.html.

Green and Smart Mobility Initiatives

Hong Kong actively promotes sustainable and smart mobility through policies that reduce car dependency, enhance pedestrian-friendliness, and integrate digital technology into transit operations. Smart transport systems, such as the Octopus Card, allow seamless, cashless travel across all public transport modes, while real-time transport apps improve journey planning. Additionally, sustainability measures include green building standards, energy-efficient transport infrastructure, and car-free zones.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

MTRC – Developer & Operator ・ Implements the R+P model by integrating railway expansion with real estate development. ・ Plans and manages mixed-use developments above and around stations. ・ Operates and maintains the MTR system, ensuring seamless multimodal transport integration. ・ Works with private developers to execute transit-linked projects.	**Hong Kong Special Administrative Region Government – Regulator & Planner** ・ Sets zoning laws, land-use policies, and planning guidelines to align with TOD principles. ・ Grants land to MTRC at a pre-determined price under the R+P model. ・ Ensures public infrastructure, affordable housing, and environmental sustainability in TOD projects.
URA – Urban Redevelopment & Revitalization ・ Leads redevelopment of aging urban areas, incorporating TOD concepts. ・ Partners with private developers to create high-density, transit-linked, mixed-use projects. ・ Focuses on heritage preservation, pedestrian connectivity, and community needs.	**Private Sector – Investor & Developer** ・ Finances and develops residential, commercial, and retail properties within TOD projects. ・ Works with MTRC and URA to deliver high-density, mixed-use developments. ・ Implements smart and green building technologies to enhance sustainability.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: The private sector contributes to property development and investment near transit hubs and sharing profits with MTRC, urban renewal and affordable housing support, public infrastructure and facility provision, and green and smart city initiatives.

Incentives for Private Developers: In return for contributing to Hong Kong's TOD, the private sector receives several incentives, including higher plot ratios and building heights, fast-track approvals, green certifications, and financial incentives.

Public Housing[1/] Open Space[2/] Pedestrian Pathways[3/] Green Building[4/]




1/ K&W Architects Ltd. "The Public Housing Development at Kai Tak Site 2B5 & 2B6." 2024. https://www.kandwarchitects.com/projects/details/The_Public_Housing_Development_at_Kai_Tak_Site_2B5_n_2B6.

2/ Hong Kong Green Building Council. "Swire Properties," July 3, 2024. www.hkgbc.org.hk/eng/membership/members-corner/2024/20240703_Swire.jsp.

3/ Blue Lapis Road. "FLOATING WAY: Central Elevated Walkways (中區行人天橋), Central (中環), Hong Kong." March 28, 2022. https://bluelapisroad.wordpress.com/2022/03/28/floating-way-central-elevated-walkways-%E4%B8%AD%E5%8D%80%E8%A1%8C%E4%BA%BA%E5%A4%A9%E6%A9%8B-central-%E4%B8%AD%E7%92%B0-hong-kong/.

4/ Archilovers. "LOHAS PARK Phase 2 - Picture Gallery 2," 2013. https://www.archilovers.com/projects/70874/lohas-park-phase-2-gallery?523683.

5) Mixed-use Development Combined with New Subway Station in Tokyo (Toranomon)

Key Words: *New subway station, City center, Mixed-use compact development*

Basic Information

Location: Minato City, Tokyo	No. of Stations: 2
Area Characteristic: CBD	Daily Ridership: 136,432 for 2 sta.
Night-time Pop. (2020): 632[1]	Project Area: 24 ha[1]
Day-time Pop. (2020): 31,399[1]	Main PIB: UR, Private developer

PROJECT BACKGROUND

Development Issues

(i) **Overcrowded Stations**: A survey of public transportation services in central Tokyo pointed out that stations around the Toranomon area are overcrowded and less accessible.

(ii) **Disaster Vulnerability**: The Toranomon area was a dense development that did not meet the latest anti-seismic standards. Its widespread narrow streets and lack of open green spaces made it less resilient to natural disasters such as earthquakes.

(iii) **Subway without Stations**: Despite a subway line passing through the Toranomon area, the lack of a station undermines the potential of the district.

Turning Points

(i) **Designation of Special District (2014–)**: In 2014, the Cabinet Office designated the area as an Urban Regeneration Emergency Improvement Area (UREIA) to enhance its international competitiveness. In the same year, the Tokyo Metropolitan Government (TMG) proposed the area to be part of the National Strategic District, which was approved by the Cabinet Office in 2015. These allowed urban development regulations to be relaxed to promote a world-class business environment while developing new transportation infrastructure.

(ii) **Decision to Develop a New Subway Station (2014):** The development plan of the UREIA stipulated the development of a new subway station in the Toranomon area. Based on this plan, the construction of Toranomon Hills Station launched in 2016.

Before Project (2004)

After project (2023)

Source: Mori.co.jp. "Toranomon Hills." https://www.mori.co.jp/projects/toranomonhills_area/.

[1] Toranomon 1-chome and 2-chome

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Coordinated and specialized urban development project:** Involve national and local governments and various private sectors, such as developers and public transportation operators, to optimize urban development opportunities. Consider the challenges, potential, and needs of the specific area from both macroscopic and microscopic perspectives and try to address them in a TOD project.

(ii) **Appropriately relax urban development regulations:** Where appropriate, **r**elax regulations to allow flexible but elaborate urban development projects. A proper combination of deregulation and conditions can incentivize private developers to implement projects while securing necessary infrastructure and facilities from the public perspective.

PROJECT OVERVIEW

Despite its strategic location, Toranomon was once an underdeveloped area characterized by densely built buildings, narrow streets, and scarce open spaces. In 2014, the Cabinet Office designated the area as an UREIA to promote the following functions with relaxed urban development regulations: (i) an international business and interaction hub with a residential environment and (ii) an intermodal transfer hub integrated with the new Toranomon Hills Station.

Various urban redevelopment projects have been implemented in this area. Two mixed-use towers adjacent to Toranomon Hills Station are seamlessly connected to the station. Several offices, condominiums, and other buildings have also been developed around the area by multiple private developers. They also developed elevated and underground walkways and a bus terminal to improve the area's intermodal function. A special scheme was applied to establish a building and an arterial road on one site by allocating necessary lands vertically. These were made possible through coordination among national and local governments, private developers, and the Urban Renaissance Agency (UR).

2013: A study reported the issue of congested stations and poor accessibility to the stations in the Toranomon area and proposed to develop a new subway station along the Hibiya line.

2014: TMG proposed the area to be part of the National Strategic District to promote its business and intermodal functions.

2014: The Cabinet Office designated the area as an UREIA to enhance its international competitiveness through the relaxation of urban development regulations.

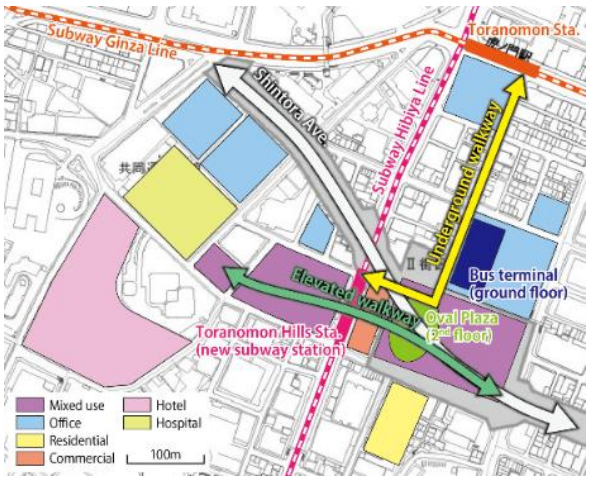
2015: The Cabinet Office approved TMG's proposal. Urban planning decision was made.

2016: Construction of Toranomon Hills station began.

2020: Toranomon Hills station opened.

2023: The connection between the station and the adjacent redeveloped building was completed.

Land Use Zoning



Source: JET based on various sources

TOD ELEMENTS

Intermodal Transfer and Pedestrian Facilities

To improve the accessibility of the station and the intermodal function of the area, the urban redevelopment plan formulated through the statutory urban planning process included the development of underground and elevated walkways and a bus terminal. The construction costs of these facilities and new subway station were borne by the private developer. Considering the importance from a national policy perspective and the need for elaborate coordination with surrounding development projects, the UR acted as an implementer of the new subway station. Thus, the subway stations, the bus terminal, and surrounding buildings are integrated with a pedestrian network.

Station concourse is directly connected to surrounding buildings.
Source: JET

Section of Toranomon Hills Station and adjacent buildings
Source: Mori.co.jp. "Toranomon Hills Station Tower." https://www.mori.co.jp/projects/toranomonhills_area/toranomonhills_stationtower/.

Incubation center in Toranomon Hills Business Tower aims to encourage communication among diverse industries to promote innovation.
Source: Arch. "Toranomon Hills Incubation Center." https://arch-incubationcenter.com/index.html.

High-grade, Mixed, and Compact Development

As a leading project of the area to be "an international new CBD and global business center," the development included diverse functions such as high-end offices, an incubation center, MICE facilities, a hospital, attractive shops and restaurants, and luxurious condominiums and hotels.

Vertical Land Use for Efficient Infrastructure Provision

To optimize the limited land with high land value, the land use was allocated vertically on one building site. Shintora Avenue, a new arterial road connecting the city center and the bayfront area, was constructed on the ground floor, and the redeveloped building with a green space was constructed above Shintora Avenue. This was made possible by a special urban development scheme called the Multi-level Road System.

Shintora Avenue (ground floor), Oval Plaza (second floor), and Toranomon Hills Mori Tower
Source: Nagao, Daisuke. "森ビル長尾氏が語る虎ノ門ヒルズ開発と周辺エリアのこれから." CBRE, March 14, 2014. https://www.cbre-propertysearch.jp/article/office_macarthur_vol3/.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

National Government	**Tokyo Metropolitan Government**
・Designated Toranomon area as the UREAI and the National Strategic District to promote flexible urban development. ・Provided financial support (mezzanine loan) and tax relaxation for urban redevelopment projects.	・Proposed designating the area as part of the National Strategic District to promote its business and intermodal functions. ・Promoted urban redevelopment projects as an administrator of urban planning and development policies. ・Implemented Shintora Avenue.
UR	**Tokyo Metro (subway operator)**
・Coordinated several redevelopment projects in the area. ・Implemented the new subway station in coordination with local government and surrounding development projects. ・Acts as a secretariat of the area management council.	・Designed and constructed the new subway station entrusted by UR. ・Operates the subway and subway stations.
Private Developers	
・Planned, promoted, and implemented the urban redevelopment projects in coordination with national and local governments, local stakeholders, and the subway operator. ・Developed intermodal transfer and pedestrian facilities. ・Bore most of the construction costs of the new subway station. ・Participates in area management activities.	

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: In return for the bonus FAR, the urban redevelopment project plan required the developers to provide funds for constructing the new subway station. In addition, they developed transportation facilities such as elevated and underground walkways and a bus terminal, an independent district energy system, temporary evacuation centers, and emergency equipment for three days to enhance disaster preparedness.

Incentives for Private Developers: In return for public contributions, the floor area ratio (FAR) was relaxed, with the FAR increasing from 600% to 1450%–1990%, providing strong incentives for private sector investment and development.

Elevated walkway[1/]

Bus terminal[1/]

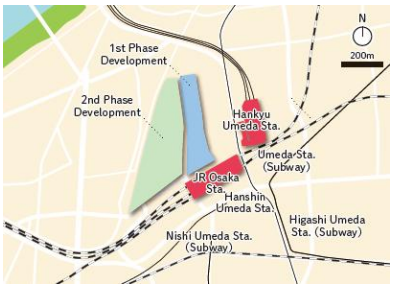
Station plaza (can be used as an evacuation center)[2/]

1/ Mori Building. « 虎ノ門ヒルズ ファクトブック 2023. »
https://www.mori.co.jp/projects/toranomonhills_area/toranomonhills_stationtower/img/fact_book.pdf

2/ JET

6) Large-scale Mixed-use Development of the Former Freight Station Site at Osaka Station North District (Umekita)

Key Words: *Long-term national projects, PPP, Area management*



Basic Information

Location: Osaka City, Osaka	No. of Stations: 6
Area Characteristic: CBD	Daily Ridership: 2.4 mil. for 7 sta.
Night-time Pop. (2020): 2.7 mil.[1/]	Project Area: 24 ha
Day-time Pop. (2020): 3.5 mil. [1/]	Main PIB: Osaka City, UR, JR, Private

1/ Osaka City

PROJECT BACKGROUND

Development Issues

(iv) **Urban Congestion**: Umekita faced overcrowding due to its central location and poor space planning for residents and commuters.

(v) **Underutilized Land**: Large areas around Osaka Station were underdeveloped.

(vi) **Lack of Integrated Transportation**: Disconnected transport networks hindered seamless movement.

(vii) **Environmental Sustainability**: There was a need for greener, energy-efficient development.

(viii) **Economic Revitalization**: The area needed revitalization to attract business growth.

(ix) **Social Infrastructure and Community Building**: The project aimed to improve infrastructure and foster community engagement.

Turning Points

(iii) **Osaka Station Redevelopment**: In the early 2000s, JR West began modernizing Osaka Station and surrounding infrastructure to handle increasing passenger demand.

(iv) **Osaka Urban Renaissance Strategy (2003)**: Osaka focused on revitalizing key urban areas, including Umekita.

(v) **Economic Pressures and Global Competitiveness**: Osaka needed to upgrade infrastructure to attract foreign investment, with Umekita's prime location offering an ideal redevelopment opportunity

(vi) **PPP Support (2007)**: The Japanese government supported PPP in driving large-scale redevelopment, enabling the Umekita TOD project.

Before Project (2004)

Project On-going (2023)

Source: https://www.ur-net.go.jp/produce/case/umekita/gallery/gallery_machi.html

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Long-term, Consistent National Support for Key Hubs:** Promote consistent, long-term projects for major transportation hubs and CBD stations at the national level, including approval from the national government, TOD priority area designation with regulatory easing and incentives, and support for urban infrastructure projects, and technical and financial assistance for LGUs.

(ii) **Advance Infrastructure Development with Public-Private Collaboration:** Prioritize infrastructure development and foster public-private partnerships, encouraging private sector contributions and incentives to improve urban infrastructure.

(iii) **Encourage Area Management by Stakeholders:** Promote effective area management by the private sector, landowners, and local communities to ensure sustainable development.

PROJECT OVERVIEW

The Umekita Project is a national-level initiative, with the area designated as an Urban Regeneration Emergency Improvement Area. This designation enabled various incentives, including regulatory easing, financial support, and streamlined project procedures.

The project was shaped through collaborative efforts, starting with Osaka City's International Concept Competition for District Development and the creation of the Town Planning Promotion Council. This collaboration involved the national government, Osaka Prefecture, Osaka City, and the business community working together to define the development vision.

The Basic Town Planning Plan guided the development concept, covering land use zoning, functions, and basic policies for the 24-hectare area. The plan is built around five key pillars: world-class gateway, vibrant pedestrian spaces, knowledge capital, public-private partnership, and a sustainable urban environment with water and greenery.

2002: Designation of Urban Regeneration Emergency Improvement Area (approx. 490 ha) and implementation of the International Concept Competition.

2004: Osaka City developed the overall concept and Basic Town Planning Plan for the northern Osaka Station area.

2004-2006: Urban planning for infrastructure facilities was approved, and land readjustment projects were authorized.

2006: Selection of developers for the 1st phase area by UR.

2010: Construction began in the 1st phase area.

2012: Establishment of the Town Management Organization (TMO).

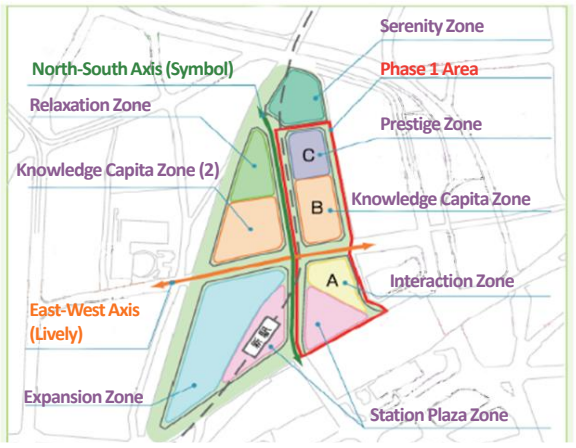
2013: Opening of the 1st phase area.

2015: Determination of the town development policies through private-sector dialogue.

2018: Selection of developers for the 2nd phase area.

2024: Partial opening (full completion expected by 2026).

Land Use Zoning

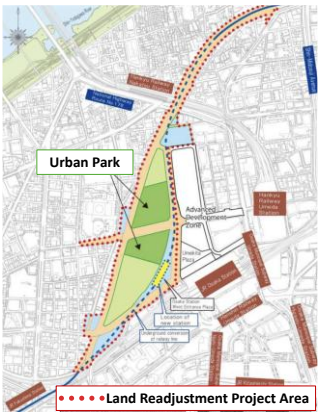


Source: JET based on "大阪駅北地区まちづくり基本計画", July 2004.
https://www.city.osaka.lg.jp/osakatokei/cmsfiles/contents/0000561/561440/a.pdf

TOD ELEMENTS

Land Readjustment

The land readjustment project was a key initiative to develop urban infrastructure and optimize land use in the redevelopment zone. It established essential infrastructure (roads, water supply, sewage systems, parks) and reorganized land ownership and zoning for efficient use. The UR Agency facilitated development through PPP, coordinated with stakeholders, and utilized early land acquisition and land value capture to generate revenue. The project also created public spaces, disaster risk reduction parks, green areas, and pedestrian-friendly networks for integrated development.



Source: Urban Renaissance Agency. "Invitation to Developers for Second Zone, Umekita Area," December 21, 2017. https://www.ur-net.go.jp/west/press/lrmhph000000dsxi-att/ur2017press_invitation-to-developers-for-secondzone-umekita-area.pdf.

New Underground Station

Source: UR都市機構. "うめきた 2 期区域（グラングリーン大阪）オープン！," September 6, 2024. https://maido-bob.osaka/2023/04/24/osaka-station-umekita/.

Access Improvement

The railway development by JR West has greatly improved transportation infrastructure and accessibility in the Umekita area. Portions of the JR lines were moved underground, and a new underground station (Osaka Station (Umekita Area) was constructed, seamlessly connecting to the existing Osaka Station for enhanced transfer convenience. This new station also improves connectivity to two international airports. Additionally, undergrounding the tracks has freed up surface land for parks, green spaces, and pedestrian-friendly areas.

Disaster Risk Reduction Park

Phase 2 district of the Umekita development includes creating an 8-ha urban park, with 4.5 ha designated as a disaster risk reduction park. The park will serve as a crucial multifunctional open space for the local community, offering both a recreational area and an emergency evacuation zone equipped with resilient infrastructure to support disaster management activities. In addition to the disaster prevention park, the remaining space within the district integrates green areas into the upper levels of buildings.

Umekita Park

Source: https://www.ur-net.go.jp/news/20240906_nishinihon_umekita.html

Cleaning Activity

Source: Wakimoto, Akiko. "街を育て持続的な発展を支える、梅田のエリアマネジメントとは" Grand Green Osaka, August 20, 2021. https://umekita.com/midori/features/osk_20210820_04/index.html.

Area Management

Real estate owners, including private companies, established a TMO and, through the establishment of the Business Improvement District system, manage the operation and maintenance of facilities using the contributions collected from property owners. The TMO oversees a variety of activities such as operating shuttle buses, providing rental bicycles, organizing events, maintaining open cafes, and managing pedestrian spaces to enhance the area's vibrancy and ensure its smooth daily functioning.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

National Government	**Osaka City Government**
・Designated Umekita as a key development area, enabling regulatory easing and financial support. ・Supported land readjustment and infrastructure with streamlined frameworks. ・Promoted PPPs through tax incentives and subsidies. ・Coordinated agencies to align with national planning and sustainability goals. ・Aimed to boost Japan's international competitiveness.	・Oversaw the urban planning and development policies for the area, including zoning and land use regulations. ・Led public-private collaboration and facilitated communication between different stakeholders. ・Played a key role in establishing the Town Planning Promotion Council and coordinated with the private sector and other governmental bodies.
UR Agency	
・Acted as the primary coordinator for the development of the land, including the acquisition of land and the implementation of land readjustment projects. ・Facilitated coordination among different agencies involved in the development. ・Led the creation of urban infrastructure and public amenities while managing land use and transportation integration.	
JR West (Railway Development)	**Private Sector Developers**
・Responsible for the railway infrastructure, including the undergrounding of tracks and the construction of the new station. ・Ensured seamless connectivity to the existing Osaka Station and improved access to key transportation hubs.	・Contributed to the development of commercial and residential buildings, including the integration of public areas. ・Invested in the development based on incentives in exchange for providing public contribution.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: The private sector made significant public contributions, including the integration of knowledge capital functions, the provision of open spaces and public areas, the development of pedestrian networks that separate pedestrians from vehicular traffic, and the creation and public access to mid-level garden spaces within buildings.

Incentives for Private Developer: In exchange for public contributions, the floor area ratio (FAR) was relaxed, increasing from 800% to 1600% and from 600% to 1150%, providing strong incentives for private sector investment and development.

Open Space[1/]

Knowledge Capital[2/]

Pedestrian Networks3/

Terrace Garden[4/]

1/ 全国まちなか広場研究会 "うめきた広場,"March 23, 2017. https://machinakahiroba.main.jp/2017/03/23/%E3%81%86%E3%82%81%E3%81%8D%E3%81%9F%E5%BA%83%E5%A0%B4/.
2/ Knowledge Capital. "グランフロント大阪　知的創造・交流の場「ナレッジキャピタル」6年間の成果を発表." PR TIMES, March 22, 2019. https://prtimes.jp/main/html/rd/p/000000129.000014551.html.
3/ 陽は西から昇る！ 関西のプロジェクト探訪. "グラングリーン大阪 「うめきた公園（サウスパーク、ノースパーク）」を南北に貫く「ひらめきの道」," October 21, 2024. http://building-pc.cocolog-nifty.com/map/2024/10/post-ad6f31.html.
4/ Re-urbanization -再都市化-. "グランフロント大阪開業特集-PART5（庭園）," May 1, 2013. https://saitoshika-west.com/blog-entry-1838.html.

7) Station Area Grand Design for Integrated Urban Development Projects (Nakano)

Key Words: *Overall planning, Integrated individual projects*

Basic Information

Location: Nakano City, Tokyo	No. of Stations: 1
Area Characteristic: Urban Neighborhood	Daily Ridership: 386,657 (2023)
Night-time Pop. (2020): 24,278[2]	Project Area: 110 ha[3]
Day-time Pop. (2020): 53,885[1]	Main PIB: Nakano City

PROJECT BACKGROUND

Development Issues

(i) **Lack of Commercial and Office Spaces**: Despite its strategic location as a transit hub, Nakano Station area lacked sufficient retail and business facilities to support economic growth.

(ii) **Inadequate Transportation Infrastructure**: The station area suffered from underdeveloped station facilities, plazas, and road networks, limiting accessibility and mobility.

(iii) **Disaster Vulnerability**: Rapid urbanization without sufficient infrastructure left the area exposed to natural disasters, necessitating improved resilience measures.

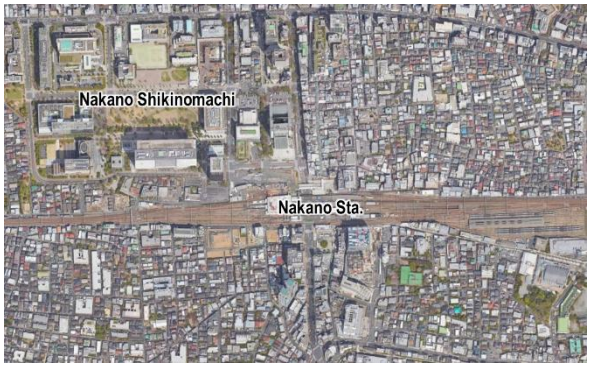
Turning Points

(i) **Nakano Station Area Urban Management Grand Design (2006–)**: In 2000, Nakano City, the Tokyo Metropolitan Government, and nearby cities initiated discussions on utilization of vacant land near Nakano Station following the relocation of the Police Academy. This led to the development of the Grand Design in 2006, with revisions in 2009 and 2012 to reflect evolving urban needs.

(ii) **Implementation of Individual Urban Redevelopment Projects (2014–)**: Bases on the Grand Design and relevant plans, more than ten urban development projects have been launched around Nakano Station. Urban planning decisions were made in 2014 for station plaza and facility development, two land readjustment projects, and one urban redevelopment project. These initiatives, expected to be completed from 2025 onwards, aim to enhance connectivity and urban vibrancy.

Before Project (1997)

After project (2022)



Source: Google Maps

[2] Nakano 1-chome, 2-chome, 3-chome, 4-chome, and 5-chome
[3] Coverage area of the Nakano Station Area Urban Management Grand Design Ver. 3

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Formulation of Overall Plan and Regular Updates:** A long-term vision for the station area should be developed with input from multiple stakeholders. The plan should cover the entire station area to ensure balanced, integrated development and undergo regular revisions to align with ongoing projects and urban dynamics.

(ii) **Coordinated Urban Redevelopment under Unified Concept:** When TOD requires multiple individual urban development projects, these must be harmonized to create a cohesive, mixed-use, and well-connected station area. A TOD concept plan can serve as a guiding framework to ensure consistency across projects.

PROJECT OVERVIEW

Nakano Station, located four kilometers from Shinjuku Station, the largest in Tokyo, serves as a cultural, business, civic, and commercial hub with two railway lines. The relocation of the Police Academy initiated discussions on comprehensive station area redevelopment. Guided by the concept of "an activity center that generates Tokyo's new energy," Nakano City has continuously updated the Grand Design, incorporating public, private, and academic stakeholders.

The latest Grand Design envisions the area as (i) an advanced business hub, (ii) a unique cultural hub, and (iii) a high-quality livable environment. Key urban planning themes include open spaces, disaster preparedness, pedestrian- and transit-oriented networks, green infrastructure, landscape enhancement, universal design, and place-making.

Based on this framework, over 10 urban redevelopment and land readjustment projects are currently underway, ensuring that developments remain coordinated and consistent despite being executed by different entities.

2000: Nakano City, the Tokyo Metropolitan Government, and the surrounding city started discussions on use of the vacant lot in front of Nakano Station

2006: The Grand Design Ver. 1 was formulated.

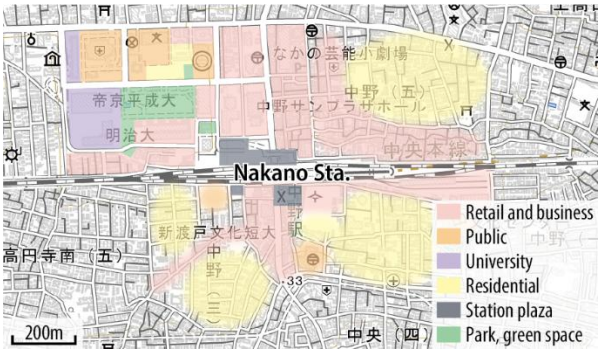
2009: The Grand Design Ver. 2 was formulated.

2012: The North Exit Station Plaza and the North-South Passageway were completed. Nakano Shikinomori Park was completed. The Grand Design Ver. 3 was formulated.

2014: Urban planning decisions were made for development of station plaza and station facility, and three urban development projects around the South Exit.

2015-: Urban planning decisions were made for more than 10 urban development projects in total.

Land Use Zoning

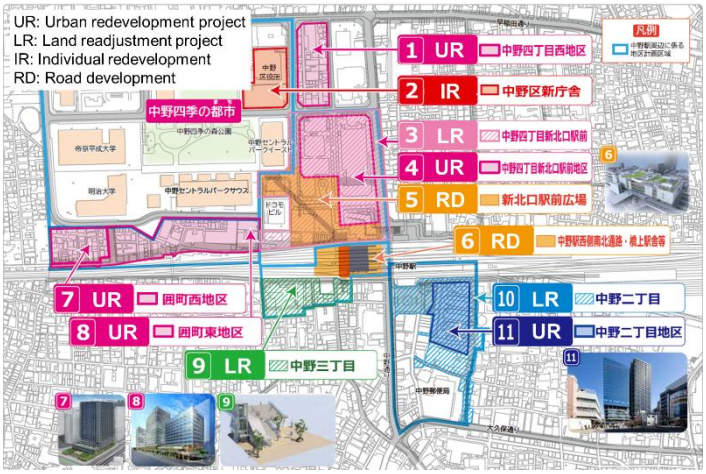


Source: JET based on Nakano City. "中野駅周辺まちづくりグランドデザイン Ver. 3" (Nakano Station Area Urban Development Grand Design Ver. 3)
https://www.city.tokyo-nakano.lg.jp/kusei/kousou/bunyabetsu/machizukuri/nakanoeki/gaiyo/granddesign.files/03005.pdf

TOD ELEMENTS

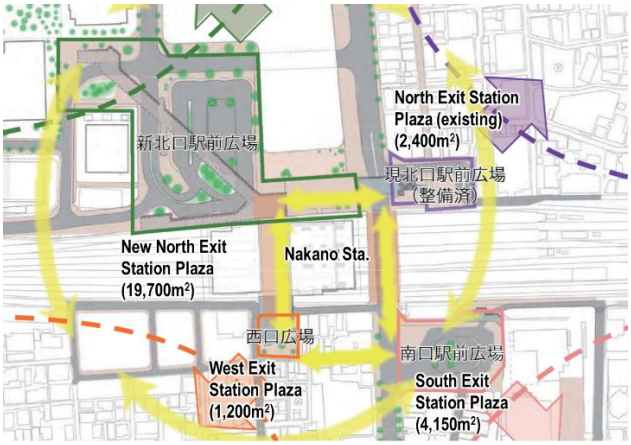
Urban Development Projects

As of 2024, 11 urban development projects are being implemented around Nakano Station under the Grand Design and relevant plans. Three land readjustment projects will provide efficient infrastructure to support new development, while five urban redevelopment projects will introduce residential, commercial, business, and cultural facilities. The station plaza and surrounding streets will also undergo strategic improvements.



Ongoing urban development projects around Nakano Station

Source: Nakano City. "中野駅周辺　まちづくり事業　一覧". https://www.city.tokyo-nakano.lg.jp/kusei/kousou/bunyabetsu/machizukuri/nakanoeki/gaiyo/nakanoekisyuhen.files/12_6jigyouichiran.pdf



Connected station plazas around Nakano Station.

Source: Nakano City. "中野駅駅前広場デザイン等方針" (Nakano Station Plaza Design Guidelines) https://www.city.tokyo-nakano.lg.jp/machizukuri/machizukuri/nakanoekisyuhen/ekimaehiroba.files/1.pdf

Station Plaza and Pedestrian Passages

The Grand Design includes the construction of four station plazas. The New North Exit Station Plaza and the South Exit Station Plaza will integrate seamlessly with adjacent urban redevelopment projects , creating a well-connected pedestrian network linking the plazas with Nakano Station.

Nakano Shikinomachi Area

Nakano City and private entities jointly purchased the former Police Academy site in 2001 , transforming it into a new mixed-use district known as Nakano Shikinomachi. The area now includes two office buildings, three university campuses, a hospital, a junior high school, and, in the future, a police station and the Nakano City Hall.

A 1.5-hectare, Nakano Shikinomori Park, serves as a key evacuation site in case of emergencies. While owned by Nakano City, the park is managed by private companies, leveraging public-private collaboration for effective maintenance.

Nakano Shikinomori Park

Source: Nakano Shikinomori Park. "Park guide". https://www.nakano-shikinomoripark.jp/about/

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Nakano City	Private companies
・Purchased the former Police Academy site for public facility development. ・Formulated the Grand Design and relevant plans in collaboration with public, private, and academic stakeholders. ・Approved urban development projects aligned with the Grand Design and relevant plans. ・Developed (or will develop) station plazas and pedestrian passages inside the station building. ・Established Nakano Shikinomori Park and retains ownership.	・Planned and implemented urban redevelopment and land readjustment projects based on the Grand Design and relevant plans. ・Manages Nakano Shikinomori Park under a public-private arrangement.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: Developers involved in urban redevelopment projects are required to provide public contributions based on specific lot characteristics. For example, in the Kakoicho West Urban Redevelopment Project (No. 7 in the above picture), the developer gained a 250% FAR bonus above the standard 300% by contributing 940 m^2 open spaces and 3m x 300m sidewalks. By entrusting private developers with park management, Nakano City reduces costs[4] while leveraging private-sector expertise.

Incentives for Private Developers: Most urban redevelopment projects have been undertaken by private developers under the urban redevelopment scheme. This framework allows developers to exceed regulated FAR limits in exchange for public contributions such as open spaces and pedestrian infrastructure. For park management, private developers entrusted by the city can gain revenue through management fees from the city, commercial events, filming permits, and rental fees for park facilities such as function rooms.

Open space to be provided in Kakoicho West[1/]

Events at Nakano Shikinomori Park (Nakano Oktoberfest) [2/]

1/ Association for Kakoicho West Urban Redevelopment Project. “Purpose”. https://kakoi-nishi.com/purpose/

2/ Nakano Central Park. “News & Event May 2019”. https://www.nakano-centralpark.jp/event/1888.html

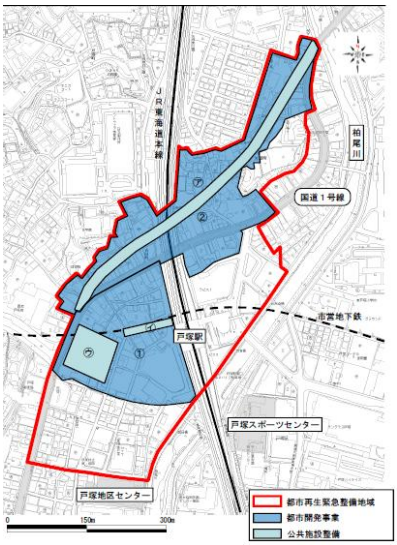
[4] At the time of public application for the park manager, the City announces the maximum amount of management consignment fee that the city can pay to the manager. This amount is usually lower than the management fee the city would have to pay to manage the park directly. In this way, the City can guarantee that the management consignment fee is lower than the management cost that the City would have to bear otherwise.

8) Comprehensive land readjustment and urban redevelopment projects (Totsuka)

Key Words: *Land Readjustment Project, Urban Redevelopment Project*

Basic Information

Location: Totsuka Ward, Yokohama City, Kanagawa	
Area Characteristic: Suburban Center	Daily Ridership: 98,000 (JR Line, 2023), 77,000 (Municipal Subway, 2022)
Night-time Pop. (2020): 283,709[5]	Project Area for Urban Development: app. 20ha (blue area in the map)
Day-time Pop. (2020): 242,516[1]	Main PIB: Yokohama City



Red: Urban Renewal Urgent Development Area
Blue: Urban Development Area (app. 20ha)
Light Blue: Public facility area

PROJECT BACKGROUND

Development Issues

(i) **Lack of Urban Functions as a Suburban Center:** Totsuka, a historically significant area, lacked the commercial, public, and recreational facilities necessary to function as a suburban center for Yokohama City. The area around the station was primarily occupied by factories and residential neighborhoods, which limited its appeal and economic activity

(ii) **Inconvenient Transfers:** Despite being a major transport hub with four railway lines and multiple bus routes, the station area suffered from inefficient transfer facilities. The at-grade railway further divided the district, creating accessibility challenges.

(iii) **Disaster Vulnerability:** Narrow streets and a high concentration of low-rise wooden houses increased the area's risk of fire and other disaster-related hazards.

Turning Points

(i) **Subway Development (1989):** Rapid urbanization and the construction of a new subway line highlighted the need for comprehensive urban renewal, particularly around the station area.

(ii) **Forrmulation of the Totsuka Ward Master Plan (2001):** The first master plan aimed to upgrade mixed-use urban functions while ensuring barrier-free access. This plan guided the implementation of urban redevelopment projects in the station area.

(iii) **Consensus Building through Long-term Dialogue:** To avoid top-down urban planning, Yokohama City engaged in extensive discussions with property owners and local stakeholders. A redevelopment committee was established to represent these groups, ensuring that the urban redevelopment project was implemented collaboratively.

Before Redevelopment Project (West Gate)

After Redevelopment Project (West Gate)

Source: Totsuka Ward Plan of Yokohama City Urban Planning Master Plan, 2018

[5] Population of Totsuka Ward, Yokohama City

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Enhancing Convenience through Mixed-Use urban Development:** By integrating commercial, public, and cultural facilities within the station area, the urban redevelopment project transformed Totsuka into a functional suburban center. A shopping mall, directly connected to the station via a pedestrian deck, was developed to improve accessibility.

(ii) **Strengthening Transport Hub Functions:** Station plazas and trunk roads were developed to facilitate seamless transfers. Additionally, railway tracks that previously divided the district were relocated underground or elevated to create a more cohesive urban environment.

(iii) **Consensus Building through Inclusive Planning:** Instead of forced relocation, property owners participated in a right conversion scheme, allowing them to maintain their commercial activities nearby the station while benefiting from improved disaster resilience in residential areas through upgraded road networks.

PROJECT OVERVIEW

Totsuka Station, originally established as an inn station along the historic Tokaido Highway, has evolved into a major transportation hub in southwestern Yokohama. It connects JR lines, municipal subway lines, and bus routes, serving as a critical transit center.

The project covered a 22-hectare area, designated as an urban planning district in 1962 for land readjustment.

In the Western District, an Urban Redevelopment Project was implemented to create a well-balanced, high-quality urban center with commercial and public services while strengthening its role as a transportation hub.

In the Central District in front of Totsuka Station, a Land Readjustment Project aimed to integrate the station's east and west sides by improving the trunk road network, eliminating bottlenecks at railway crossings, and developing an underpass and pedestrian bridge.

Land Readjustment Project of Totsuka Station-front District (original, amended later)

1962: City planning decision

(1) Urban Redevelopment Project of the East Gate Area of Totsuka Station

1982: Project approval → **1990:** Completion

(2) Urban Redevelopment Project of the West Gate Area of Totsuka Station

1994: City planning decision

1997: Project approval

2006: Approval of property management and disposal plan, selection of contractor, building demolition, operation of temporal shops, start construction

2010: Opening of commercial buildings and station plaza

2011: Start construction of public facility

2013: Opening of public facility

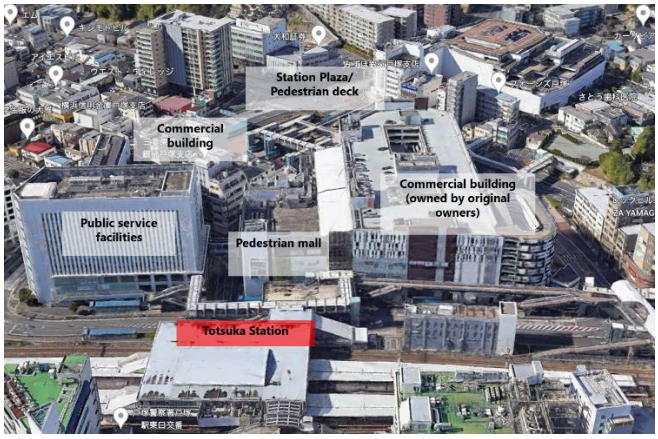
(3) Land Readjustment Project of the Central District of Totsuka Station

2002: City planning decision → **2002:** Project approval → **2019:** Completion

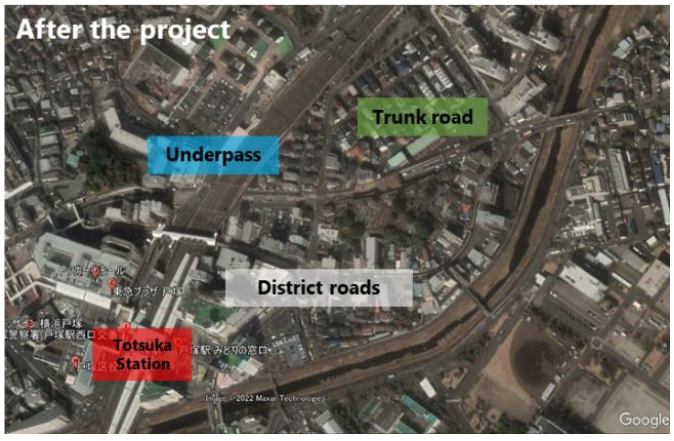
TOD ELEMENTS

Urban Redevelopment Project of the Western District

The 4.3-hectare Western District was fully redeveloped with a pedestrian deck, mall, a station plaza, commercial buildings, and public service facilities, including the ward office, a community center, a taxi and private vehicle drop-off zone, and parking facilities. A cooperative including property owners led the redevelopment, ensuring that businesses could continue operations within the new commercial buildings.



Source: JICA Project Team



Source: JICA Project Team

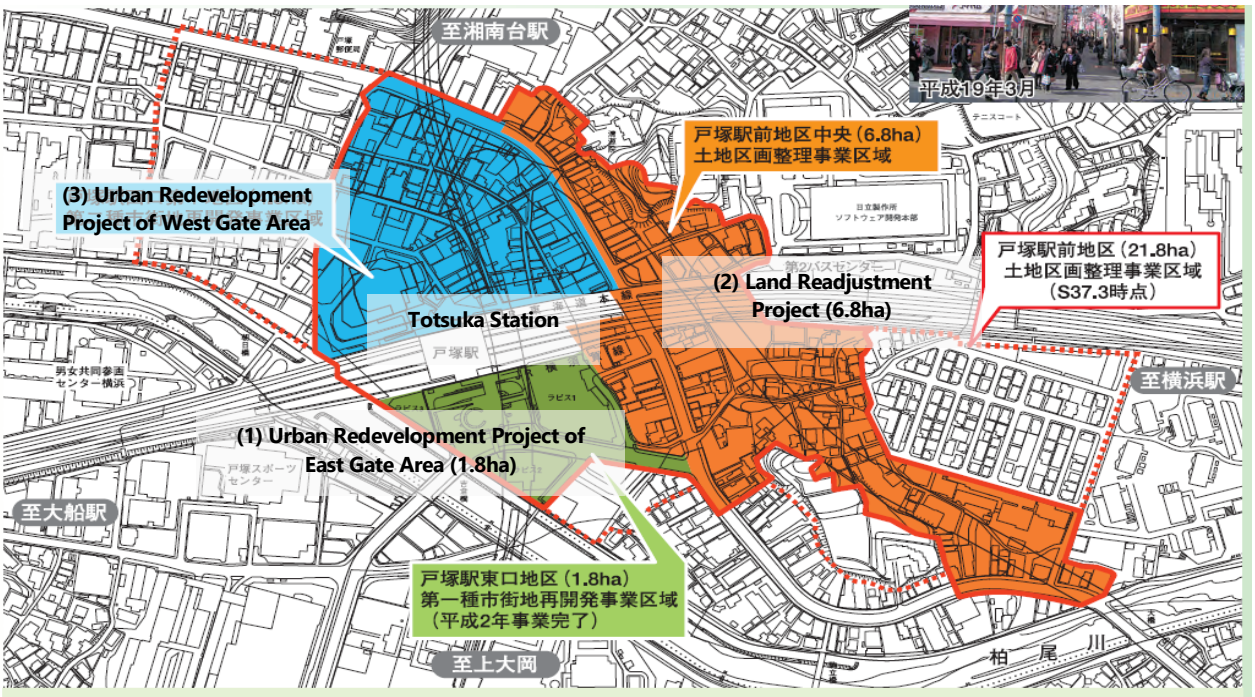
Land Readjustment Project of Central District

The 6.8-hectare Central District was redeveloped under a land readjustment scheme, consolidating land contributions from property owners to improve infrastructure and disaster resilience. A key feature was the removal of an at-grade railway crossing, replaced with an underground vehicle underpass and a pedestrian bridge to enhance connectivity. Additional district roads were also developed to improve access and disaster preparedness in residential areas.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Yokohama City Government	**Property Owners**
・Formulated Totsuka Ward Plan , guiding both the Land Readjustment and Urban Redevelopment projects. ・Purchased land within the Western District Urban Redevelopment project, enabling business owners to resettle in newly constructed buildings. ・Implemented and oversaw both the Land Readjustment and Urban Redevelopment projects. ・Conducted consultations and negotiated with property owners, adjusting project plans accordingly. ・Allocated city budgets for LR project. ・Constructed roads and the station plaza	・Agreed to participate in Land Readjustment and Urban Redevelopment projects (or opted for compensation and relocation if they declined). ・Established committees to represent property owners in both Land Readjustment and Urban Redevelopment projects. ・Temporarily relocated during construction and later returned to continue business or residential activities within the redeveloped district.
Mitsubishi HC Capital (for public facility)	**Tokyu Corporation (for UR project)**
・Selected through a Private Finance Initiative (PFI) framework to construct and operate public facilities for 17 years (2010–2027) on behalf of Yokohama City.	・Selected as the primary contractor for the Western District Urban Redevelopment Project, responsible for construction and operation of new commercial buildings.

Location Map of LR Project and UR Project



Source: JICA Expert Team based on the map of Project Brochure of Yokohama City

9) Pedestrian and Nature Oriented Urban Redevelopment (Futako Tamagawa)

Key Words: *Pedestrian-oriented district, Harmonization with nature, Town Management*

Basic Information

Location: Setagaya Ward, Tokyo	
Area Characteristic: Suburban Center	Daily Ridership:148,000 (2 lines, 2022)
Night-time Pop. (2020): 38,000[6]	Project Area: 11.2 ha (urban redevelopment project) + 6.3ha (park development project)
Day-time Pop.: 32,000	Main PIB: Private Company (Tokyu Corporation)

PROJECT BACKGROUND

Development Issues

(i) **Disparity in Regional Activities:** The west side of the station, where a department store was located, attracted high foot traffic, while the east side remained a quiet residential area dominated by detached houses, creating a stark contrast in vibrancy.

(ii) **Transit Inconvenience:** Despite its strategic location near a national highway and two urban railway lines connecting to Kanagawa Prefecture, inadequate road networks and transport facilities made transfers inconvenient for bus users commuting to areas beyond walking distance.

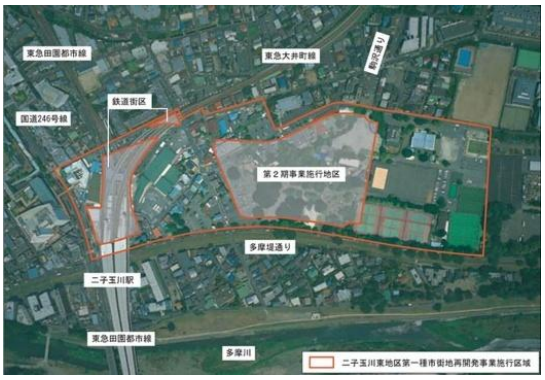
(iii) **Balancing Development with Natural Environment:** While the district benefited from a rich natural setting, it also faced disaster risks, including potential flooding from the adjacent Tama River, necessitating urban planning that prioritized both environmental preservation and disaster prevention.

Turning Points

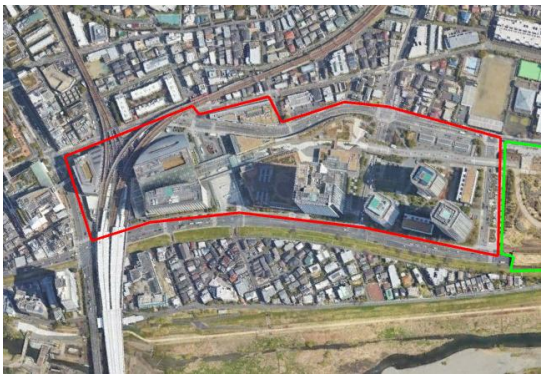
(i) **Incorporation of Residential Development (1990s):** Initially planned as a commercial and office district leveraging its proximity to central Tokyo (Shibuya Station within 15 minutes), the economic downturn of the 1990s led to a revision of the plan to include 1,000 residential units, responding to strong demand in the stable housing market.

(ii) **Phasing Development:** The project was divided into two phases, with the first phase prioritizing residential complexes, including resettlement units, and commercial buildings, ensuring early resettlement opportunities for original property owners.

Before Redevelopment Project



After Redevelopment Project



Source: https://www.rise.sc/whatsrise/plan/ (left), Google Map (right)

[6] Night time and day time population within 1km radius from Futako Tamagawa Station (source: https://gpt-realty.com/articles/stations/2755/)

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Separation of Pedestrian and Vehicular Traffic:** The creation of pedestrian-only spaces such as elevated decks and underground walkways enhances walkability and ensures safe, seamless connections across the development.

(ii) **Open Mall-type Facility Layout:** Arranging commercial and business facilities along pedestrian pathways creates an inviting atmosphere, integrating indoor and outdoor spaces and allowing for open plazas that support events and social interaction.

(iii) **Development of a Disaster Prevention Park:** A park adjacent to the station serves as a recreational space during normal times and a temporary evacuation site equipped with disaster prevention facilities for local residents and visitors.

PROJECT OVERVIEW

The Futako Tamagawa redevelopment transformed the area into a vibrant suburban center by integrating commercial, residential, and public spaces while preserving its natural surroundings. Initially planned as a commercial and office hub, the project was revised in the 1990s to include 1,000 residential units in response to market demand. The redevelopment was carried out in two phases, prioritizing resettlement and infrastructure improvements.

A pedestrian-friendly urban design was introduced, featuring elevated walkways, open-mall-style retail, and seamless station connectivity. Disaster resilience was enhanced with a multi-functional park serving as both a recreational space and an emergency evacuation site. The project was led by Tokyu Corporation in collaboration with local government and stakeholders. Town management initiatives, including events and branding, continue to ensure long-term vibrancy. Sustainability efforts earned the project a LEED ND Gold certification, with extensive green spaces covering 10,000 m², including 6,000 m² of rooftop greenery.

1957: Urban planning decision of park development
1969: Department store was opened at the west gate
1982: Establishment of local committee for urban development
2000: Urban planning decision of urban redevelopment project
2005: Approval of urban redevelopment project phase 1
2007: Launching urban redevelopment project
2008: Approval of park development project
2010: Approval of urban redevelopment project phase 2
2011: Opening of commercial and residential buildings (phase 1)
2013: Opening of Futako Tamagawa Park
2015: Opening of commercial and office buildings (phase 2)

Futako Tamagawa Station Area

Source: JET

Urban Redevelopment Project (Futako Tamagawa Rise)

Source: https://www.rise.sc/whatsrise/plan/

PROJECT COMPONENTS

Urban Planning and Regulations

The urban redevelopment plan aimed to strengthen commercial and business functions, improve transportation infrastructure, and integrate green spaces. The district plan included:

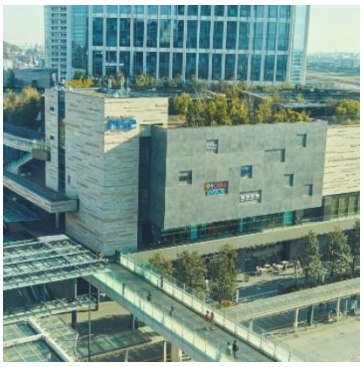
- Urban redevelopment projects (dash line): Guidelines for public facility development, building usage, and zoning regulations.
- Roads (blue): location, width, and extension
- Parks (green): location, area
- Zoning (pink): land use zoning

Urban Plan of Futako Tamagawa East District

Legend: Urban road, Park, Zoning amendment, urban redevelopment project area (dot line)

Source: Urban Plan of Setagaya City

Commercial (left) and Residential Buildings (right)



Source: JET

Mixed-use Development

The urban redevelopment project created a vibrant suburban hub featuring:

- Commercial facilities (Total floor area: ~72,600m^2)
- Offices (Total floor area: ~85,800 m^2)
- Residential units (~1,000 housing units)
- Bus terminal, hotel, etc.

Town Management and Environmental Integration

To ensure long-term sustainability and effective area management:

- The Futako Tamagawa Rise Council, composed of Tokyu Corporation and local associations, was established to oversee town management, branding, and event organization.
- Sustainability measures included earning the LEED ND Gold certification for environmental performance.
- Green spaces cover approximately 10,000 m², including 6,000 m² of rooftop greenery.

Town Management and Greening

Source: https://www.rise.sc/whatsrise/townmanagement/

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Tokyu Corporation (Railway Operator and Developer/Private Sector)

- Constructed and operates the Den-en-toshi Line and Oimachi Line.
- Coordinated with Setagaya City on redevelopment planning and public infrastructure provisions.
- Led Tamagawa East Area urban redevelopment project.
- Managed project execution in two phases (completed in 2011 and 2015)
- Established partnerships with local landowners to establish a committee and plan the area's long-term development.
- Continues town management through collaboration with local committees.

Property Owners

- Formed the urban redevelopment committee alongside Tokyu Corporation.
- Participated in discussions and planning of the redevelopment project.
- Established a town management committee to oversee district-wide initiatives and maintenance.

Setagaya Ward Government

- Formulated urban development policies and plans.
- Amended urban plans to accommodate redevelopment.
- Approved the district plan for urban redevelopment.

Tokyo Metropolitan Government

- Approved the urban redevelopment project plan.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: Under the district plan, Tokyu Corporation and other private developers invested in public spaces such as roads, pedestrian pathways, and plazas as part of the urban redevelopment initiative.

Incentives for Private Developers: Tokyu Corporation, as both the railway operator and developer, benefited from the project through:

- Enhanced station-area urban functions, attracting more commuters and visitors.
- Increased brand value and property value in the vicinity.
- Improved commercial viability of surrounding retail and office spaces.
- Higher railway ridership due to improved accessibility and amenities.

Galleria

Station Plaza

Well in the Park

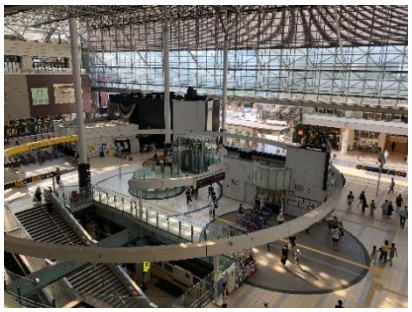
Source: JET

10) Integrated Development of Pedestrian Spaces and Urban facilities above the Railway (Tama Plaza)

Key Words: *District Plan, Elevated Walkway, Urban Development Agreement*

Basic Information

Location: Yokohama City, Kanagawa	
Area Characteristic: Suburban Neighborhood	Daily Ridership: 77,074 (2023)
Night-time Pop. (2020): 42,417[7]	Project Area: 5.1 ha
Day-time Pop. : N/A	Main PIB: Private Company（Tokyu Corporation）



PROJECT BACKGROUND

Development Issues

(iv) **Insufficient Transportation and Urban Functions as a Suburban Neighborhood Station:** The station lacks the necessary public transportation connectivity and urban functions expected of a suburban gateway station.

(v) **Separation of Urban Space by Railway Tracks and Land Terrain:** The railway tracks and elevation differences divided the area between the north and south of the station.

(vi) **Underutilized Land:** The land use remained underutilized or temporary due to its designation as a residential-use zone.

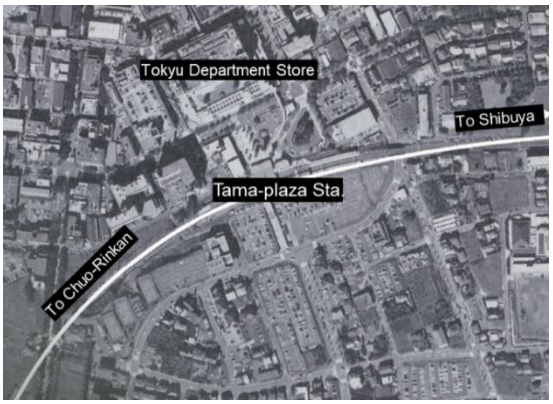
Turning Points

(iii) **Establishment of Stakeholder's Committee:** A committee was established in 1986 with the collaboration of the railway operator, landowners, and local government to discuss the future development of the area.

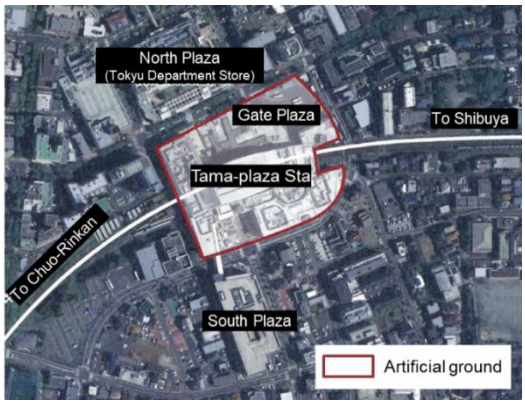
(iv) **Designation of District Plan:** After 16 years of discussions within the committee, the district plan was finalized in 2002, with residential zones converted into commercial areas.

(v) **Formulation of Urban Development Agreement:** After the designation of a district plan, urban development agreement was created as complementary agreements, aiming to create attractive streetscapes. Based on this agreement, developments around the station are discussed by a committee composed of landowners and local authorities.

Before Redevelopment Project



After Redevelopment Project



Source: Station City Integrated Development - Attraction of TOD46 (Shinkenchiku-sha Co., Ltd., 2019)

[7] Utsukushigaoka and Shin-Ishikawa, Aoba Ward, Yokohama City

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(iv) **Connecting the Station Area across the Railway:** Construct passageways and commercial facilities above the tracks to link the surrounding area, which was divided by the ground-level railways like the Philippine National Railways.

(v) **Stakeholder Collaboration:** The railway operator, landowners, and local authorities collaborate over a long duration to operate the committee and discuss the future direction of urban development.

(vi) **Community-driven Urban Development Agreement:** Lead to a community-driven approach in shaping the cityscape by a committee of landowners.

PROJECT OVERVIEW

Tama-Plaza Station serves as a key suburban hub on the Tokyu Den-en-toshi Line. Even after 20 years since its opening, despite being a key station on the line, the southern side of the station remained designated as a residential zone, leading to underutilization and temporary land use.

After discussions with the railway operator, landowners, and the local government, the zoning regulations were revised, and the “Tama-Plaza Station Area District Plan” was formulated in 2002. Additionally, as complementary, the "Tama Plaza Station Area Urban Development Agreement " were established and are implemented by a committee composed of landowners and local government.

To eliminate the division between the north and south sides of the station caused by the railway and address the approximately 8-meter elevation difference, a 3-hectare artificial ground was constructed over the railway facilities incorporating pedestrian spaces and commercial facilities. This improvement enabled seamless connectivity around the station.

1966: The Tokyu Den-en-toshi Line was constructed, and Tama-Plaza Station was opened.

1966-1986: 20 years after its opening, despite being a key station on the Tokyu Den-en-toshi Line, the area in front of the station remained designated as a residential zone, resulting in continued underutilization and temporary land use.

1986: A committee was established to promote the formulation of the district plan through collaboration between the railway operator, landowners, and the local government.

2002: The district plan around the station was designated, converting some residential zones into commercial areas.

2002-: Urban development agreement was established as complementary agreement and managed by a committee composed of landowners.

2004: The redevelopment project began the construction of 3 ha artificial ground over railway facilities.

2010: Opening of the new station facilities

Redevelopment Area

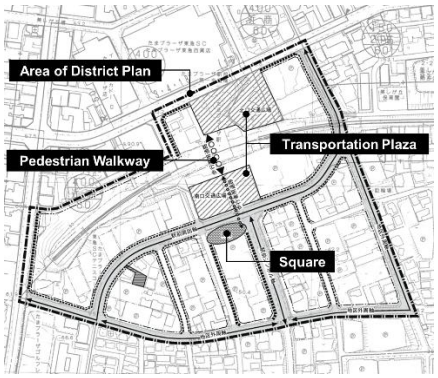
Source: MLIT. “たまプラーザ駅.” https://www.mlit.go.jp/toshi/content/001351576.pdf

TOD ELEMENTS

District Plan

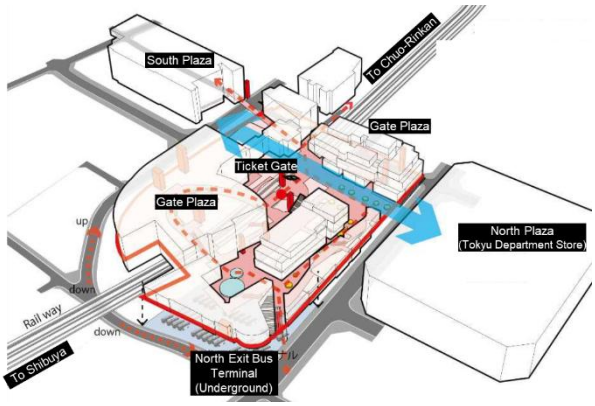
The "Tama-Plaza Station Area District Plan" was established in 2002 to enhance the urban environment around Tama-Plaza Station and strengthen its role as a regional hub. Stakeholders formed a committee and collaborated to promote the formulation of the district plan. Previously, the southern area of the station was designated as a residential zone. However, a part of it was reclassified as a commercial area, creating a district that facilitates connectivity between the north and south sides.

District Plan



Source: JET based on Tama-Plaza Station Area District Plan

Elevated Walkway Diagram

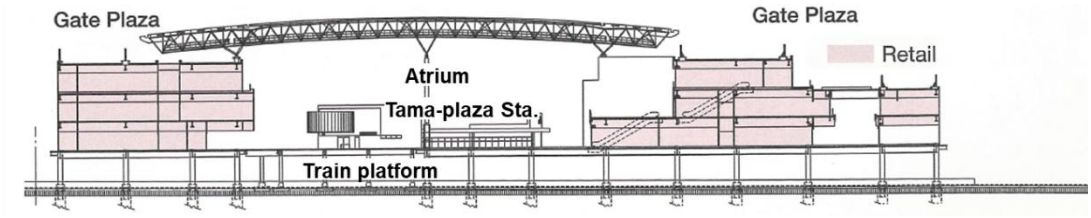


Source: Station City Integrated Development - Attraction of TOD46 (Shinkenchiku-sha Co., Ltd., 2019)

Elevated Walkway with Commercial and Transportation Facilities

An elevated walkway was constructed utilizing the space above railway by integrating passageways, public spaces, commercial facilities, and an underground transportation plaza with the railway infrastructure. This development established essential urban functions around the station, unifying and revitalizing the north and south areas divided by the railway tracks.

Cross Section

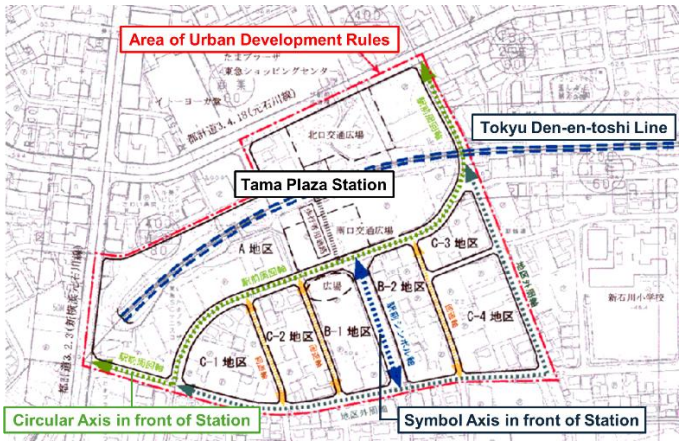


Source: Station City Integrated Development - Attraction of TOD46 (Shinkenchiku-sha Co., Ltd., 2019)

Urban Development Agreement

The "Tama Plaza Station Area Urban Development Agreement" were established to supplement the district plan and enhance the urban environment of the area. This agreement stipulate development principles regarding the location of plazas, building forms, greenery, streetscapes, and parking in the area surrounding the station.

Urban Development Agreement



Source: JET based on Tama-Plaza Station Area Urban Development Agreement

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Tokyu Corporation (Railway Development/Private Sector)

- Constructed the Den-en-toshi Line and opened Tama-Plaza Station in 1966.
- Collaborated with local landowners to form the committee and initiate discussions on the future development of the Tama-Plaza Station area.
- Began the station redevelopment in 2004.
- Completed the station redevelopment in 2010, enhancing essential urban functions such as commercial and transportation facilities, and integrating the north and south sides of the station, previously divided by railway tracks.
- Developed an urban planning framework for areas around Den-en-toshi Line stations in 2020. The plan for Tama-Plaza Station emphasizes creating a hub for vibrancy and interaction, focusing on securing access from the station plaza and roads, and preventing the overlapping of pedestrian and vehicle movement.

Stakeholder's Committee	**Yokohama City Government**
・Composed of railway operators and local landowners ・Led discussions on the future development of the Tama-Plaza Station area. ・Engaged in consultations with Yokohama City to formulate the district plan. ・Created and operated urban development agreement led by landowners to complement the district plan.	・Engaged in continuous discussions with the committee, resulting in zoning changes and the formulation of the district plan. ・Develop roads and open spaces based on the district plan. ・Review compliance with the district plan when urban developments are proposed within the Tama-Plaza Station area.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: Based on the district plan, private sectors, including Tokyu Corporation, developed public spaces such as roads, pedestrian pathways, and plazas.

Incentives for Private Developers: The redevelopment of Tama-Plaza Station was carried out primarily by Tokyu Corporation, the railway operator and developer. For the railway operator, enhancing urban functions around the station, improving convenience, and upgrading the urban environment provide incentives such as increased brand value, higher real estate value around the station, greater attraction to commercial facilities, and an increase in railway users.

Atrium

Transportation Square

Station Plaza with Mall

Source: JET

11) Suburban Hub for Smart City Development through Public-Private-Academic Collaboration (Kashiwa-no-ha Campus)

Key Words: *Public-Private-Academic Collaboration, Urban Design and Management, Smart City*

Basic Information

Location: Kashiwa City, Chiba	Area Characteristic: Suburban Center
Night-time Pop. (2019): 9,000 (planned pop.: 26,000)	Daily Ridership: 18,724 (2023)
Day-time Pop.: N/A	Project Area: 272.9ha
Main PIB: Chiba Prefecture, Kashiwa City, UR, Universities, Private developer	

Source: https://www.city.kashiwa.lg.jp/hokubuseibi/nishiguchi.html

PROJECT BACKGROUND

Development Issues

(i) **Underutilized Land:** The area was previously occupied by a U.S. military camp and a golf course, with the surrounding land primarily consisting of agricultural fields and vast undeveloped areas.

(ii) **Limited Transportation Access:** Inadequate public transportation infrastructure led to a reliance on private vehicles , reducing mobility and accessibility.

(iii) **Lack of Industrial Growth Foundation:** The area had a low concentration of industries and businesses, lacking an environment conducive to economic development.

(iv) **Environment Consideration:** Development needed to balance urbanization with environmental sustainability, preserving the surrounding natural landscape.

Turning Points

(i) **Opening of the Tsukuba Express (TX) (2005):** The introduction of TX significantly improved connectivity, making Kashiwa-no-ha Campus Station a vital link between central Tokyo and surrounding suburban areas.

(ii) **Formulation of the "Kashiwa-no-ha International Campus Town Initiative" (2008):** A framework for collaborative urban development was established, bringing together public, private, and academic stakeholders.

Before Project (before 2000)

After Project (2025)

Source: https://www.city.kashiwa.lg.jp/hokubuseibi/shiseijoho/keikaku/machizukuri/hokubu/shinchoku.html

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Integrated Suburban TOD with Railway Infrastructure: TOD with Railway Infrastructure**: Ensure that suburban centers integrate transport, residential, commercial, and research functions, enhancing accessibility and economic vitality.

(ii) **Fostering Industrial Cluster along the Railway Corridor:** Develop station areas as a hubs for technology and research, leveraging railway corridors for economic growth.

(iii) **Public-Private-Academic Collaboration:** Establish organizations that coordinate urban development, manage public spaces, and engage communities in planning and decision-making.

PROJECT OVERVIEW

Since the opening of TX in 2005, urban development along the railway corridor has been systematically integrated with transport infrastructure and residential expansion. Kashiwa-no-ha Campus Station, located at the center of the TX line, has been developed as a suburban hub that connects central Tokyo with surrounding areas.

Located approximately 30 kilometers from central Tokyo, with a direct 30-minute rail connection, the area is being transformed into a mixed-use suburban center with residential, office, and commercial facilities. Positioned between Tsukuba Science City, known for its concentration of research institutions, and Akihabara, a hub for technology and innovation, Kashiwa-no-ha Campus is emerging as a key location for fostering advanced research, business, and technology-driven industries.

Urban development in the area is being carried out through public-private-academic collaboration, leveraging the presence of universities, research facilities, and major private enterprises. This collaboration is driving the Kashiwa-no-ha Smart City initiative, which promotes cutting-edge urban development concepts, including smart mobility, AI-driven urban design, and renewable energy integration.

1979: Return of U.S. Army Camp Tomlinson to the Japanese Government

1989: Enactment of the Housing and Railroad Law

2000: Decision of Integrated Land Readjustment Project for the Kashiwa Northern Central District

2001: Closure of Kashiwa Golf Club

2005: Opening of the Tsukuba Express line.

2006: Opening of commercial facilities and the Kashiwa-no-ha Urban Design Center on the west side of the station.

2008: Formulation of the “Kashiwa-no-ha International Campus Town Initiative”.

2014: Opening of the Kashiwa-no-ha Campus Station Satellite and Kashiwa-no-ha Open Innovation Lab (KOIL)

2017: Opening of the Kashiwa-no-ha T-SITE and Aqua Terrace (commercial complex and public open space)

Kashiwa-no-ha Station Area

Source: https://www.ur-net.go.jp/overseas/AseanSmartCityNetwork/lrmhph0000015tvv-att/9kashiwanoha.pdf

TOD ELEMENTS

Urban Development Leveraging New Rail Infrastructure

Kashiwa-no-ha Campus Station, centrally located along TX line, provides seamless access to central Tokyo. The station area has been developed as a walkable, mixed-use district, integrating residential, commercial, and business facilities within proximity.

Leveraging its strategic position near Tsukuba Science City and other hubs of venture companies and research institutions, the area has emerged as a center for innovation and technology. Institutions such as The University of Tokyo and Chiba University have played a key role in fostering research collaboration and industry partnerships.

The development of the TX railway line has simultaneously enhanced the residential environment while catalyzing economic activity, making Kashiwa-no-ha a model TOD driven by rail infrastructure and knowledge-based industries.

Tsukuba Express Corridor

Source: https://www.ur-net.go.jp/takuchi/archive/case/tsukuba.html

Autonomous Bus

Source: https://www.udck.jp/projects/Autonomous_buses

Kashiwa-no-ha Smart City

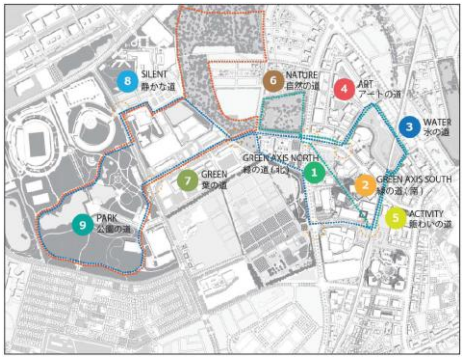
The Urban Design Center Kashiwa-no-ha (UDCK) leads smart city development through public-private-academic collaboration. Key initiatives include autonomous buses using AI and IoT, human flow-based urban design, and fostering innovation ecosystems. Under the theme "New Industry Creation," it supports startups and businesses in developing sustainable, technology-driven urban solutions.

Walkable Design Around the Station

The Kashiwa-no-ha International Campus Town Initiative was developed through collaboration among public sectors, private companies, and academia, aiming to establish an international academic research city and a next-generation environmental city.

A key objective of this initiative is to create a healthy and pedestrian-friendly urban environment. To achieve this, various walkability-focused improvements are being actively implemented around the station.

Walking Route Around the Station



Source: Kashiwa-no-ha Walkable Design Guideline (UDCK)

Aqua Terrace (Retention Pond)

Source: https://www.city.kashiwa.lg.jp/hokubuseibi/aquaterrace.html

Creation and Management of High-quality Urban Space

The Kashiwa-no-ha Urban Design Strategy was developed as a unified guideline for urban space planning and environmental design to support the Kashiwa-no-ha International Campus Initiative.

Following this strategy, the town management organization plays a key role in enhancing public spaces, such as the station area and retention pond, while also overseeing area management and coordinating community events.

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

Chiba Prefecture Government ・ Formulated land-use plans and implements land readjustment. ・ Supports smart city initiatives, focusing on renewable energy and urban planning.	**Kashiwa City Government** ・ Provides essential public services (education, welfare, healthcare). ・ Establishes urban development regulations and guidelines. ・ Develops policies and subsidies for smart city initiatives.
Urban Renaissance Agency (UR) ・ Leads land redevelopment and infrastructure improvements. ・ Supplies and manages rental housing. ・ Coordinates with private developers. ・ Collaborates with private firms to implement an Area Energy Management System (AEMS).	**Universities (The Univ. of Tokyo, Chiba Univ.)** ・ Act as research and development hubs for cutting-edge technology. ・ Conduct smart city demonstration projects. ・ Support startups and collaborate with local stakeholders.
Urban Design Center Kashiwa-no-ha (UDCK) ・ Facilitates collaboration between government, academia, and private sectors. ・ Develops urban design strategies and manages public spaces. ・ Promotes community engagement and participatory planning.	**Private Developers** ・ Construct and operate commercial, office, and residential facilities. ・ Attract businesses and investment to the area. ・ Implement renewable energy solutions and smart infrastructure. ・ Manage facilities to enhance area appeal.

PUBLIC INFRASTRUCTRUE DEVELOPMENT BY PRIVATE SECTOR

Private Sector Investment: Private companies contribute to public infrastructure by integrating smart city technologies, enhancing transportation infrastructure, supporting economic growth through innovation labs, creating public spaces, and enhancing education and healthcare facilities.

Incentives for Private Developer: The development of Kashiwa-no-ha Campus Station offers private investors tax benefits, deregulation opportunities, and priority business incentives under sustainable urban development and public-private collaboration policies.

UDCK | Aqua Terrace | Commercial Facility | Residence



Source: https://www.mitsuifudosan.co.jp/business/development/kashiwanoha/

12) Suburban Railway Development with TOD (Nagareyama Ohtaka no Mori)

Key Words: *Land readjustment project with railway development, City promotion*

Basic Information

Location: Nagareyama City, Chiba	
Area Characteristic: Suburban Neighborhood	Daily Ridership: 41,000 (2023)
Planned Night-time Pop.: 28,600	Project Area of LR: 275 ha
Day-time Pop.: N/A	Main PIB: UR

PROJECT BACKGROUND

Development Issues

(i) **Lack of Basic Infrastructure:** Roads and sewage systems were underdeveloped, while scattered small-scale developments contributed to urban inefficiencies. Domestic wastewater discharge also led to river flooding.

(ii) **New Suburban Center with the Railway Development:** Alongside the existing JR line, the introduction of a new railway station and trunk road network was necessary to establish a well-planned suburban center.

(iii) **Environmental Preservation Needs:** The area, primarily composed of paddy fields and forests, was home to endangered species such as the goshawk. Unregulated development threatened the local ecosystem.

Turning Points

(i) **Enactment of Housing and Railway Act (1989):** This law provided a legal framework for local governments to integrate residential land development with railway construction.

(ii) **Formulation of TX Coordination Committee (1990):** Chiba Prefecture, Kashiwa City, Nagareyama City, and UR formed a committee to develop a Basic Plan integrated with TX. Nagareyama City requested UR to implement a land readjustment project.

(iii) **Environmental and Disaster Preparedness Measures:** Following an environmental assessment, a forest area was preserved within the land readjustment project, integrating urban parks to enhance resilience.

Before LR Project

After LR Project

Source: Nagareyama Ohtaka no Mori LR Project Brochure, UR

POSSIBLE LESSONS LEARNED FOR THE PHILIPPINES

(i) **Integrated Land Use and Transport Planning with Railway Development:** Urban railway alignment and station locations should be incorporated into local plans to ensure compact, efficient, and well-connected station areas with mixed-use zoning and intermodal facilities.

(ii) **Development of Public Facility for Sustainable Urban Growth:** Schools, hospitals, and other essential public services must be planned alongside TOD projects to support long-term livability and urban management.

(iii) **Consensus Building with Property Owners:** Land readjustment principles, including right conversion, facilitate onsite resettlement with equivalent land value exchange.

PROJECT OVERVIEW

The project aimed to create a "new center of Nagareyama" centered around the newly developed Nagareyama Otakanomori Station, forming a transit-oriented suburban hub integrating residential, commercial, and public facilities.

A 7.9 km-long TX railway line was planned to traverse the city, serving as a catalyst for structured urban development. Covering approximately 638 hectares, the project integrated a land readjustment scheme to establish a well-connected and sustainable community.

UR commenced land pre-purchase in 1993 to secure space for the TX railway, station area, and public infrastructure. TX opened in 2005, significantly improving accessibility to the Tokyo metropolitan area. The land readjustment project, approved in 2000, was completed in 2019 after 11 amendments to accommodate evolving urban needs and ensure a well-balanced development approach.

1985: Announcement of TX construction by Transport Policy Committee

1989: Enactment of “Act for Integrated Railway and Housing Development”1)

1991: Establishment of railway company (invested by 16 local governments)

1992: Start railway construction

1993: Start land purchase

1997: Start new town development

1998: Urban planning decision of Land Readjustment project

2000: Approval of Land Readjustment Project

2005: Railway operation

2019: Completion of land readjustment project

2021: Completion of new town development

Station Area after 1year of TX opening

Source: Nagareyama Ohtaka no Mori LR Project Brochure, UR

Station and Pedestrian Plaza

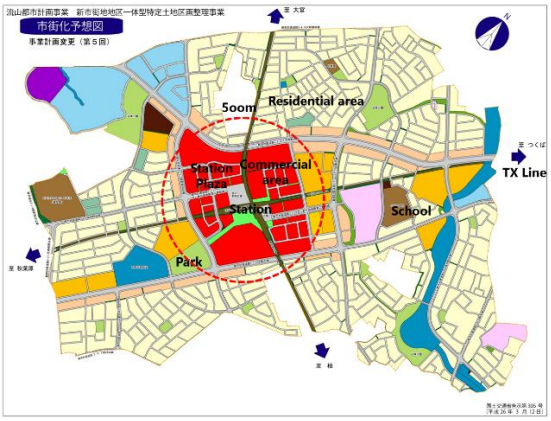
Source: Nagareyama Ohtaka no Mori LR Project Brochure, UR

TOD ELEMENTS

Land Use Plan

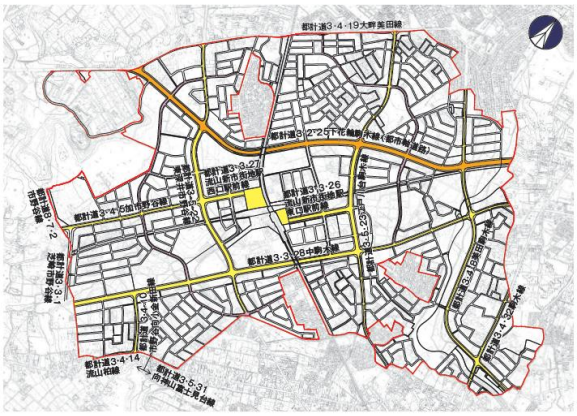
The "new Nagareyama hub" was planned around the station with a 500m-radius commercial district (center district), roadside business areas, and surrounding residential zones with parks and schools. Public land accounts for 32.5% of the area, ensuring balanced urban growth. The plan integrates mixed-use development, transit access, and environmental preservation to create a vibrant, well-connected suburban center.

Land Use Plan



Source: Land Use Plan, Nagareyama City

Road Network Map



Legend: Trunk Road District Road Access Road

East Gate Station Plaza

Source: Nagareyama Ohtaka no Mori LR Project Brochure, UR

Public Facility Plan

A hierarchical road network was developed, including trunk roads, district roads, and local access roads.

Station plazas were constructed at both the east and west station gates, while north and south pedestrian plazas were designed for public amenities and events.

Various parks were integrated to support community engagement, environmental sustainability, and disaster resilience.

New schools were developed with multi-purpose functions, integrating libraries, community centers, and emergency storage facilities.

Mixed-use Development

A large-scale commercial facility was strategically developed between the station plaza, park, and residential areas to create an attractive center district. A pedestrian bridge was built to connect the TX station with the commercial facility, ensuring seamless access for both passengers and local residents.

Commercial Facility connected with Pedestrian Bridge

Source: Nagareyama Ohtaka no Mori LR Project Brochure, UR

ROLE-SHARING AMONG PROJECT IMPLEMENTION BODY (PIB)

UR (Land Readjustment implementing body) ・ Implemented the land readjustment project. ・ Conducted consultation meetings with property owners to build consensus. ・ Formulated the right conversion plan. ・ Developed public facilities as part of the land readjustment project.	**Nagareyama City Government** ・ Developed urban plans, including land use and public facility plans. ・ Requested UR to implement the land readjustment project ・ Issued project approvals for land readjustment. ・ Coordinated with UR for project implementation. ・ Constructed public facilities and promoted the city's branding.
Land Readjustment Council ・ Established by property owners and academic advisers to discuss project details, including temporary relocations and reserved public-use lands. ・ Selected land appraisers (real estate appraisers, local bank, Legal Affairs Bureau, City Government) to ensure fair land value assessments.	**Property Owners** ・ Agreed to participate in the land readjustment project or opted for relocation with compensation. ・ Took part in consultation meetings to address project-related issues. ・ Received new land parcels equivalent in value to their pre-project holdings while contributing portions of land for public infrastructure.

PUBLIC INFRASTRUCTURE DEVELOPMENT BY PRIVATE SECTOR

City-owned land utilization project: Nagareyama City initiated a PPP project to develop 1 hectare of city-owned land near the station for public and commercial purposes.

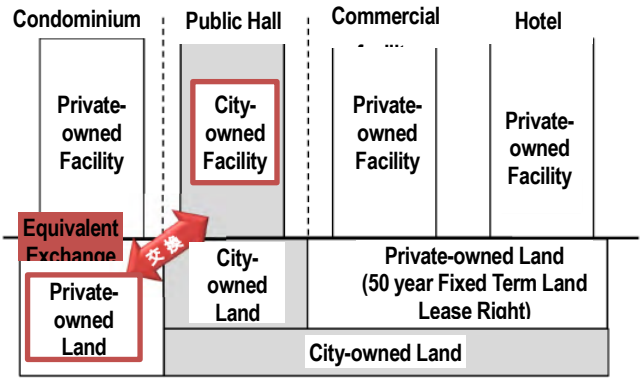
Private Sector Investment: A private company was selected through a bidding process to develop public facilities (multi-purpose hall and civic center), a hotel, commercial spaces, and condominiums.

Incentives for Private Developer: In exchange for developing public facilities such as a multipurpose hall and civic center, developers were allowed to construct profit-generating condominiums, hotels, and commercial facilities. This arrangement reduced development risks, ensured stable long-term revenue, and generated approximately JPY 732 million in rental income for the city.

Mixed-use Facility (1: public hall, 2: hotel and commercial, 3: condominium)

Source: website of STARRTS

Facility Section Image



Source: Project Profile of Nagareyama City

Appendix B

Preliminary TIA

for TOD Conceptual Plan for BGC Station Area

1 INTRODUCTION

1) Objectives

The main objective of the preliminary traffic impact assessment (TIA) is to evaluate the impact to the quality of road operations of redeveloping the Market! Market! area into a TOD and the opening of the MMSP BGC station when the MMSP commences operations in 2029. Furthermore, it also aims to come up with the minimum modal shift to rail to mitigate and slow down the deterioration of road level of service in the BGC area. Specifically, this will be done by estimating the number of vehicle trips generated by the Market! Market! redevelopment and the MMSP BGC station and their impact on the quality of roads operation in target intersections within the BGC area, and the required modal shift to mitigate or slowdown said impact.

2) Scope of Work

As a preliminary undertaking, this TIA will consider intersections as the level of analysis. This means that the evaluation of impacts to vehicle traffic from the Market! Market! redevelopment and MMSP operations will be viewed from a summarized measure of all roads within an intersection rather than a measure of each road/lane and direction. The time frame for the preliminary TIA is from 2023 to 2040. This is further divided into a short-term period, 2023 to 2030, and mid- to long-term period, 2030 to 2040.

3) Impact Area

The impact area covered in this TIA consists of the major intersections that are also the major entry points to BGC. This area is roughly within the 1-2km radius to the west of Market! Market! Also included are the four (4) intersections immediately around the Market! Market!. Due to C5 currently separating and limiting access to the BGC area from the east, the area 1-2 km from Market! Market! to the east was excluded in the TIA.

2 TRANSPORTATION SURVEY

As part of TODCUP, a transportation survey was conducted from March to May 2023 to provide an overview and understanding of the current transportation demand characteristics of the target areas.

The transportation survey consists of five (5) survey types.

1. Traffic Volume Count and Pedestrian Count Surveys,
2. Roadside Interview Survey,
3. Traffic Generation Survey,
4. Public Utility Vehicle (PUV) Routes, Stop and Ridership Survey, and
5. PUV Terminal Survey.

All surveys were conducted on one (1) weekday within Tuesday, Wednesday, and Thursday for fourteen (14) hours from 6:00 AM to 8:00 PM. In addition, one (1) weekend survey was also conducted in the Traffic Generation Survey with the same time period for two (2) commercial establishments, namely Market! Market! and Uptown Mall.

For this preliminary TIA, only the Traffic Volume Count and Pedestrian Count Survey, the Traffic Generation Survey, and the PUV surveys are utilized. The traffic count and pedestrian surveys aim to tally the number of vehicles by type, and pedestrians, respectively. The traffic count and pedestrian surveys were conducted on one (1) weekday within Tuesday, Wednesday, and Thursday for fourteen (14) hours from 6:00 AM to 8:00 PM. Surveyors conducted manual counts of vehicles and pedestrians at survey stations every fifteen (15) minutes, counting by vehicle type and by direction. The types of vehicles considered are as follows:

1. Private car, SUV, Van, Taxi
2. Jeepney
3. UV Express
4. Bus (ordinary/aircon, coaster, e-bus)
5. Trucks (delivery jeepney/elf/rigid/trailer)
6. Tricycle/e-trike
7. Motorcycle
8. Bicycle/scooter/non-motorized vehicles, and
9. Others (firetruck, police mobile, ambulance, etc.)

The traffic generation survey is targeted at establishments/buildings identified as traffic generators a priori. The survey accounts for vehicles entering and exiting the access gates of the target establishment/buildings. The target vehicle types are the same as in the traffic count survey. The traffic generation survey was also conducted on one (1) weekday within Tuesday, Wednesday, and Thursday for fourteen (14) hours from 6:00 AM to 8:00 PM. Surveyors will count vehicles entering and exiting the access gates of the target establishment/buildings, counting by vehicle type and by direction (inbound or outbound). Tallies are summarized every 15 minutes.

For more information on the transportation survey, please refer to the Transportation Survey Report prepared separately for the same project.

3 METHODOLOGY

The approach taken starts with determining the baseline traffic condition in the target impact area using traffic count data collected from the transportation survey. At the same time, the forecasted/proposed layout for the Market! Market! redevelopment is taken from the business plan to estimate the vehicle trips generated from the same. Also, using forecasts for passenger demand and station users of the MMSP from the MMSP design study, the number of vehicle trips generated by the BGC station is estimated.

To bring the baseline traffic situation from the survey in line with the estimated vehicle trips generated by the Market! Market! redevelopment and the BGC MMSP station, traffic growth rates from established from previous studies are applied to the vehicle counts and are projected to the respected time periods for short-term and mid- long-term.

As mentioned earlier, the time frame used is from 2023 to 2040 which is divided into a short-term period (2023 to 2030), and mid- to long-term period, (2030 to 2040). Thus, the vehicle trips generated, and vehicle counts are projected to align with the time frames before conducting the evaluation. The evaluations are conducted for the years of 2030 and 2040, for the short-term, and the mid to long-term, respectively. This means that after estimating the vehicle trips generated from the Market! Market! redevelopment and BGC station, they are projected to 2030 and 2040 using growth rates.

For the Market! Market! redevelopment, the phasing of the proposed facility layout is also considered. According to the proposed business plan, phase 1 construction will be completed by 2032 and phase 2 will be finished by 2037. Regarding the commencement of operations of the MMSP, this study assumes 2029 as the starting year. This implies that there will be no additional vehicle trip generation from the Market! Market! redevelopment from 2023 to 2032, and no additional vehicle trips generated from the MMSP BGC station until it opens in 2029. This means that for the short-term evaluation in 2030, only vehicle trips generated for 1 year from the BGC MMSP station is included.

In the context of the preliminary TIA impact area, the Level of Service (LOS) at various intersections is a primary aspect that will be assessed. The method for evaluating LOS will involve calculating the volume to capacity ratios, a key determinant of the quality of road and intersection operations.

1) Peak Hours

To conduct this assessment effectively, two distinct peak hours are considered as revealed from the transportation survey:

1. **AM peak (Morning Peak)**: This period spans from 7:00 AM to 8:00 AM, capturing the increased traffic during the morning rush.
2. **PM peak (Afternoon/Evening Peak)**: The PM peak corresponds to the hours between 5:00 PM and 6:00 PM, which is when traffic congestion typically peaks in the afternoon/evening.

2) Modal Shift to Rail

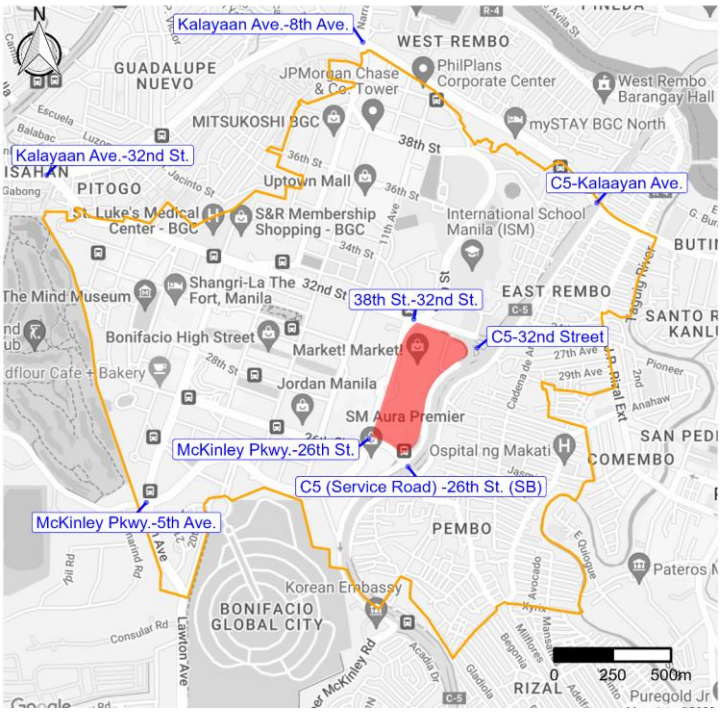
The modal shift to rail represents another key consideration in this preliminary TIA. As part of this assessment, the combined impact of shifting varying percentages of car and motorcycle commuters to the rail system will be evaluated. For simplicity, the modal shift percentages under consideration are as follows: 5%, 10%, 15%, 20%, 25%, and 50%.

Moreover, the modal shift of Public Utility Vehicles (PUVs) to rail is also considered, taking into account the Northbound (NB) and Southbound (SB) shares of PUV in the PUV survey. Within an 800-meter radius from Market! Market!/MMSP BGC station, an estimated 56.9% of PUVs are expected to shift to rail. In a broader context encompassing all available data in the PUV survey, the modal shift for PUVs to rail transit is projected to be approximately 60.6%. Thus, for the purpose of this undertaking, the latter is used for the expected PUV modal shift to rail.

3) Unit of analysis

As mentioned earlier, this TIA will consider intersections as the level of analysis. Figure 3.1 shows the eight (8) intersections included in the TIA. This means that the evaluation of impacts to vehicle traffic from the Market! Market! redevelopment and MMSP operations will be viewed from a summarized measure of all roads within an intersection rather than a measure of each road/lane and direction. Specifically, the intersections evaluated are the following.

1. Kalayaan Ave. – 32nd St.
2. Kalayaan Ave. – 8th Ave.
3. C5 – Kalaayan Ave.
4. C5 – 32nd St.
5. C5 (Service Road) – 26th St. (SB)
6. McKinley Pkwy. – 5th Ave.
7. 38th St. – 32nd St.
8. McKinley Pkwy. – 26th St.



Source: JICA Expert Team based on Google Map

Figure 3.1 Target Intersections

4) Volume to Capacity Ratio (V/C ratio) and Level of Service (LOS)

In evaluating the impacts of the Market! Market! redevelopment and the MMSP BGC station to vehicle traffic in the impact area, the LOS will involve calculating the volume to capacity ratios, a key determinant of the quality of road and intersection operations. Before calculating the volume to capacity ratios, vehicle counts are converted to their Passenger Car Units (PCU) using a Passenger Car Equivalent Factor (PCEF) for their respective modes as shown in Table 3.1.

For the purpose of these evaluations, a lane capacity of 1600 Passenger Car Units per hour (PCU/hr) is assumed based on the basic hourly capacity for urban streets with carriageway width of 6.1-6.5 meters as provided in the DPWH Highway Planning Manual.

After converting vehicle counts to PCU and determining the capacity of roads/intersections based on the standard used, the volume to capacity ratio (V/C ratio) is computed and evaluated to determine the level of service (LOS). The ranges of V/C ratios and their corresponding LOS with a short description of traffic flow are shown in Table 3.2.

Table 3.1 PCEF

Mode	PCEF
Car	1.0
Taxi	1.0
PUJ	1.3
UV	1.5
Bus	2.5
Truck	2.0
Tricycle	0.8
Motorcycle	0.3
Bicycle	0.3

Source: MMUTIS Update and Enhancement Project (MUCEP) (JICA, 2015)

Table 3.2 V/C Ratio and LOS

LOS	V/C Ratio	Description
A	Less than 0.20	Free flowing traffic
B	0.21 – 0.50	Relatively free flowing traffic
C	0.51 – 0.70	Moderate traffic
D	0.71 – 0.85	Moderate/Heavy traffic
E	0.86 – 1.00	Heavy traffic
F	Greater than 1.00	Saturation traffic volumes, stop and go situations

Source: MMUTIS Update and Enhancement Project (MUCEP) (JICA, 2015)

5) Assumptions

The assumptions used in undertaking the preliminary TIA are introduced in this section. These assumptions pertain to the traffic growth rates used, Market! Market! redevelopment facility plan, and the trip rates used to estimate its trip generation, and the assumptions used to estimate the trip generation from the MMSP BGC station.

(a) Traffic Growth Rates

Traffic growth rates were used to align the traffic counts into the respective time frame chosen for the TIA, namely 2030 and 2040. They were also used to bring the trip generation from the Market! Market! redevelopment and MMSP BGC station into the same time frame. Table 3.3 shows the traffic growth rates used.

Table 3.3 Traffic Growth Rates

Traffic Growth	NCR
2018 - 2030	1.79%
2030 - 2040	1.67%

Source: Project for Masterplan on High Standard Highway Network Development (JICA, 2021)

(b) Market! Market! Redevelopment Facility Plan and Trip rates

The trip rates applied to estimate the vehicle trips generated from the Market! Market! redevelopment is shown in Table 3.4.

Table 3.4 Trip Generation Rates

Land Use	Production	Attraction	Unit
Office	0.0027	0.0176	trips/sq.m GFA
Commercial	0.0576	0.0735	trips/sq.m GFA
Hotel	2.00	2.55	trips/hotel room
Residential	2.42	1.52	trips/dwelling unit

Source: UP SURP/UP-NCTS

Table 3.5 provides the Market! Market! redevelopment facility plan proposed layout as part of the business plan output. These net floor areas/units are the basis for estimating the vehicle trips generated from the Market! Market! redevelopment. The appropriate land use trip rates are applied to the respective building types. In addition to lane capacity, the utilization of these lanes at each phase is a crucial factor. Specifically, during the AM and PM peaks, the residential areas exhibit an 80% utilization rate.

Table 3.5 Market! Market! Redevelopment Facility Plan

	Total		Phase 1 (Completion: End of 2032)			Phase 2 (Completion: End of 2037)		
Building Type	Floor Area (m2)	Units (Total)	Floor Area (m2)	Net Floor Area (m2)	Units	Floor Area (m2)	Net Floor Area (m2)	Units
Hotel	61,600	890	0	0	0	61,600	40,040	890
Office	177,100		113,850	85,388	-	63,250	47,438	-
Residential	370,800	2,596	93,600	65,520	655	277,200	194,040	1,940
Retail	198,360		102,560	51,280	-	95,800	47,900	-
Service Apartment	53,760	777	53,760	34,944	777	0	0	0
Total	861,620							

Source: JET

(c) MMSP BGC Station Vehicle Trip Generation

The study also considers the introduction of the Mass Rapid Transit System (MMSP), which is expected to commence its operations in 2030. This significant development is anticipated to impact traffic patterns and the modal choices of commuters. According to The Detailed Design Study of the Metro Manila Subway Project in the Republic of the Philippines (JICA, 2022), it is expected that there will be 200,000 users per day of the MMSP BGC station.

3.5.c.1 MMSP BGC Station Users Modal Share and Peak Hour Seat Occupancy

To estimate the peak hour trip generation from the MMSP BGC station, an assumed 12.5% peak hour share (MUCEP 2015) is used. This is necessary to align trip generation from the MMSP BGC station to the vehicle counts used from the transportation survey.

After determining the peak hour share, the share of users that will access the MMSP BGC station by bus, jeepney, UV, or car are determined based on the MMSP design study forecast shown in Table 3.6. They are then converted to vehicle units using the peak hour

seat occupancy shown in Table 3.7. Finally, the vehicle units are converted to PCU by applying their respective PCEF.

Table 3.6 Estimated MMSP BGC Station Users

Area	Mode	North	East	South	West	Total
Within 800m area	Walk	9%	22%	2%	9%	75%
Outside 800m area	Bus	2%	3%	1%	1%	7%
	Jeepney	4%	6%	2%	2%	14%
	UV	1%	1%	0%	0%	3%
	Car	0%	0%	0%	0%	1%
	Total	6%	10%	4%	4%	25%

Source: MMSP-DD

Table 3.7 Peak Hour Occupancy

Mode	Peak Hour
Standard Bus	44.63
Minibus	3.56
Jeepney	8.96
Tricycle	1.24
Pedicab	0.34
Car/Jeep	1.57
Taxi	0.88
HOV Taxi	5.35
Utility Vehicle	-
Truck/Trailer	2.17
Private Bus	5.96
Motorcycle/Bicycle	1.19
Others	2.43

Source: MUCEP (2015)

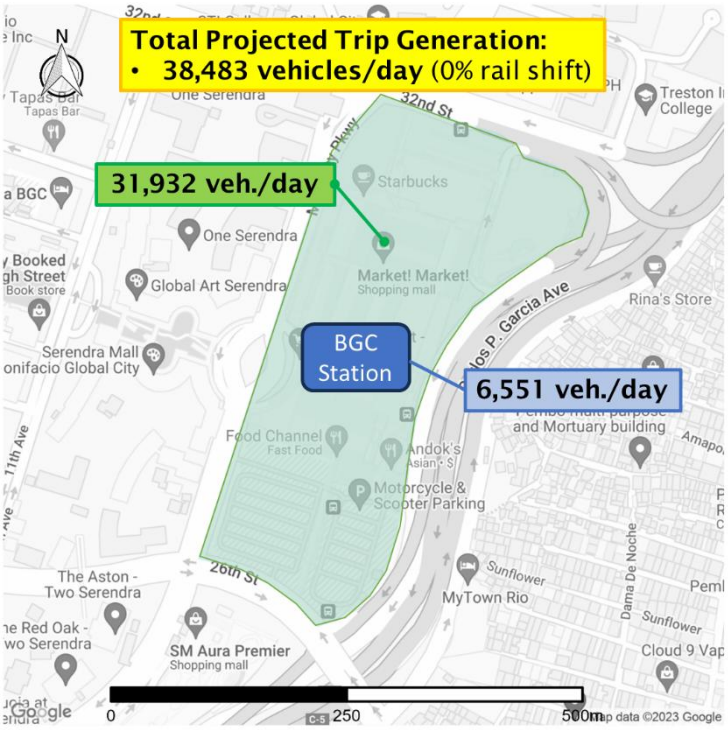
6) Initial Demand Forecast

Having laid out the necessary information and assumptions, initial demand forecasts are produced as presented in Table 3.8 and Figure 3.2. Note that the initial demand forecasts presented in are considered in isolation and do not consider the base traffic situation and any modal shift to rail that may happen. This is only to show the magnitude of the combined vehicle trips generated from Market! Market! redevelopment when it is completed in 2037, and the vehicle trips generated from the users of the MMSP BGC station in 2037.

Table 3.8 Initial Demand Forecast

	Year	Vehicles/day
MMSP BGC Station (opening year)	2030	5,834
MMSP BGC Station	2037	6,551
Market! Market! Redevelopment	2037	31,932
Total Projected Trip Generation	2037	38,483

Source: JICA Expert Team



Source: JICA Expert Team

Figure 3.2 Initial Demand Forecast

4 BASELINE TRAFFIC SITUATION AND SCENARIO RESULTS

Having established the methodology and assumptions applied for the preliminary TIA, the baseline traffic situation is presented. Also included are the different scenarios considered to evaluate the LOS of target intersections in the impact area. The scenarios presented and visualized are for 1) business-as-usual (BAU), 2) only Market! Market! redevelopment scenario, 3) 5% modal shift to rail scenario, and 4) 10% modal shift to rail scenario. The complete tabulation of varying percentages of modal shift to rail from car and motorcycle commuters to rail (MMSP) can be found in the Appendix.

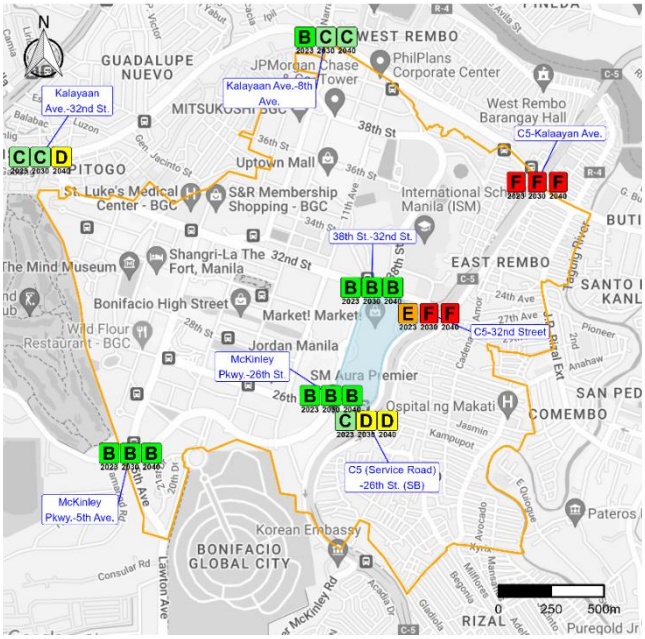
The LOS for the base year (2023), short-term (2030), and mid- to long-term (2040) are displayed in increasing chronological order from left to right as shown in Figure 4.1. This means that for all scenarios shown hereafter, the first LOS (left-most) shown on each intersection describes the baseline traffic situation, the second (middle) short-term, and the last (right-most) mid- to long-term.

Source: JICA Expert Team

Figure 4.1 Example LOS

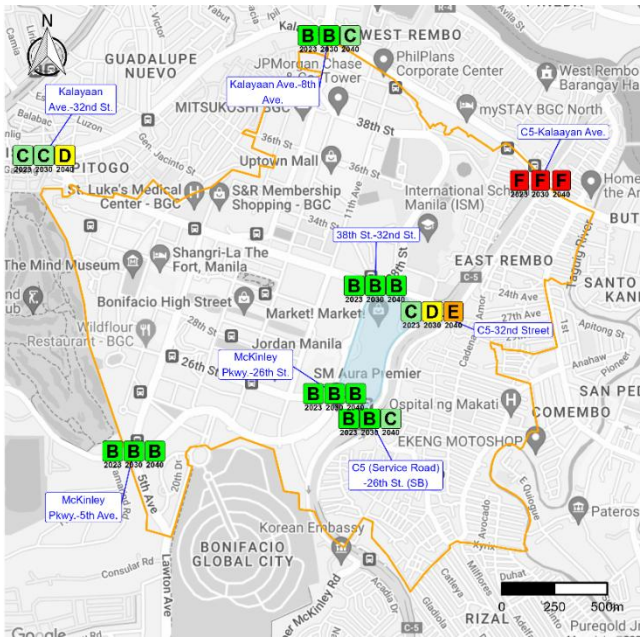
1) Scenario 1: Business-as-usual (BAU)

Figure 4.2 and Figure 4.3 show the BAU scenarios for the AM peak and PM peak, respectively. For the base year (2023), a notable observation is that C5-32nd St. is at LOS E (heavy traffic) during the AM peak, while C5-Kalayaan Ave. is at LOS F (stop and go) during the AM peak and PM peak. Simple stated, C5-32nd St. and C5-Kalayaan Ave. are already experiencing traffic congestion especially during peak hours.



Source: JICA Expert Team

Figure 4.2 BAU AM peak



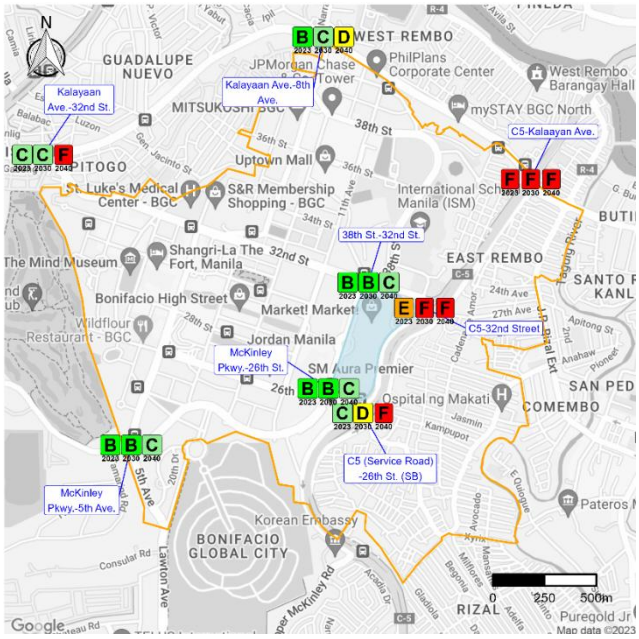
Source: JICA Expert Team

Figure 4.3 BAU PM peak

Furthermore, by the short-term (2030), C5-32nd St. deteriorates to LOS F (stop and go) at the AM peak and worsens to LOS D (moderate/heavy traffic) at the PM peak, while C5 (Service Road)-26th St. (SB) worsens to LOS D (moderate/heavy traffic) at the AM peak. Lastly, by the mid- to long-term (2040), Kalayaan Ave.-32nd St. worsens to LOS D (moderate/heavy traffic). This shows that even without any intervention, by natural traffic growth alone, the traffic situation deteriorates.

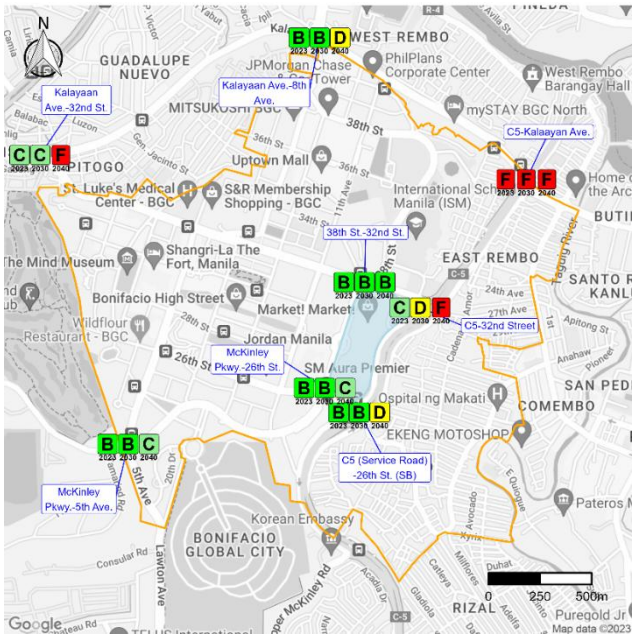
2) Scenario 2: Only Market! Market! redevelopment

Figure 4.4 and Figure 4.5 show the AM peak and PM peak LOS, respectively, for the hypothetical scenario where only the redevelopment of Market! Market! is implemented. In other words, they show the traffic situation in the Market! Market! area if it is redeveloped without implementing the MMSP. Given that phase 1 of the Market! Market! redevelopment is estimated to be completed in 2032, all base year and short-term (2030) LOS will be the same as the BAU scenario are only affected by the natural traffic growth. However, in the mid- to long-term (2040), the completion of both phase 1 and phase 2 of Market! Market! redevelopment is now included.



Source: JICA Expert Team

Figure 4.4 Only Market! Market! Redevelopment AM Peak



Source: JICA Expert Team

Figure 4.5 Only Market! Market! Redevelopment PM Peak

By 2040, at the AM peak, C5 (Service Road)-26th St. (SB) and Kalayaan Ave.-32nd St. becomes LOS F (stop and go), Kayalaan Ave.-8th Ave. becomes LOS D (moderate/heavy traffic), and McKinley Pkwy.-5th Ave. becomes LOS C (moderate traffic). At the PM peak, Kalayaan Ave.-32nd St. becomes LOS F (stop and go), C5 (Service Road)-26th St. (SB) becomes LOS D (heavy traffic), Kayalaan Ave.-8th Ave. becomes LOS D (heavy traffic), and McKinley Pkwy.-5th Ave. becomes LOS C (moderate traffic)

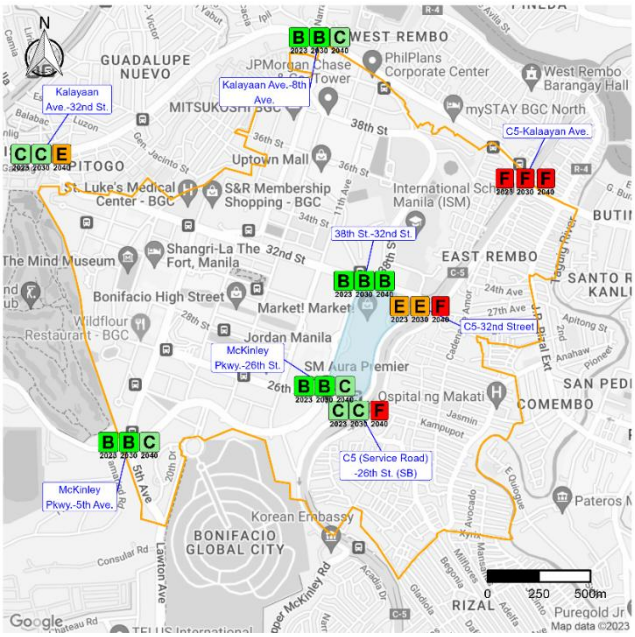
There are notable differences in mid- to long-term (2040) LOS from BAU (scenario 1). For the AM peak, C5 (Service Road) – 26th St. (SB) and Kalayaan Ave. – 32nd St. worsens from LOS D (moderate/heavy traffic) to LOS F (stop and go), Kayalaan Ave.-8th Ave. worsens from LOS C (moderate traffic) to LOS D (moderate/heavy traffic), and McKinley Pkwy. – 5th Ave. deteriorates from LOS B (relatively free flowing traffic) to LOS C (moderate

traffic). For the PM peak, Kalayaan Ave. – 32nd St. worsens from LOS D (moderate/heavy traffic) to LOS F (stop and go), C5 (Service Road) – 26th St. (SB) and Kayalaan Ave.-8th Ave. worsens from LOS C (moderate traffic) to LOS D (moderate/heavy traffic), C5 – 32nd St. worsens from LOS E (heavy traffic) to LOS F (stop and go).

In this hypothetical scenario, where only the Market! Market! area redevelopment happens, the traffic situation worsened in the mid- to long-term (2040). This demonstrates that land development, or in this case redevelopment, will generate transport demand.

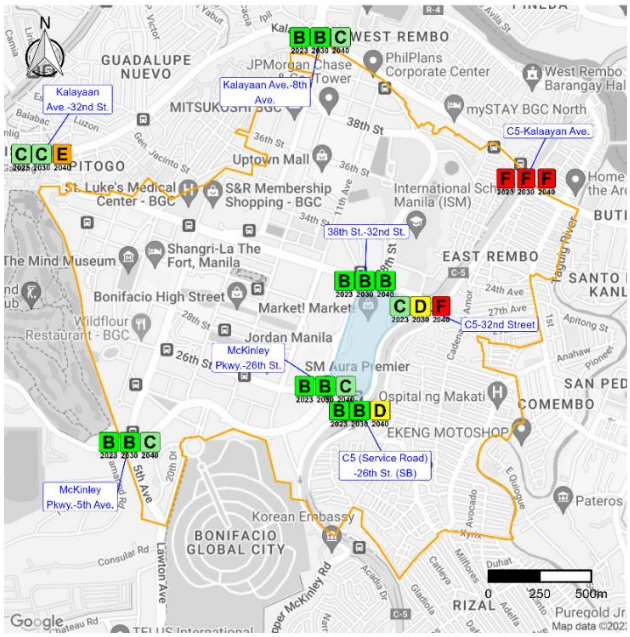
3) Scenario 3: Market! Market! redevelopment and 5% rail shift to MMSP

Figure 4.6 and Figure 4.7 show the AM peak and PM peak LOS, respectively, for the scenario of an assumed yearly 5% modal shift to rail (MMSP) from private cars and motorcycles. Given that phase 1 of the Market! Market! redevelopment is estimated to be completed in 2032, all base year (2023) LOS will still be the same as the previous two scenarios. However, in the short-term (2030), a modal shift to rail for 1 year is now included considering the MMSP start of operations in 2030. Furthermore, in the mid- to long-term (2040), the completion of both phase 1 and phase 2 of Market! Market! redevelopment is now included together with the yearly 5% modal shift to rail (MMSP).



Source: JICA Expert Team

Figure 4.6 Market! Market! Redevelopment, 5% to MMSP AM Peak



Source: JICA Expert Team

Figure 4.7 Market! Market! Redevelopment, 5% to MMSP PM Peak

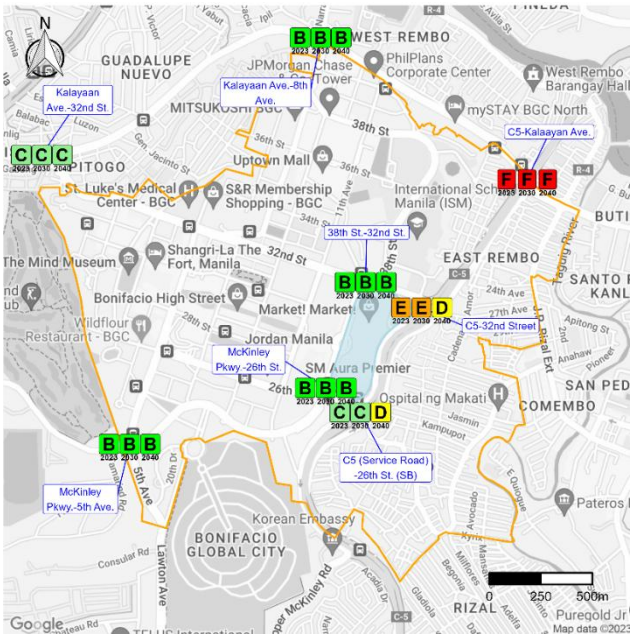
In the short-term (2030), although there is now an assumed 5% yearly modal shift to rail, the LOS of target intersections remains unchanged from the base year (2023) except for C5-32nd St. which still worsens to LOS D (moderate/heavy traffic) like the previous 2 scenarios. However, by 2040, at the AM peak, C5 (Service Road) – 26th St. (SB) and C5-32nd St. still becomes LOS F (stop and go), while Kalayaan Ave. – 32nd St. becomes LOS E (heavy traffic). For the PM peak, Kalayaan Ave. – 32nd St. still worsens, but only until LOS E (heavy traffic), C5 (Service Road) – 26th St. (SB) still worsens to LOS D (moderate/heavy traffic), C5 – 32nd St. still worsens to LOS F (stop and go), and Kayalaan Ave.-8th Ave. worsens to LOS C (moderate/heavy traffic).

However, there are also notable differences with the scenario with only Market! Market! redevelopment (scenario 2). In the short-term (2030), the AM peak LOS at C5 (Service Road)-26th St. (SB) improves from LOS D (moderate/heavy traffic) to C (moderate traffic), and C5-32nd St. improves from LOS F (stop and go) to LOS E (heavy traffic). In the mid- to long-term (2040), for both AM and PM peak LOS, Kalayaan Ave.-8th Ave. improves from LOS D (moderate/heavy traffic) to C (moderate traffic) and Kalayaan Ave. – 32nd St. improves from LOS F (stop and go) to LOS E (heavy traffic).

As seen in this scenario, with the introduction of MMSP and an assumed 5% yearly modal shift to rail, the deterioration of traffic conditions at some intersections slows down but, in general, traffic conditions continue to become saturated by 2040.

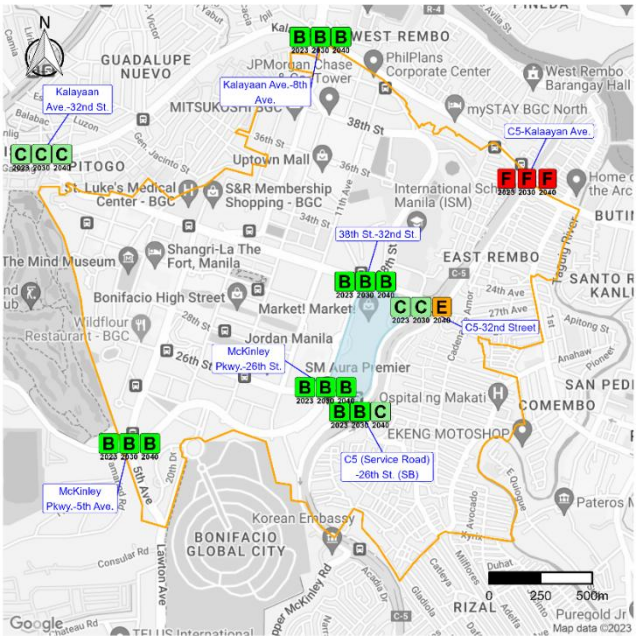
4) Scenario 4: Market! Market! redevelopment and 10% rail shift to MMSP

Figure 4.8 and Figure 4.9 show the AM peak and PM peak LOS, respectively, for the scenario of an assumed yearly 10% modal shift to rail (MMSP) from private cars and motorcycles. The conditions are similar to scenario 3 with only the increase in modal shift from 5% to 10% different.



Source: JICA Expert Team

Figure 4.8 Market! Market! Redevelopment, 10% to MMSP AM Peak



Source: JICA Expert Team

Figure 4.9 Market! Market! Redevelopment, 10% to MMSP PM Peak

In the short-term (2030), with the increase in assumed yearly modal shift to rail to 10%, the LOS of all target intersections are preserved from the base year (2023).

In the mid- to long-term (2040), C5 (Service Road)-26th St. (SB) worsens to LOS D (moderate/heavy traffic) and LOS C (moderate traffic) for the AM peak and PM peak, respectively, while C5-32nd St. improves to LOS D (moderate/heavy traffic) at the AM peak and worsens to LOS E (heavy traffic) at the PM peak. On the other hand, Kalayaan Ave. – 32nd St. stays at LOS C (moderate traffic) from the base year (2023) for both AM and PM peak.

Comparing this scenario with the yearly 5% modal shift to rail (scenario 3), notable significant improvements are observed. In the For the AM peak, C5 (Service Road)-26th

St. (SB) and C5-32nd St. improves from LOS F (stop and go) to LOS D (moderate/heavy), while Kalayaan Ave.-32nd St. improves from LOS E (heavy) traffic to C (moderate traffic). At the PM peak, for the short-term (2030), C5-32nd St. improves from LOS D (moderate/heavy traffic) to LOS C (moderate traffic). In the mid- to long-term (2040), Kalayaan Ave.-32nd St. improves from LOS E (heavy) traffic to LOS C (moderate traffic), C5 (Service Road)-26th St. (SB) improves from LOS D (moderate/heavy traffic) to LOS C (moderate traffic) and C5-32nd St. improves from LOS F (stop and go) to LOS E (heavy traffic).

As shown in this scenario, the opening of MMSP with an assumed 10% yearly modal shift to rail will significantly slow down the worsening of traffic conditions because of the increase in travel demand brought by the Market! Market! redevelopment and the MMSP BGC station. However, common to all scenarios, the LOS at C5-Kalayaan Ave. remains unchanged and continues to be saturated until 2040.

5 SUMMARY

This preliminary TIA presented four scenarios related to traffic conditions in the BGC area and the impact to LOS of target intersections, focusing on the Market! Market! redevelopment and the MMSP up to the year 2040.

The first scenario, Business-as-Usual (BAU) revealed that in 2023, C5-32nd St. faces heavy traffic during the AM peak, and C5-Kalayaan Ave. experiences stop-and-go traffic during both the AM and PM peaks. By 2030, traffic worsens at various intersections, and by 2040, without intervention, traffic conditions deteriorate further.

The second scenario, Only Market! Market! redevelopment, assumes the redevelopment of Market! Market! without implementing the MMSP. It was shown that by 2040, traffic worsens, indicating that redevelopment alone generates increased transport demand.

The third scenario considers both Market! Market! redevelopment and MMSP operations from 2030. It assumes a yearly 5% modal shift to rail (MMSP) starting in 2030. In the short term (2030), some improvements are noted, but by 2040, traffic conditions still become saturated, but at a slower rate compared to the second scenario.

The fourth and last scenario presented also considers both Market! Market! redevelopment and MMSP operations from 2030, similar to scenario 3, but assumes a yearly 10% modal shift to rail. Notable improvements are observed in the mid- to long-term (2040) compared to the 5% shift scenario, indicating that achieving a higher modal shift can significantly slow down the worsening of traffic conditions.

Overall, the scenarios suggest that the introduction of the MMSP, especially with a higher modal shift to rail, can help mitigate the worsening traffic conditions resulting from both natural growth and the Market! Market! redevelopment. However, challenges persist, particularly in specific intersections like C5-Kalayaan Ave., which remains saturated in all scenarios until 2040.

6 LIMITATIONS

This preliminary TIA was conducted to provide an indicative understanding of the potential traffic implications on the Market!Market! area. It is important to emphasize that the TIA was not a core component of this study and was undertaken on a best-effort basis using limited data. As such, the results should be interpreted as a high-level diagnostic rather than a definitive assessment.

Due to constraints in the available survey data, particularly the lack of detailed directional traffic volumes and road-specific information, the analysis adopts a simplified, intersection-level approach. Instead of assessing individual turning movements or directional flows, a single LOS rating was assigned to each intersection as a whole. This methodological adjustment was necessary to accommodate the data limitations, especially where traffic counts were unlabelled or incomplete across surveyed intersections.

However, it is essential to note certain limitations. The preliminary TIA does not account for other planned/proposed developments such as the MMSP Kalayaan Station Area. It also does not consider future redevelopments by FBDC in BGC. Also, traffic counts might not accurately depict some intersection realities due to survey method nuances. In connection to the traffic counts, the hourly vehicle traffic may appear low especially in the base year (2023), but this could be deceptive, as counts may be low due to slow-moving traffic or complete standstills caused by congestion. Notably, intersections like Kalayaan Ave.- 32nd St., C5 (Service Road)-26th St. (SB), and McKinley Pkwy.- 5th Ave. could already be at LOS D (moderate/heavy traffic) or LOS E (heavy traffic) in 2023.

Despite these challenges, the overarching message remains consistent and underscores the importance of discouraging private car use. Rather, it emphasizes even further the need to promote public transport/mass transit modes and enhance walkability to address and alleviate traffic concerns.

7 CONCLUSION

This preliminary TIA has shown that the redevelopment of Market! Market! as TOD and the commencement of MMSP operations alone cannot address the already worse traffic conditions in the BGC area. Not because they are ineffective in solving the issues they are at, but because the problem of traffic congestion cannot be viewed and treated in isolation with respect to the area covered by the conceptual plan and business plan. In other words, the problem of traffic congestion in the BGC area is not limited to the boundary of the conceptual plan, but rather it involves the wider area of Metro Manila, among other issues. To be specific, the transportation problems in Metro Manila, particularly traffic congestion, are manifested in multiple cities within the metro through spill-over as a consequence of the rapid increase in motorized road traffic without any more room for road expansion and a lagging public mass transit development.

Suppose that there is indeed room for road expansion or land for additional roads to address traffic congestion in the BGC area, it is nevertheless highly discouraged as it will defeat the objectives and aims of conceptualizing the Market! Market! redevelopment and its surrounding areas as TOD and maximizing the benefits of an improved public transport system when the MMSP starts operations. Rather than addressing the traffic congestion problem by road expansion/construction, which tackles the supply side of a transportation system, it is highly recommended that measures that instead deal with demand be explored and considered. Such measures that aim to influence demand to improve transport system efficiency and performance are known as Travel Demand Management (TDM) measures. TDM is the art/strategy of influencing traveler behavior for the purpose of reducing or redistributing travel demand and achieving specific planning objectives.

In closing, it was shown that by aiming for at least 10% yearly modal shift to rail once the MMSP commences operations, the worsening of traffic could be mitigated and slowed down, if not improved. This highlights the importance of promoting public transport/mass transit usage particularly the MMSP and other existing or future public transport modes and infrastructure. Rather than creating/widening roads, the full benefits of TOD and the MMSP should be maximized by looking into TDM measures to promote modal shift and to increase rail ridership.

Appendix

A.1 Business-as-usual (BAU)

Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
AM	1	Kalayaan Ave.-32nd St.	9405	10649	12567	10	16000	0.59	C	0.67	C	0.79	D
	2	Kalayaan Ave.-8th Ave.	10212	11562	13645	14	22400	0.46	B	0.52	C	0.61	C
	4	C5-Kalaayan Ave.	32680	37001	43666	10	16000	2.04	F	2.31	F	2.73	F
	5	C5-32nd Street	11318	12814	15123	8	12800	0.88	E	1.00	F	1.18	F
	6	C5 (Service Road) -26th St. (SB)	4947	5601	6610	5	8000	0.62	C	0.70	D	0.83	D
	8	McKinley Pkwy.-5th Ave.	6640	7518	8872	12	19200	0.35	B	0.39	B	0.46	B
	9	38th St.-32nd St.	7740	8763	10341	16	25600	0.30	B	0.34	B	0.40	B
	10	McKinley Pkwy.-26th St.	6174	6991	8250	12	19200	0.32	B	0.36	B	0.43	B
PM	1	Kalayaan Ave.-32nd St.	9243	10465	12350	10	16000	0.58	C	0.65	C	0.77	D
	2	Kalayaan Ave.-8th Ave.	8952	10136	11962	14	22400	0.40	B	0.45	B	0.53	C
	4	C5-Kalaayan Ave.	25915	29342	34627	10	16000	1.62	F	1.83	F	2.16	F
	5	C5-32nd Street	8829	9997	11797	8	12800	0.69	C	0.78	D	0.92	E
	6	C5 (Service Road) -26th St. (SB)	3402	3852	4546	5	8000	0.43	B	0.48	B	0.57	C
	8	McKinley Pkwy.-5th Ave.	5735	6493	7663	12	19200	0.30	B	0.34	B	0.40	B
	9	38th St.-32nd St.	7102	8041	9489	16	25600	0.28	B	0.31	B	0.37	B
	10	McKinley Pkwy.-26th St.	5666	6415	7571	12	19200	0.30	B	0.33	B	0.39	B

A.2 Only Market! Market! redevelopment, without MMSP operations

Car and Motorcycle Rail Shift[1]	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
0%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	13574	10	16000	0.59	C	0.67	C	1.08	F
		2	Kalayaan Ave.-8th Ave.	10212	11562	14733	14	22400	0.46	B	0.52	C	0.84	D
		4	C5-Kalaayan Ave.	32680	37001	44832	10	16000	2.04	F	2.31	F	3.77	F
		5	C5-32nd Street	11318	12814	16403	8	12800	0.88	E	1.00	F	1.63	F
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7744	5	8000	0.62	C	0.70	D	1.14	F
		8	McKinley Pkwy.-5th Ave.	6640	7518	10010	12	19200	0.35	B	0.39	B	0.64	C
		9	38th St.-32nd St.	7740	8763	11358	16	25600	0.30	B	0.34	B	0.56	C
		10	McKinley Pkwy.-26th St.	6174	6991	9281	12	19200	0.32	B	0.36	B	0.59	C
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	13339	10	16000	0.58	C	0.65	C	1.07	F
		2	Kalayaan Ave.-8th Ave.	8952	10136	12915	14	22400	0.40	B	0.45	B	0.74	D
		4	C5-Kalaayan Ave.	25915	29342	35552	10	16000	1.62	F	1.83	F	2.99	F
		5	C5-32nd Street	8829	9997	12796	8	12800	0.69	C	0.78	D	1.27	F
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5326	5	8000	0.43	B	0.48	B	0.78	D
		8	McKinley Pkwy.-5th Ave.	5735	6493	8646	12	19200	0.30	B	0.34	B	0.55	C
		9	38th St.-32nd St.	7102	8041	10423	16	25600	0.28	B	0.31	B	0.51	C
		10	McKinley Pkwy.-26th St.	5666	6415	8517	12	19200	0.30	B	0.33	B	0.54	C

[1] Also included is 60% modal shift to rail from PUVs (jeepneys, bus, uv)

A.3 Market! Market! redevelopment with MMSP operations

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
5%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	13702	10	16000	0.59	C	0.61	C	0.86	E
		2	Kalayaan Ave.-8th Ave.	10212	11562	14531	14	22400	0.46	B	0.47	B	0.66	C
		4	C5-Kalaayan Ave.	32680	37001	42186	10	16000	2.04	F	2.11	F	3.06	F
		5	C5-32nd Street	11318	12814	16245	8	12800	0.88	E	0.92	E	1.28	F
		6	C5 (Service Road) -26th St. (SB)	4947	5601	8571	5	8000	0.62	C	0.67	C	1.02	F
		8	McKinley Pkwy.-5th Ave.	6640	7518	10643	12	19200	0.35	B	0.37	B	0.55	C
		9	38th St.-32nd St.	7740	8763	11867	16	25600	0.30	B	0.32	B	0.46	B
		10	McKinley Pkwy.-26th St.	6174	6991	9925	12	19200	0.32	B	0.34	B	0.52	C
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	13633	10	16000	0.58	C	0.61	C	0.86	E
		2	Kalayaan Ave.-8th Ave.	8952	10136	13027	14	22400	0.40	B	0.41	B	0.59	C
		4	C5-Kalaayan Ave.	25915	29342	34148	10	16000	1.62	F	1.70	F	2.54	F
		5	C5-32nd Street	8829	9997	13107	8	12800	0.69	C	0.73	D	1.13	F
		6	C5 (Service Road) -26th St. (SB)	3402	3852	6214	5	8000	0.43	B	0.45	B	0.67	C
		8	McKinley Pkwy.-5th Ave.	5735	6493	9404	12	19200	0.30	B	0.32	B	0.49	B
		9	38th St.-32nd St.	7102	8041	11051	16	25600	0.28	B	0.30	B	0.43	B
		10	McKinley Pkwy.-26th St.	5666	6415	9279	12	19200	0.30	B	0.32	B	0.48	B
10%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	13134	10	16000	0.59	C	0.58	C	0.54	C
		2	Kalayaan Ave.-8th Ave.	10212	11562	13960	14	22400	0.46	B	0.45	B	0.43	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		4	C5-Kalaayan Ave.	32680	37001	40463	10	16000	2.04	F	2.02	F	2.04	F
		5	C5-32nd Street	11318	12814	15563	8	12800	0.88	E	0.88	E	0.80	D
		6	C5 (Service Road) -26th St. (SB)	4947	5601	8273	5	8000	0.62	C	0.64	C	0.72	D
		8	McKinley Pkwy.-5th Ave.	6640	7518	10247	12	19200	0.35	B	0.35	B	0.38	B
		9	38th St.-32nd St.	7740	8763	11373	16	25600	0.30	B	0.31	B	0.29	B
		10	McKinley Pkwy.-26th St.	6174	6991	9572	12	19200	0.32	B	0.33	B	0.36	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	13063	10	16000	0.58	C	0.58	C	0.54	C
		2	Kalayaan Ave.-8th Ave.	8952	10136	12506	14	22400	0.40	B	0.40	B	0.38	B
		4	C5-Kalaayan Ave.	25915	29342	32816	10	16000	1.62	F	1.63	F	1.75	F
		5	C5-32nd Street	8829	9997	12668	8	12800	0.69	C	0.70	C	0.82	D
		6	C5 (Service Road) -26th St. (SB)	3402	3852	6003	5	8000	0.43	B	0.43	B	0.46	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	9071	12	19200	0.30	B	0.31	B	0.34	B
		9	38th St.-32nd St.	7102	8041	10614	16	25600	0.28	B	0.28	B	0.28	B
		10	McKinley Pkwy.-26th St.	5666	6415	8941	12	19200	0.30	B	0.30	B	0.33	B
15%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	12565	10	16000	0.59	C	0.56	C	0.36	B
		2	Kalayaan Ave.-8th Ave.	10212	11562	13389	14	22400	0.46	B	0.43	B	0.30	B
		4	C5-Kalaayan Ave.	32680	37001	38739	10	16000	2.04	F	1.94	F	1.45	F
		5	C5-32nd Street	11318	12814	14880	8	12800	0.88	E	0.83	D	0.53	C
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7975	5	8000	0.62	C	0.61	C	0.54	C

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		8	McKinley Pkwy.-5th Ave.	6640	7518	9850	12	19200	0.35	B	0.34	B	0.28	B
		9	38th St.-32nd St.	7740	8763	10878	16	25600	0.30	B	0.29	B	0.19	A
		10	McKinley Pkwy.-26th St.	6174	6991	9220	12	19200	0.32	B	0.31	B	0.27	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	12492	10	16000	0.58	C	0.55	C	0.36	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	11985	14	22400	0.40	B	0.38	B	0.26	B
		4	C5-Kalaayan Ave.	25915	29342	31485	10	16000	1.62	F	1.56	F	1.30	F
		5	C5-32nd Street	8829	9997	12230	8	12800	0.69	C	0.67	C	0.64	C
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5791	5	8000	0.43	B	0.41	B	0.33	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	8739	12	19200	0.30	B	0.29	B	0.26	B
		9	38th St.-32nd St.	7102	8041	10178	16	25600	0.28	B	0.27	B	0.20	A
		10	McKinley Pkwy.-26th St.	5666	6415	8604	12	19200	0.30	B	0.29	B	0.24	B
20%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	11997	10	16000	0.59	C	0.53	C	0.26	B
		2	Kalayaan Ave.-8th Ave.	10212	11562	12819	14	22400	0.46	B	0.41	B	0.23	B
		4	C5-Kalaayan Ave.	32680	37001	37016	10	16000	2.04	F	1.85	F	1.13	F
		5	C5-32nd Street	11318	12814	14198	8	12800	0.88	E	0.79	D	0.37	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7676	5	8000	0.62	C	0.59	C	0.44	B
		8	McKinley Pkwy.-5th Ave.	6640	7518	9454	12	19200	0.35	B	0.32	B	0.22	B
		9	38th St.-32nd St.	7740	8763	10384	16	25600	0.30	B	0.28	B	0.13	A
		10	McKinley Pkwy.-26th St.	6174	6991	8867	12	19200	0.32	B	0.30	B	0.22	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	11922	10	16000	0.58	C	0.53	C	0.26	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	11464	14	22400	0.40	B	0.36	B	0.19	A
		4	C5-Kalaayan Ave.	25915	29342	30153	10	16000	1.62	F	1.49	F	1.05	F
		5	C5-32nd Street	8829	9997	11792	8	12800	0.69	C	0.65	C	0.54	C
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5580	5	8000	0.43	B	0.40	B	0.26	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	8407	12	19200	0.30	B	0.28	B	0.21	B
		9	38th St.-32nd St.	7102	8041	9742	16	25600	0.28	B	0.26	B	0.15	A
		10	McKinley Pkwy.-26th St.	5666	6415	8266	12	19200	0.30	B	0.28	B	0.19	A
25%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	11428	10	16000	0.59	C	0.50	C	0.20	B
		2	Kalayaan Ave.-8th Ave.	10212	11562	12248	14	22400	0.46	B	0.39	B	0.19	A
		4	C5-Kalaayan Ave.	32680	37001	35292	10	16000	2.04	F	1.76	F	0.96	E
		5	C5-32nd Street	11318	12814	13516	8	12800	0.88	E	0.75	D	0.29	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7378	5	8000	0.62	C	0.56	C	0.39	B
		8	McKinley Pkwy.-5th Ave.	6640	7518	9057	12	19200	0.35	B	0.31	B	0.19	A
		9	38th St.-32nd St.	7740	8763	9890	16	25600	0.30	B	0.26	B	0.11	A
		10	McKinley Pkwy.-26th St.	6174	6991	8514	12	19200	0.32	B	0.29	B	0.19	A
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	11352	10	16000	0.58	C	0.50	B	0.20	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	10943	14	22400	0.40	B	0.34	B	0.16	A
		4	C5-Kalaayan Ave.	25915	29342	28822	10	16000	1.62	F	1.42	F	0.91	E

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		5	C5-32nd Street	8829	9997	11353	8	12800	0.69	C	0.62	C	0.49	B
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5368	5	8000	0.43	B	0.38	B	0.23	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	8075	12	19200	0.30	B	0.27	B	0.19	A
		9	38th St.-32nd St.	7102	8041	9306	16	25600	0.28	B	0.24	B	0.12	A
		10	McKinley Pkwy.-26th St.	5666	6415	7929	12	19200	0.30	B	0.26	B	0.17	A
50%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	8585	10	16000	0.59	C	0.36	B	0.15	A
		2	Kalayaan Ave.-8th Ave.	10212	11562	9395	14	22400	0.46	B	0.29	B	0.15	A
		4	C5-Kalaayan Ave.	32680	37001	26675	10	16000	2.04	F	1.31	F	0.79	D
		5	C5-32nd Street	11318	12814	10102	8	12800	0.88	E	0.54	C	0.21	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	5887	5	8000	0.62	C	0.42	B	0.34	B
		8	McKinley Pkwy.-5th Ave.	6640	7518	7075	12	19200	0.35	B	0.23	B	0.16	A
		9	38th St.-32nd St.	7740	8763	7417	16	25600	0.30	B	0.19	A	0.08	A
		10	McKinley Pkwy.-26th St.	6174	6991	6749	12	19200	0.32	B	0.22	B	0.17	A
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	8501	10	16000	0.58	C	0.36	B	0.15	A
		2	Kalayaan Ave.-8th Ave.	8952	10136	8338	14	22400	0.40	B	0.25	B	0.12	A
		4	C5-Kalaayan Ave.	25915	29342	22164	10	16000	1.62	F	1.08	F	0.79	D
		5	C5-32nd Street	8829	9997	9162	8	12800	0.69	C	0.48	B	0.44	B
		6	C5 (Service Road) -26th St. (SB)	3402	3852	4311	5	8000	0.43	B	0.28	B	0.19	A
		8	McKinley Pkwy.-5th Ave.	5735	6493	6413	12	19200	0.30	B	0.20	B	0.16	A

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		9	38th St.-32nd St.	7102	8041	7124	16	25600	0.28	B	0.18	A	0.10	A
		10	McKinley Pkwy.-26th St.	5666	6415	6242	12	19200	0.30	B	0.20	A	0.14	A

A.4 Without Market! Market! redevelopment, only MMSP operations

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
5%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	12774	10	16000	0.587831	C	0.61229	C	0.81	D
		2	Kalayaan Ave.-8th Ave.	10212	11562	13550	14	22400	0.455884	B	0.466694	B	0.62	C
		4	C5-Kalaayan Ave.	32680	37001	41120	10	16000	2.042494	F	2.113492	F	2.88	F
		5	C5-32nd Street	11318	12814	15072	8	12800	0.88	E	0.92	E	1.21	F
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7495	5	8000	0.62	C	0.67	C	0.97	E
		8	McKinley Pkwy.-5th Ave.	6640	7518	9576	12	19200	0.35	B	0.37	B	0.52	C
		9	38th St.-32nd St.	7740	8763	10912	16	25600	0.30	B	0.32	B	0.43	B
		10	McKinley Pkwy.-26th St.	6174	6991	8960	12	19200	0.32	B	0.34	B	0.49	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	12710	10	16000	0.58	C	0.61	C	0.81	D
		2	Kalayaan Ave.-8th Ave.	8952	10136	12157	14	22400	0.40	B	0.41	B	0.55	C
		4	C5-Kalaayan Ave.	25915	29342	33291	10	16000	1.62	F	1.70	F	2.39	F
		5	C5-32nd Street	8829	9997	12179	8	12800	0.69	C	0.73	D	1.06	F

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5483	5	8000	0.43	B	0.45	B	0.64	C
		8	McKinley Pkwy.-5th Ave.	5735	6493	8477	12	19200	0.30	B	0.32	B	0.46	B
		9	38th St.-32nd St.	7102	8041	10168	16	25600	0.28	B	0.30	B	0.41	B
		10	McKinley Pkwy.-26th St.	5666	6415	8385	12	19200	0.30	B	0.32	B	0.45	B
10%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	12248	10	16000	0.59	C	0.58	C	0.51	C
		2	Kalayaan Ave.-8th Ave.	10212	11562	13022	14	22400	0.46	B	0.45	B	0.41	B
		4	C5-Kalaayan Ave.	32680	37001	39440	10	16000	2.04	F	2.02	F	1.92	F
		5	C5-32nd Street	11318	12814	14439	8	12800	0.88	E	0.88	E	0.76	D
		6	C5 (Service Road) -26th St. (SB)	4947	5601	7242	5	8000	0.62	C	0.64	C	0.68	C
		8	McKinley Pkwy.-5th Ave.	6640	7518	9228	12	19200	0.35	B	0.35	B	0.36	B
		9	38th St.-32nd St.	7740	8763	10463	16	25600	0.30	B	0.31	B	0.27	B
		10	McKinley Pkwy.-26th St.	6174	6991	8649	12	19200	0.32	B	0.33	B	0.34	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	12182	10	16000	0.58	C	0.58	C	0.51	C
		2	Kalayaan Ave.-8th Ave.	8952	10136	11675	14	22400	0.40	B	0.40	B	0.36	B
		4	C5-Kalaayan Ave.	25915	29342	31993	10	16000	1.62	F	1.63	F	1.65	F
		5	C5-32nd Street	8829	9997	11772	8	12800	0.69	C	0.70	C	0.77	D
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5304	5	8000	0.43	B	0.43	B	0.43	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	8185	12	19200	0.30	B	0.31	B	0.32	B
		9	38th St.-32nd St.	7102	8041	9772	16	25600	0.28	B	0.28	B	0.27	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		10	McKinley Pkwy.-26th St.	5666	6415	8087	12	19200	0.30	B	0.30	B	0.31	B
15%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	11722	10	16000	0.59	C	0.56	C	0.34	B
		2	Kalayaan Ave.-8th Ave.	10212	11562	12494	14	22400	0.46	B	0.43	B	0.29	B
		4	C5-Kalaayan Ave.	32680	37001	37760	10	16000	2.04	F	1.94	F	1.37	F
		5	C5-32nd Street	11318	12814	13806	8	12800	0.88	E	0.83	D	0.50	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	6990	5	8000	0.62	C	0.61	C	0.51	C
		8	McKinley Pkwy.-5th Ave.	6640	7518	8879	12	19200	0.35	B	0.34	B	0.26	B
		9	38th St.-32nd St.	7740	8763	10014	16	25600	0.30	B	0.29	B	0.18	A
		10	McKinley Pkwy.-26th St.	6174	6991	8337	12	19200	0.32	B	0.31	B	0.26	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	11655	10	16000	0.58	C	0.55	C	0.34	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	11193	14	22400	0.40	B	0.38	B	0.24	B
		4	C5-Kalaayan Ave.	25915	29342	30695	10	16000	1.62	F	1.56	F	1.23	F
		5	C5-32nd Street	8829	9997	11364	8	12800	0.69	C	0.67	C	0.60	C
		6	C5 (Service Road) -26th St. (SB)	3402	3852	5124	5	8000	0.43	B	0.41	B	0.31	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	7893	12	19200	0.30	B	0.29	B	0.24	B
		9	38th St.-32nd St.	7102	8041	9376	16	25600	0.28	B	0.27	B	0.19	A
		10	McKinley Pkwy.-26th St.	5666	6415	7790	12	19200	0.30	B	0.29	B	0.23	B
20%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	11196	10	16000	0.59	C	0.53	C	0.24	B
		2	Kalayaan Ave.-8th Ave.	10212	11562	11966	14	22400	0.46	B	0.41	B	0.22	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		4	C5-Kalaayan Ave.	32680	37001	36080	10	16000	2.04	F	1.85	F	1.07	F
		5	C5-32nd Street	11318	12814	13173	8	12800	0.88	E	0.79	D	0.35	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	6737	5	8000	0.62	C	0.59	C	0.42	B
		8	McKinley Pkwy.-5th Ave.	6640	7518	8530	12	19200	0.35	B	0.32	B	0.21	B
		9	38th St.-32nd St.	7740	8763	9565	16	25600	0.30	B	0.28	B	0.13	A
		10	McKinley Pkwy.-26th St.	6174	6991	8026	12	19200	0.32	B	0.30	B	0.21	B
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	11127	10	16000	0.58	C	0.53	C	0.24	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	10711	14	22400	0.40	B	0.36	B	0.18	A
		4	C5-Kalaayan Ave.	25915	29342	29396	10	16000	1.62	F	1.49	F	0.99	E
		5	C5-32nd Street	8829	9997	10956	8	12800	0.69	C	0.65	C	0.51	C
		6	C5 (Service Road) -26th St. (SB)	3402	3852	4945	5	8000	0.43	B	0.40	B	0.25	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	7601	12	19200	0.30	B	0.28	B	0.20	B
		9	38th St.-32nd St.	7102	8041	8980	16	25600	0.28	B	0.26	B	0.14	A
		10	McKinley Pkwy.-26th St.	5666	6415	7492	12	19200	0.30	B	0.28	B	0.18	A
25%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	10670	10	16000	0.59	C	0.50	C	0.19	A
		2	Kalayaan Ave.-8th Ave.	10212	11562	11438	14	22400	0.46	B	0.39	B	0.18	A
		4	C5-Kalaayan Ave.	32680	37001	34399	10	16000	2.04	F	1.76	F	0.90	E
		5	C5-32nd Street	11318	12814	12540	8	12800	0.88	E	0.75	D	0.27	B
		6	C5 (Service Road) -26th St. (SB)	4947	5601	6484	5	8000	0.62	C	0.56	C	0.37	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
		8	McKinley Pkwy.-5th Ave.	6640	7518	8181	12	19200	0.35	B	0.31	B	0.18	A
		9	38th St.-32nd St.	7740	8763	9115	16	25600	0.30	B	0.26	B	0.10	A
		10	McKinley Pkwy.-26th St.	6174	6991	7715	12	19200	0.32	B	0.29	B	0.18	A
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	10600	10	16000	0.58	C	0.50	B	0.19	A
		2	Kalayaan Ave.-8th Ave.	8952	10136	10229	14	22400	0.40	B	0.34	B	0.15	A
		4	C5-Kalaayan Ave.	25915	29342	28098	10	16000	1.62	F	1.42	F	0.86	E
		5	C5-32nd Street	8829	9997	10549	8	12800	0.69	C	0.62	C	0.46	B
		6	C5 (Service Road) -26th St. (SB)	3402	3852	4766	5	8000	0.43	B	0.38	B	0.21	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	7308	12	19200	0.30	B	0.27	B	0.18	A
		9	38th St.-32nd St.	7102	8041	8584	16	25600	0.28	B	0.24	B	0.12	A
		10	McKinley Pkwy.-26th St.	5666	6415	7194	12	19200	0.30	B	0.26	B	0.16	A
50%	AM	1	Kalayaan Ave.-32nd St.	9405	10649	8040	10	16000	0.59	C	0.36	B	0.50	C
		2	Kalayaan Ave.-8th Ave.	10212	11562	8798	14	22400	0.46	B	0.29	B	0.39	B
		4	C5-Kalaayan Ave.	32680	37001	25999	10	16000	2.04	F	1.31	F	1.62	F
		5	C5-32nd Street	11318	12814	9374	8	12800	0.88	E	0.54	C	0.73	D
		6	C5 (Service Road) -26th St. (SB)	4947	5601	5220	5	8000	0.62	C	0.42	B	0.65	C
		8	McKinley Pkwy.-5th Ave.	6640	7518	6438	12	19200	0.35	B	0.23	B	0.34	B
		9	38th St.-32nd St.	7740	8763	6870	16	25600	0.30	B	0.19	A	0.27	B
		10	McKinley Pkwy.-26th St.	6174	6991	6158	12	19200	0.32	B	0.22	B	0.32	B

Car and Motorcycle Rail Shift	Peak	Station No.	Station Name	2023 PCU	2030 PCU	2040 PCU	Lanes	Capacity	2023 VCR	2023 LOS	2030 VCR	2030 LOS	2040 VCR	2040 LOS
	PM	1	Kalayaan Ave.-32nd St.	9243	10465	7962	10	16000	0.58	C	0.36	B	0.50	B
		2	Kalayaan Ave.-8th Ave.	8952	10136	7818	14	22400	0.40	B	0.25	B	0.35	B
		4	C5-Kalaayan Ave.	25915	29342	21608	10	16000	1.62	F	1.08	F	1.35	F
		5	C5-32nd Street	8829	9997	8511	8	12800	0.69	C	0.48	B	0.66	C
		6	C5 (Service Road) -26th St. (SB)	3402	3852	3869	5	8000	0.43	B	0.28	B	0.48	B
		8	McKinley Pkwy.-5th Ave.	5735	6493	5847	12	19200	0.30	B	0.20	B	0.30	B
		9	38th St.-32nd St.	7102	8041	6603	16	25600	0.28	B	0.18	A	0.26	B
		10	McKinley Pkwy.-26th St.	5666	6415	5704	12	19200	0.30	B	0.20	A	0.30	B