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A Proposed Manila-Batangas By-pass Road Development Model Plan: Enhancing the Socio-Spatial Interaction and Urbanization of New By-pass Roads

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ABSTRACT

Urban by-pass roads reduce congestion but often trigger fragmented growth, land-use conflicts, and socio-spatial disconnection. This study evaluates the Manila–Batangas by-pass corridor to determine how infrastructure influences spatial interaction, urban form, and development control. A mixed-method approach was applied, combining household surveys, focus group discussions, key personnel interviews, spatial mapping, and traffic volume analysis. Results indicate that improved accessibility stimulates economic activity and mobility but accelerates linear sprawl and uneven land conversion without coordinated zoning. Stakeholders emphasized the need for integrated corridor planning, growth node management, environmental safeguards, and multimodal accessibility. Guided by growth pole and corridor development frameworks, the study proposes policy-oriented land-use strategies that promote compact development, balanced node distribution, and protection of open spaces. The findings support the use of by-pass corridors as structured urban growth tools rather than passive transport infrastructure, offering a transferable planning model for emerging urban regions.

Keywords: Manila-Batangas by-pass road; socio-spatial interaction; corridor development; urbanization; land-use planning

INTRODUCTION

Urban sprawl is a growing concern in many cities around the world because this may lead to the degradation of natural landscapes and loss of valuable green spaces. As such they the by-pass roads are often at risk of becoming possible sites of unrestrained development and urban sprawl. Construction of by-pass roads sometimes contribute to urban sprawl as it encourages further development along newly established routes. With that situation, it can lead to increased traffic congestion, air pollution, increased carbon footprint and loss of green spaces.

As the Manila- Batangas by-pass road is currently being constructed, it may somehow be a possible approach in reducing traffic in the metropolitan area, ultimately promoting sustained economic growth. As perceived by many, it could reduce the thirty-minute (30 min.) travel time to seven (7) minutes between Barangay Inosluban and Barangay Balintawak.

The by-pass road have three (3) segments, the first segment is 1.73 kms. second, 1.85 kms. and the last segment is 1.84 kms.

Conducting thorough research and analysis, the study could provide valuable insights into the current state of the area, by means of identifying potential challenges and preventing urban sprawl on by-pass roads. As a result, thereof, this would maintain the uprightness of the city, preserve the natural environment and identify opportunities for the improvement of the Socio-Spatial Interaction and Urbanization of the new By-pass road (See Fig 1).

Such innovation would offer innovative solutions and design concepts that would

enhance transportation efficiency, promote economic growth, and create a more livable environment for the city residents. By prioritizing beautification efforts and implementing strict zoning regulations, we can ensure that these vital transportation corridors remain free from unchecked development since they will continuously serve the intended purpose for the years to come.

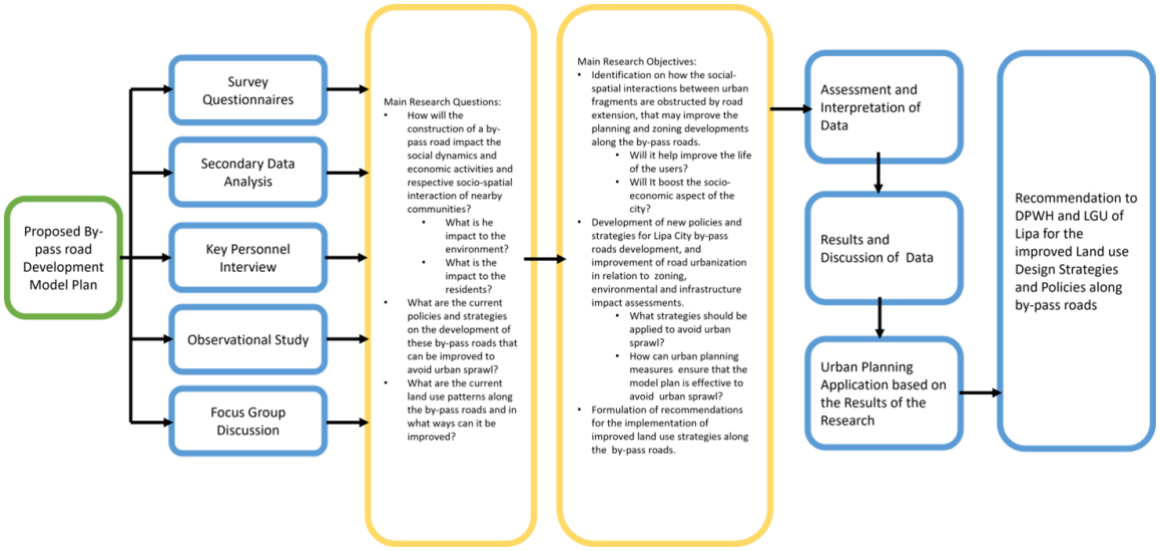

Figure 1. Conceptual Framework

OBJECTIVES

The general objective of this research is to understand the socio-spatial dynamics of urbanization on by-pass roads, prevent urban sprawl and identify its urban fragments as basis for other by-pass roads policy model through the Proposed Manila-Batangas By-pass Road Development Model Plan. This objective could be accomplished with the completion of the following:

- Identification on how the social-spatial interactions between urban fragments are obstructed by road extension, that may improve the planning and zoning developments along the by-pass roads.
- Development of policy guidelines and strategic measures for Lipa City by-pass roads, evaluated based on their alignment with zoning compliance, mitigation of environmental impacts, and support for efficient infrastructure utilization, serving as benchmarks for improved road-induced urban development.
- Formulation of recommendations for the implementation of improved land use strategies along the by-pass roads.

STATEMENT OF THE PROBLEM

The “Build, Build, Build” infrastructure program initiated under former President Rodrigo Duterte aimed to stimulate national development through enhanced connectivity and mobility. Among its key components was the construction of by-pass roads intended to decongest city centers and improve regional accessibility. However, despite these efforts, the implementation of by-pass roads in the Philippines has revealed several persistent challenges. While these roads initially ease traffic congestion, they often lead to induced demand—attracting more vehicles over time and eventually recreating or even worsening the original traffic conditions.

Moreover, the uneven and uncoordinated development of by-pass roads has contributed to uncontrolled urban sprawl. In the absence of integrated planning and adequate support

infrastructure, these roads have expanded urban boundaries without fostering cohesive and sustainable urban growth. This has resulted in fragmented socio-spatial interactions between communities, inefficient land use, and limited access to essential services and economic opportunities in newly urbanized zones.

Consequently, cities struggle to manage growth effectively, facing rising congestion, environmental degradation, pollution, and declining urban livability. The current model of by-pass road development fails to fully harness their potential as tools for balanced urbanization and improved socio-spatial integration.

In light of these issues, there is a critical need to rethink and redesign the approach to by-pass road planning. This research proposes a development model for the Manila-Batangas by-pass road that aims to not only address traffic concerns, but also enhance socio-spatial interactions, promote sustainable urbanization, and guide future infrastructure initiatives in the Philippines.

RESEARCH DESIGN

A mixed-method research design was employed to ensure analytical rigor and triangulation:

- Surveys captured quantitative data from residents in affected barangays.
- Key Personnel Interviews (KPIs) involving planning officials and stakeholders.
- Focus Group Discussions (FGDs) provided rich qualitative insights from community members.
- Observational Study where the researcher observes and records behavior or events as they occur naturally
- Secondary Data Analysis validated trends and contextualized findings.

Spatial analysis and mapping were conducted to evaluate land-use distribution, hazard exposure, and zoning compliance, while traffic volume assessment supported infrastructure performance evaluation. Growth Pole Theory and Corridor Development Theory guided the analytical framework and policy interpretation.

SUMMARY OF FINDINGS

The findings of this research clearly demonstrate that while the Manila–Batangas By-Pass Road has accelerated urbanization, investment activity, and regional connectivity, its full developmental potential remains constrained by fragmented socio-spatial interactions, unregulated land-use transitions, and weak institutional coordination. These patterns affirm the research hypothesis that by-pass roads significantly shape urban structure and influence economic growth yet also reveal the necessity of guiding such growth through deliberate planning frameworks. By integrating the principles of Growth Pole and Corridor Development Theory, the Proposed By-pass Road Development Model offers a strategic path toward transforming the corridor from a source of urban fragmentation into a catalyst for sustainable, connected, and balanced development—ensuring that the benefits of progress are equitably shared and spatially coherent across Lipa City and beyond.

CONCLUSION

The Manila–Batangas By-pass Road possesses strong potential to function as a structured growth corridor rather than a passive transport facility. Integrating corridor-based zoning, growth node hierarchy, environmental safeguards, and participatory governance can enhance socio-spatial cohesion and long-term urban resilience. The proposed development model provides a transferable framework for guiding future by-pass road urbanization in rapidly growing secondary cities.

RECOMMENDATIONS

Drawing from the study's findings and interpretations, the following recommendations aim to strengthen the strategic development of the Manila–Batangas By-Pass Road as a catalyst for sustainable and well-managed urbanization. These proposals are presented across four interconnected dimensions: technical and spatial interventions, integrated planning and policy alignment, community and institutional capacity building, and a guiding conceptual framework to steer infrastructure development within emerging secondary growth areas.

Technical Recommendations:

- Establish Designated Growth Nodes at Strategic Intersections (Growth Pole Theory)
- Implement Corridor-Based Mixed-Use Zoning (Corridor Development Theory)
- Develop an Integrated Multimodal Mobility Network
- Introduce Land Readjustment and Plot Consolidation Mechanisms
- Develop a Green and Blue Corridor System
- Create a By-pass Corridor Management Council (BCMC)
- Adopt a Node-Based Public Transport and Logistics System
- Implement a Development Impact Assessment (DIA) Requirement

Policy and Planning Recommendations:

- Establish a By-pass Road Corridor Development Policy Framework
- Implement Growth Nodes as Official Urban Policy Anchors
- Mandate Multimodal and Complete Streets Standards Along the By-pass
- Strengthen Land Use Conversion Controls and Environmental Safeguards
- Adopt a Corridor-Based Mixed-Use Zoning Policy
- Create a By-pass Corridor Management Council (BCMC)
- Introduce Public–Private Partnership (PPP) Incentives for Strategic Developments
- Enforce Cultural and Community Integration Policies
- Implement a Socio-Spatial Connectivity Improvement Program
- Develop a Long-Term By-pass Corridor Master Plan

CONCEPTUAL VISION FOR URBAN INFRASTRUCTURE AND SPATIAL DEVELOPMENT

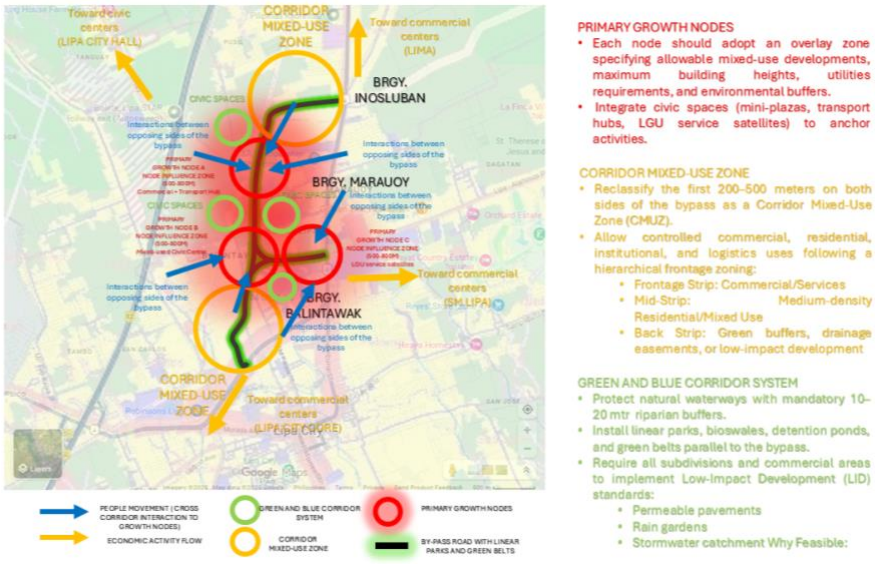

Figure 2. Proposed Growth Nodes, Civic Spaces, and Corridor Mixed-Use Zones Along the By-pass Road

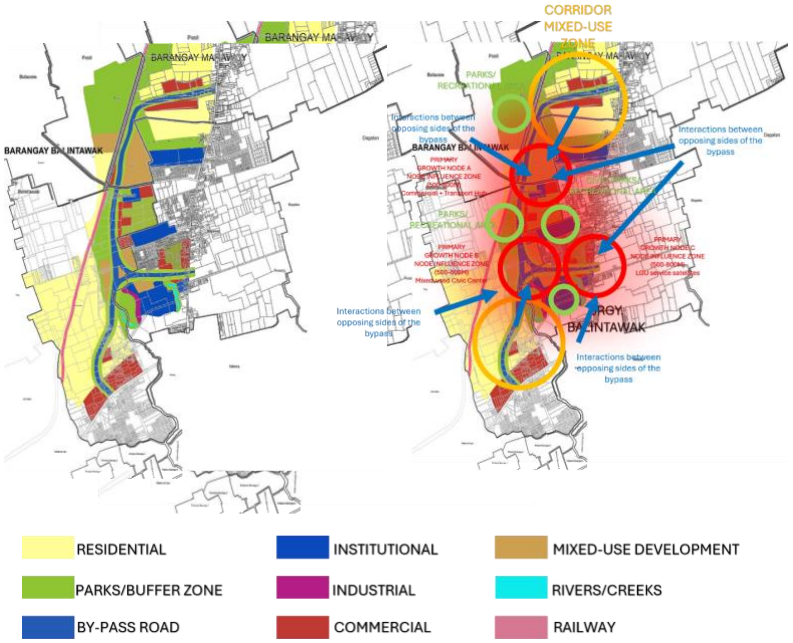

Figure 3. Proposed Land Use Map along the By-pass Road

As illustrated in Fig. 3, the foundation of the proposed By-pass Road Development Model is a comprehensive spatial analysis that evaluates the existing physical and functional characteristics of the corridor. This analysis examines the area's topography, current land-use patterns, transportation networks, ecological systems, and surrounding community relationships. Understanding these baseline conditions is essential for identifying development potentials, spatial constraints, and opportunities for integrated urban growth. The insights gathered through this spatial assessment guide the formulation of a master plan that is both context-sensitive and responsive to the unique socio-spatial dynamics of the by-pass.

- Nodes were placed at key road intersections where interaction naturally concentrates.
- Each node aligns with the proposed "first 200–500 meters" Corridor Mixed-Use Zone (CMUZ).
- Civic spaces were located where socio-spatial connections need reinforcement.
- Green and blue systems guided placement of "back strip" buffer zones.

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ETHICS DECLARATION

Ethics declaration: not applicable.

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