



BIKE LANE MASTER PLAN

Network Planning for the Establishment of Bike Lanes in Metro Manila, Metro Cebu, and Metro Davao

UNDP Philippines (2023) Bike Lane Master Plan

This research is authored by a study team from the University of the Philippines – National Center for Transportation Studies Foundation, Inc. (UP-NCTSFI) and funded by the Global Environment Facility (GEF).

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**Network Planning for the Establishment of Bike Lanes
in Metro Manila, Metro Cebu, and Metro Davao**

Foreword



Jaime J. Bautista
Secretary
Department of Transportation

The Department of Transportation (DOTr) has been mandated by President Ferdinand Marcos, Jr. to raise the Philippine transport system to global standards.

Part of that mandate is promoting road-based projects that address the impact of climate change through sustainable, green transport initiatives such as the Active Transport Program.

Crucial to this program is the collaborative support of local government units (LGUs). Their partnership role is building the necessary transport infrastructures such as protected cycling lanes and paths; end-of-trip facilities; safe and accessible pedestrian walkways; improvement of existing bike lanes; and public transport stops.

We are advocating for LGUs to allocate at least 50% of their road space for public transport, pedestrians and bicycle users.

This Active Transport Program has been incorporated in the Bike Lane Master Plan for Metro Manila, Cebu and Davao that is being proudly turned over to the Department of Interior and Local Government (DILG) by the DOTr Active Transport Program Management Office, United Nations Development Programme (UNDP) and Global Environment Facility (GEF).

This master plan shows a comprehensive bike lane network development plan, including technical, institutional, and information education components.

We extend our full support to this Plan as it equips local officials of the country's three metropolis - Manila, Cebu and Davao - with a how-to-do manual on how to proactively promote urban cycling.

We will continue to expand bike lanes and create a connected network of sidewalks, and pedestrian facilities to encourage commuters to adopt alternative transport modes.



Jaime J. Bautista

Secretary

Department of Transportation

Foreword



Dr. Selva Ramachandran
Resident Representative
UNDP Philippines

The United Nations Development Programme remains strongly committed to the protection of the environment towards the global achievement of the Sustainable Development Goals (SDGs). Since 2017, UNDP has partnered with the Department of Transportation (DOTr) in the implementation of “Promotion of Low Carbon Urban Transport (LCT) in the Philippines Project.” With funding from the Global Environment Facility (GEF), LCT hopes to actively take part in building an enabling environment for the adoption of sustainable transport at the national and local levels across the country.

All over the world, there are numerous studies and models that attest to the health, social, economic and environmental benefits of active transport. This type of mobility refers to the non-motorized means of travel such as walking or cycling; and it is a practice that is yet to take off on a larger scale in the Philippines. Implementation models show that the existence of a well-developed bike lanes network is among the prerequisites for a cycling culture to thrive. With this in mind, LCT partnered with the UP National Center for Transportation Studies (UP-NCTS) for the Network Planning for the Establishment of Bike Lanes in Metro Manila, Metro Cebu, and Metro Davao.

Employing an intensive and participatory approach, UP NCTS has developed this Bike Lane Master Plan for the three urban centers in Luzon,

Visayas and Mindanao. We hope that the local governments of Manila, Cebu, and Davao will find helpful and actionable strategies to promote the shift to and further encourage low carbon modes of mobility. We look forward to the adoption and localization of the technical, institutional, and educational components discussed in the plan that would make for an inclusive, responsive, and comprehensive approach to the implementation of active transport in their localities.

The publication of this Master Plan is meant to uphold, support, and complement public transport policies and initiatives. These include the National Transport Policy crafted by the National Economic Development Authority (NEDA) in 2017. Further, the Plan directly addressed the interagency proposal of developing a bike lane network in Metro Manila through Joint Administrative Order (JAO) No. 0001, Series of 2020 issued by the Department of Health, Department of Transportation, Department of the Interior and Local Government, and Department of Public Works and Highways. The COVID-19 pandemic has shown the positive environmental impact when more people cycle and fewer vehicles are on the roads. Embedding this transport culture will render us cleaner air and healthier people.

By promoting and adopting low carbon urban transport together, we contribute to the achievement of SDG 11 on sustainable cities and communities, and SDG 13 on climate action. We call on our local governments to intensify their efforts. We appeal to the people to consider the shift to sustainable transport. We are beyond excited to anticipate a future of mobility where roads are meant for people, and benefit the people, the community, and the environment.



Dr. Selva Ramachandran
Resident Representative
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The Global Environment Facility (GEF) supported this research through the Promotion of Low Carbon Urban Transport (LCT) Systems in the Philippines Project. LCT is jointly implemented by the Department of Transportation (DOTr) and the United Nations Development Programme (UNDP).

The Project commissioned a study team from the University of the Philippines – National Center for Transportation Studies Foundation, Inc. (UP-NCTSFI) led by Dr. Ricardo DG Sigua with senior transport engineer Jose Regin F Regidor and senior transport economist Gilbert G Garchitorena. They are supported by administrative assistant Alorna A. Abao and research assistants Julshabar U. Halil, Roseanne Ramos, Al-Qadeer J. Abdullah, and Ramir Seraphim L. Angeles.

The study team would like to thank the DOTr and UNDP together with GEF for promoting active transportation in the country, particularly cycling, which has been identified as one of the modes of sustainable transport. DOTr's initiatives have paved way for several projects and activities such as the development of a bike lane network for the metropolitan areas of Manila, Cebu and Davao.

The study team would also like to extend their gratitude to the following LGUs for their active participation and contribution in the conduct of the network planning: Metro Manila (Caloocan City, Las Piñas City, Makati City, Malabon City, Mandaluyong City, Manila City, Marikina City, Muntinlupa City, Navotas City, Parañaque City, Pasay City, Pasig City, Municipality of Pateros, Quezon City, San Juan City, Taguig City, and Valenzuela City); Metro Cebu (Lapu-lapu City, Mandaue City, Municipality of Cordova, Cebu City, and Talisay City); Metro Davao (Davao City and Tagum City). The team also would like to express their gratitude to the various bicycle groups and mobility advocates who provided inputs throughout the master plan formulation.

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Abbreviations & Acronyms

AADT	Annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ADB	Asian Development Bank
ADT	Average daily traffic
AT	Active transport
CO2	Carbon dioxide
DBP	Development Bank of the Philippines
DILG	Department of the Interior and Local Government
DO	Department Order
DOH	Department of Health
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways
ECQ	Enhanced community quarantine
EST	Environmentally sustainable transport
FGD	Focus group discussion
GAA	General Appropriations Act
GAM	Goal Achievement Matrix
GDP	Gross domestic product
GEF	Global Environment Facility
GFI	Government financial institutions
GHG	Greenhouse gas
ICSC	Institute for Climate and Sustainable Cities
IEC	Information-Education Campaign
ILS	Institute for Labor Studies
IRA	Internal revenue allotments
iRAP	International Road Assessment Programme
ITDP	Institute for Transportation and Development Policy
JAO	Joint Administrative Order
LBP	Land Bank of the Philippines
LCT	Promotion of Low Carbon Urban Transport Systems in the Philippines
LGU	Local government unit

LMT	Light mobility vehicles
LGSF-AC	Local Government Support Fund-Assistance to Cities
MDFO	Municipal Development Fund Office
MMDA	Metro Manila Development Authority
MMARAS	Metro Manila Accident Reporting and Analysis System
NACTO	National Association of City Transportation Officials
NBO	National Bicycle Organization
NEDA	National Economic Development Authority
NMT	Non-motorized transport
ODA	Official development assistance
OSM	OpenStreetMap
PFI	Private financial institutions
PMD	Personal Mobility Devices
PPA	Programs Projects and Activities
PUV	Public utility vehicles
SDGs	Sustainable Development Goals
TWG	Technical working group
UNDP	United Nations Development Programme
UP-NCTS	University of the Philippines – National Center for Transportation Studies
UP-NCTSFI	University of the Philippines – National Center for Transportation Studies Foundation, Inc.
VOC	Vehicle operating cost

Executive Summary

The main objective of this master plan is to provide local government units in Metro Manila, Metro Cebu and Metro Davao with a guide towards a more comprehensive, inclusive and equitable bike lanes network development. This plan includes technical, institutional and information/education components among others that may be adopted by the LGUs.

Based on the discussions with the various cities and municipalities in Metro Manila, Metro Cebu and Metro Davao, the following vision is formulated to describe the aspirations of stakeholders:

“A metropolis where riding a bicycle is safe and sustainable for everyone.”

“Safe” captures comfortability, convenience and attractiveness. The word “safe” is more familiar to most people and stronger in the context of road and traffic conditions. “Sustainable” captures purpose (i.e., commute, errands, exercise, recreation). It also covers health, environmental, and energy concerns. The word “everyone” means cycling should be for all people regardless of gender, physical ability and income level. Thus, it is inclusive and equitable for people who opt to use bicycles as means of transport. The vision is not exclusive or independent of walking as it should be integral of an overall vision for active transport. This is also consistent with the vision described in the National Transport Policy.²

In accordance with the National Transport Policy issued by the National Economic and Development Authority in 2017, and Joint Administrative Order (JAO) No. 0001, Series of 2020, the DOH, DOTr, DILG and DPWH proposed a Metro Manila-Wide Bike Lane Network which would cover the Circumferential, Radial, and other major roads in Metro Manila through the “Bayanihan to Recover As One” Act. The whole alignment is estimated to cover about 497 kilometers of bikeway infrastructure for both directions of all the sections of the Network and would connect major residential areas, activity areas, and major public transport facilities. Similar efforts are being done in Metro Davao and Metro Cebu to promote active transportation in the country.

¹ Focus Group Discussions with Metro Manila, Metro Cebu and Metro Davao local government units held on September 7, 8, 9 and 15.

² National Economic and Development Authority (2017) “Approving the National Transport Policy,” <https://neda.gov.ph/national-transport-policy/>

In Metro Manila, the expansion of the bike lane network has to go beyond major thoroughfares (circumferential and radial roads). There is a need to connect these bike lanes to interior parts of local government units to increase their utilization. During the capacity building activities conducted for LGUs, it was found out that there were already some LGUs with existing bike lanes. Some LGUs without bike lanes were still at the stage of planning for bike facilities. The capacity building under this project seemed timely as part of the activities during the capacity building was the development of bike lanes network in each LGU, with the objectives of connecting the bike lanes to major centers/establishments within the LGU, and connecting them to the current bike lane network developed under Bayanihan II. The following figures show the consolidated bike network plans for Metro Manila, Metro Cebu and Metro Davao.

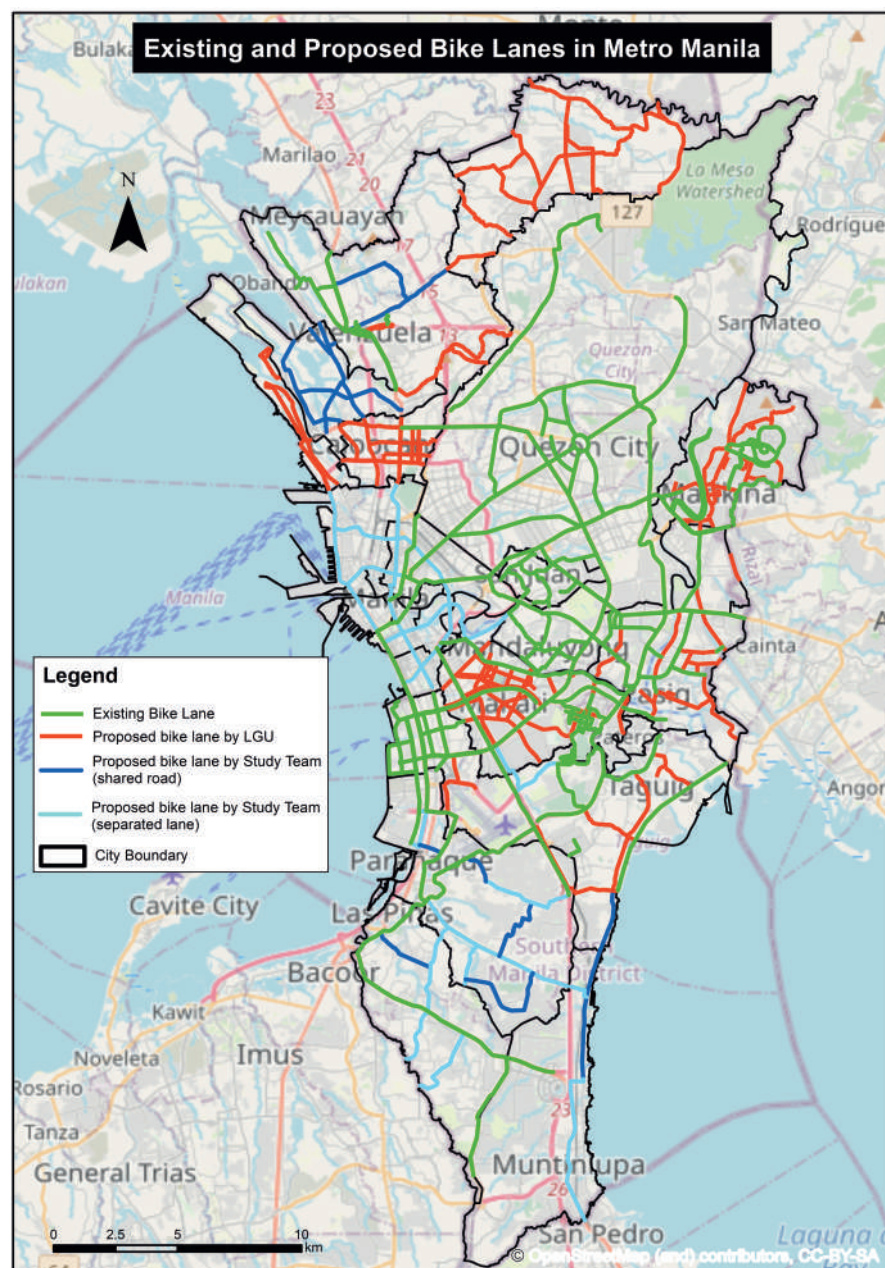


FIGURE ES-1: BIKEWAY NETWORK PLAN FOR METRO MANILA



FIGURE ES-2: BIKEWAY NETWORK PLAN FOR METRO CEBU

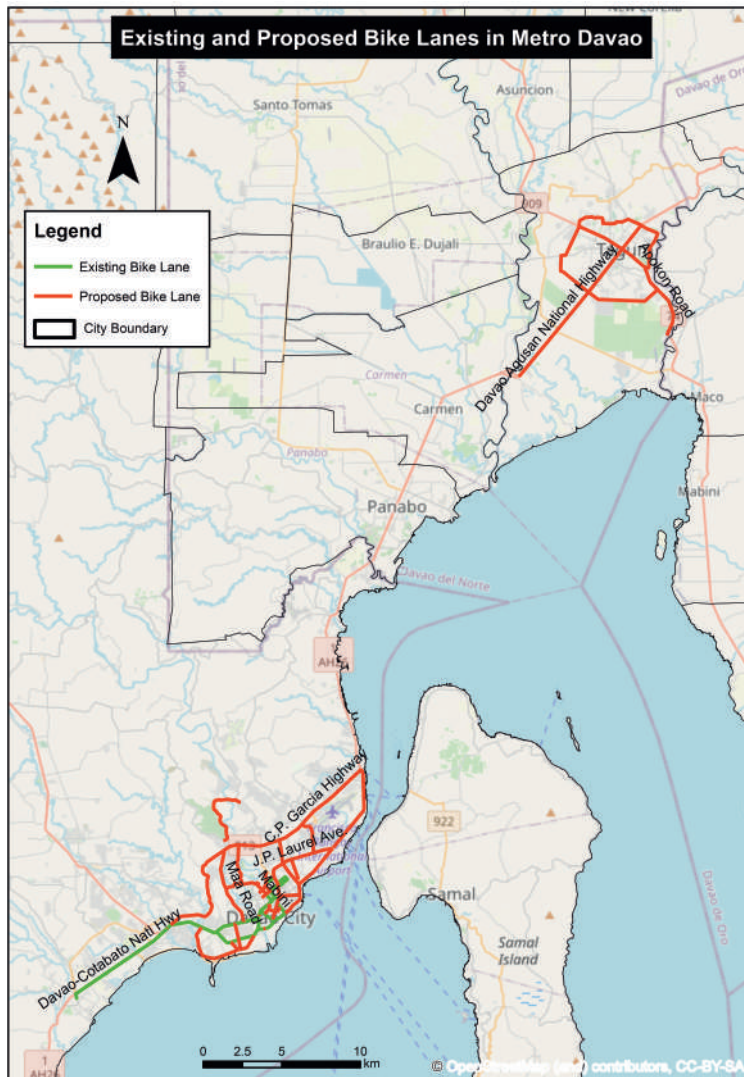


FIGURE ES-3: BIKEWAY NETWORK PLAN FOR METRO DAVAO

Summary of Recommendations

The recommendations are outlined in the form of strategies, actions, and targets. Table ES-1 summarizes the strategies for establishing a network of bike lanes and related facilities as well as the promotion of cycling for various purposes in the metropolitan areas. Corresponding actions and targets are also presented for the implementation or realization of these strategies that include concrete and measurable items that can be monitored for progress.

TABLE ES-1: SUMMARY OF STRATEGIES, ACTIONS, AND TARGETS

STRATEGIES	ACTIONS	TARGETS*
1) Expand network of protected and/or exclusive bike lanes	Allocate and legislate funding for expansion of protected bike lanes (i.e., Class I and Class II) at the national level;	Annual funding for bike lane expansion, maintenance and studies at the national and local levels from 2022;
	Construct or upgrade Bayanihan bike lanes to at least Class II-Type A;	Upgrading Bayanihan bike lane network to Class II-Type A within 3 years or 2025;
	Research on the bike lane network required for bicycle commuting (i.e., bike-to-work, bike-to-school);	Metropolitan-scale transport models including bicycles as a mode of transport within 3 years or 2025;
	Collect relevant data for bike lane development including counts, travel time and trip purpose	Metro-wide database of relevant data for bicycle facilities planning and design within 3 years or 2025; Regular (annual) data collection at the institutional level within 3 years or 2025 Publish unit costs for bicycle facilities such as cost of construction of Class I bike lanes by 2022.
2) Develop network of streets with shared lanes	Allocate and legislate funding for expansion of protected bike lanes (i.e., Class I and Class II) at the local level;	Annual funding for bike lane expansion and maintenance at the local level in the immediate term or by 2022;
	Identify and develop local streets for shared lanes (i.e., Class III);	Develop shared lanes for local streets in the immediate term (i.e., within 1 year or by 2022); Upgrading of local streets bike lane network to Class II-Type B within 3 years or by 2025;
	Implement lower speed limits;	Reduction of motor vehicle speed-related crashes and fatalities within 3 years or by 2025;
	Research on the bike lane network required for bicycle commuting (i.e., bike to work, bike to school); Collect relevant data for bike lane development including counts, travel time and trip purpose	LGU-scale transport models including bicycles as a mode of transport by 2025; LGU-wide database of relevant data for bicycle facilities planning and design at the local level by 2022;
3) Develop end-of-trip facilities for all types of establishments	Inventory survey of bicycle parking facilities for various establishments including designs, number of slots and costs;	Local ordinances providing legal basis for minimum bicycle parking for various establishments within 3 years or by 2025;
	Research on design, suitable number of slots and cost-effective bicycle parking facilities for short-term and long-term parking;	National Building Code provisions for minimum bicycle parking for various establishments within 3 years or by 2025; Publication of unit costs for parking and other end-of-trip facilities at the local level by 2022.

STRATEGIES	ACTIONS	TARGETS*
<p>4) Encourage bicycle use especially for commuting (i.e., bike-to-work and bike- to-school)</p>	<p>Provide bicycle facilities at public transport stops, stations and terminals;</p>	<p>Bike racks on city buses and jitneys within 3 years or by 2025;</p> <p>Bike slots on commuter trains within 3 years or by 2025;</p> <p>Annual increase in mode share of bicycles per LGU;¹³</p>
	<p>Provide bicycle facilities at workplaces and schools</p>	<p>Shower and changing facilities at workplaces and schools in the immediate term or by 2022;</p> <p>Annual increase in mode share of bicycles per school or workplace;¹⁴</p>
	<p>Collect relevant travel data including origin-destination data, trip purpose and travel time;</p> <p>Research on bicycle safety including suitable assessment methodology (e.g., IRAP's Star Ratings);</p>	<p>Publication of unit benefits and costs for incremental improvements in safety (e.g., crash reduction in PHP per unit increase in bike activity in person-km traveled or % mode share) by 2022;</p> <p>Adoption of IRAP Star Ratings for active transport by 2022;</p> <p>Production and dissemination of IEC/C4D materials on the benefits of cycling by 2022.</p>
	<p>Research on the health, environmental and economic benefits of cycling</p>	<p>Publication of unit benefits and costs for incremental improvements in active transport activities (e.g., health savings in PHP/person per unit increase in activity in person-km traveled or % mode share) by 2022;</p> <p>Production and dissemination of IEC/C4D materials on the benefits of cycling by 2022.</p>



CHAPTER 1

Background



1. Background

1.1 Context and Rationale

Active transportation was earlier known as non-motorized transport (NMT), which has been cited as one of the major thematic areas of Environmentally Sustainable Transport (EST)¹. Setting the tone for EST and NMT is Executive Order No. 774, Series of 2008², which includes Section 9 assigning the then Department of Transportation and Communications (DOTC) to reform the transport sector to favor non-motorized transport, and the Department of Interior and Local Government (DILG) to “*coordinate with local government units and guide them on the plan to transform the locomotion and transportation system to favor parties who have to motorized vehicles.*” Previous work on EST and NMT in the Philippines include the Capacity Building and Social Marketing for Environmentally Sustainable Transport (2009)³, and the Formulation of a National Environmentally Sustainable Transport (EST) Strategy for the Philippines (2011)⁴. Even earlier was the development of the Marikina City Bikeways Network that was initially funded by the World Bank through a GEF grant (Marikina City Bikeways Network Master Plan, 2000)⁵ and continued by the local government unit (LGU) afterwards.

More recent issuances include the National Economic and Development Authority (NEDA) Board Resolution No. 5, Series of 2017, “Approving the National Transport Policy.”⁶ The National Transport Policy was formulated to achieve a vision of a “*safe, secure, reliable, efficient integrated, intermodal, affordable, cost-effective, environmentally sustainable, and people-oriented national transport system that ensures improved quality of life of the people.*” The Department of Transportation (DOTr) issued Department Order No. 2020-14, “Guidelines and Protocols for Active Transportation and Light Mobility Vehicles.”⁷ The D.O. reinforces the provisions of E.O. 774, S. 2008 by providing guidelines for all road users in order to promote NMTs, personal mobility devices (PMDs), and ultimately improve road safety for all.

The COVID-19 pandemic exposed the deficiencies of the transportation system of many cities and municipalities, and brought out the important role active transport can play in

¹ Aichi Statement (2005) “Towards establishment of the Regional Forum for the promotion of environmentally sustainable transport (EST) in Asia,” Regional EST Forum, https://www.uncrd.or.jp/content/documents/200508_Aichi-Statement.pdf

² Office of the President of the Philippines (2008) Executive Order No. 774, Series of 2008, Reorganizing the Presidential Task Force on Climate Change, <https://www.officialgazette.gov.ph/2008/12/26/executive-order-no-774-s-2008/>

³ National Center for Transportation Studies (2009) EST Casebook: Leading Practices of Philippine Cities on Environmentally Sustainable Transport (EST), with DOTC, DENR and UNDP.

⁴ National Center for Transportation Studies (2011) Formulation of a National Environmentally Sustainable Transport (EST) Strategy for the Philippines, with DOTC, DENR, UNCRD, CAA and iGES.

⁵ UP National Center for Transportation Studies Foundation, Inc.(2000) Development of Marikina City Bikeway Network Masterplan.

⁶ National Economic and Development Authority (2017) “Approving the National Transport Policy,” <https://neda.gov.ph/national-transport-policy/>

⁷ Department of Transportation (2020) Department Order 2020-14, Guidelines and Protocols for Active Transportation and Light Mobility Vehicles, <https://drive.google.com/file/d/1i481lxYP8bO4In0MVAYmweD9PqD4vagL/view>

order to face the challenges of a new normal. Pop-up and permanent bike lanes sprouted along several major roads, with pandemic frontliners commuting on bicycles among the primary users. These were followed by more people opting to use bicycles as part of their commutes or other trips; encouraged by the separated, if not protected bike lanes.

The Department of the Interior and Local Government (DILG) issued Memorandum Circular No. 2020-100: “Guidelines for the Establishment of a Network of Cycling Lanes and Walking Paths to Support People’s Mobility” on 17 July 2020. In line with the principles and policies set by the memo and the criteria for monitoring of LGUs establishment of cycling lanes and walking paths, it is desired to formulate plans and identify projects to promote walking and cycling, otherwise known as active transportation, that can be included and can be adopted by local government units in Metro Manila, Metro Cebu, and Metro Davao.

The Department of Health (DOH), the Department of Transportation (DOTr), the Department of Interior and Local Government (DILG), and the Department of Public Works and Highways (DPWH) issued the Joint Administrative Order (JAO) No. 2020-0001: “Guidelines on the Proper Use and Promotion of Active Transport During and After the COVID-19 Pandemic” last 19 August 2020. The primary objective of this Order is to provide guidance for the promotion and safe use of active transport during and after the COVID-19 pandemic. It enjoins LGUs to do the following, among other provisions of the JAO:

- Promote the use of active transport such as walking, cycling or other forms of light mobility for transportation;
- Provide a community-wide network of safe walking paths, bicycle lanes, and roads to enable travel entirely by foot, by bicycle, or by other forms of light mobility through their own ordinances; and
- Allocate bicycle lanes and walking paths on roads under their jurisdiction, subject to the result of feasibility studies

The main objective of this master plan is to provide local government units in Metro Manila, Metro Cebu, and Metro Davao with a guide towards a more comprehensive, inclusive and equitable bike lanes network development. This plan includes technical, institutional and information/education components among others that may be adopted by the LGUs.

1.2 Current situation

1.2.1 Issues and Challenges

a. Users' perspective

The World Bank conducted consultations with the active transport community in June 2021.⁸ The consultations were part of a Technical Assistance for Active Transport to support the Government of the Philippines in delivering effective bicycle infrastructure, capacity building and community consultation activities. The consultations covered the areas of Metro Manila, Metro Cebu, and Metro Davao. Among the likely barriers for not cycling, the top three came out as:

1. No proper cycling lanes;
2. No proper bicycle parking; and
3. No end of trip facilities.

Other responses were related to travel distance, weather, helmet use, fitness and bicycle ownership; but were found to be not as significant as the top three concerns. Safety can already be assumed as included in the lack of proper cycling lanes.

The outcomes revealed that most respondents declared their main purpose for cycling was exercise/leisure. Elsewhere and not necessarily part of the study area for this master plan, it was determined that up to 63% of those riding bicycles use it for commuting as a main mode of transport.⁹

b. LGU perspective

A series of Focus Group Discussions (FGDs) were conducted from 7 to 15 September 2021. Prior to the FGDs, a Self-Administered questionnaire was sent to LGUs to gather information on issues from their perspective. The word cloud in Figure 1.1 illustrates the main issues and other notables from the survey.

⁸ World Bank (2021) Active Transport Infrastructure Community Consultation Report

⁹ Zamboanga City (2021) Transportation and Traffic Management Plan, Final Report – It was found that 14% of the population own bicycles and use them for commuting and recreation. Of the respondents in the Origin-Destination survey 30% stated that they use bicycles primarily for commuting while 37% use bikes mainly for recreation/exercise. 30% use bicycles for both.

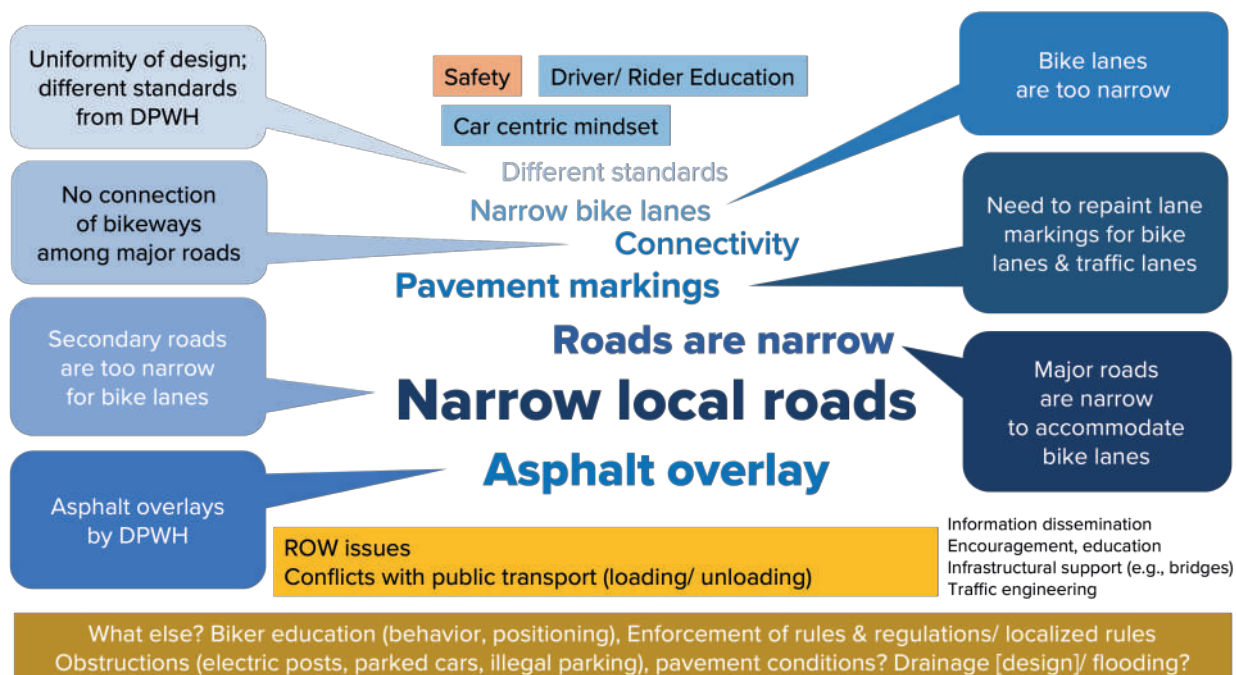


FIGURE 1.1 WORD CLOUD OF ISSUES CONCERNING BIKE LANES

These issues were presented to the LGUs that were clustered based on their geographic locations (e.g., CaMaNaVa cities of northern Metro Manila were in one group, MuntiParLas cities of southern Metro Manila in another, etc.) to initiate discussions. Table 1.1 shows the summary of issues identified and discussed based on the FGDs as well as the survey conducted.

TABLE 1.1 SUMMARY OF ISSUES DERIVED FROM LGU CONSULTATIONS AND FGDs

Metropolitan Area	LGU	Issues ^a
METRO MANILA	Caloocan City	On-street parking and standing conflict with bike lanes especially along roads with many commercial establishments
	Las Piñas City	Connectivity; road safety; biker education
	Makati City	When the DOTr installed their facilities, they overrode/took over key target roads like J. P. Rizal Avenue, Kalayaan Avenue and Buendia Avenue, what remains for Makati are the included secondary roads in our plan; Some preferred roads are too narrow to have double sided bike lanes, like Pasong Tamo Street and other secondary roads; bicycle security/theft

Metropolitan Area	LGU	Issues ^a
	Malabon City	Narrow streets to enable separate bike lanes
	Mandaluyong City	Connectivity among LGUs; accessibility (i.e., people's proximity to bike lanes); on-street parking/illegal parking; driver and rider (motorcycle) behavior/education
	Manila City	On-street parking; motor vehicles waiting/standing along bike lanes; narrow local roads; safety (e.g., bike lanes alongside truck lanes)
	Marikina City	No response received ^b
	Muntinlupa City	Connectivity; road safety
	Navotas City	On-street parking and standing conflict with bike lanes especially along roads with many commercial establishments
	Parañaque City	Separation and conflict among bicycles and motorcycles; lack of ordinance supporting bike use
	Pasay City	Current protected bike lanes established in Pasig City were kept to 1.5 meters or 4.9 feet per direction on average, considering the city's local context. For reference, said width corresponds only to the lowest infrastructure grade by Dutch standards. Car-centric mindset & behavior.
	Pateros	No response received ^b
	Quezon City	On-street parking; motor vehicles waiting/standing along bike lanes; narrow local roads; safety (e.g., bike lanes alongside truck lanes); lack of data to determine where to prioritize construction of bike lanes
	San Juan City	Connectivity among LGUs; accessibility (i.e., people's proximity to bike lanes); on-street parking/illegal parking

Metropolitan Area	LGU	Issues ^a
	Taguig City	Coordination regarding barriers; maintenance of barriers and bollards; Narrow streets that cannot accommodate separate bike lanes; Currently, there are no established bike lanes or shared roads connecting C-6 road to either C-5 road or Cayetano Boulevard. The bike lane network can be connected either through Cuasay Road or Ruhale Street. Both roads were evaluated to be too narrow to accommodate a bike lane with a minimum width of 4 feet or 1.2 meters.
	Valenzuela City	On-street parking and standing conflict with bike lanes especially along roads with many commercial establishments; conflicts with public utility vehicles (e.g., no loading/unloading bays); separation of bike lanes and traffic lanes especially considering trucks
METRO CEBU	Lapu-Lapu City	Infrastructure support; connectivity
	Mandaue City	Coordination among neighboring LGUs; connectivity; implementation of ordinance
	Cordova	Infrastructure support; connectivity
	Cebu City	No response received ^b
	Talisay City	Rider behavior (i.e., younger riders are more aggressive while older ones are more disciplined)
METRO DAVAO	Davao City	Localized rules; lack of guidance for bike network development especially in light of High Priority Bus System development; design guidelines
	Tagum City	Road design issues including pavement and intersection design

Notes:

- a. All LGUs that provided inputs and opinions cite lack of funding as a constraint in local bike lane network development (i.e., roads that are not part of Bayanihan).
- b. Cebu City, Marikina City and Pateros did not participate in the consultations and FGDs.

1.2.2 Current practices

The DPWH, in collaboration with the DOTr, issued Department Order No. 88, series of 2020 – “*Prescribing Guidelines on the Design of Bicycle Facilities along National Roads*”. This was used by many LGUs that were unaware or had no prior experience in bike lanes or bikeways design and construction. This was updated recently with a Memorandum dated 18 June 2021 – “Updated Guidelines and Standard Drawings for Bicycle Facilities.” DPWH D.O. No. 88, Series of 2020 and the Updated Guidelines can be found in Annexes A and B, respectively.

Consultations with Metro Manila, Metro Cebu, and Metro Davao LGUs revealed more references currently in use by some LGUs other than the DPWH guidelines. These include the following:

1. CROW Design Manual for Bicycle Traffic (used for Dutch bicycle infrastructure);
2. DOH’s Local Health System Health Promotion Playbook: Active Transport;
3. Dutch Cycling, EnMorgen (Netherlands);
4. National Association of City Transportation Officials (NACTO);
5. Online seminars learned from UP-NCTS including the standards of the facilities, from pavement line markings patterns and design of the signages to be used; and
6. Various articles on bike lanes and bikeways design found on the internet.

The DOH Playbook on Active Transport is not a design manual but contains recommendations for interventions such as street transformations, as well as templates for ordinances, cost estimates, and information-education campaign (IEC) materials that can be adopted and customized by LGUs. The playbook is included in Annex C.

CHAPTER 2

Framework



2. Framework

2.1 Vision

A vision statement usually reflects the future image of transportation defined and desired by stakeholders. There may be a vision and image for transportation in general and there may also be a more specific vision and image for active transportation. These two need to be harmonized especially in the context of sustainability.

Based on the discussions with the various cities and municipalities in Metro Manila, Metro Cebu and Metro Davao¹ the following vision is formulated to describe the aspirations of stakeholders:

“A metropolis where riding a bicycle is safe and sustainable for everyone.”

“Safe” captures comfortability, convenience and attractiveness. The word “safe” is more familiar to most people and stronger in the context of road and traffic conditions. “Sustainable” captures purpose (i.e., commute, errands, exercise, recreation). It also covers health, environmental, and energy concerns. The word “everyone” means cycling should be for all people regardless of gender, physical ability and income level. Thus, it is inclusive and equitable for people who opt to use bicycles as means of transport. The vision is not exclusive or independent of walking as it should be integral of an overall vision for active transport. This is also consistent with the vision described in the National Transport Policy².

2.2 Goals

Goals may be classified according to ridership, safety, connectivity, equity, and livability.³ Ridership goals are related to a target percentage of the population using bicycles as their primary or choice mode of transportation. Safety goals refers to the reduced crash rates or incidents involving cyclists and may extend to reduced fatalities and injuries. Connectivity goals pertain to network development including quality (i.e., protected bike lanes with the highest capacities) and quantity (i.e., length of bike lanes). Equity can be interpreted as the accessibility and availability of bike facilities for everyone’s use. This includes public and private investments towards bike facilities development. Livability means building an

¹ Focus Group Discussions with Metro Manila, Metro Cebu and Metro Davao local government units held on September 7, 8, 9 and 15.

² National Economic and Development Authority (2017) “Approving the National Transport Policy,” <https://neda.gov.ph/national-transport-policy/>

³ Seattle Department of Transportation (2014) Bicycle Master Plan

enabling environment for active transport in general and cycling in particular. These goals will be discussed in more detail in the subsequent chapters, where strategies and actions will be presented.

2.3 Context

The main concept for complete streets is that it places a priority on active transport. Complete streets designs emphasize making it easier for people to cross the street, walk to shops, and use bicycles. It also refers to designs around efficient street networks and context-sensitive solutions, like allowing buses to run on time and making it safe for people to walk to and from transit stations (i.e., jeepney or bus stops). Technically, complete streets also refers to the coordination of all street elements (infrastructure, paving, street furniture, signage, lighting, trees, and vegetation) for the use, enjoyment, and understanding of the public realm.

Complete streets must be designed with the following in mind:

- **Accessibility first** – Streets that focus on accessibility before vehicle flow and capacity/ accessible to everyone;
- **Inclusive design** – Streets that favor the most vulnerable users lead to fair and democratic streets;
- **Safety principles** – Streets that care for the comfort and well-being of its users through smart design;
- **Effective for all citizens** – Streets that take into account impacts, benefits, and externalities for all users;
- **Urban integration** – Streets that take into account the street’s multi-functionality, compatibility, and diversity of use; and
- **Continuity** – Streets that are envisioned not only in a plan or street section, but consistent in space and time along their corridor.

Table 2.1 shows a comparison of traditional and new framing of streets.⁴

⁴ Schlossberg, M., Lindgren, R., Amos, D. and Rowell, J. (2019) Rethinking Streets for Bikes: An Evidence-Based Guide to 25 Bike-Focused Street Transformations, University of Oregon.

TABLE 2.1 FRAMING OF STREETS

TRADITIONAL FRAMING (car-oriented)	NEW FRAMING (people-oriented)
Mobility	Accessibility
Throughput of vehicles	Throughput of people
Vehicular delay	Person delay
Average daily traffic (ADT)	ADT for all
Plan for the peak	Plan for off-peak
Journey to work	All trips
Congestion reduction	Congestion alternatives
American Association of State Highway and Transportation Officials (AASHTO)	National Association of City Transportation Officials (NACTO)
Vehicle level of service (LOS)	Multimodal level of service
Going somewhere else	Places to be

Figure 2.1 shows an infographic explaining how cycling becomes part of sustainable economic development policy. This includes how cycling covers all aspects of the society including health and mobility.

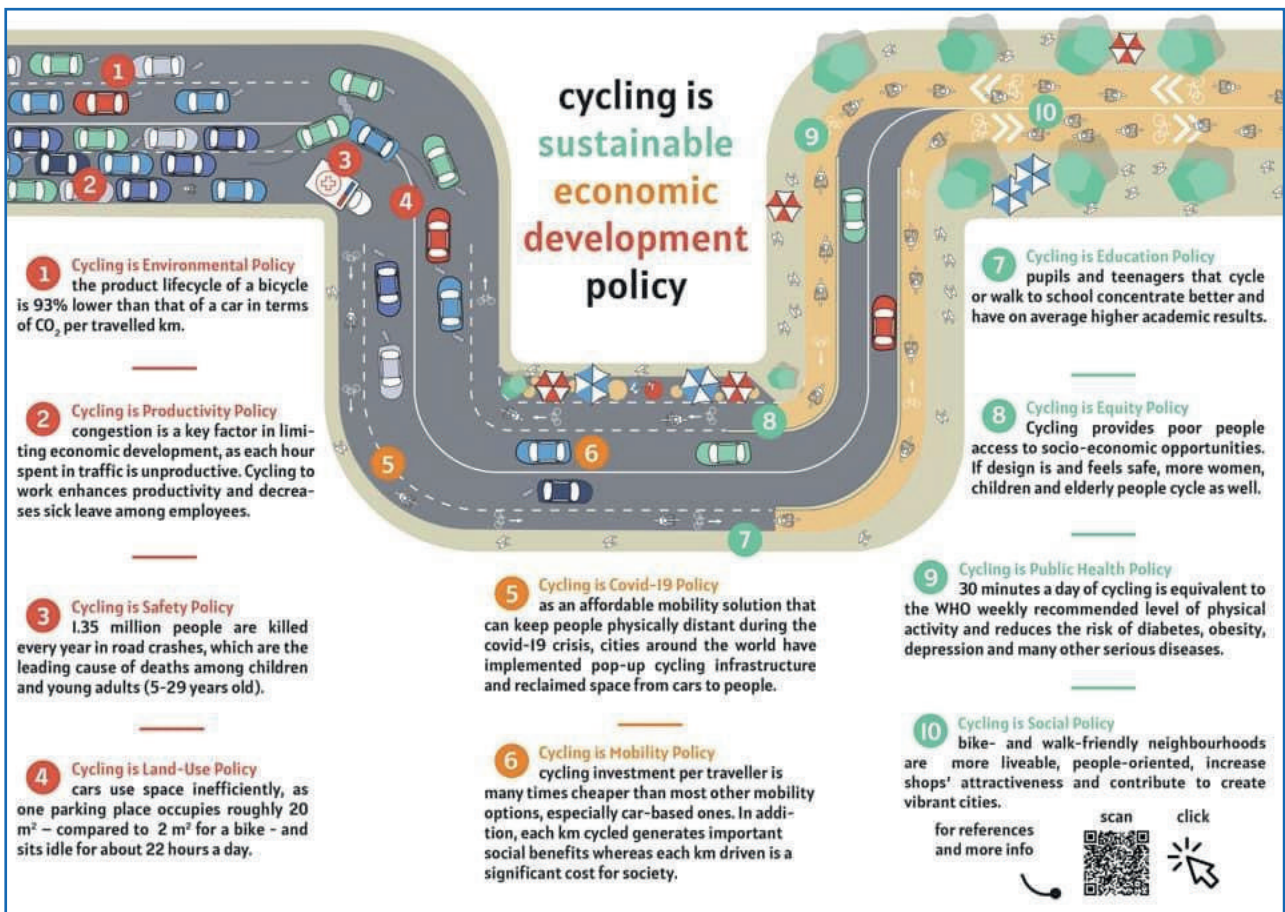


FIGURE 2.1 CYCLING AS SUSTAINABLE ECONOMIC DEVELOPMENT POLICY (REF. DUTCH CYCLING)

2.4 Policies and legislation

2.4.1 National

Table 2.2 shows the relevant national issuances in the form of Executive Orders, Joint Administrative Orders, Department Orders, Memorandum Circulars, and others that have been issued over the past decade. These provide the official and legal basis for the development of a comprehensive bike lane network across the country including the necessary facilities to encourage and support cycling as a preferred mode of transport.

TABLE 2.2 RELEVANT NATIONAL ISSUANCES ON ACTIVE TRANSPORT

AGENCY	TYPE OF ISSUANCE	NUMBER	TITLE	DATE OF ISSUANCE/ APPROVAL
NEDA	n/a	n/a	Philippine Development Plan 2023 – 2028	27 January 2023
DPWH	Department Order	263 (2022)	Updated Guidelines and Standard Design Drawings for Bicycle Facilities along National Roads	19 December 2022
DPWH	Memorandum	unnumbered	Updated Guidelines and Standard Drawings for Bicycle Facilities	18 June 2021
LTFRB	Memorandum Circular	042 (2021)	Road Safety Guidelines to be Observed by Public Utility Vehicles (PUV), with Priority to Active Transport (AT) and Light Mobility Vehicles (LMV)/ Personal Mobility Devices (PMD) Users	24 June 2021
LTO	Memorandum Circular	2267 (2021)	Guidelines and Protocols for Drivers in the Operation of Motorcycles, Cars, Trucks and Other Motorized Vehicles	21 May 2021
Office of the President	Proclamation	1052, (2020)	Declaring the Fourth Sunday of November as National Bicycle Day	18 November 2020
DPWH	Department Order	88 (2020)	Prescribing Guidelines on the Design of Bicycle Facilities along National Roads	29 September 2020
Congress	Republic Act	11494	An Act Providing for Covid-19 Response and Recovery Interventions and Providing Mechanisms to Accelerate the Recovery and Bolster the Resiliency of the Philippine Economy, Providing Funds Therefor, and for Other Purposes	11 September 2020
DOTr	Department Order	14 (2020)	Guidelines and Protocols for Active Transportation and Light Mobility Vehicles	25 August 2020
DOH- DOTr- DILG- DPWH	Joint Administrative Order	0001 (2020)	Guidelines on the Proper Use and Promotion of Active Transport During and After the COVID-19 Pandemic	19 August 2020
DILG	Memorandum Circular	100 (2020)	Guidelines for the Establishment of a Network of Cycling Lanes and Walking Paths to Support People's Mobility	17 July 2020
NEDA	n/a	n/a	National Transport Policy and its Implementing Rules and Regulations	14 December 2018
NEDA	Board Resolution	5 (2017)	Approving the National Transport Policy	12 September 2017

AGENCY	TYPE OF ISSUANCE	NUMBER	TITLE	DATE OF ISSUANCE/ APPROVAL
Office of the President	Administrative Order	254 (2009)	Mandating DOTC to take the lead in formulating a Strategy also attached importance to the development of the National EST Strategy	30 January 2009
Office of the President	Executive Order	774 (2008)	Reorganizing the Presidential Task Force on Climate Change	26 December 2008

2.4.2 Local

Table 2.3 lists the bicycle-related local ordinances in the cities and municipalities in Metro Manila, Metro Cebu and Metro Davao. These reinforce national issuances and provide for more localized policies for bicycle facilities.

TABLE 2.3 APPROVED BIKE ORDINANCES

Metropolitan Area	LGU	Bike Ordinance		
		Ordinance Number	Title	Date of Approval/ Issuance
METRO MANILA	Mandaluyong City	838, S-2021	An Ordinance Establishing a Network of Bicycle Lanes and Improved Pedestrian Walkways to Support the Alternative Mobility of Mandaluyong City	23 August 2021
	Navotas City	2020-04	An Ordinance Adding Sections 2(h) and amending Section 2(c) and Section 3 of City Ordinance No. 2018-11, Otherwise Known as An Ordinance Regulating the Use of Electronic Bicycles (e-bikes) within the City of Navotas and Imposing Penalties Thereof	9 March 2020
	Parañaque City	2020-23, Series of 2020	An Ordinance Designating the Outer Lane of Dr. A. Santos Avenue and Ninoy Aquino Avenue in the City of Parañaque as Motorcycle Lane and a Portion of which as Bicycle Lane, Establishing Appropriate Rules and Regulations, Providing Penalties for Violations and Appropriating Funds for the Purposes thereof	16 July 2020
	Pasig City	13, Series of 2011	Ordinance Promoting Biking as Healthful and Environmentally Sound Mode of Transportation in Pasig City by Providing Institutional Mechanisms, Incentives, People's Participation, Penalties for Violation thereof and for other Purposes	16 June 2011
	Quezon City	2988, S-2020	An Ordinance Promoting Safe Cycling and Active Transport as an Alternative Mode of Transportation in Quezon City, Creating the Bicycle and Active Transport Section under the Department of Public Order and Safety-Green Transport Office, and for other Purposes	9 December 2020

Metropolitan Area	LGU	Bike Ordinance		
		Ordinance Number	Title	Date of Approval/ Issuance
METRO MANILA	San Juan City	47, Series of 2020	An Ordinance Promoting Healthier Lifestyle and Environmentally Sound Mode of Getting Around the City Through the Use of Bicycles and Providing Institutionalized Infrastructure thereof	13 July 2020
	Taguig City	17, Series of 2020	An Ordinance Adopting a Bike Friendly Program for Taguig City, Providing Framework for its Implementation, Appropriating the Necessary Funds thereof, and for other Purposes	1 June 2020
	Valenzuela City	969, Series of 2021	Paggamit ng Bike Lane sa Valenzuela	6 December 2021
METRO CEBU	Mandaue City	15-2020- 1582	An Ordinance Providing for the Comprehensive Rules and Regulations in the Operation of Bicycle System in the City of Mandaue and Providing Penalties therefor	7 December 2020
	Cebu City	2408	An Ordinance Providing for Shared Priority Bike Lanes in Designated Roads in Cebu City, Establishing Appropriate Traffic Rules and Regulations and Providing Funds and Penalties for Violations Thereof	29 October 2014
METRO DAVAO	Davao City	0668-21, Series of 2021	Amended Bicycle & Light Mobility Vehicle Ordinance of Davao City	27 July 2021

It is important to note that the DOH Playbook⁵ includes a template for an ordinance establishing an active transport network which covers bike lanes and pedestrian facilities. The template can be readily adopted and customized by LGUs for their purposes.

CHAPTER 3

Bike Lane Network



3. Bike Lane Network

3.1 Network development & connectivity

3.1.1 Backbone network

In accordance with the National Transport Policy issued by the National Economic and Development Authority in 2017, and Joint Administrative Order (JAO) No. 0001, Series of 2020, the DOH, DOTr, DILG and DPWH proposed a Metro Manila-Wide Bike Lane Network which would cover the Circumferential, Radial, and other major roads in Metro Manila through the “Bayanihan to Recover As One” Act. The whole alignment is estimated to cover about 497 kilometers of bikeway infrastructure for both directions of all the sections of the Network and would connect major residential areas, activity areas, and major public transport facilities. Similar efforts are being done in Metro Davao and Metro Cebu to promote active transportation in the country. The three metropolitan areas have been prioritized by the DOTr due to their high economic activity. Figures 3.1 to 3.3 show the extent of bike lane network in the three areas as proposed.

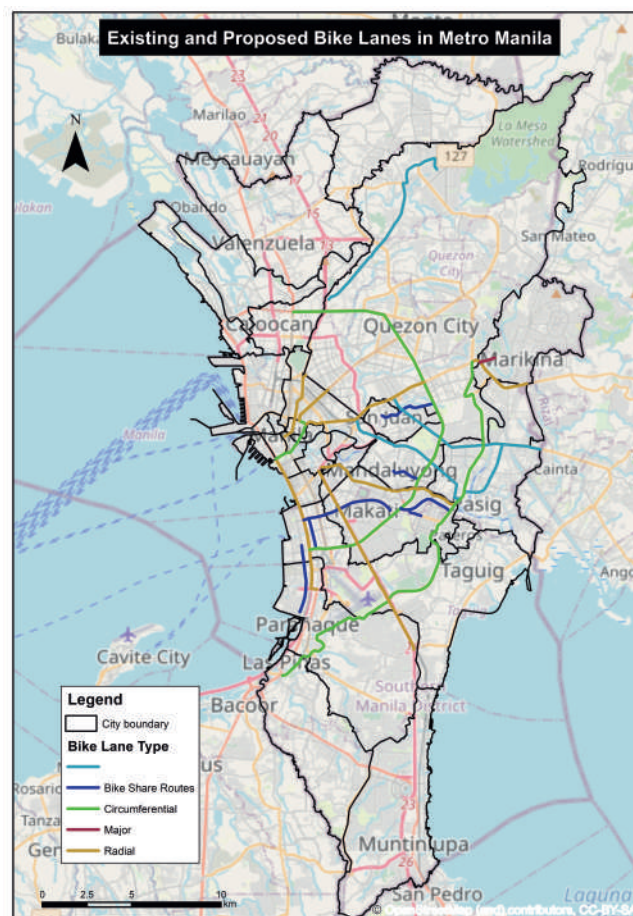


FIGURE 3.1 METRO MANILA BIKE LANE NETWORK (SOURCE: DOTr)

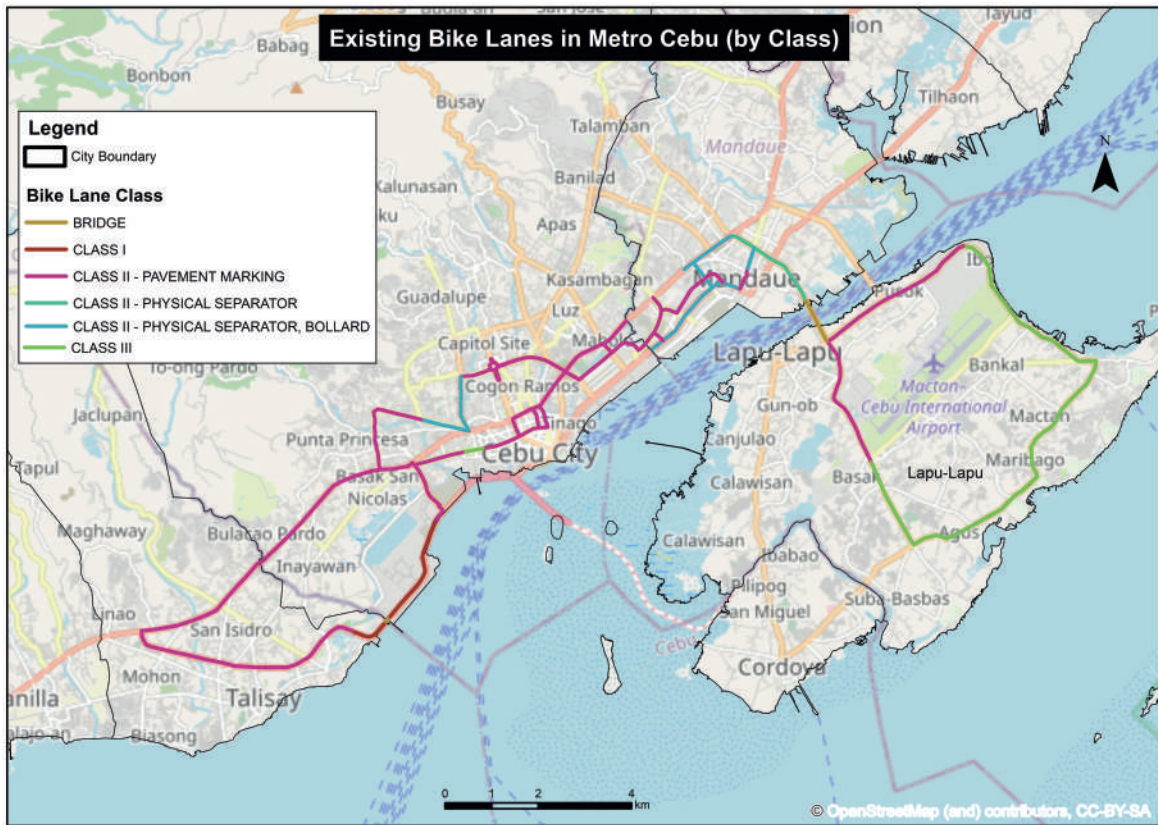


FIGURE 3.2 METRO CEBU BIKE LANE NETWORK (SOURCE: DOTR)



FIGURE 3.3 METRO DAVAO BIKE LANE NETWORK (SOURCE: DOTR)

The following tables show the coverage of the Bayanihan II bike lane network. In July 2021, all the bike lane networks in the three metropolitan areas were inaugurated.

TABLE 3.1 METRO MANILA BIKE LANE NETWORK

Road Name	Length in km. (both ways)
R-1 to R-7	68.399
C-5	52.129
C-4	45.953
R-5	38.474
Bike share Routes	33.750
R-3	22.105
R-4	16.878
R-6	27.725
R-8	7.705
Other roads	-
TOTAL	313.118

TABLE 3.2 METRO CEBU BIKE LANE NETWORK

Road Name	Length in km. (both ways)
Cebu South Coastal Road	14.48
ML Quezon Natl Highway	5.83
N Bacalso Ave	9.35
Mactan Circumferential Rd	12.41
General Aviation Rd	8.79
MV Patalinjug Jr Ave	3.82
MC Briones St	4.18
AC Cortes Ave	4.13
Katipunan St	1.97
Basak - Marigondon Rd	3.91
Other Roads	50.87
TOTAL	129.66

TABLE 3.3 METRO DAVAO BIKE LANE NETWORK

Road Name	Length in km. (both ways)
Davao - Cotabato Rd	28.78
ABS-CBN Quimpo Blvd. Div. road	9.10
Daang Maharlika Rd (CM Recto St)	1.56
E Jacinto Ext	1.97
Mabini St	1.90
Roxas Ave	1.50
Quezon Blvd	2.50
Loyola St	1.42
GE St (Sandawa Rd)	1.41
Other roads	4.37
TOTAL	54.51

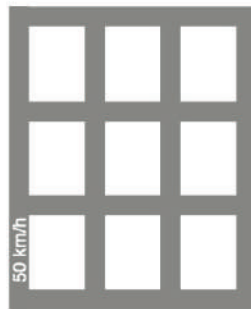
3.1.2 Network development at the local level

There are several ways to develop a bike lanes network at the local level. Figure 3.4 shows the different approaches applied in other countries in bicycle network development. The Philippines' association with the United States and the latter's design guidelines and policies for highways and streets often mean that we adopt these. As such, bicycle networks and infrastructure in the country are not as developed as desired, with few examples of bike lanes or bikeway projects that can be regarded as successful and therefore worth emulating across the country.

Urban Bicycle Network Approaches

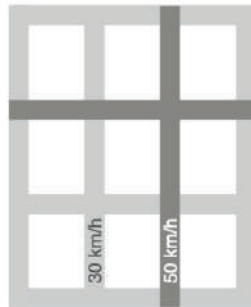
Michael Szell @mszll

US Approach
No effective bicycle infrastructure, e.g. **sharrows**



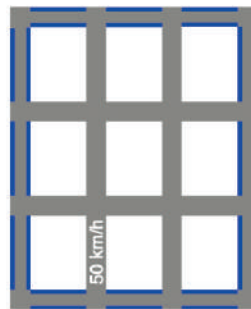
Houston

Brussels Approach
Medium speed limits on most streets



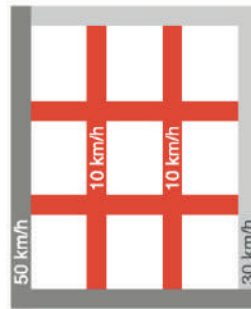
Brussels

Copenhagen Approach
Network of protected on-street tracks



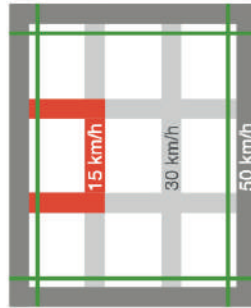
Copenhagen

Barcelona Approach
Superblocks: Spatially clustered living streets



Barcelona

Dutch Approach
Network of off-street tracks, medium and low speed limit **erf** and **fietsstraat**



Delft

FIGURE 3.4 URBAN BICYCLE NETWORK APPROACHES

a. Metro Manila

The expansion of the bike lane network in Metro Manila should go beyond major thoroughfares (circumferential and radial roads). There is a need to connect these bike lanes to interior parts of local government units to increase their utilization. During the capacity building activities conducted for LGUs, it was found out that there were already some LGUs with existing bike lanes. Some LGUs without bike lanes were still at the stage of planning for bike facilities. The capacity building under this project seemed timely as part of the activities during the capacity building was the development of bike lanes network in each LGU. The key objectives of the exercise were connecting the bike lanes to major centers/establishments within the LGU, and also connecting them to the current bike lane network developed under Bayanihan II.

This intuitive approach to bikeways planning, although less precise, is less time – consuming compared to the conventional planning using travel demand forecasting method which would require enormous data including origin – destination information. In this approach, destination throughout the study area that would attract bicyclists are shown on a base map. Routes are then selected that serve higher concentrations of destinations or those that yield high numbers of cyclists (Schools, Hospitals, Shopping centers, major employment centers, Parks and recreation facilities, Trails and greenway connections). Except for Quezon City, which provided data on major destinations/activity centers, locations of such centers in each LGU were obtained from OpenStreetMap (OSM).

For Metro Manila, the map in Figure 3.5 shows a consolidation of all the LGUs' existing and proposed bike lanes based on their initial plans and on their outputs during the capacity building exercise and the data and maps provided by the DOTr and DPWH. In addition, the map also shows the bike lanes recommended by the study team for selected LGUs that currently have limited or no plans for bike lane expansion. The study team's recommendation also aimed at strengthening the connectivity of the LGU proposed bike routes with the Bayanihan II routes.

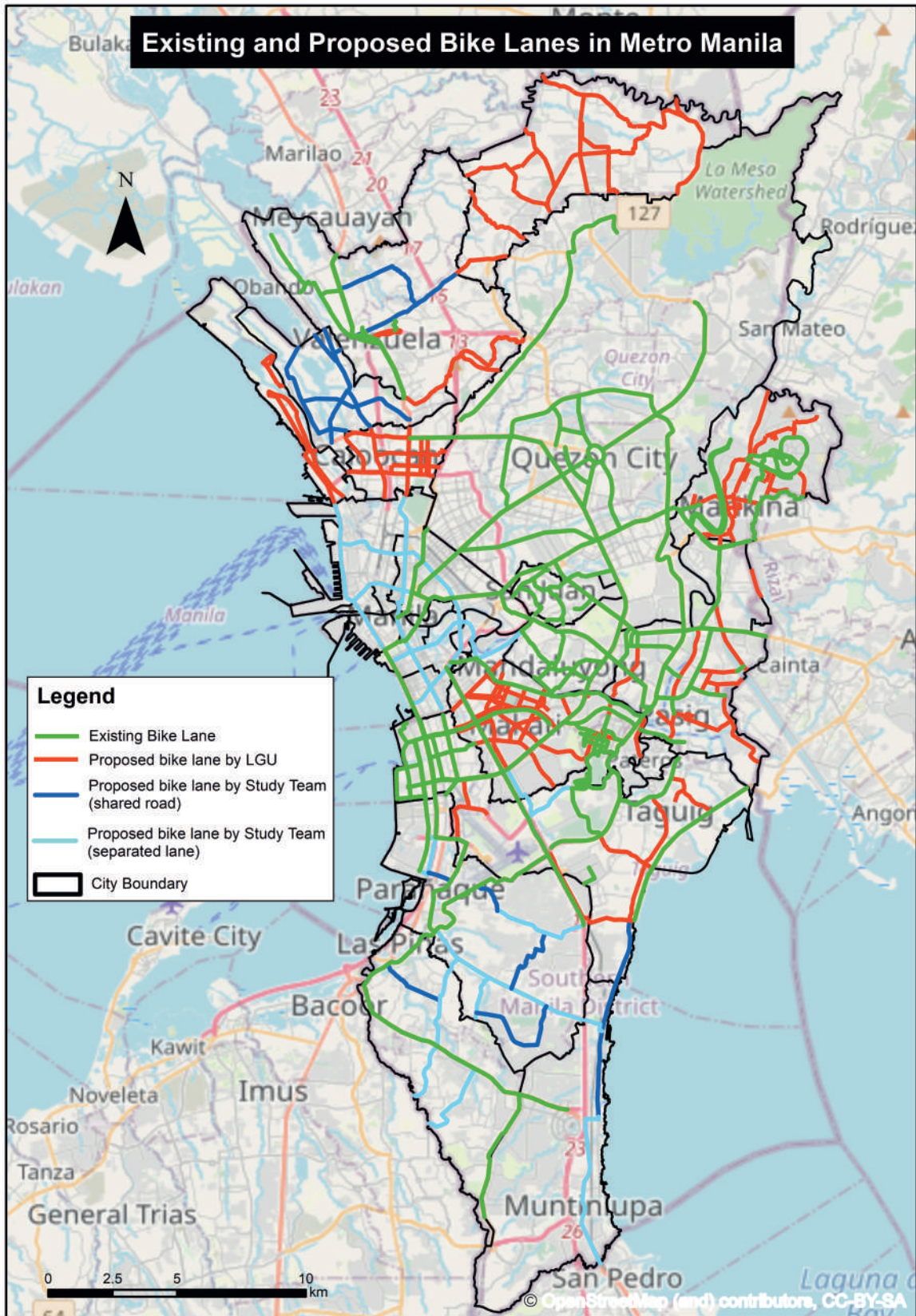


FIGURE 3.5 EXISTING AND PROPOSED BIKE LANES IN METRO MANILA

As of January 2022, most of the LGUs have existing and proposed bike lanes as shown in Table 3.4.

TABLE 3.4 EXISTING AND PROPOSED BIKE LANES OF LGUs IN METRO MANILA

LGU	With Existing Bike lanes	With Proposed Bike Lanes
Caloocan City	✓ ¹	✓
Las Pinas City	✓	-
Makati City	✓ ²	✓
Malabon City	-	✓
Mandaluyong City	✓	✓
Manila City	✓	-
Marikina City	✓	✓
Muntinlupa City	✓	-
Navotas City	-	✓
Parañaque City	✓	-
Pasay City	✓	✓
Pasig City	✓	✓
Quezon City	✓	-
San Juan City	✓	-
Taguig City	✓	✓
Valenzuela City	✓	✓

The following maps shown in Figures 3.6 to 3.22 show the individual maps of existing and proposed bike lanes of Metro Manila LGUs based on data provided by the respective LGUs and the DOTr and DPWH. Facilities indicated in the maps were sourced from OpenStreetMap with the exception of Quezon City. The latter provided the data for facilities connected by their bike lanes.

The bike lane network for Metro Manila emphasizes connectivity across borders of LGUs. Examples are provided in Figure 3.23 showing the connectivity of bike lanes for Manila, Navotas and Caloocan, and in Figure 3.24 showing the connectivity of bike lanes for

¹ Caloocan implemented temporary bike lanes using pavement markings.

² Makati City, through MACEA, established Class 3 bike lanes.

Taguig, Parañaque and Muntinlupa.

Bikeway facilities along Mabuhay Lanes as identified by MMDA may be improved to provide alternatives to the bike routes along high speed highways such as EDSA and C-5.

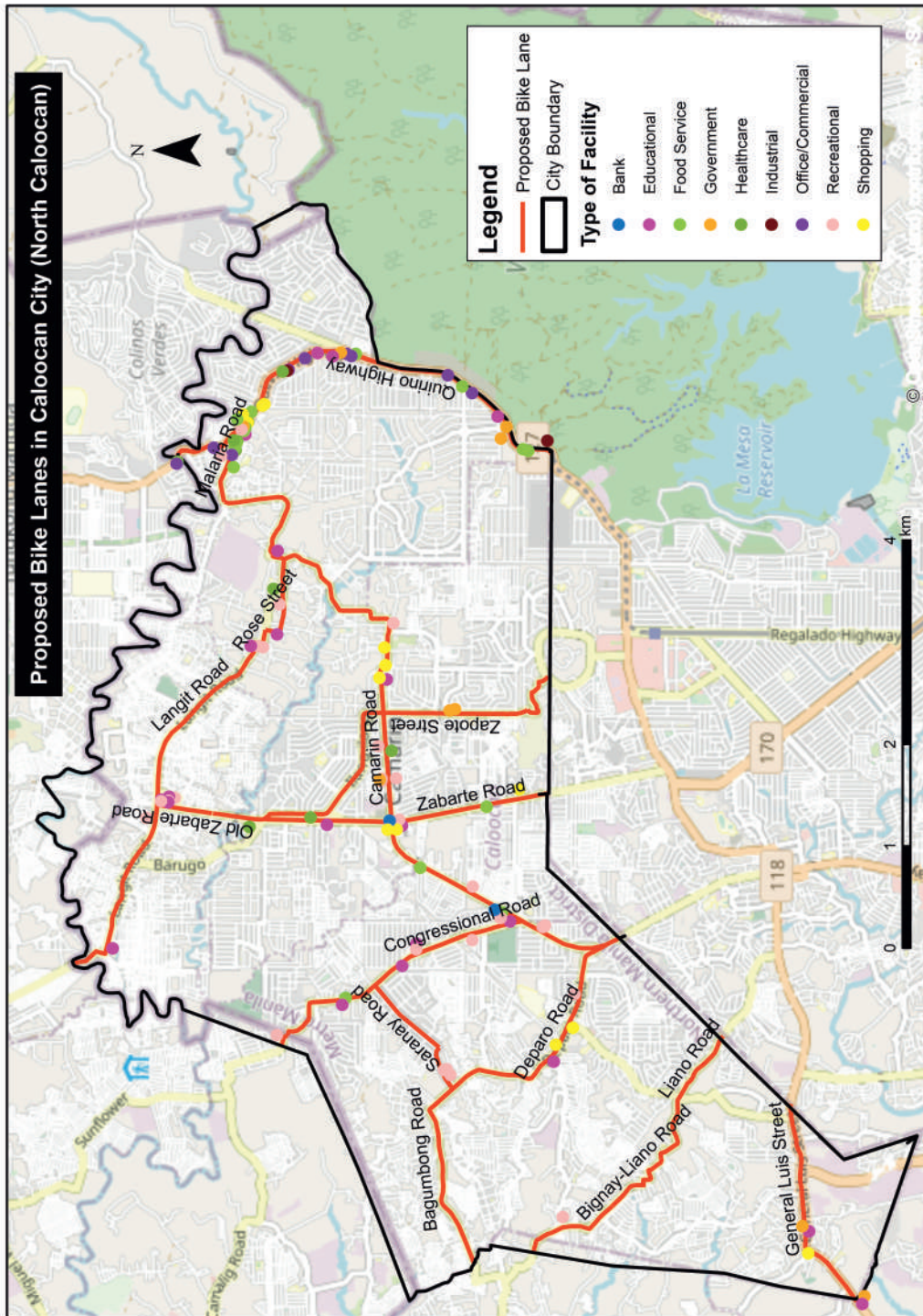


FIGURE 3.6 PROPOSED BIKE LANES BY CALOOCAN CITY – NORTH CALOOCAN

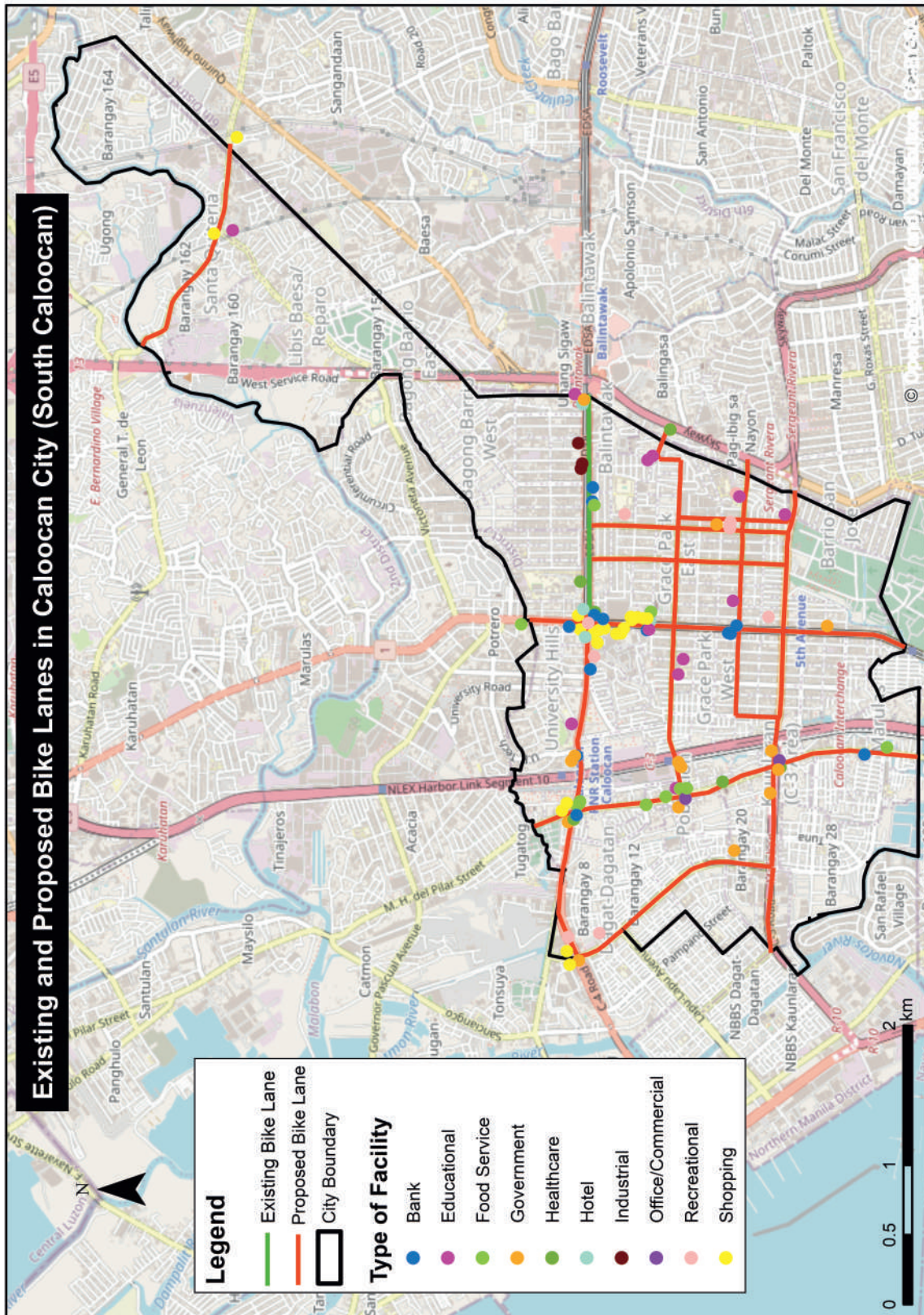


FIGURE 3.7 EXISTING AND PROPOSED BIKE LANES BY CALOOCAN CITY — SOUTH CALOOCAN



FIGURE 3.8 EXISTING AND PROPOSED BIKE LANES IN LAS PIÑAS CITY³

³ Las Piñas City’s existing bike lanes were constructed by DPWH and DOTr. The proposed bike lanes are based on the recommendations of the study team.

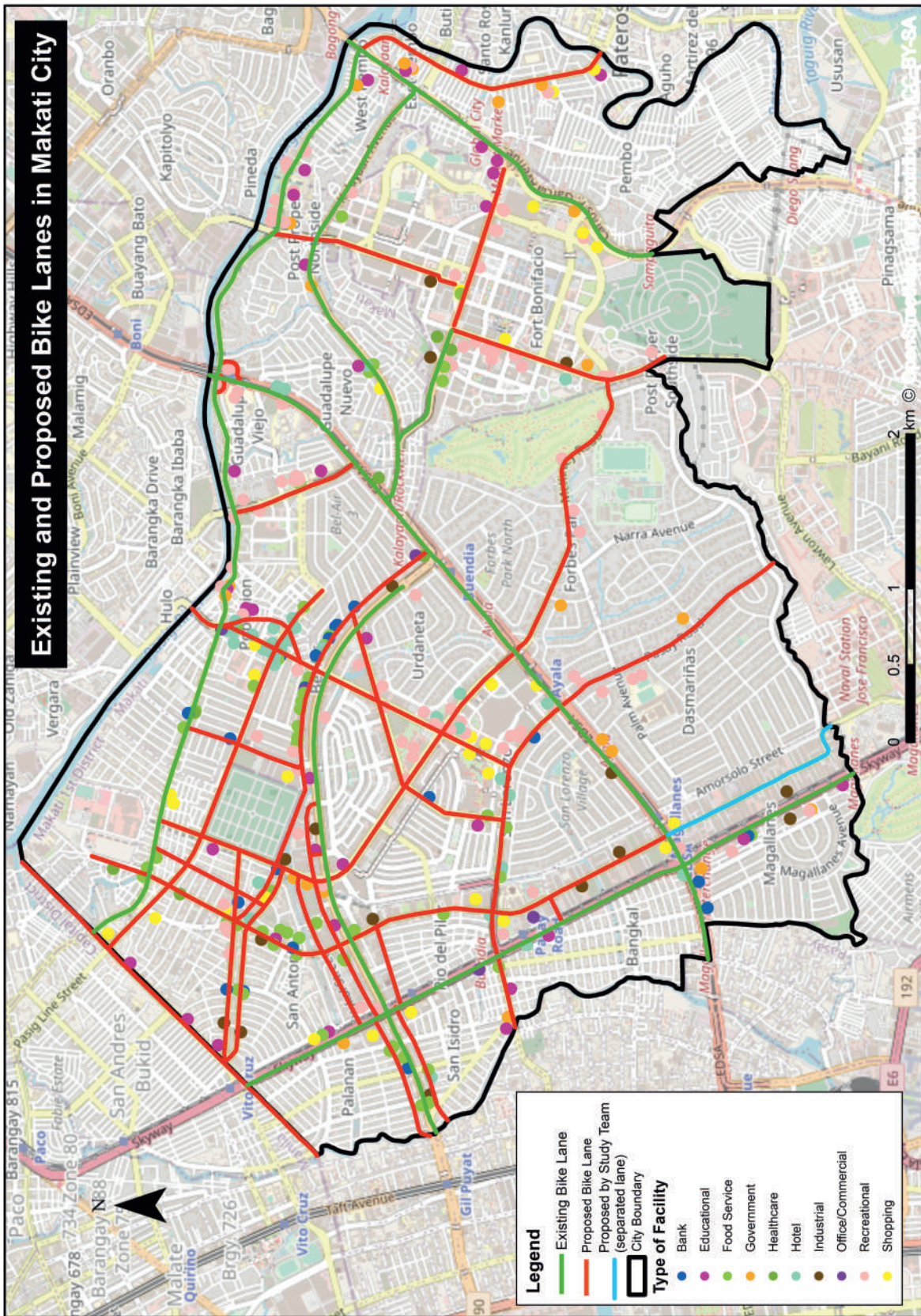


FIGURE 3.9 EXISTING AND PROPOSED BIKE LANES BY MAKATI CITY

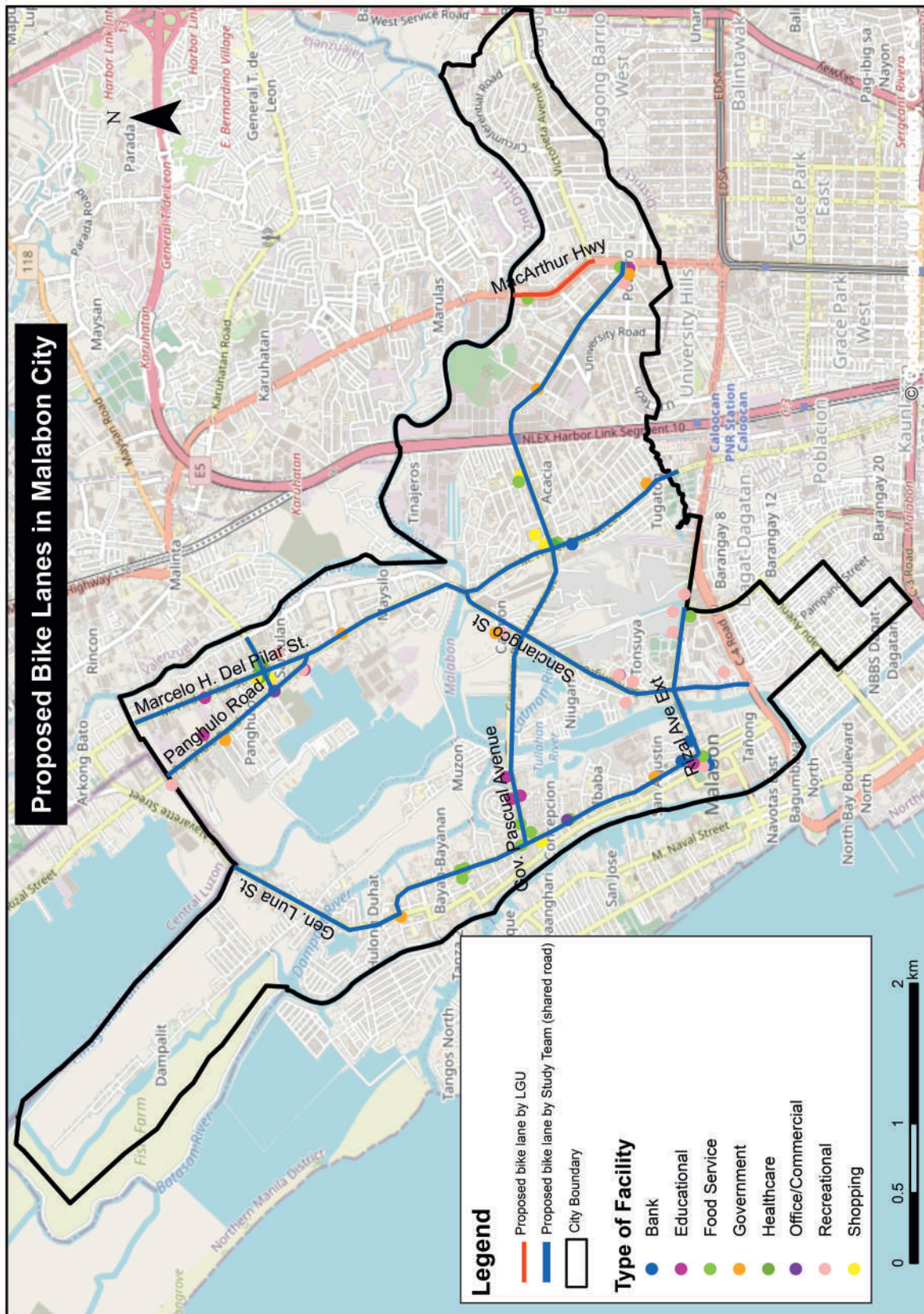


FIGURE 3.10 PROPOSED BIKE LANES PLANNED BY MALABON CITY⁴

⁴ The proposed bike lanes for Malabon City are based on the recommendations of the study team.

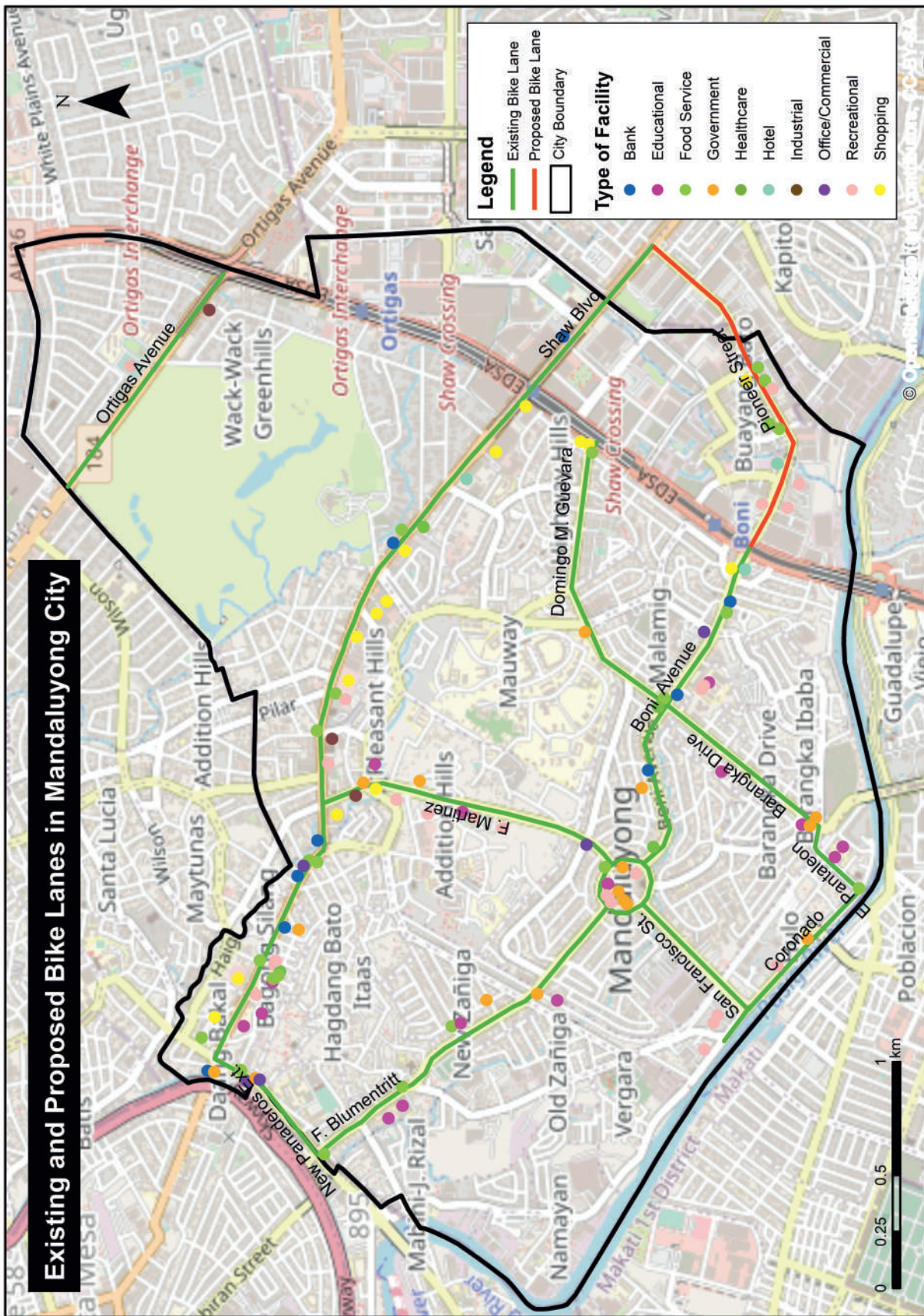


FIGURE 3.11 EXISTING AND PROPOSED BIKE LANES PLANNED BY MANDALUYONG CITY



FIGURE 3.12 EXISTING AND PROPOSED BIKE LANES IN THE CITY OF MANILA⁵

⁵ The proposed bike lanes for the City of Manila are based on the recommendations of the study team.

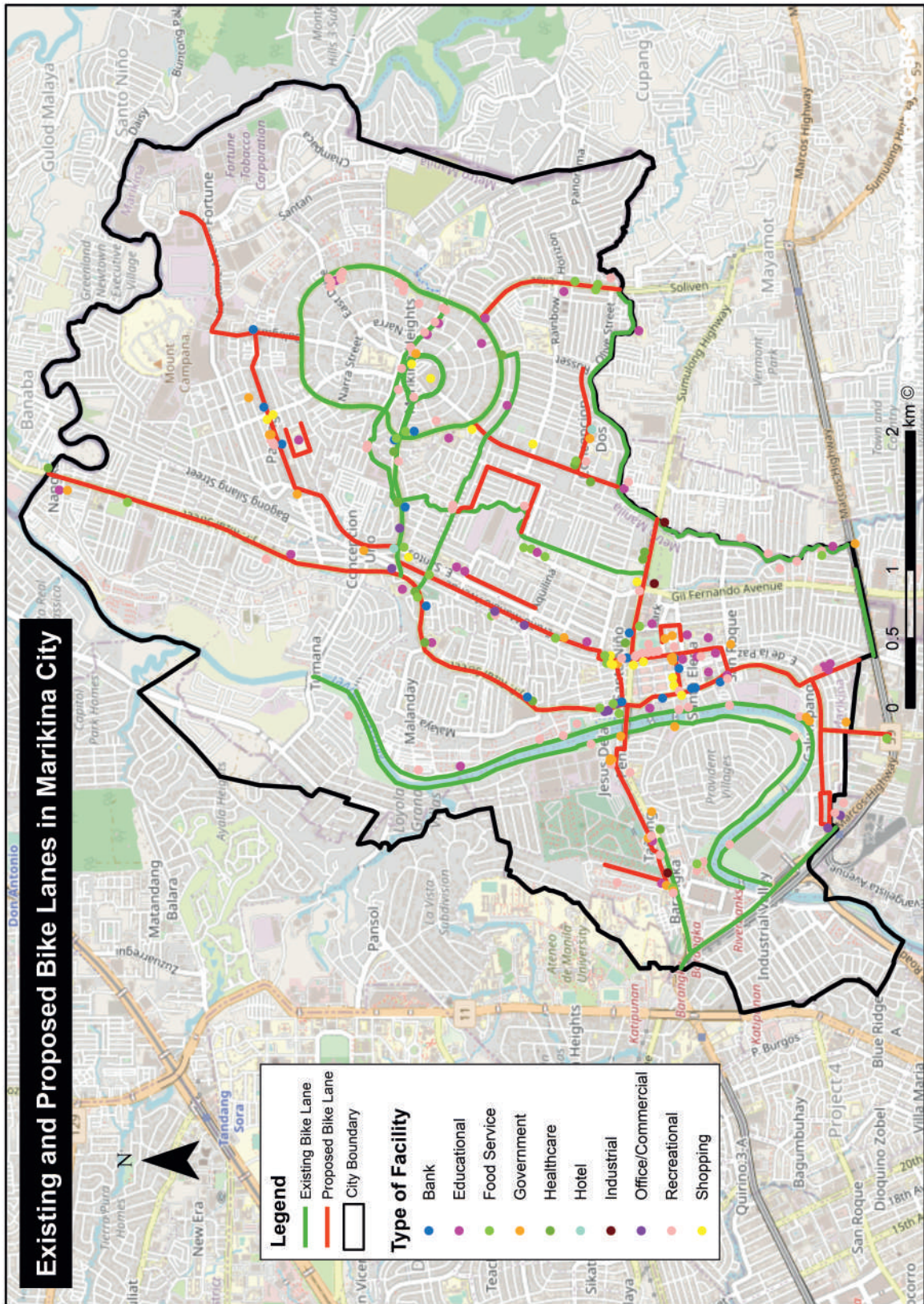


FIGURE 3.13 EXISTING AND PROPOSED BIKE LANES IN MARIKINA CITY⁶

⁶ Part of Marikina's network being constructed by DOTr and DPWH (East Expansion)

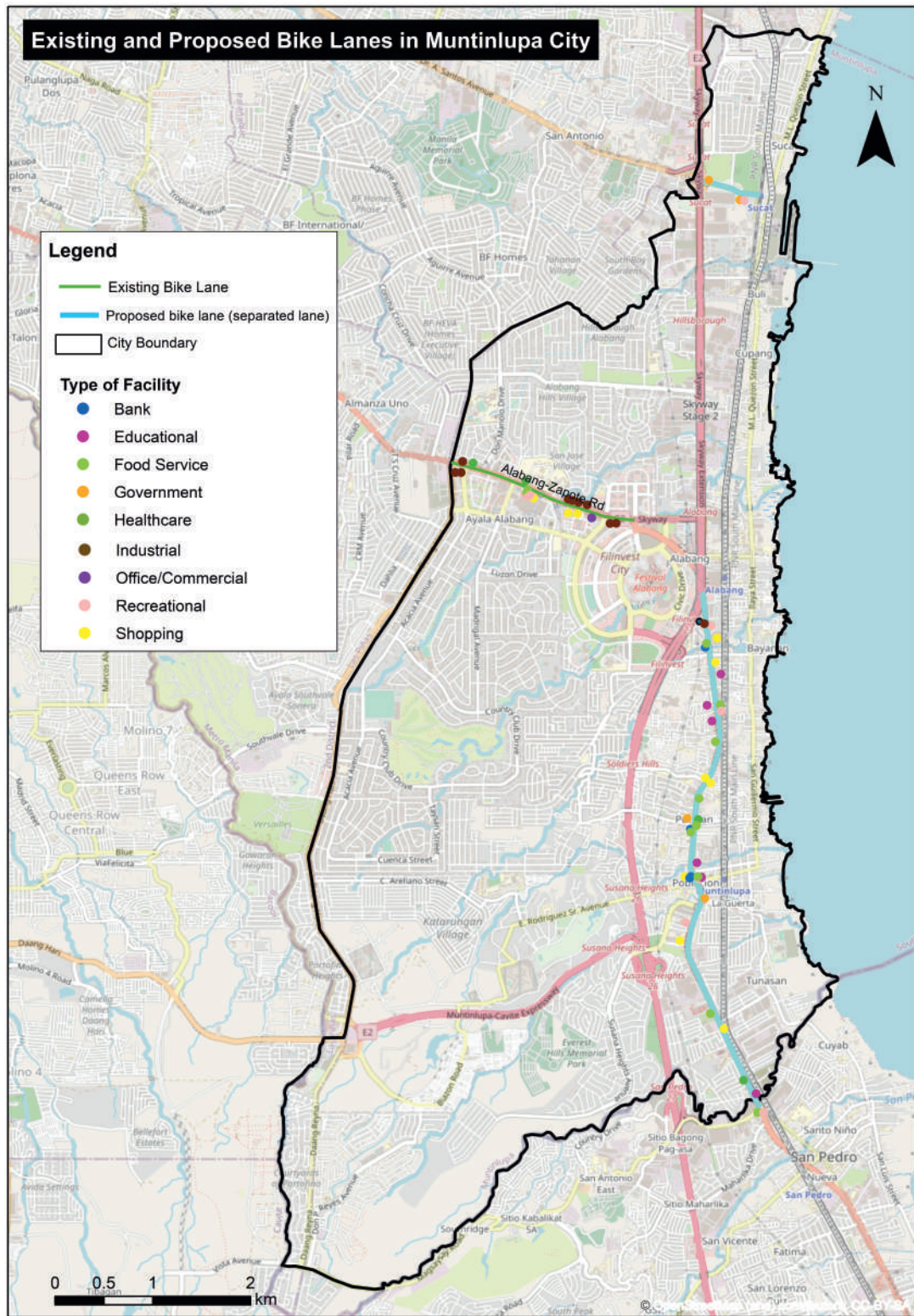


FIGURE 3.14 EXISTING AND PROPOSED BIKE LANES IN MUNTINLUPA CITY⁷

⁷ Existing bike lanes in Muntinlupa City were constructed by the DOTr and DPWH (Southern Expansion). The proposed bike lanes are based on the recommendations of the study team.

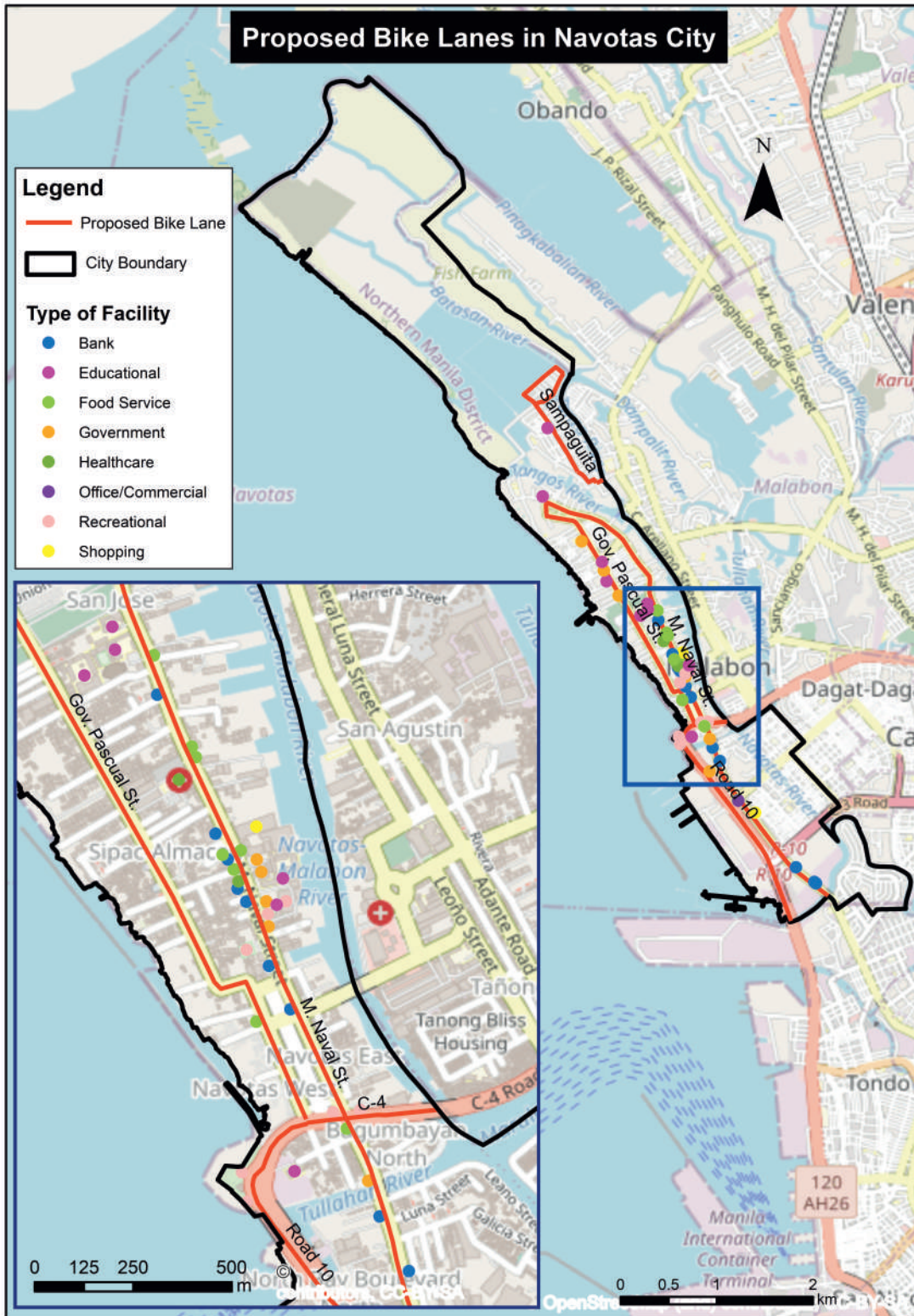


FIGURE 3.15 PROPOSED BIKE LANES PLANNED BY NAVOTAS CITY

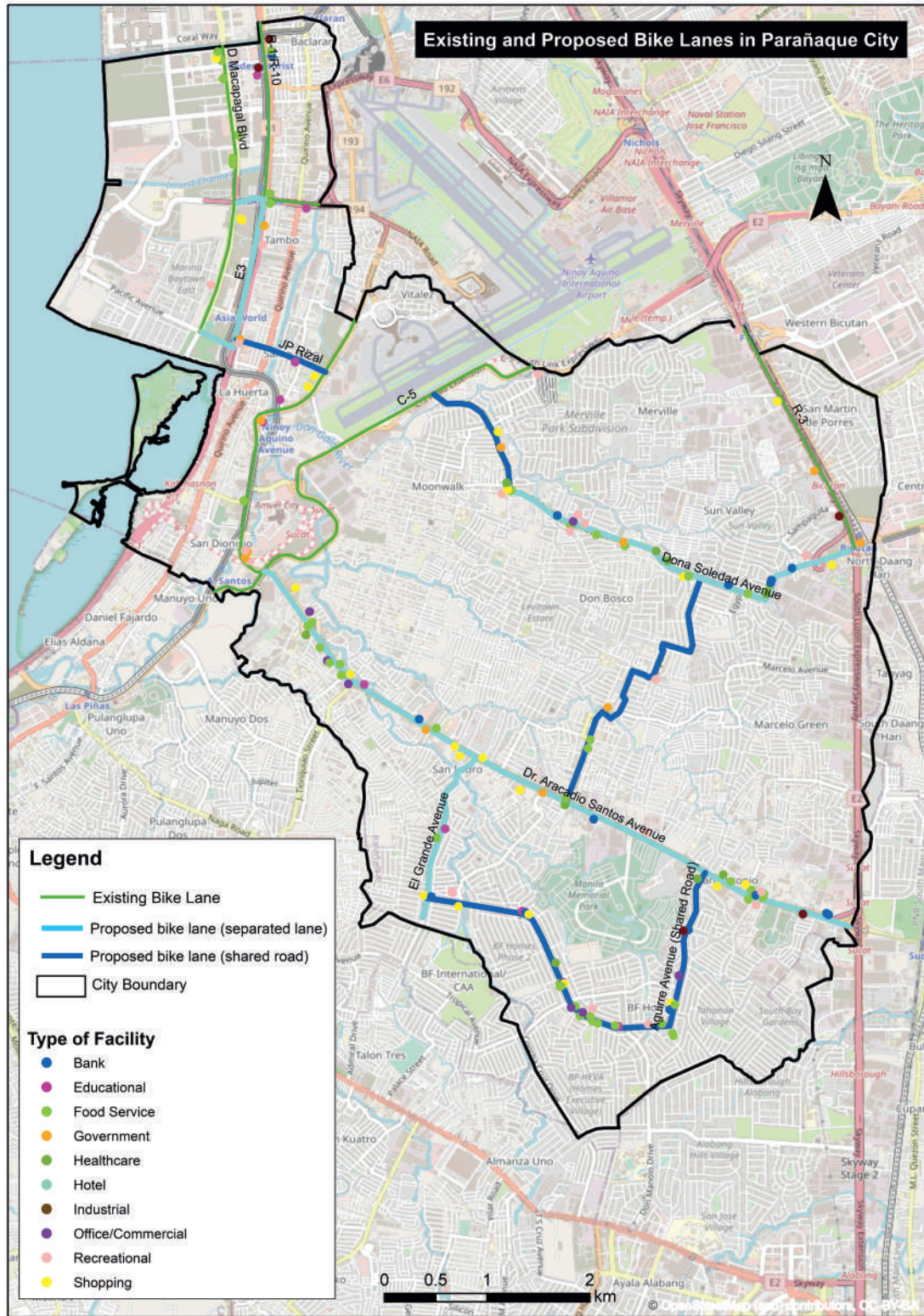


FIGURE 3.16 EXISTING AND PROPOSED BIKE LANES IN PARAÑAQUE CITY⁸

⁸ Existing bike lanes in Parañaque City were constructed by the DOTr and DPWH (Southern Expansion). The proposed bike lanes are based on the recommendations of the study team.

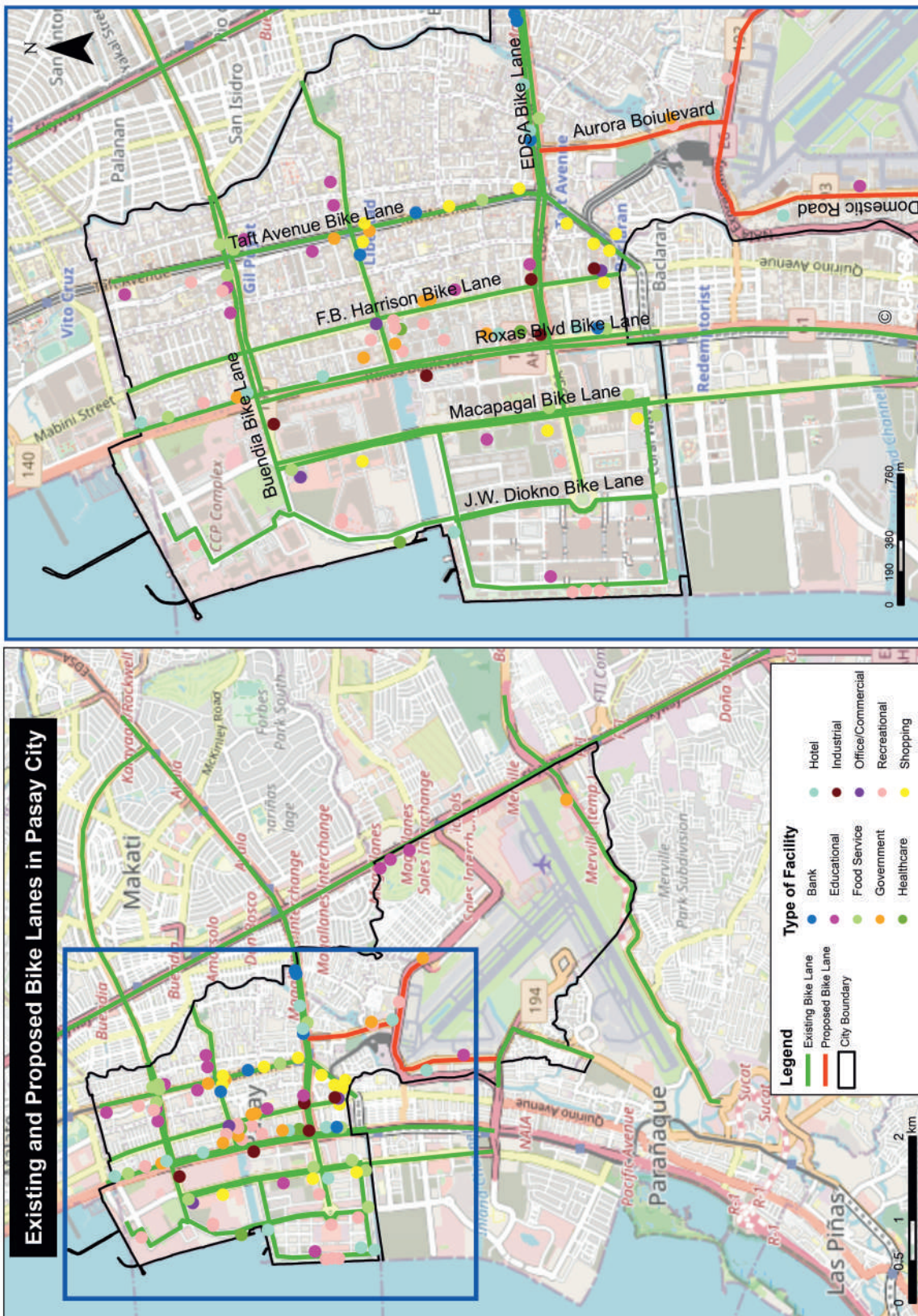


FIGURE 3.17 EXISTING AND PROPOSED BIKE LANES IN PASAY CITY⁹

⁹ Parts of Pasay's network was constructed by SM (i.e., those around the SM Mall of Asia complex). Other part were constructed by the DOTr.

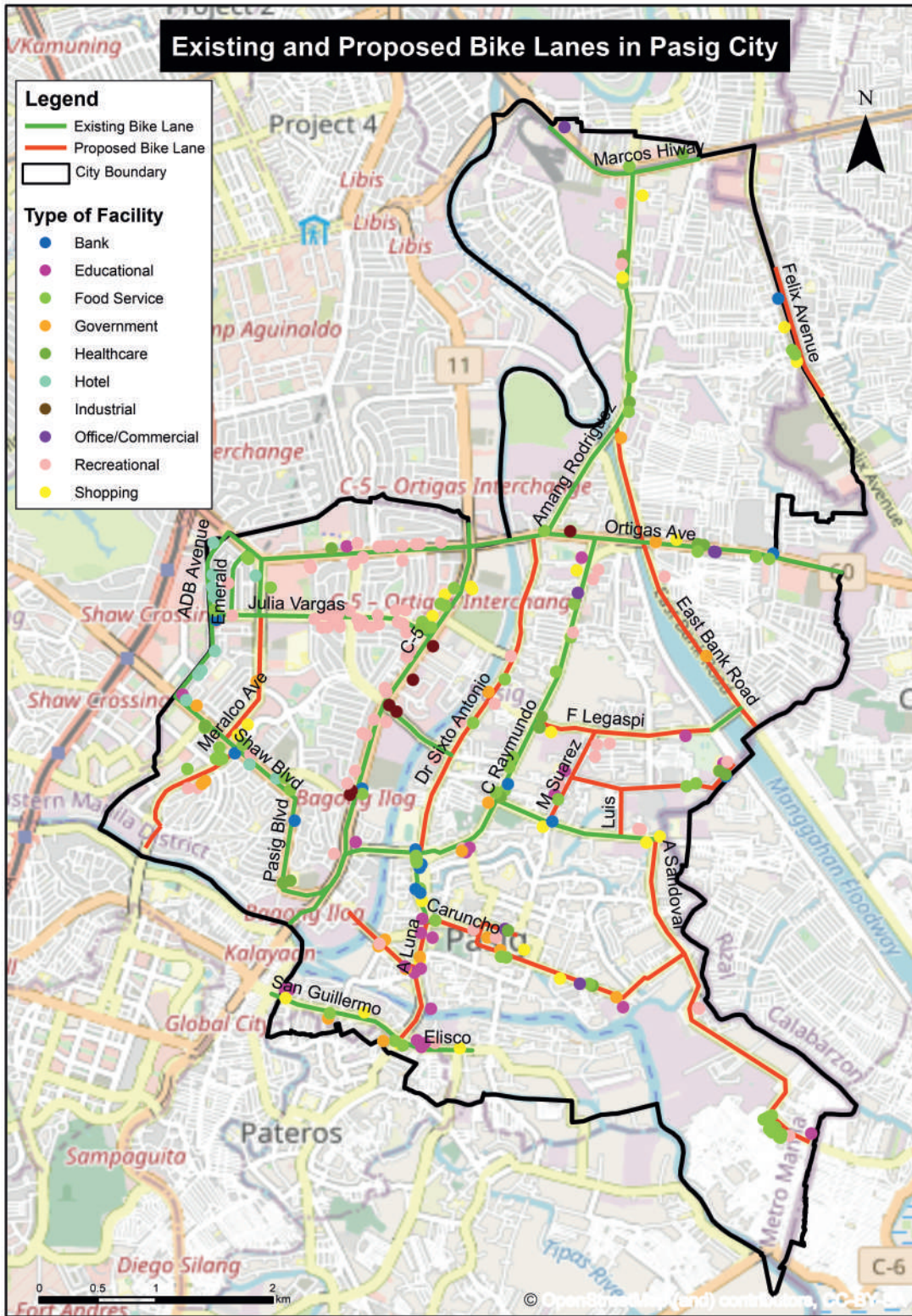


FIGURE 3.18 EXISTING AND PROPOSED BIKE LANES PLANNED BY PASIG CITY

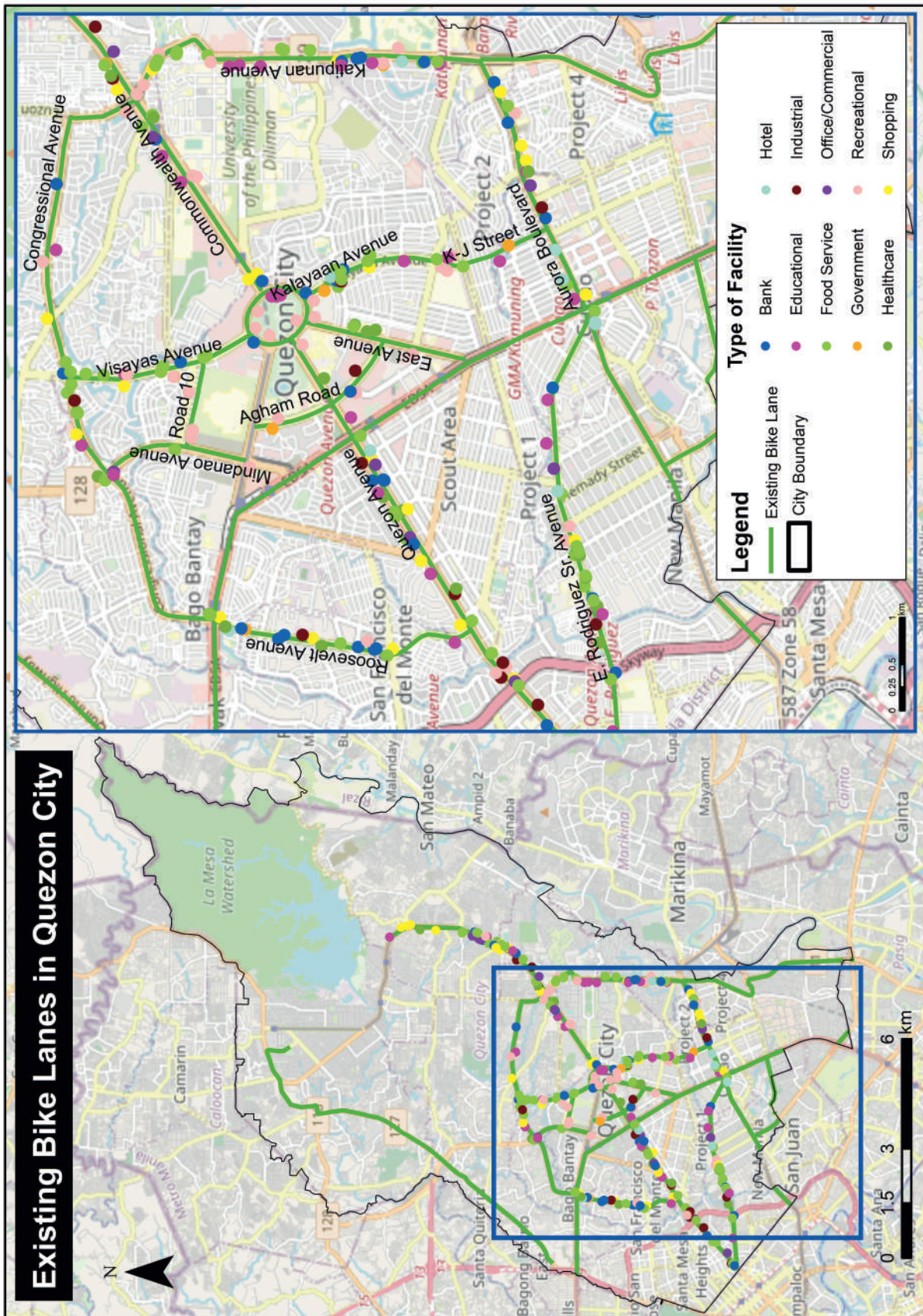


FIGURE 3.19 EXISTING BIKE LANES CONSTRUCTED BY QUEZON CITY



FIGURE 3.20 EXISTING BIKE LANES CONSTRUCTED IN SAN JUAN CITY

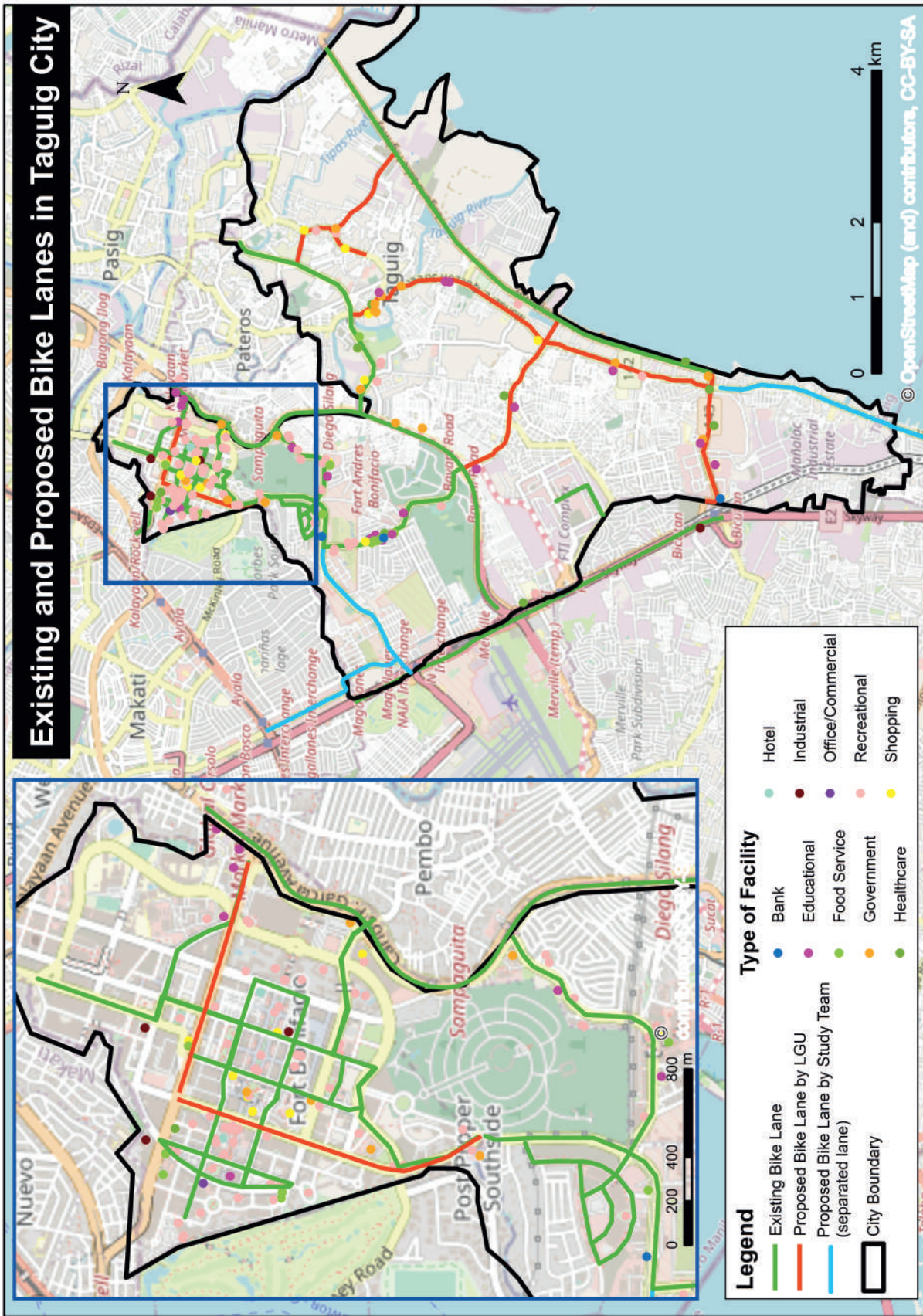


FIGURE 3.21 EXISTING AND PROPOSED BIKE LANES IN TAGUIG CITY

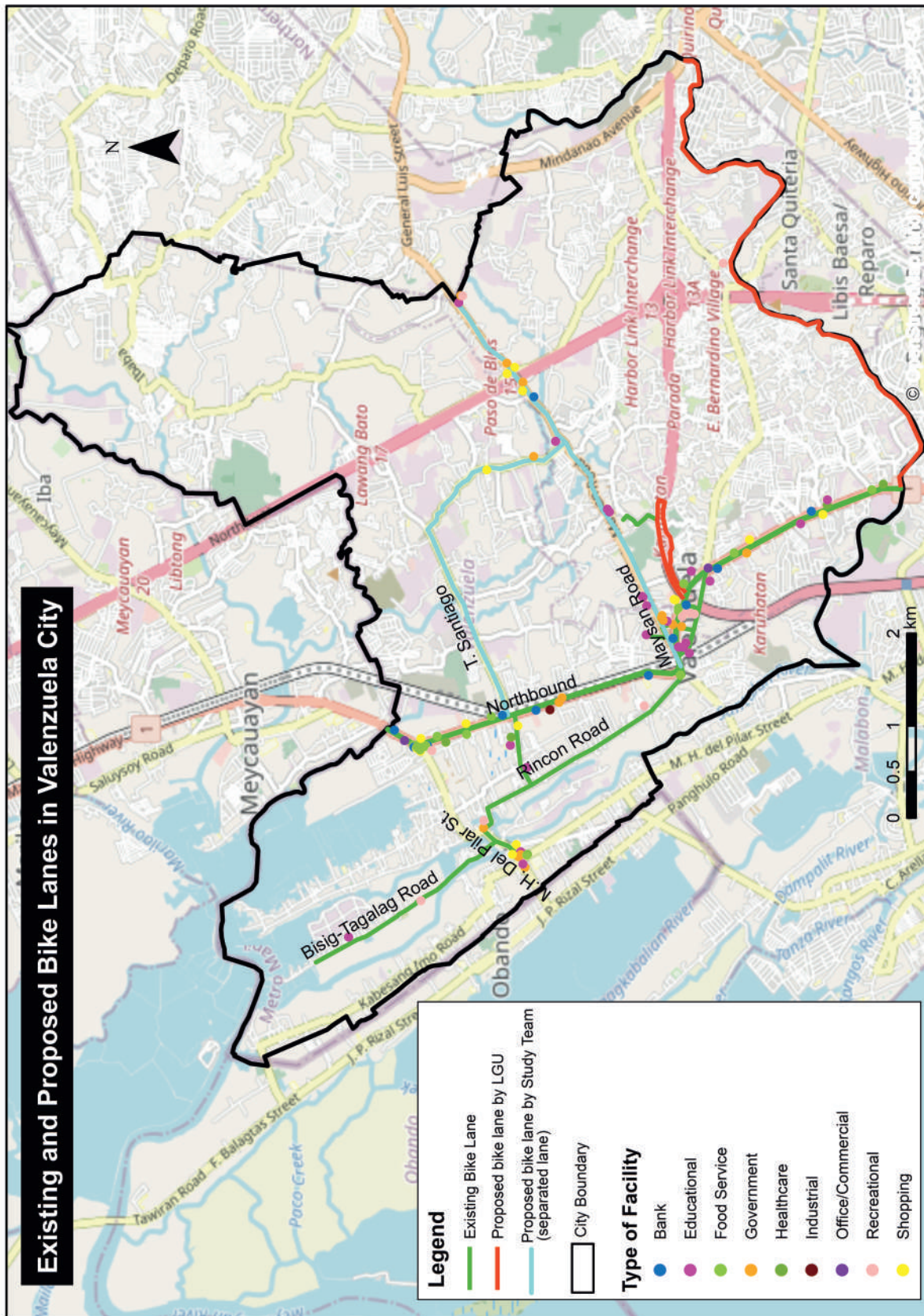


FIGURE 3.22 EXISTING AND PROPOSED BIKE LANES IN VALENZUELA CITY¹⁰

¹⁰ Existing bike lanes in Valenzuela City were constructed by the DOTr and DPWH (Southern Expansion). The proposed bike lanes are based on the recommendations of the study team.



FIGURE 3.23 CONNECTIVITY OF BIKE LANES FOR MANILA, NAVOTAS AND CALOOCAN

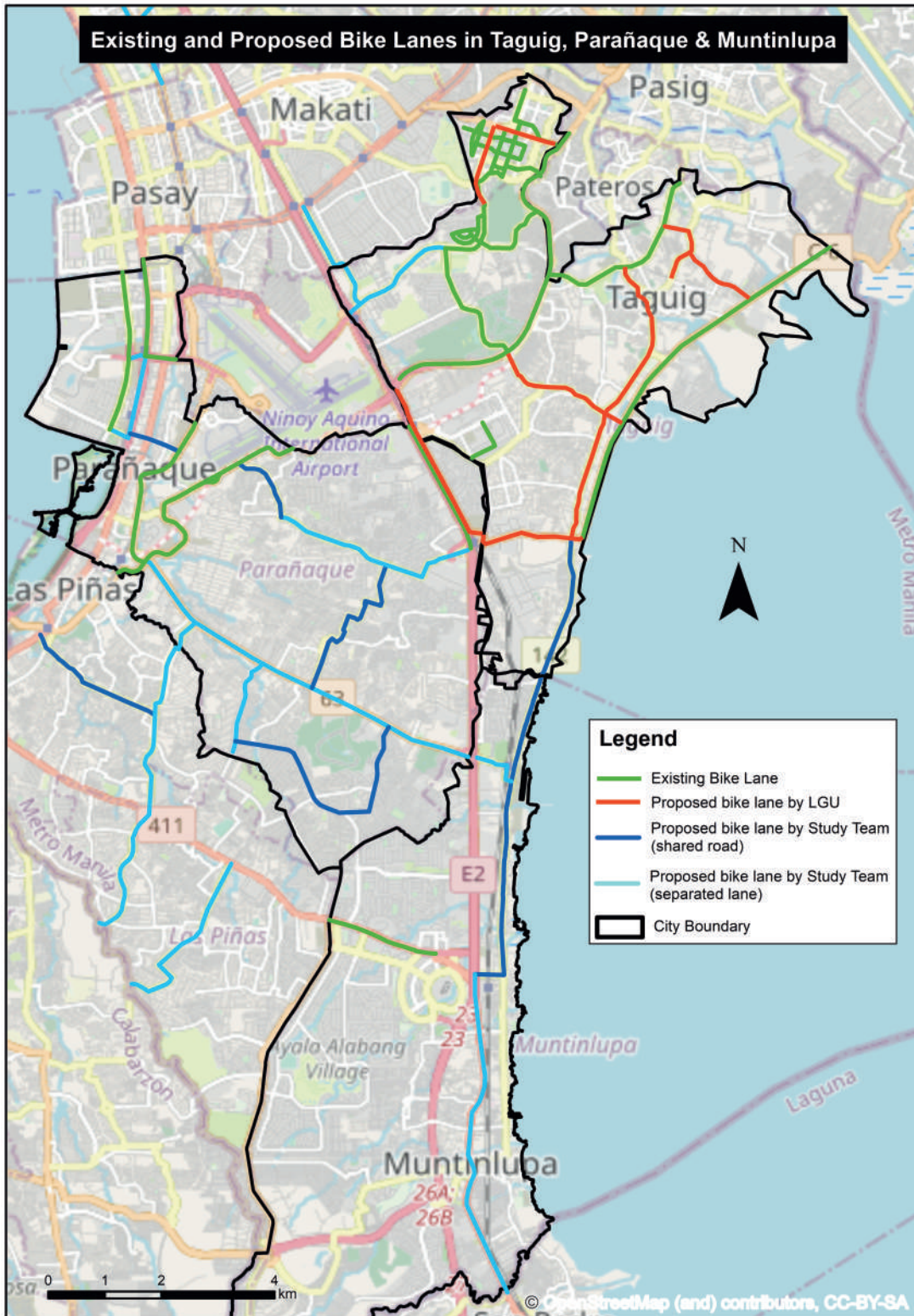


FIGURE 3.24 CONNECTIVITY OF BIKE LANES FOR TAGUIG, PARAÑAQUE AND MUNTINLUPA

b. Metro Cebu

For Metro Cebu, the map in Figure 3.25 shows a consolidation of all the LGUs’ existing and proposed bike lanes based on their initial plans and on their outputs during the capacity building exercise and the data and maps provided by the DOTr and DPWH.



FIGURE 3.25 EXISTING AND PROPOSED BIKE LANES IN METRO CEBU

As of January 2022, most of the LGUs have existing and proposed bike lanes as shown in Table 3.5.

TABLE 3.5 EXISTING AND PROPOSED BIKE LANES IN METRO CEBU

LGU	With Existing Bike lanes	With Proposed Bike Lanes
Cebu City	✓	-
Lapu-lapu City	✓	✓
Cordova City	✓	✓
Mandaue City	✓	✓
Talisay City	✓	✓

The following maps shown in Figures 3.26 to 3.30 show the individual maps of existing and proposed bike lanes of Metro Cebu LGUs based on data provided by the respective LGUs and the DOTr and DPWH.

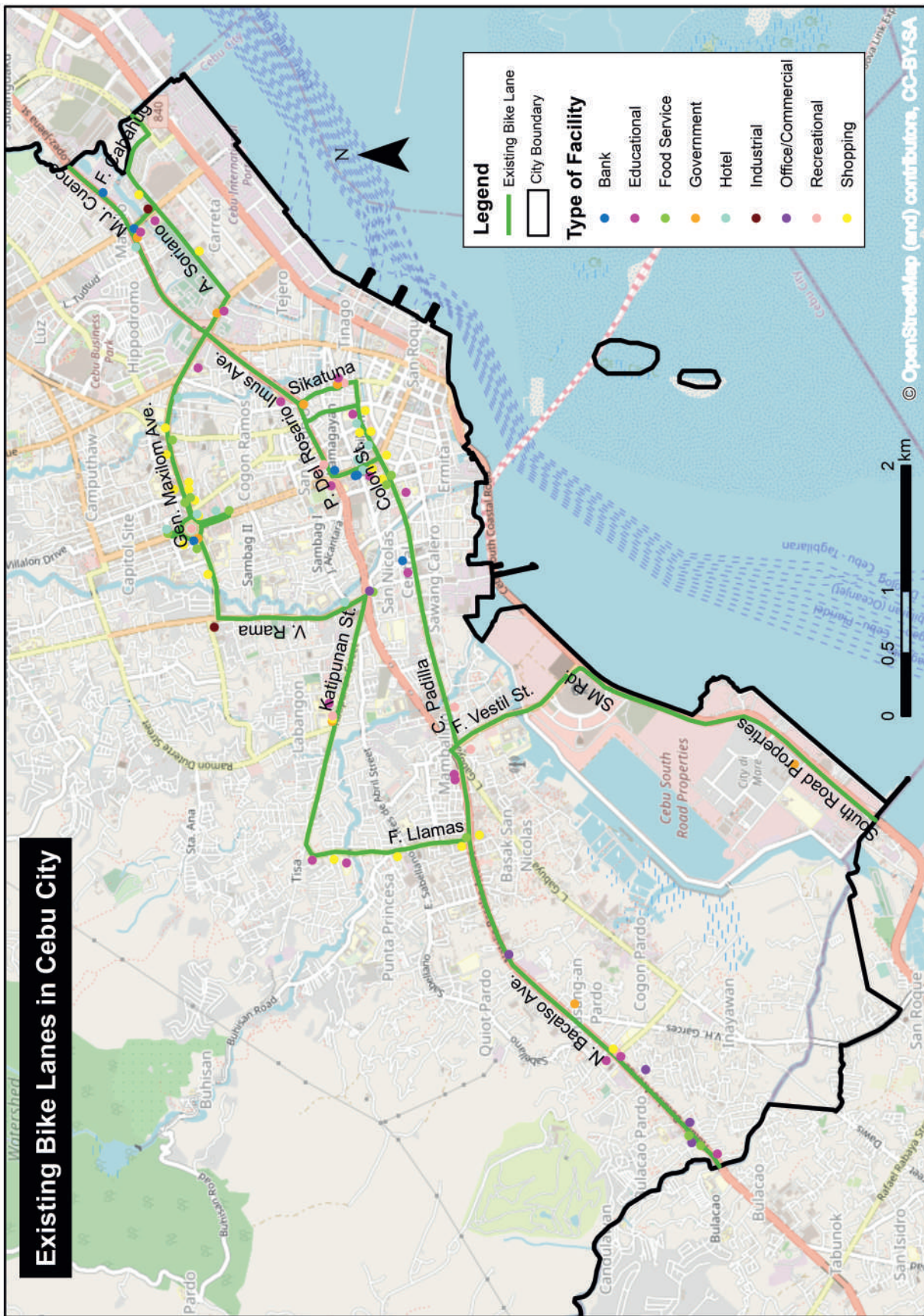


FIGURE 3.26 EXISTING BIKE LANES IN CEBU CITY

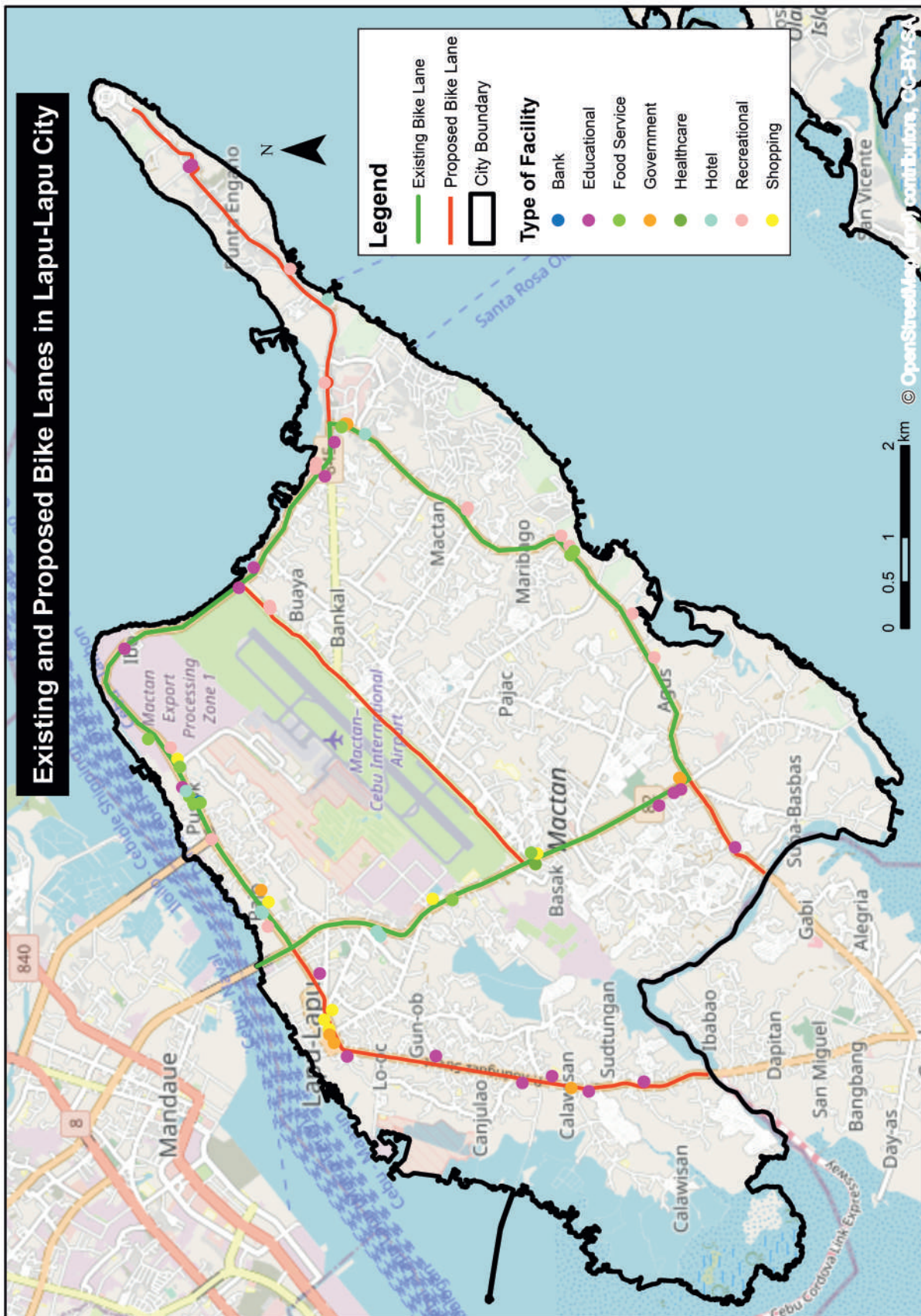


FIGURE 3.27 EXISTING AND PROPOSED BIKE LANES IN LAPU-LAPU CITY

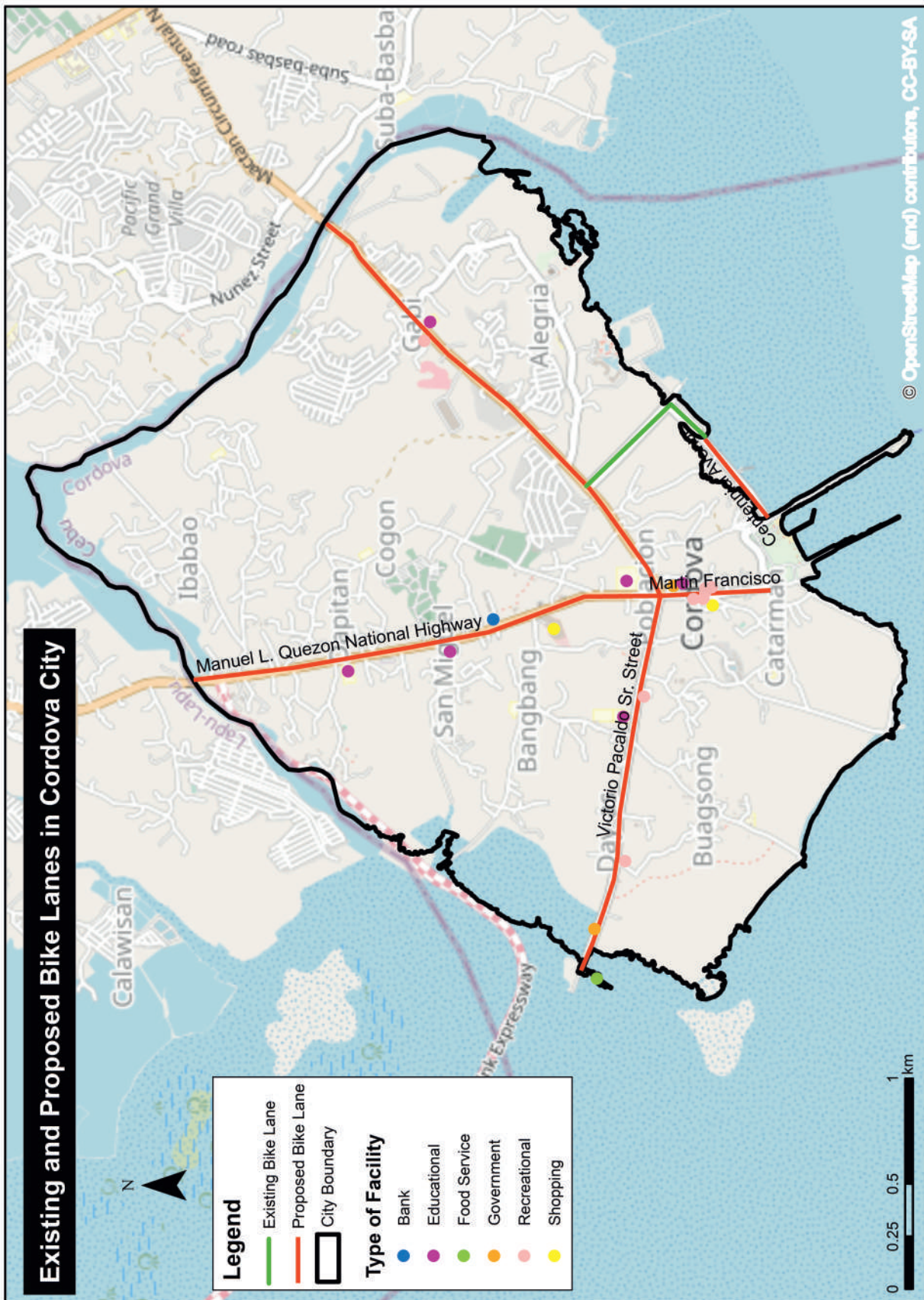


FIGURE 3.28 PROPOSED BIKE LANES IN CORDOVA

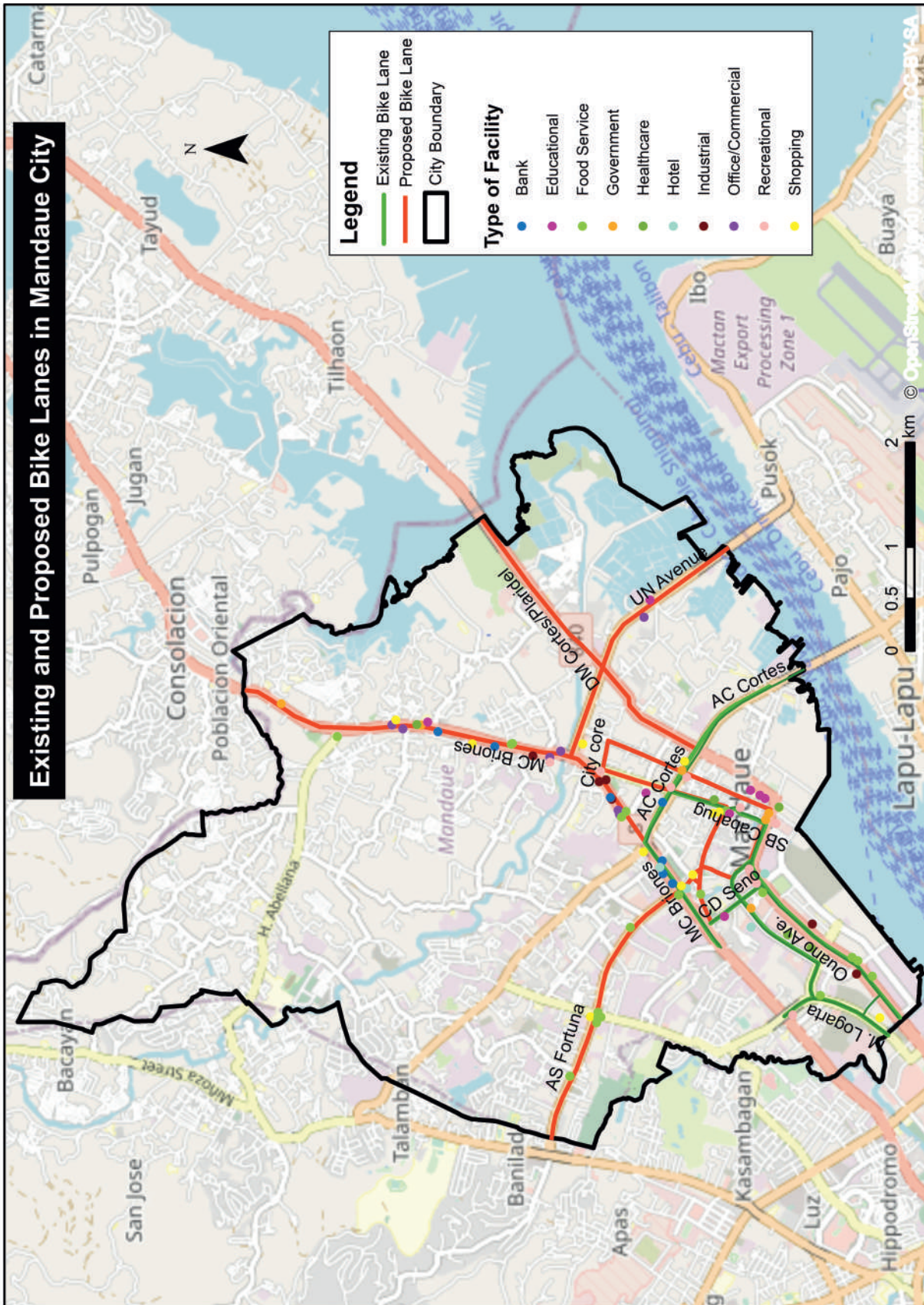


FIGURE 3.29 EXISTING AND PROPOSED BIKE LANES IN MANDAUE CITY

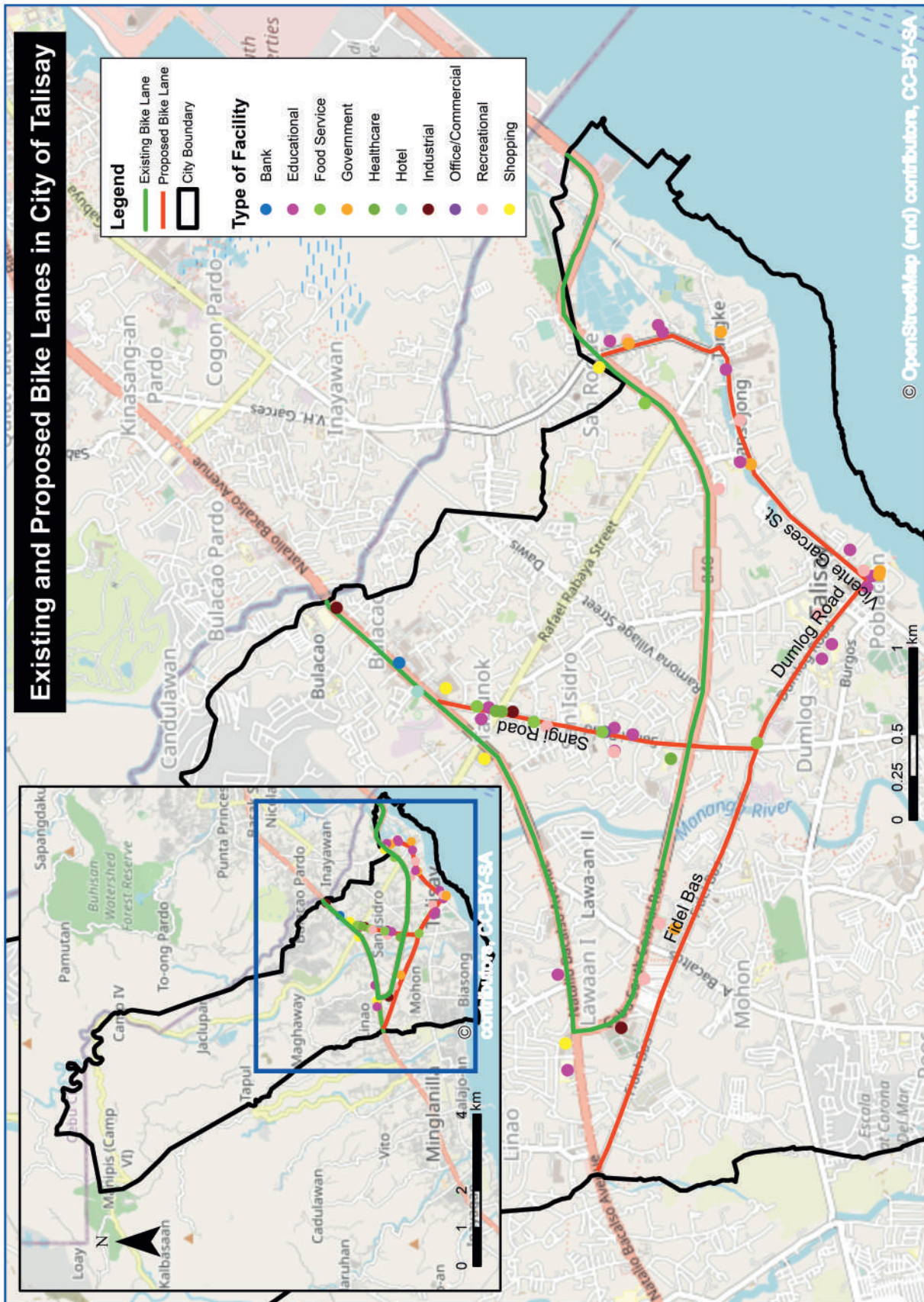


FIGURE 3.30 EXISTING AND PROPOSED BIKE LANES IN TALISAY

c. Metro Davao

For Metro Davao, the map in Figure 3.31 shows a consolidation of all the LGUs’ existing and proposed bike lanes based on their initial plans and on their outputs during the capacity building exercise and the data and maps provided by the DOTr and DPWH.

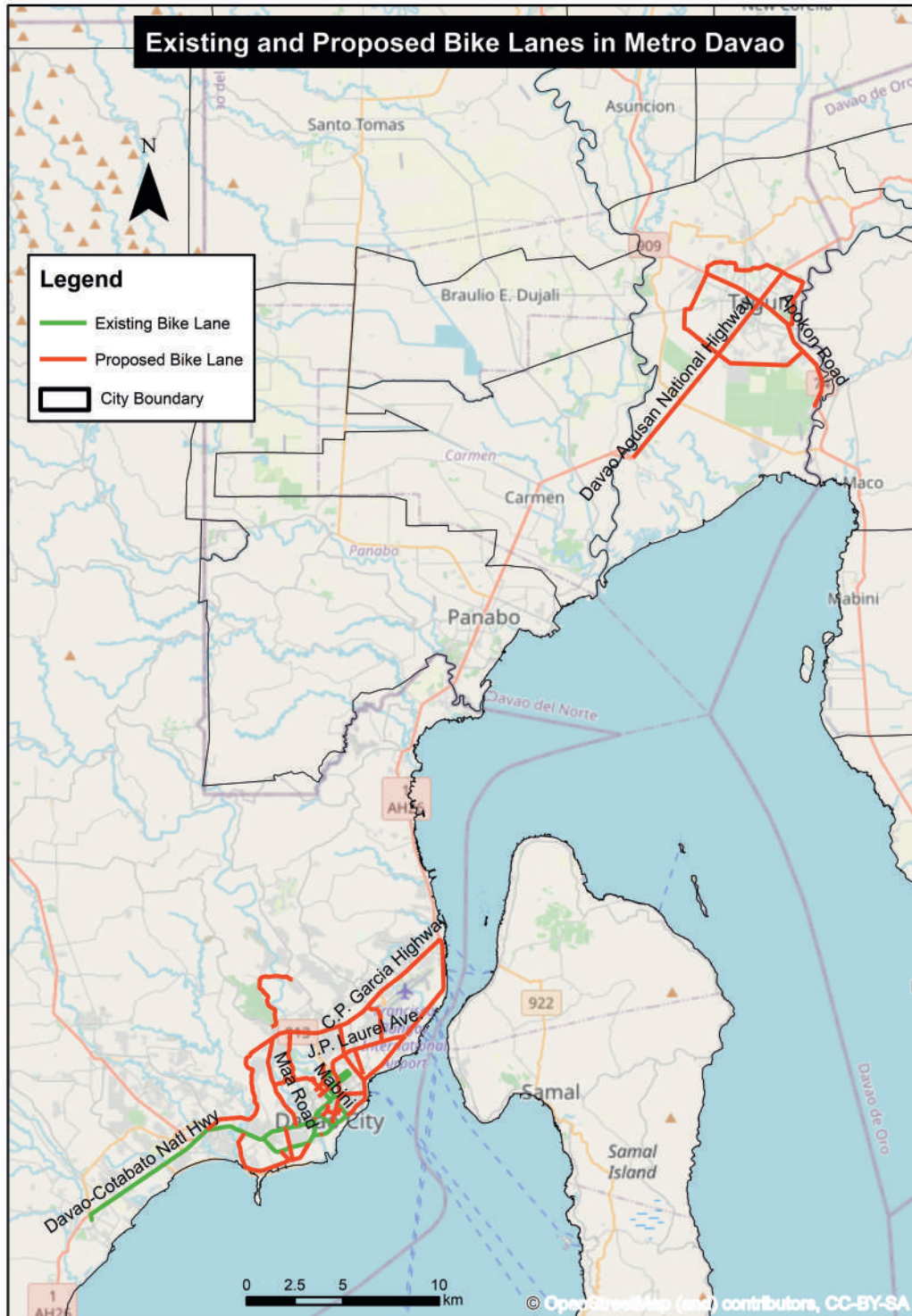


FIGURE 3.31 EXISTING AND PROPOSED BIKE LANES IN METRO DAVAO

At the time of writing the report, Davao City has both existing and planned bike lanes while Tagum City has plans for bike lanes along its major roads including the Davao-Agusan National Highway (Table 3.6).

TABLE 3.6 EXISTING AND PROPOSED BIKE LANES IN METRO DAVAO

LGU	With Existing Bike lanes	With Proposed Bike Lanes
Davao City	✓	✓
Tagum City	-	✓

The following maps shown in Figures 3.32 to 3.33 show the individual maps of existing and proposed bike lanes of Metro Davao LGUs based on data provided by the respective LGUs and the DOTr and DPWH.

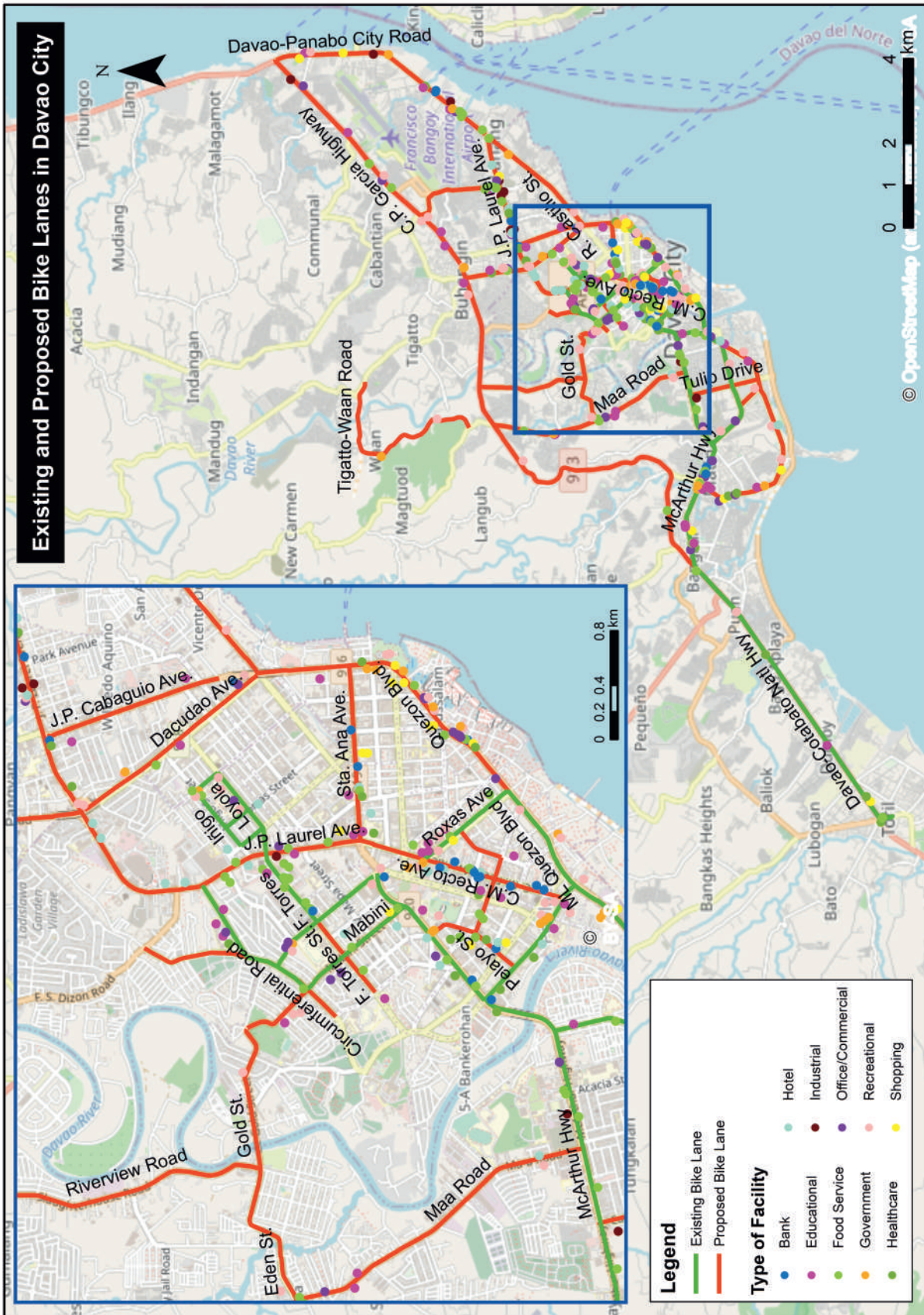


FIGURE 3.32 EXISTING AND PROPOSED BIKE LANES IN DAVAO CITY

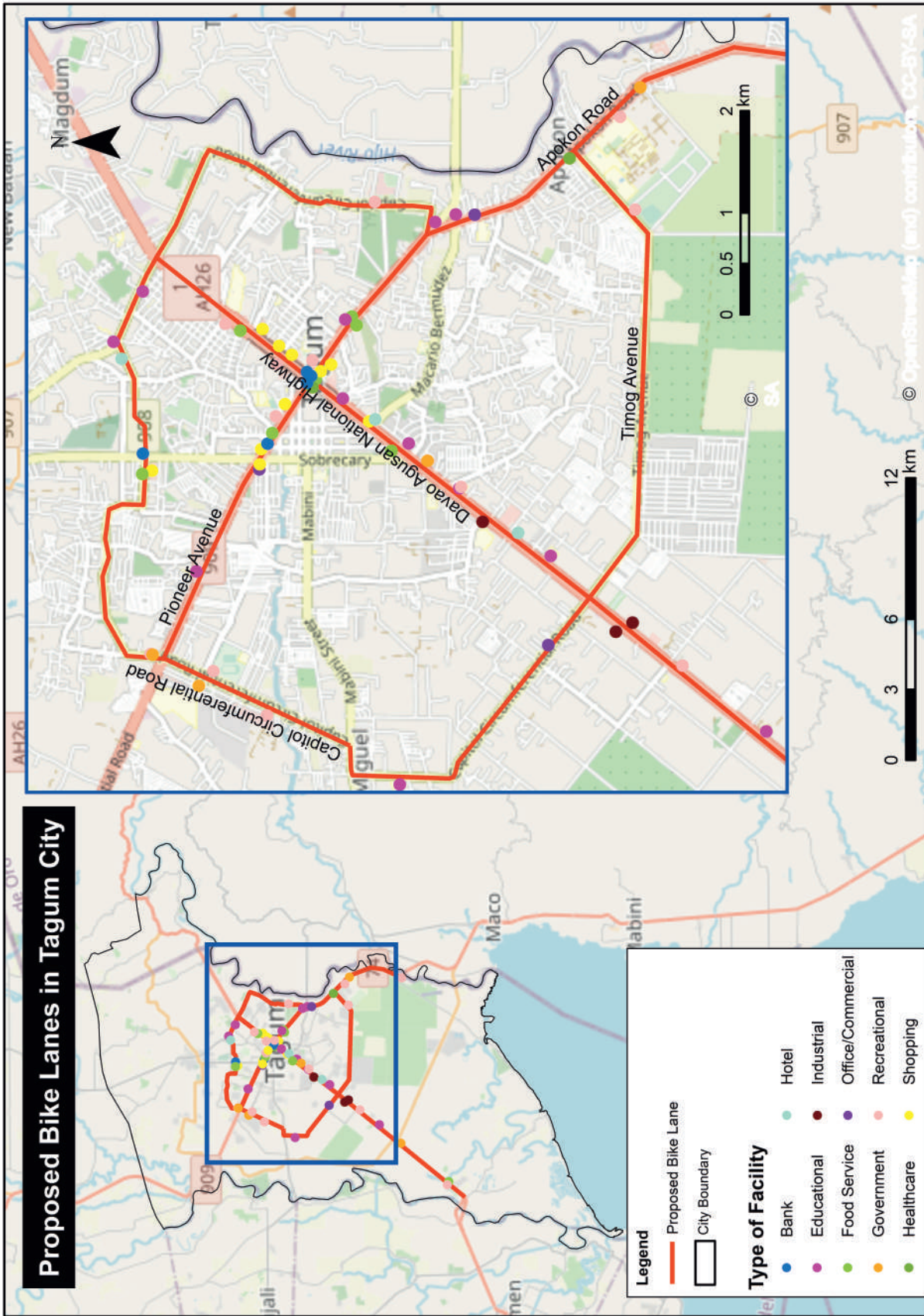


FIGURE 3.33 PROPOSED BIKE LANES IN TAGUM

3.2 Prioritization of proposed bike routes

The previous section provides the level of bikeway planning prepared by each LGU. Some of the LGUs have just one or two proposed bike routes while others have numerous bike routes in their proposal. In the former, the task of prioritizing which route to consider is a lot simpler. In the latter case, however, prioritization will be required, especially if the budget is not adequate to consider all the proposed bike routes.

The Goal Achievement Matrix (GAM) can be used as a tool to facilitate the process of prioritization when faced with a long list of projects or routes in a transparent way. The GAM tool operates a scoring calculation on a long list of projects based on a set of objective criteria. For this purpose, the following prioritization criteria, which were presented during the capacity building session, have been identified:

1. Bicycle travel demand: number of destination/attraction points instead of OD data;
2. Existing conditions: number of lanes, PT route, traffic volume, speed;
3. Public opinion and political support: LGU endorsed plan; (may have no time to solicit public opinion through stakeholders meeting);
4. Route continuity and directness: straight alignment; homogenous road section; provides connection with other bikeways in the network;
5. Cost effectiveness: estimated cost per user of bikeway facility

Criteria can either be given same importance or weight, or they can be given different weights. The table below illustrates the GAM method using weights and scoring for Pasig City. (See Figure 3.18 for the proposed bike network)

TABLE 3.7 EXAMPLE APPLICATION OF THE GAM METHOD TO PASIG CITY

Criteria	Weight, %	Score	Proposed Route						
			Felix Avenue	East Bank Road	A. Sandoval Road	Dr. Sixto Antonio/ A. Luna Avenue	Meralco Avenue	F. Legaspi Street	Caruncho Avenue
Criteria 1: Bicycle travel demand									
High		4	0.8			0.8	0.8		0.8
Medium	20	2		0.4	0.4			0.4	
Low		0							
Criteria 2: Existing conditions/ Safety/Security									
Low risk		4	0.8	0.8			0.8	0.8	
Medium Risk	20	2			0.4	0.4			0.4
High Risk		0							

Criteria	Weight, %	Score	Proposed Route						
			Felix Avenue	East Bank Road	A. Sandoval Road	Dr. Sixto Antonio/ A. Luna Avenue	Meralco Avenue	F. Legaspi Street	Caruncho Avenue
Criteria 3: Public opinion and political support									
The project is very feasible to implement		4	0.8	0.8	0.8	0.8	0.8	0.8	0.8
The project is questionable in terms of feasibility	20	2							
The project is unlikely to be feasible		0							
Criteria 4: Route continuity and directness									
High		4	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Medium	20	2							
Low		0							
Criteria 5: Cost effectiveness									
High		4				0.8	0.8		0.8
Medium	20	2	0.4	0.4	0.4			0.4	
Low		0							
TOTAL			3.6	3.2	2.8	3.6	4	3.2	3.6

The Excel worksheets for each LGUs are included in Annex F. Table 3.8 summarizes the results of the prioritization exercise.

TABLE 3.8 SUMMARY OF GAM SCORES FOR THE LGUS

Road	Score	Road	Score	Road	Score
Metro Manila					
1) Caloocan (North)		2) Caloocan (South)		3) Las Piñas	
Camarin Road	4.0	Samson Road/ EDSA	4.0	Alabang- Zapote Road	4.0
Quirino Highway	4.0	McArthurs Highway	4.0	PD Sera Avenue	3.2
Congressional Road	4.0	A. Mabini Street	4.0	Daang- Hari Road	3.2
General Luis Street	3.6	Tandang Sora Avenue Extension	3.2	BF Resort Dr./ CAA Rd.	4.0
Malaria Road	3.6	10th Avenue	3.2	Naga Rd.	3.6
Zabarte Road	3.6	7th Avenue	3.2	Marcos Alvarez Rd.	3.2
Langit Road	3.2	5th Avenue/ C-3 Road	3.2		
Saranay Road	3.2	Dagat-dagatan Avenue	3.2		
Zapote Street	3.2				

Road	Score	Road	Score	Road	Score
Metro Manila					
1) Caloocan (North)		2) Caloocan (South)		3) Las Piñas	
Bignay-Liano Road	3.2				
Bagumbong/ Deparo Road	2.8				
4) Mandaluyong City		5) Makati City		6) Malabon City	
Pioneer Street	3.2	Kalayaan Avenue	4.0	McArthur Highway	3.6
		Jupiter Street	4.0	Gen. Luna St.	3.2
		Osmena Highway	4.0	Rizal Ave.	3.6
		32nd Street	4.0	Gov. Pascual	3.6
		Makati Avenue	4.0	Sanciangco St.	2.4
		JP Rizal Avenue	3.6	Panghulo Rd.	2.8
		Gil Puyat Avenue	3.6	Marcelo H. del Pilar	2.4
		Arnaiz Avenue	3.6		
		Ayala Avenue	3.6		
		Zobel Roxas Street	3.6		
		Chino Roces/A Reyes Avenue	3.6		
7) Manila City		8) Marikina City		9) Muntinlupa City	
Taft Ave	3.6	Bayan Bayanan Avenue	4.0	Alabang- Zapote Road	4.0
Rizal Ave	3.2	Shoe Avenue	4.0	Manila South Rd.	3.6
Recto Ave.	3.6	Lopez- Jaena Street	3.6		
UN Ave	3.6	J.P. Rizal Street	3.6		
C2	3.6	Erano Manalo Avenue/ Paraluman Street	3.6		
R10	2.4	Katipunan Avenue	3.6		
		Fortune Avenue	2.8		
		F Santos Avenue	2.8		
		1st Avenue	2.8		
		Balagtas Street	2.8		
10) Navotas City		11) Parañaque City		12) Pasay City	
M. Naval Street	3.6	DA Santos Avenue	4.0	Aurora Boulevard	4.0
Road 10	3.2	N. Aquino Avenue	3.2	Domestic Road	4.0
C-4	3.2	El Grande Ave.	3.2		
Sampaguita Street	2.8	Aguirre Ave.	3.2		
Gov. Pascual Street	2.8	San Antonio	2		
		JP Rizal	2		
		E3	3.2		
		E. Rodriguez	2.0		
		Dona Soledad Ave.	4.0		

Road	Score	Road	Score	Road	Score
Metro Manila					
13) Pasig City		14) Taguig City		15) Valenzuela City	
Meralco Avenue	4.0	East Service Road	2.8	Near NLEX Segment 9	2.8
Caruncho Avenue	4.0	MLQ Avenue Shared Lanes	3.6	Maysan Rd.	3.6
Dr. Sixto Antonio/ A. Luna Avenue	3.6			T. Santiago	2.8
Felix Avenue	3.2				
East Bank Road	3.2				
A. Sandoval Road	2.8				
F. Legaspi Street	2.8				
Metro Cebu					
16) Cordova		17) Lapu-lapu City		18) Mandaue City	
Martin Francisco	3.6	MCR East	4.0	MC Briones Avenue	4.0
Manuel L. Quezon National Highway	3.2	Marigondon-MVP	3.6	City Core	3.6
Centennial Avenue	2.8	Punta Engaño Road	3.2	UN Avenue	3.2
Victorio Pacaldo Sr. Street	2.8	MCR West	3.6	AS Fortuna Avenye	3.2
		Aviation Road	2.8	DM Cortes/ Plaridel	3.2
19) Talisay City					
Sangi Road	3.6				
Vicente Garces St.	3.6				
Dumlog Road	3.2				
Fidel Bas	2.8				
Metro Davao					
20) Davao City		21) Tagum City			
CP Garcia Highway	4.0	Capitol Circumferential Road	4.0		
JP Laurel Avenue	4.0	Davao Agusan National Highway	4.0		
Sta. Ana Avenue	4.0	Pioneer Avenue	4.0		
Quezon Blvd.	4.0	Apekon Road	3.6		
CM Recto Ave.	4.0	Timog Avenue	2.8		
Davao- Panabo City Road	4.0				
Dacudao Avenue	4.0				
Ecoland Drive	3.2				
Riverview Road	3.2				
MAA road	3.2				
Ecowest Drive	3.2				
Tigatto- Waan Road	2.8				
Eden St./ Gold Street	2.8				
Tulip Drive	2.8				

3.3 Designs for various road or corridor types

In 2020, the DPWH issued Department Order No. 88, series of 2020 – "*Prescribing Guidelines on the Design of Bicycle Facilities along National Roads.*" A memorandum updating the guidelines was issued dated 18 June 2021 on "*Updated Guidelines and Standard Drawings for Bicycle Facilities.*" Most recently last 19 December 2022, DPWH issued Department Order No. 263 on "*Updated Guidelines and Standard Design Drawings for Bicycle Facilities along National Roads.*" Prior to this, the only existing guidelines for a city in the area covered by this master plan are the ones developed for Marikina City in 2000 as part of the feasibility study for the Marikina Bikeways.

3.3.1 Typical bike lane designs

The following figures illustrate the different classes and types of bike lanes as per revised guidelines.



FIGURE 3.34 CLASS I-TYPE A: SHARED USE PATH WITH FENCE



FIGURE 3.35 CLASS I-TYPE B: SHARED USE PATH WITHOUT FENCE



FIGURE 3.36 CLASS II-TYPE A: SEPARATED BIKE LANE USING BOLLARDS AND PRE-CAST CONCRETE DELINEATORS



FIGURE 3.37 CLASS II-TYPE A: SEPARATED BIKE LANE ALONG CONFLICT AREAS USING BOLLARDS AND PRE-CAST CONCRETE DELINEATORS



FIGURE 3.38 CLASS II-TYPE B: SEPARATED BIKE LANE USING LED PAVEMENT MARKERS

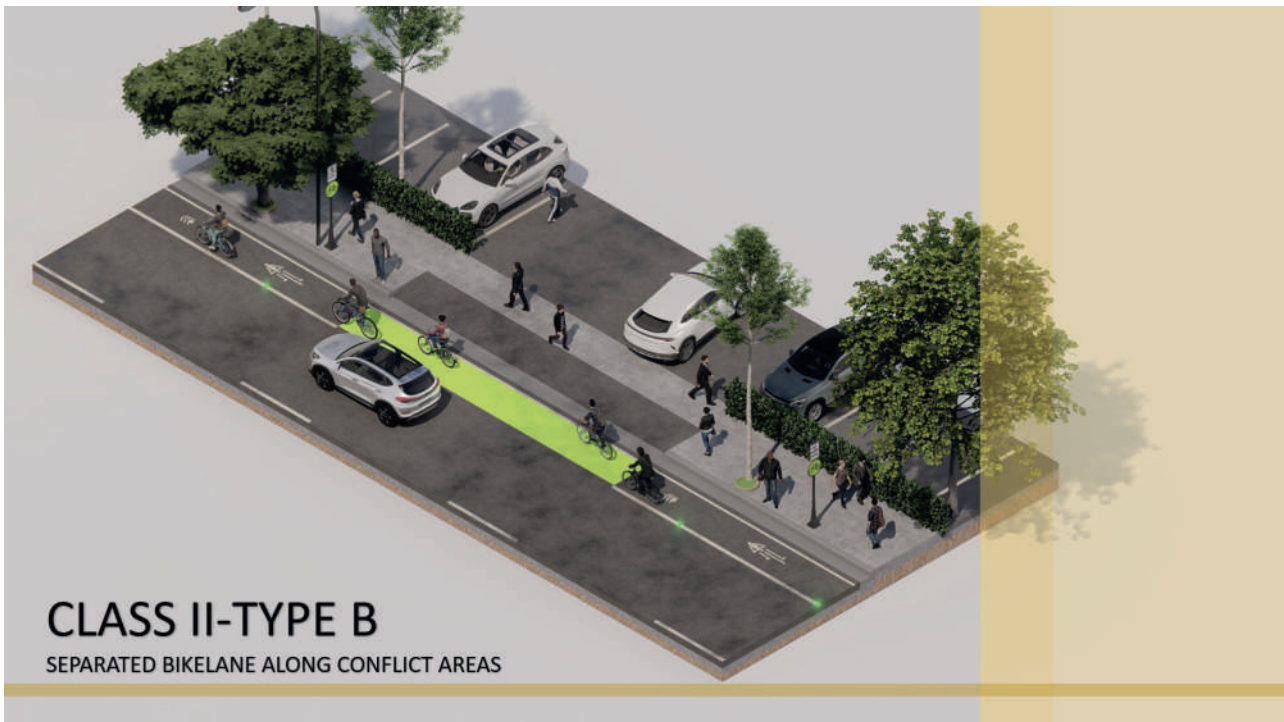


FIGURE 3.39 CLASS II-TYPE B: SEPARATED BIKE LANE ALONG CONFLICT AREAS USING LED PAVEMENT MARKERS



FIGURE 3.40 CLASS II-TYPE B: SEPARATED BIKE LANE (BI-DIRECTIONAL)



FIGURE 3.41 CLASS II-TYPE B: SEPARATED BIKE LANE ALONG CONFLICT AREAS (BI-DIRECTIONAL)



FIGURE 3.42 CLASS II-TYPE C: SEPARATED BIKE LANE ALONG CONFLICT AREA (WITH BOLLARDS)

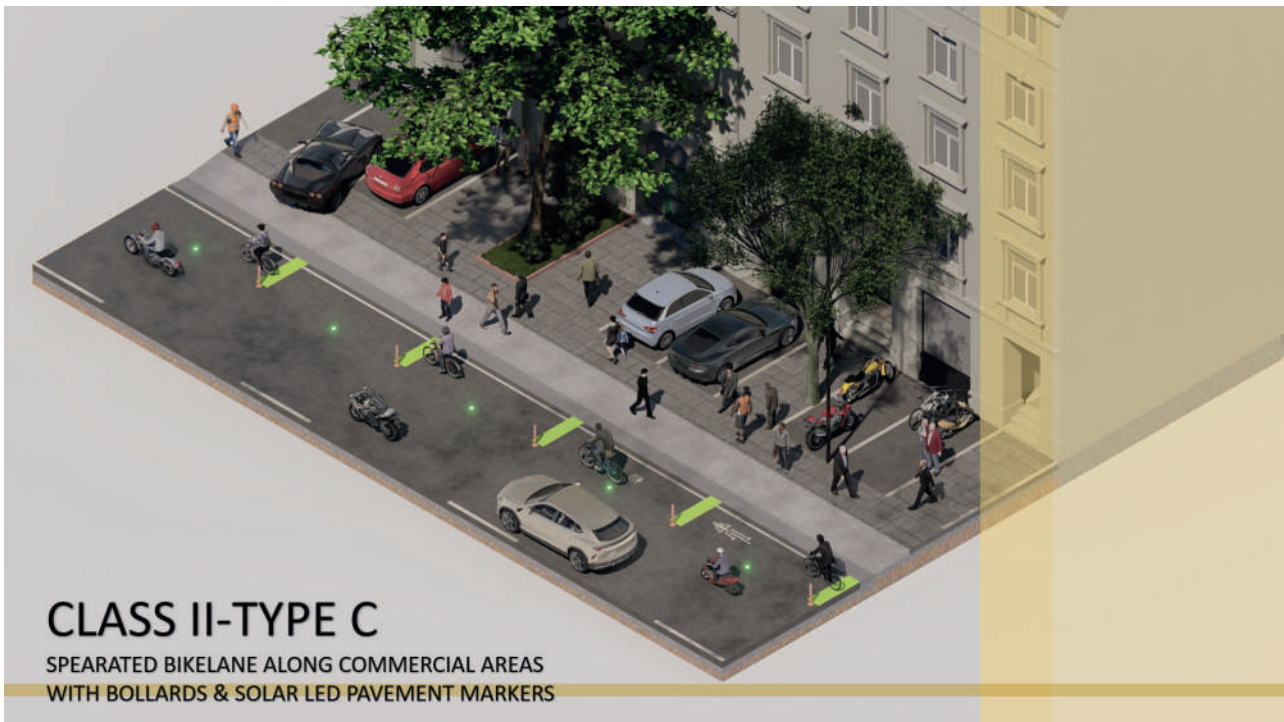


FIGURE 3.43 CLASS II-TYPE C: SEPARATED BIKE LANE ALONG COMMERCIAL PROPERTIES (WITH BOLLARDS & SOLAR LED PAVEMENT MARKERS)



FIGURE 3.44 CLASS III: SHARED ROADWAY



FIGURE 3.45 CLASS III: SHARED ROADWAY ALONG CONFLICT AREAS



FIGURE 3.46 CLASS III: SHARED ROADWAY ALONG COMMERCIAL PROPERTIES

3.3.2 Intersection treatments

At intersections, both powered vehicles and bicycles change direction of travel thus causing several conflicts which could lead to potential collisions. Such conflicts have to be significantly reduced, if not totally eliminated. The following intersection treatments may be considered as shown in the illustrations based on the DPWH revised guidelines.



FIGURE 3.47 BIKE LANES INSIDE YELLOW INTERSECTION BOX



FIGURE 3.48 BIKE LANES OUTSIDE YELLOW INTERSECTION BOX



FIGURE 3.49 BIKE LANE INTERSECTION APPROACH "A"



FIGURE 3.50 BIKE LANE INTERSECTION APPROACH "B"



FIGURE 3.51 BIKE LANE INTERSECTION APPROACH "C"



FIGURE 3.52 BIKE LANE INTERSECTION APPROACH "D"

3.3.3 Public Utility Vehicles Loading and Unloading Areas

Since most of the public utility vehicles use the outermost lane for their operation as well as for loading and unloading of passengers, conflicts with bicycles become a serious concern. Treatments at PUV stops such as shown in the succeeding figures will greatly eliminate the conflicts between PUVs and bicycles. Overcrowding of commuters must be controlled as this may lead to blockage of the bike lanes. Longer dwelling times of PUVs must also be discouraged. Therefore, presence of traffic enforcers in such locations are necessary especially during peak hours.



FIGURE 3.53 BIKE LANES AT PUV STOPS/LOADING & UNLOADING BAY



FIGURE 3.54 BIKE LANES AT PUV TURNOUT/LOADING & UNLOADING BAY

3.3.4 Bike Boxes

In addition to the intersection templates provided in the DPWH revised guidelines, it is recommended that designs incorporating bike boxes be also included in the standard options available to engineers and planners. Such boxes have been initially planned largely at intersections with large volume of motorcycles but the concept may be used for storage of bicycles as well.



FIGURE 3.55 BIKE BOXES AT A 4-LEG INTERSECTION



FIGURE 3.56 BIKE BOXES AT A 3-LEG INTERSECTION

3.3.5 Proposed Bike Lane Class

Based largely on the road width and existing number of lanes, the following Table 3.9 show the proposed type/class of bicycle facility that may be adopted along each road listed in Table 3.8 It is assumed that if the road has a total of 4 lanes or more (at least 2 lanes per direction), there is a possibility to provide a Class II bike lane. Otherwise, a Class III may be provided unless modification in traffic management (conversion to one-way, for instance) is introduced to the road network.

TABLE 3.9 PROPOSED BIKE LANE CLASS FOR PLANNED ROUTES IN THE METROPOLITAN LGUs

Road	Bike Lane Class	Road	Bike Lane Class	Road	Bike Lane Class
Metro Manila					
1) Caloocan (North)		2) Caloocan (South)		3) Las Piñas	
Camarin Road	III	Samson Road/ EDSA	II	Alabang- Zapote Road	II
Quirino Highway	II	McArthurs Highway	II	PD Sera Avenue	II
Congressional Road	II	A. Mabini Street	II	Daang- Hari Road	II
General Luis Street	II	Tandang Sora Avenue Extension	II	BF Resort Dr./ CAA Rd.	II
Malaria Road	III	10th Avenue	II	Naga Rd.	III
Zabarte Road	III	7th Avenue	II	Marcos Alvarez Rd.	II
Langit Road	III	5th Avenue/ C-3 Road	II		
Saranay Road	II	Dagat-dagatan Avenue	II		
Zapote Street	III				
Bignay-Liano Road	III				
Bagumbong/ Deparo Road	III				
4) Mandaluyong City		5) Makati City		6) Malabon City	
Pioneer Street	III	Kalayaan Avenue	II	McArthur Highway	III
		Jupiter Street	II	Gen. Luna St.	III
		Osmena Highway	II	Rizal Ave.	III
		32nd Street	II	Gov. Pascual	III
		Makati Avenue	II	Sanciangco St.	III
		JP Rizal Avenue	II	Panghulo Rd.	III
		Gil Puyat Avenue	II	Marcelo H. del Pilar	III
		Arnaiz Avenue	II		
		Ayala Avenue	II		
		Zobel Roxas Street	II		
		Chino Roces/A Reyes Avenue	II		
7) Manila City		8) Marikina City		9) Muntinlupa City	
Taft Ave	II	Bayan Bayanan Avenue	II	Alabang- Zapote Road	II
Rizal Ave	II	Shoe Avenue	II	Manila South Rd.	II
Recto Ave.	II	Lopez- Jaena Street	III		

Road	Bike Lane Class	Road	Bike Lane Class	Road	Bike Lane Class
Metro Manila					
7) Manila City		8) Marikina City		9) Muntinlupa City	
UN Ave	II	J.P. Rizal Street	III		
C2	II	Erano Manalo Avenue/ Paraluman Street	III		
R10	II	Katipunan Avenue	III		
		Fortune Avenue	III		
		F Santos Avenue	III		
		1st Avenue	III		
		Balagtas Street	III		
10) Navotas City		11) Parañaque City		12) Pasay City	
M. Naval Street	III	DA Santos Avenue	II	Aurora Boulevard	II
Road 10	II	N. Aquino Avenue	II	Domestic Road	II
C-4	II	El Grande Ave.	III		
Sampaguita Street	III	Aguirre Ave.	III		
Gov. Pascual Street	III	San Antonio	III		
		JP Rizal	III		
		E3	II		
		E. Rodriguez	III		
		Dona Soledad Ave.	II		
13) Pasig City		14) Taguig City		15) Valenzuela City	
Meralco Avenue	II	East Service Road	II	Near NLEX Segment 9	III
Caruncho Avenue	II	MLQ Avenue Shared Lanes	III	Maysan Rd.	III
Dr. Sixto Antonio/ A. Luna Avenue	III			T. Santiago	III
Felix Avenue	II				
East Bank Road	II				
A. Sandoval Road	III				
F. Legaspi Street	III				
Metro Cebu					
16) Cordova		17) Lapu-lapu City		18) Mandaue City	
Martin Francisco	III	MCR East	II	MC Briones Avenue	II
Manuel L. Quezon National Highway	III	Marigondon-MVP	II	City Core	III
Centennial Avenue	III	Punta Engaño Road	III	UN Avenue	II
Victorio Pacaldo Sr. Street	III	MCR West	III	AS Fortuna Avenye	II
		Aviation Road	III	DM Cortes/ Plaridel	II
19) Talisay City					
Sangi Road	III				
Vicente Garces St.	III				
Dumlog Road	III				
Fidel Bas	III				

Road	Bike Lane Class	Road	Bike Lane Class	Road	Bike Lane Class
Metro Davao					
20) Davao City		21) Tagum City			
CP Garcia Highway	II	Capitol Circumferential Road	II		
JP Laurel Avenue	II	Davao Agusan National Highway	II		
Sta. Ana Avenue	II	Pioneer Avenue	II		
Quezon Blvd.	II	Apekon Road	II		
CM Recto Ave.	II	Timog Avenue	III		
Davao- Panabo City Road	II				
Dacudao Avenue	II				
Ecoland Drive	II				
Riverview Road	II				
MAA road	II				
Ecowest Drive	II				
Tigatto- Waan Road	III				
Eden St./ Gold Street	III				
Tulip Drive	III				

3.4 Other guidelines and standards

Other guidebooks that have become popular and perceived as more user-friendly are those developed and published by the National Association of City Transport Officials (NACTO) of the US. These include the “Global Street Design Guide” and the “Urban Street Design Guide” that have been adopted by many US cities and have been promoted in cities in other countries as well, including the Philippines. There is a separate “Urban Bikeway Design Guide” that is more focused on bikeways or bike lanes, including various treatments to the most common situations such as bikeway designs at intersections, driveways and public transport stops. These guides are shown in Figure 3.57, and are already being used as references by several LGUs including Pasig City and Quezon City, based on the FGDs.

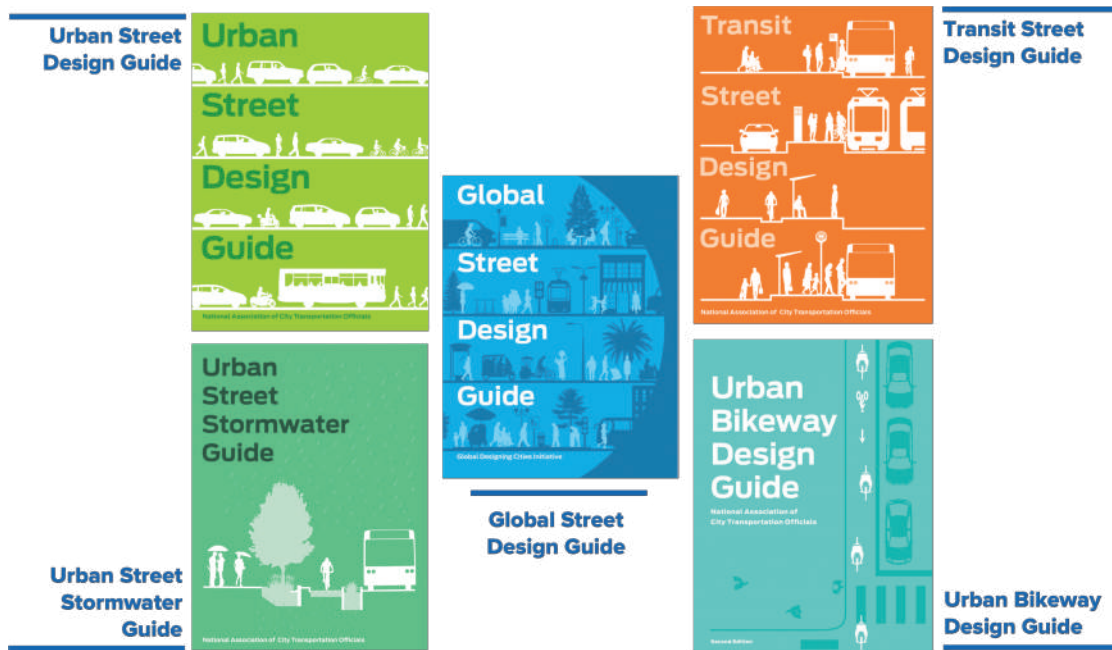


FIGURE 3.57 VARIOUS GUIDELINES BY NACTO

Most recently, NACTO also published guidelines in relation to the COVID-19 pandemic, focusing on children, and utilizing/adopting the iRAP Star Ratings. This is shown in Figure 3.58.



FIGURE 3.58 RECENT GUIDELINES PUBLISHED BY NACTO

Guidelines on street transformations consistent with the complete streets concept have also been published and can easily be accessed (i.e., downloaded). These include the Rethinking Streets guides from the University of Oregon features in Figure 3.57.



FIGURE 3.59 GUIDELINES DEVELOPED BY THE UNIVERSITY OF OREGON’S SUSTAINABLE CITIES INSTITUTE (SCI) AND NATIONAL INSTITUTE FOR TRANSPORTATION AND COMMUNITIES (NITC)

There are many other guidelines or manuals developed in other countries. The more popular ones including the Dutch Crow manual are shown in Figure 3.60. These are also being used as references by some LGUs in Metro Manila, Metro Cebu and Metro Davao.



FIGURE 3.60 OTHER GUIDELINES FROM VARIOUS COUNTRIES

Perhaps among these design guides and manuals, the Walking and Cycling Design Guide from Singapore will be most appropriate for reference. The guide is a collaboration of many agencies including their Land Transport Authority and Urban Redevelopment Authority. It is also a complete and comprehensive design guide that integrates both walking and cycling, roadside and non-roadside facilities, crossings, and end of trip facilities. It should also be noted that Singapore and the Philippines share very similar climates, thereby indicating the suitability of their design elements to the Philippine setting.

CHAPTER 4

End of Trip Facilities



4. End-of-Trip Facilities

4.1 Parking

4.1.1 Elements

In this section, various bicycle parking facility designs, guidelines, and supporting policies are provided. Internationally, there are numerous bicycle parking facility types and bicycle rack designs, including proprietary designs by private commercial suppliers. The applicability of bike parking facility and certain bike rack types varies depending on several factors, with each type having its own advantages and disadvantages depending on the situation.

Factors to consider in the choice of bike parking facility design:

- Availability of space/Capacity
 - Bike parking capacity or the number of bikes that can be parked depends on the bike rack design and amount of space provided.
 - It is ideal to put bike parking as close to the building entrance as possible, this makes cycling a more attractive mode of transport due to the more convenient distance between the parking area and the entrance.
- Bike parking facility cost
 - The direct cost of a bike parking facility consists of the cost of bike racks and additional structures or features, which may include signage or shelter structures.
 - In general, the manufacture of basic bike rack designs only include material and labor costs, while bike racks with proprietary or custom designs will include additional cost.
- Protection against the elements
 - Bicycles exposed to the elements for extended periods of time are prone to damage and may require additional maintenance or repair. During rainy weather, a wet bicycle may be inconvenient to ride, rainfall can also cause steel parts to rust, additional maintenance is needed to prevent this. On the other hand, extended exposure to sunlight can also damage the tires, saddle, handlebar grips/tape, and paint on the bicycle. Cyclists especially those with more expensive bikes will prefer sheltered bike parking when available.
 - Establishments/businesses with sheltered bike racks can attract more cyclists

since they prefer sheltered bike parking especially during rainy weather.

- Parking duration
 - In locations where cyclists park their bikes for a short duration and can constantly see their bikes, bike locks may not be used and lower security bike racks can be provided. For long durations where owners cannot see or attend to their bikes, bike locks are needed, with high security bike racks recommended as well as additional security (security guards, CCTV cameras, entry restrictions, etc.).
- Types of cyclists utilizing the parking area
 - Recreational and sport cyclists tend not to bring locks, it is ideal to locate bike parking within view of owners, especially if a low-security type of bike rack is used.
 - For commuter cyclists using the bike parking and leaving their bikes for several hours, prioritize having secure bike racks, sheltered if possible.
- Protection against theft
 - A securely locked bike has the frame and one or both wheels locked to the rack. Secure bike racks should have both the bike's front and rear wheel and the frame in close contact with the rack, enabling the use of even small locks (see Figure 4.1). Bike racks which can only enable locking one wheel and the frame, while generally acceptable, may have cases of bikes having the other wheel being stolen, especially if the bicycle wheel is attached using quick-release skewers.



Small locks can only lock a bike at its contact point with the bike rack.

Longer cable or chain locks can extend and lock a wheel and the frame to the bike rack.

FIGURE 4.1 BIKE LOCKS AND LOCKING PRACTICE¹

A securely locked bike has the frame and one or both wheels locked to the rack. Secure bike racks should have both the bike’s front and rear wheel and the frame in close contact with the rack, enabling the use of even small locks (such as U-locks). Bike racks which can only enable locking one wheel and the frame, while generally acceptable, may have cases of bikes having the other wheel being stolen, especially if the bicycle wheel is attached using quick-release skewers.

¹ **Image sources (clockwise):** (1) Cheap-Steel-Bike-Bicycle-Cable-Lock-for-Tricycle.jpg (1000×1000) (made-in-china.com); (2) Kryptonite - Keeper Standard U-Lock: 4 x 8" | State Bicycle Co.; (3) Combination Cable Bike Lock - Master Lock Dorm Security Products College Stuff (dormco.com); (4) Kryptonite Chain Lock with Moly Padlock | REI Co-op; and (5) About Bike Theft / The Problem / Contributing Factors / Type of Locking Practice (bikeoff.org)

4.1.2 Common types of bicycle rack designs

a. Support rack (Inverted-U)

Support racks support bicycles at many points and offer many possible locking combinations for the frame and wheels. Bikes lean onto the rack and can be secured with one or more locks. An individual rack can accommodate two bikes, one on each side. Although a variety of designs are possible, inverted U support racks are common and are widely recommended when available space and cost allow it.



Inverted-U shaped racks are widely recommended due to its capacity for multiple locks. Creative designs which offer similar support and security can be used.

Advantages:

- Bikes can be securely locked with small locks, including the frame and both wheels, and can accommodate multiple locks.
- Excellent lateral support for parked bikes

Disadvantages:

- Full bike racks may look disorderly due to the wide variety of locking orientations.

FIGURE 4.2 SUPPORT RACK ADVANTAGES AND DISADVANTAGES²

² Image sources: (1) The Rib Rack - Commercial Bike Racks | Bike Security Racks; (2) CycleSafe Bike Parking Catalog

b. Hanging rack (single bar)

A hanging rack is simply a horizontal bar supported at both endpoints. Parked bicycles are hung onto the horizontal bar at the area of the bicycle between the nose of the saddle and the seatpost. Bicycles are typically not locked to the rack. Hanging racks are common in locations where owners can always attend to their bikes, such as carinderias, bike cafes and small local bike shops.



Advantages:

- Low cost
- Can be installed in small spaces
- Convenient to use for riders parking for short durations without locking their bikes
- Additional supports can be added so bikes can be locked (see bottom image).

Disadvantages:

- Bikes cannot be securely locked – locking the frame requires a long lock (without extra supports) and the front wheel cannot be locked to the rack
- Poor lateral support to parked bicycles - strong winds can cause parked bikes to move or fall off and may cause damage

FIGURE 4.3 HANGING RACK ADVANTAGES AND DISADVANTAGES³

³ **Image sources (clockwise):** (1) Feedback Sports A-Frame - Bike World (bikeworldiowa.com); (2) How to Easily Build a Cheap Multi-Bike Hanging Storage Rack - Singletracks Mountain Bike News; (3) Image courtesy of Robert Anthony Siy

c. Wheel clamp rack

Wheel clamp racks support one (front or rear) wheel, keeping the bicycle upright while parked. Bicycles are parked by lifting the wheel and inserting it down to the clamp. Bicycles can be locked to the rack through the supported wheel, with longer locks able to lock the frame as well. However, this type of rack is more suited to bikes left unlocked for short durations.



Advantages:

- Low cost
- Can be installed in small spaces

Disadvantages:

- Bikes cannot be securely using small locks – locking the frame requires a long lock
- Only one side of the bicycle can be securely locked.
- Locks can be difficult to reach when the rack is filled with bikes, especially when the rack is placed by a wall.
- Bikes with wide tires may not fit into narrow racks.

FIGURE 4.4 WHEEL CLAMP RACK ADVANTAGES AND DISADVANTAGES⁴

⁴ **Image sources:** (1) Installing Bike Racks: A Brief Bike Parking Guide for Perth (imageextra.com.au); (2) Global Industrial™ Single-Sided Adjustable Bicycle Parking Rack, 5-Bike Capacity | 708150 - GLOBALindustrial.com

d. Grid / Insert rack

Insert racks support one (front or rear) wheel, with larger racks also able to accommodate forks or rear triangles. Bicycles are parked by inserting the wheel through the rack. Bicycles can be locked to the rack through the supported wheel and through the fork/frame on larger racks.



Advantages:

- Low cost
- Can be installed in small spaces
- Easy to lock/ unlock bikes



Disadvantages:

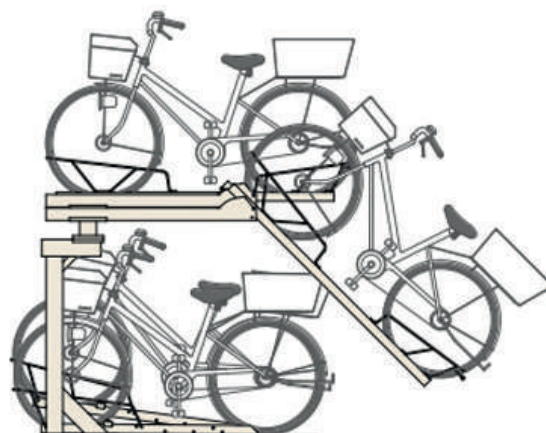
- In narrow racks, bikes cannot be securely locked using small locks – locking the frame requires a long lock
- Only one side of the bicycle can be securely locked.
- Bikes with wide tires may not fit into narrow racks.

FIGURE 4.5 INSERT RACK ADVANTAGES AND DISADVANTAGES⁵

e. Tiered rack

Tiered racks feature two-storey bike parking, with wheel clamps supporting both wheels keeping the bike upright. Bike racks at the upper-level slide down and are pushed back up after the bicycle is mounted and locked.

⁵ **Image sources:** (1) Bike racks are now available for use at certain MRT-3 stations (topgear.com.ph); (2) Product | READING BIKE RACK | Keystone Ridge Designs



Advantages:

- Maximum parking capacity for available space
- Bikes can be securely locked with options to lock both wheels and frame using small locks

Disadvantages:

- High cost
- Moving parts within the bike rack will require proper maintenance
- Locks can be difficult to reach when the rack is filled with bikes, especially when the rack is placed by a wall.
- Physical effort required to park bikes at the upper rack

FIGURE 4.6 TIERED RACK ADVANTAGES AND DISADVANTAGES⁶

⁶ Image sources (clockwise): (1) Two Tier Bicycle Racks | Stackable Bike Racks | Double Tier Bike Racks (cycle-rack.com); (2) Two Tier Bike Rack (bikerackcompany.com)

f. Decorative bike racks

Bike racks can be designed for decorative purposes with creative designs, as long as basic functionality remains. Decorative designs can be implemented to follow a certain theme of a location such as historical areas and theme parks, or to serve as aesthetic street furniture.



FIGURE 4.7 DECORATIVE BIKE RACKS IN MANILA⁷

4.1.3 Long-term bike parking

Most bike racks for short-term bicycle parking are situated outdoors and are readily accessible for bike owners. Long-term bike parking refers to bicycles parked for several hours at a time with the owner far away. For example, a cyclist can leave their bike at a train station while they ride the train to their destination. In these cases, security is most important since bikes are unattended for majority of the time. Protection from the elements is also recommended so that bikes are not exposed to sunlight and rain for extended periods of time. Bike parking facilities such as bike lockers and dedicated indoor bike parking garages are ideal for long-term bike parking.

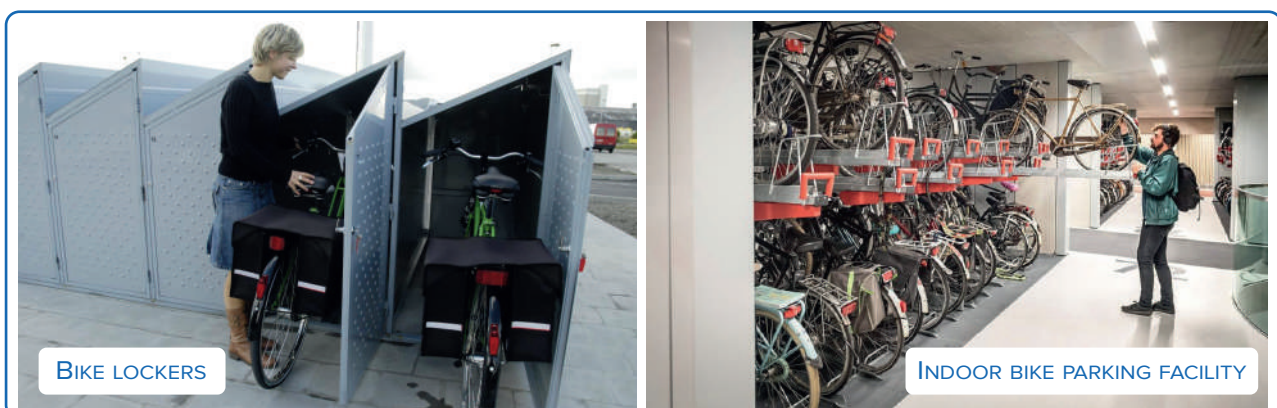


FIGURE 4.8 LONG-TERM BIKE PARKING EXAMPLES⁸

⁷ Image source: LOOK! Manila's newest bike racks are artful tributes to the city's beloved icons | ABS-CBN News

⁸ Image sources: (1) Types of cycle parking available: Bike lockers (mobility-academy.eu); (2) Utrecht has the largest bicycle parking in the world - DivercityDivercity | Divercity : Explore the cities (divercitymag.be)

4.1.4 Bicycle parking minimums

The National Building Code currently does not have minimum parking provisions pertaining to bicycles. In fact, it also does not have minimum parking provisions for motorcycles. As such, establishments including residential (e.g., high-rise condominiums, apartments, subdivisions), workplaces (e.g., office buildings, factories, etc.), commercial (e.g., malls, shops, restaurants, etc.) and institutional (i.e., government buildings, schools, etc.) had to figure out for themselves how many bicycle parking slots they would have to provide. The City of Seattle in the US provides the following examples of bicycle parking minimums:

- Office: 1 space per 5,000 square feet (464.52 square meters) of gross floor area of office use;
- Retail: 1 space per 5,000 square feet (464.52 square meters) of retail use for uses exceeding 10,000 square feet (929.03 square meters) gross floor area;
- Residential: 1 space per 2 dwelling units.

The DPWH D.O. 88 provides the design specifications and typical layouts for bicycle parking facilities but does not recommend minimum number of bicycle parking slots similar to those specified for cars, jeepneys and buses in the National Building Code. One simple solution for malls and residential and office buildings has been to convert car parking spaces for bicycle use. But how many bicycles can you fit into a car slot? Depending on the design, perhaps there can be 10 bike slots fitted into a single car slot. This is illustrated in Figure 4.7.

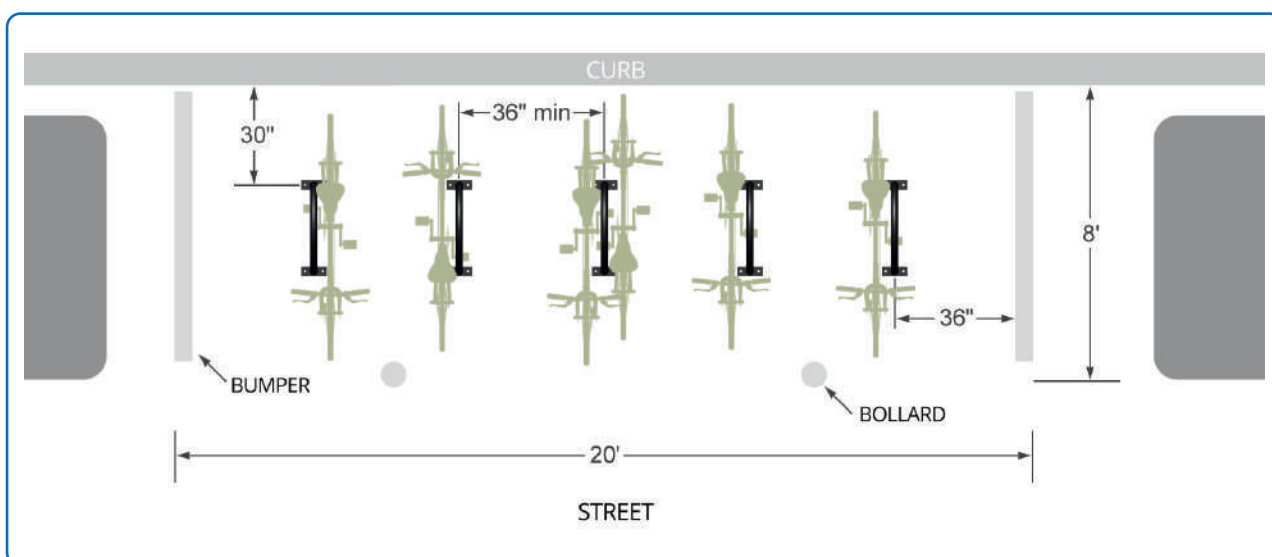


FIGURE 4.9 EXAMPLE CONVERSION OF CAR PARKING SLOT TO BIKE PARKING (SOURCE: CYCLESAFE.COM)

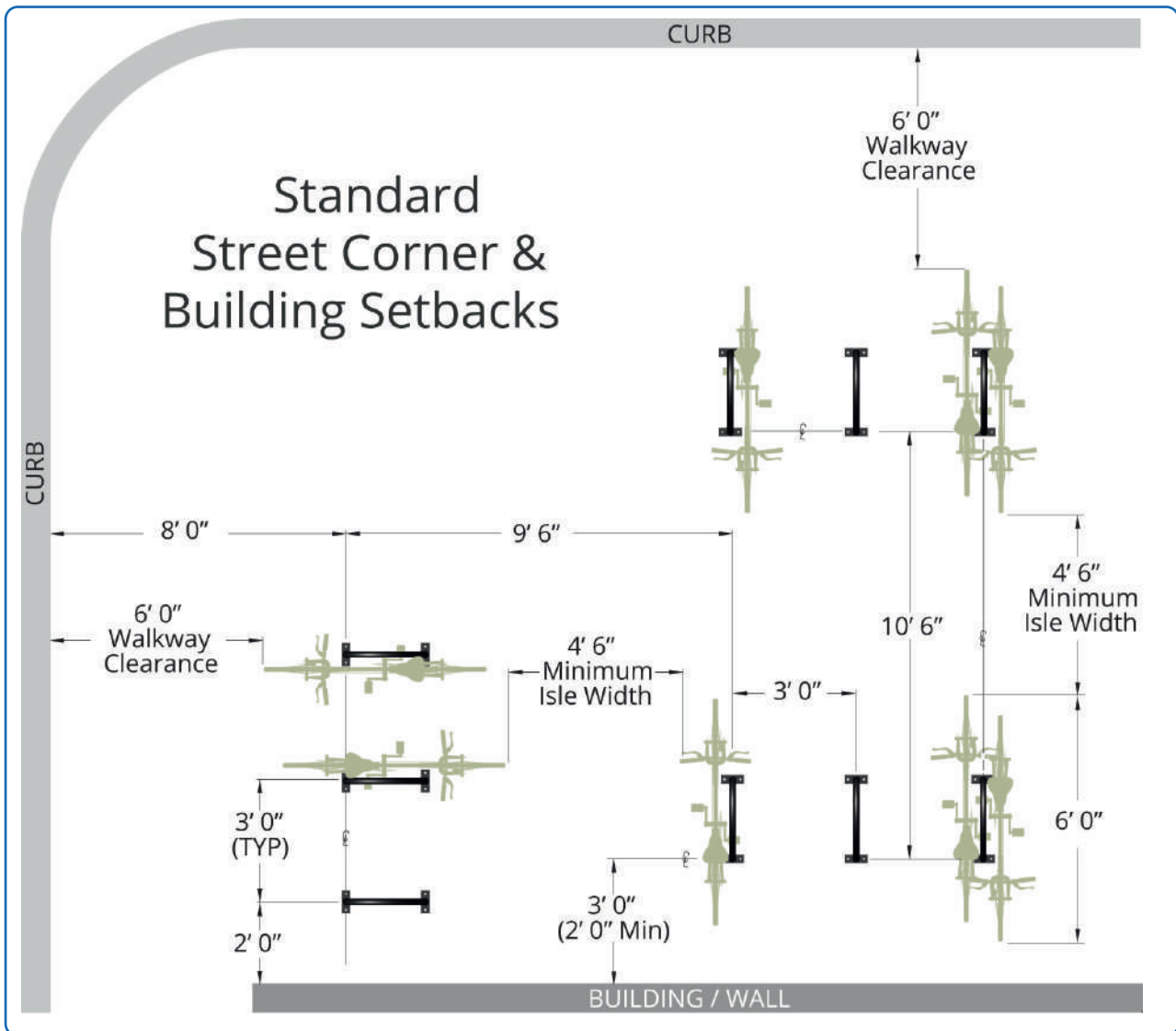


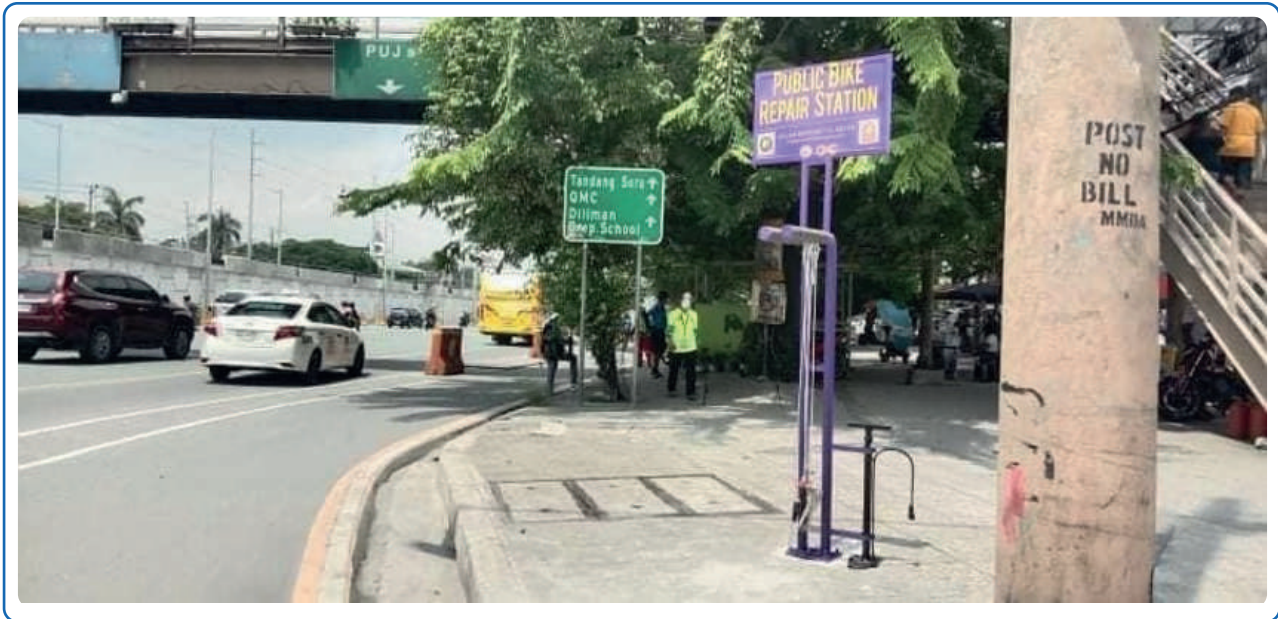
FIGURE 4.10 EXAMPLE BIKE PARKING AT STREET CORNERS (SOURCE: CYCLESAFE.COM)

4.2 Showers, changing rooms and lockers

Depending on the nature of the trip ends, certain facilities may also be essential for bicycle users. Bike commuters (i.e., bike to work, bike to school) will most likely require showers, changing rooms and clothing storage at their workplaces or schools. While the DPWH D.O. 88 provides design layouts for these facilities, there are no established local guidelines or standards yet for the number of showers, changing rooms and lockers for particular locations, local government units will have to determine a reasonable number of these facilities in cooperation with companies, schools and other stakeholders. In the city of Seattle, for example, a building with 250,000 square feet (23,225.76 square meters) of gross office floor area or greater are required to provide shower facilities and clothing storage for bicycle commuters at a ratio of one shower per gender for each 250,000 square feet (23,225.76 square meters) of office use.

4.3 Bike repair stations

Bike repair stations need not be limited to trip ends. Instead, these are to be strategically located along typical cycling routes. An example of bike repair stations that are not necessarily located at a building or establishment (e.g., at the bike parking area of an office, restaurant or mall) are public bike repair stations installed by local bicycle groups in cooperation with the LGUs. These repair stations would typically have pumps for tire inflation and basic tools.



(SOURCE: BIKERS UNITED MOVEMENT, [HTTPS://WWW.FACEBOOK.COM/BIKERSUNITEDMOVEMENT/PHOTOS/](https://www.facebook.com/bikersunitedmovement/photos/))
 FIGURE 4.11 BIKE REPAIR STATION ALONG COMMONWEALTH AVENUE IN QUEZON CITY



FIGURE 4.12 BIKE REPAIR STATION AND PARKING AT BONIFACIO GLOBAL CITY, TAGUIG CITY

4.4 Recommended end-of-trip facilities

Table 4.1 shows a summary of recommended end-of-trip facilities for various developments or establishments.

TABLE 4.1 END-OF-TRIP FACILITIES FOR THE MOST COMMON TRIP ENDS

USE	PARKING		SHOWER AND CHANGING ROOMS	LOCKERS/ CLOTHING STORAGE	REMARKS
	Short-term	Long-term			
Residential	✓	✓	n/a	n/a	Short-term parking are basically for visitors or guests including service providers
Office	✓	n/a	✓	✓	Incentives may be provided to employees opting to bike-to-work including premium locations for parking and shower and changing facilities nearby
Industrial	✓	n/a	✓	✓	Incentives may be provided to employees opting to bike-to-work including premium locations for parking and shower and changing facilities nearby
Worksites	✓	n/a	✓	✓	Incentives may be provided to employees opting to bike-to-work including premium locations for parking and shower and changing facilities nearby
School	✓	n/a	✓	✓	Many schools already have shower and changing rooms as well as lockers
Government	✓	n/a	✓	✓	Showers, changing rooms and lockers are mainly for government employees/workers
Shopping	✓	n/a	✓	✓	Showers, changing rooms and lockers are mainly for employees/workers
Recreational	✓	n/a	✓	✓	Showers, changing rooms and lockers are mainly for government employees/workers
Restaurants/ Fast-food	✓	n/a	✓	X	Showers, changing rooms and lockers are mainly for employees/workers

USE	PARKING		SHOWER AND CHANGING ROOMS	LOCKERS/ CLOTHING STORAGE	REMARKS
	Short-term	Long-term			
Transit stations	✓	✓	n/a	n/a	Long-term parking facilities are recommended for transit stations especially those connecting to airports and transport terminals
Transport terminals	✓	✓	✓	n/a	Storage may not be required for passengers as they are essentially in transit
Airports	✓	✓	✓	✓	Facilities for both travelers and employees

The DPWH guidelines contain example designs for short term and long-term parking including bike racks and bike cages or shelters. There are also example designs and layout for toilet/shower/change facilities but these appear to be standalone rather than integrated to buildings such as offices and schools. Designs should not be limited to these examples but need to evolve and adopt best practices from other countries in order to maximize space use.

CHAPTER 5

Programs



5. Programs

5.1 Bicycle safety and security

According to a recent study of the Institute for Labor Studies (ILS) of the Department of Labor and Employment¹, 76% of the survey respondents are willing to bike to work even if other forms of transportation are available. However, concerns about safety on the road and poor road conditions were major deterrents to bicycling (see Figure 5.1). Most drivers of motorized vehicles are still unaware of how to share the roads with the cyclists. The cyclists can be considered as among the least protected road users. Bicycle advocacy groups are clamoring for the establishment of a safe and effective bicycle network. Simply painting the roads does not sufficiently create a protected bicycle lane ensuring the safety of cyclists. These groups also complained about the lack of secured bike parking, lockers, showers, and changing rooms.

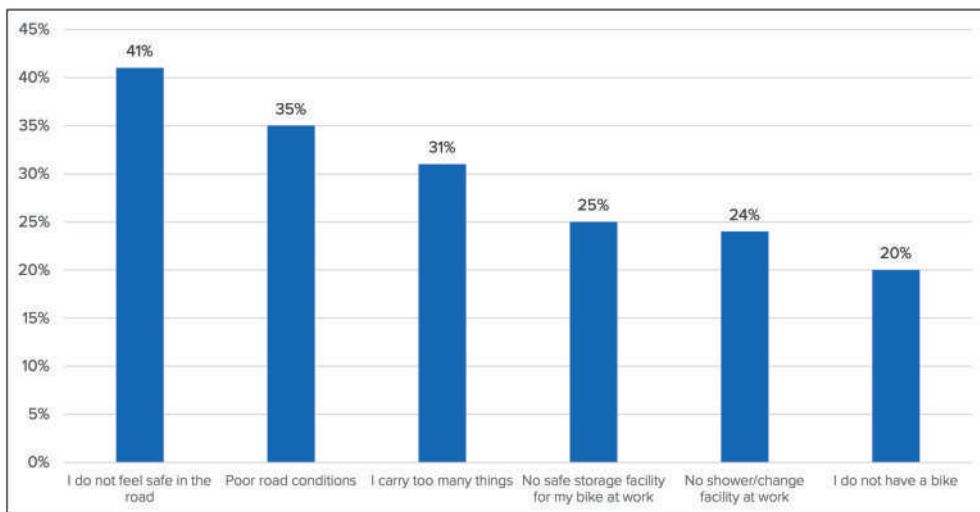


FIGURE 5.1 FACTORS DETERRENT TO BICYCLING

Based on data from the Metropolitan Manila Development Authority (MMDA), the number of bikes, e-bikes, and pedicabs involved in road crashes has been increasing since 2016 at an average rate of 19.9% per annum as shown in Table 5.1. The series of lockdowns and restrictions on transportation have limited personal mobility and resulted in more people biking to work. It has also led to more cyclists being involved in road crashes. In 2020, there were 3,026 accidents involving bicycles, e-bikes, and pedicabs. This represents a 69.7% increase from its comparative figure the previous year. The share of bikes, e-bikes and pedicabs in road crashes increased from 0.7% in 2016 to 2.4% in 2020.

¹ Bike to Work: A Survey on Use of Bike in the Time of Covid-19 Pandemic by Miraluna S. Tacadao and Ivan Cassidy F. Villena, ILS Discussion Paper Series 2020.

TABLE 5.1 ROAD CRASH STATISTICS: NUMBER OF VEHICLES INVOLVED

VEHICLE TYPE	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Bike/ E-Bike/ Pedicab	3,026	1,783	1,627	1,431	1,396	1,340	1,413	1,345	1,326	1,308
Motorcycle	25,208	35,006	29,261	24,058	23,105	20,283	20,515	20,272	19,574	17,837
Tricycle	1,942	3,922	3,831	3,655	3,773	3,666	3,595	3,824	3,669	3,463
Car	58,778	118,522	117,225	110,653	108,307	90,629	78,970	79,918	75,880	71,393
PUJ	2,562	10,296	9,617	10,163	11,157	10,741	11,106	11,853	11,937	11,424
Taxi / FX	3,038	6,331	5,667	6,378	8,360	9,652	12,511	13,868	11,067	7,343
Bus	3,233	10,841	11,447	9,214	9,563	7,371	6,266	6,435	6,752	6,940
Van	13,964	24,959	22,954	20,940	18,772	15,774	13,930	6,041	8,103	12,117
Truck	10,550	18,667	18,163	17,858	19,614	17,268	15,188	12,996	11,791	9,480
Train	13	17	24	18	34	30	19	11	21	19
Unknown	2,696	5,373	5,981	5,668	6,461	7,570	8,300	7,032	5,845	4,865
Total	125,010	235,717	225,797	210,036	210,542	184,324	171,813	163,595	155,965	146,189

Source: Metro Manila Accident Reporting and Analysis System (MMARAS), MMDA

Out of the 3,026 road crashes involving bikes, e-bikes and pedicabs in 2020, 36 were considered fatal and involved the death of the driver, passenger, or pedestrian as shown in Figure 5.2. The number of fatal accidents in 2020 was 80% higher compared to the previous year. There were significant increases in the number of non-fatal injuries and damages to properties with growth rates in 2020 at 95.0% and 31.3%, respectively.

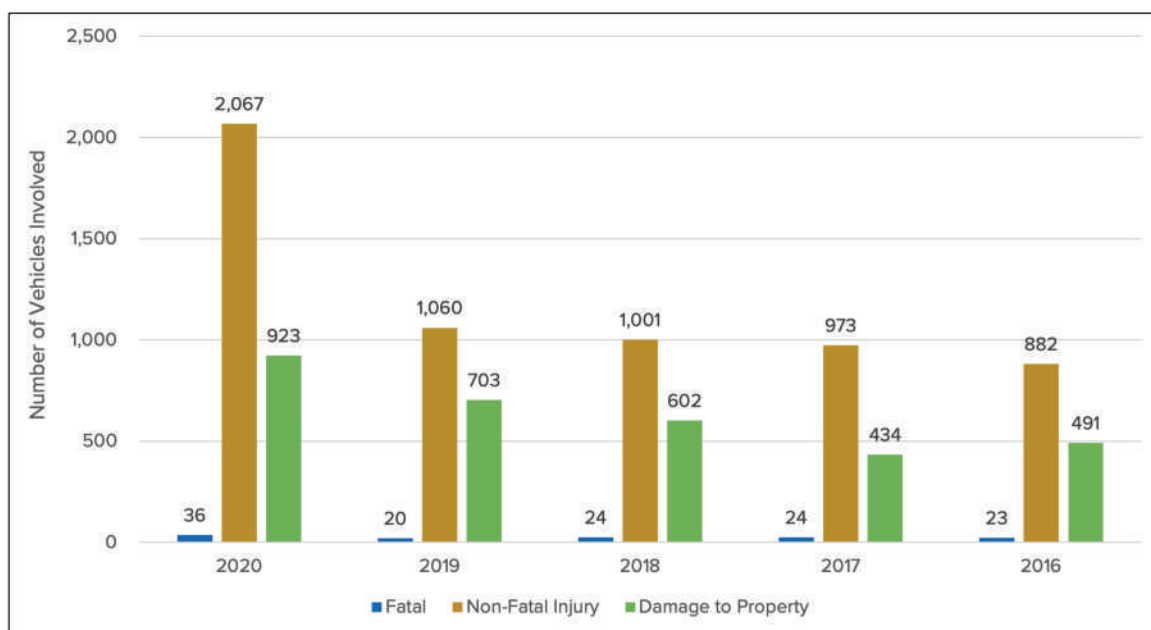


FIGURE 5.2 BIKES, E-BIKE AND PEDICABS INVOLVED IN ROAD CRASHES, 2016-2020 (Source: MMARAS, MMDA)

Bicycle theft has also been on the rise as more people use their bikes to work coupled with the hefty increase in bike sales. Most LGUs in the study area do not keep records on incidents of bicycle theft in the respective geographical jurisdictions. However, the uptrend in bicycle theft can be seen in the number of posts shared by cyclists in their Facebook or other social media accounts. Only a few of the bicycles stolen are even reported to the

police. Furthermore, the likelihood of recovering the stolen bicycles is very low. Only in cases where the incidents were captured by the closed-circuit TV (CCTV) were the instances that bicycles were recovered by the authorities.

Two possible measures that can address bicycle security are registration and insurance. Bicycle registration increases the likelihood of recovery. In addition, the serial number stamped on the bicycles can help prevent the thieves from stealing the bikes. Last May 2021, the Quezon City government, through its Green Transport Office (GTO) launched its voluntary bike registration program. The said program would assist bikers locate their bicycles in cases of loss or theft and assist them in case of an accident.² The bike registrants will be issued stickers to be attached to the bicycles by the GTO.

The city government of Davao relaunched its bicycle registration program last July 2021 after it was suspended last June 2020. The amended ordinance provides for the mandatory registration of bicycles, which is valid for one year. Registrants will be issued waterproof stickers with license numbers which have to be attached to the bicycles.

In the case of Cebu City, an ordinance was issued last June 2020 providing for mandatory registration of bicycles. Immediately after the issuance, Cebu City Mayor Edgardo Labella was forced to recall and suspend indefinitely the ordinance after receiving complaints from various cycling groups.

Bicycle insurance is another measure which can address bike security. If a cyclist wants to cover his bicycle against loss and accidental damages, then it is well worth considering investing in an insurance. Bicycle insurance usually covers: (1) damage to the bicycle due to accidents, (2) personal accidents for rider-owner, (3) third-party liabilities, and (4) theft or loss. Presently, there are only a handful of companies offering bicycle insurance in the country.

The best way to prevent bicycle theft is to use tamper-proof locks and to make sure that the bikes are parked in well-lit and visible areas. Bicycles with quick-release mechanisms such as seat posts and wheel sets also must be secured with bike seat locks and locking wheel skewers. Bicycle theft is an opportunistic crime. If bicycles are not locked or properly secured, it can create an environment conducive to the offender.³

5.2 Bike Share

In the ILS survey, 20% of the respondents considered not owning a bike as a major deterrent to bicycling. Bicycles are expensive particularly for those who belong to the

² QC Launches Bike Registration Program, Quezon City Government, 21 May 2021.

³ Bicycle Theft Awareness and Prevention. Presented Vanderbilt University Police Department, 2010.

lower socio-economic income classes. Some 64% of the respondents to the ILS survey have monthly incomes of less than Php 30,000. The acquisition cost for an entry level bike ranges from Php 8,000 to Php 10,000. Branded bikes are more expensive with acquisition cost starting at Php 30,000. Currently, there is a shortage of branded bikes because of the sharp increase in bicycle use worldwide coupled with the adverse effects of the pandemic on the supply chain of major bicycle manufacturers.

There were several bike sharing programs previously implemented in major cities of the country. Among the first bike sharing programs implemented in the Philippines was the Asian Development Bank (ADB)-supported “Tutubi” bicycle project. The project was launched in Davao City in November 2012 with an estimated number of 20 bicycles. The bike sharing program was later expanded to Bonifacio Global City and some parts of Pasig City. The ADB initiative was an attempt to show that urban traffic conditions can be improved through low-cost and zero-emission solutions such as bicycle-sharing systems.⁴ The news release likewise mentioned that “bicycle-sharing is recognized as a means of traveling on short trips that are too long to walk, and a way to close the gap between public transport and rider’s final destination – otherwise known as the “last mile” issue. Under the sharing program, stations are set up in key locations where a bicycle could be accessed with a smart card. Users can ride the bicycle for free for a given period but will be charged a nominal fee when the free period is fully consumed.



FIGURE 5.3 TUTUBI BIKE SHARE STATION IN PASIG CA. 2016

⁴ ADB Launches Bicycle-Sharing Schemes in Three Asian Cities, News Release, 6 November 2012.



FIGURE 5.4 TUTUBI BIKE SHARE STATION AT BGC CA. 2016

In January 2013, the MMDA launched its own bike sharing program along a one kilometer stretch in EDSA, from Magallanes to Ayala Avenue. The MMDA acquired 40 new mountain bikes for the sharing program. The MMDA did not charge any service fee nor required any security deposit for the use of the bicycles. Users were only required to present valid IDs with photos in the control area. The two bike sharing programs were relatively unsuccessful because they were unable to scale reliable service to the public.⁵



FIGURE 5.5 MMDA’s EDSA BIKE SHARE STATION AT BGC CA. 2019

⁵ Bikeshare in Metro Manila: An accessible, affordable transportation system we need by Lyka Ilagan, Manila News, 22 December 2020.

Presently, only the city governments of Pasig and Mandaue have bike sharing programs. Last March 2020, the Pasig City government provided 100 bikes for its Pasigreen Bike Share Program in an effort to promote an eco-friendly mode of transportation. Use of the bike will be free of charge in the first 30 minutes but riders will be charged Php10 per hour thereafter. The bike share program is operated through the use of a smart card, where the user must swipe the card to release the bicycle from the dock. A total of ten stations were established throughout the city.

The DOTr is planning to implement its own bike sharing project to promote active transportation by making bicycles readily available to commuters (Figure 5.6). The initial proposal shows the project's coverage area stretching from the Mall of Asia to SM North EDSA. The bike share program seeks to connect national and local governments, medical facilities, and commercial establishments in the central business districts. The DOTr is currently finalizing the locations of the bicycle stations.

According to the Institute for Transportation and Development (ITDP) guidebook⁶, there are over 1,600 publicly- and privately-operated bike-share systems operating worldwide. The guidebook noted that a successful bike-share system should be:

1. Safe, reliable, affordable and accessible to all potential users;
2. Flexible and adaptable to changes in technology, trends, and operating models;
3. Thoughtfully connected to public transit and other modes;
4. Able to leverage and generate expanded investments and land use dedicated to cycling; and
5. A tool to help meet broader sustainability goals set by the city.

⁶ The Bike-Share Planning Guide, Institute for Transportation and Development Policy, 2018 Edition.



FIGURE 5.6 DOTr BIKE SHARING PROJECT (Source: DOTr)

The ITDP guidebook identified five elements that are critical in the attainment of the proposed performance metrics of the bike-share system – average number of daily users and average daily trips per resident. These elements will ensure the successful implementation of a cost-effective and high-performance system. These elements are as follows:

1. Station density. The guidebook proposes 10 to 16 stations per square kilometer (km²). This will allow an average spacing of 300 meters per station. This will provide a convenient walking distance from each station to any point in between. Docks are only found in station-based systems. The total number of docks should exceed the number of bikes at a ratio of approximately two-to-one to ensure that docks are available for returning bikes during peak demand times.
2. Bikes per resident. The guidebook recommends 10 to 30 bikes should be available for every 1,000 residents within the coverage area. This will ensure that bicycles will be readily available to meet the needs of both commuters and residents. Based on the 2020 Census of Population and Housing, the population of the National Capital Region (NCR) was 13.48 million. This implies that 135,000 to 405,000 bicycles must be made available to commuters and residents under the bike-share system.
3. Coverage area. The guidebook proposes a minimum coverage area of 10 square kilometers which is large enough to contain a significant number of user origins and destinations. The total land area of the NCR is 619.54 km² with an average of 36.44 km² per LGU. Only the cities of Mandaluyong and Taguig have land areas less than 10 km².
4. Quality bikes. Bikes should be durable, attractive and practical (with a front basket to carry bags, packages or groceries). The bicycles should also have specially designed parts and sizes to discourage theft and resale.
5. Easy-to-use stations. The process of checking out a bicycle should be simple. The payment and authorization technology should have an easy-to-use interface, a fully automated locking system, and real-time monitoring of occupancy.

Figure 5.7 shows the infrastructure usage (daily trips per bike) and market penetration (trips per 1,000 residents) for 21 bike-share systems around the world. Mexico City has the most trips per 1,000 residents, while Dublin has the greatest number of trips per bike. Conversely, Seattle has the lowest penetration rate and the least number of trips per bike. There appears to be no clear relationship between infrastructure usage and market penetration.

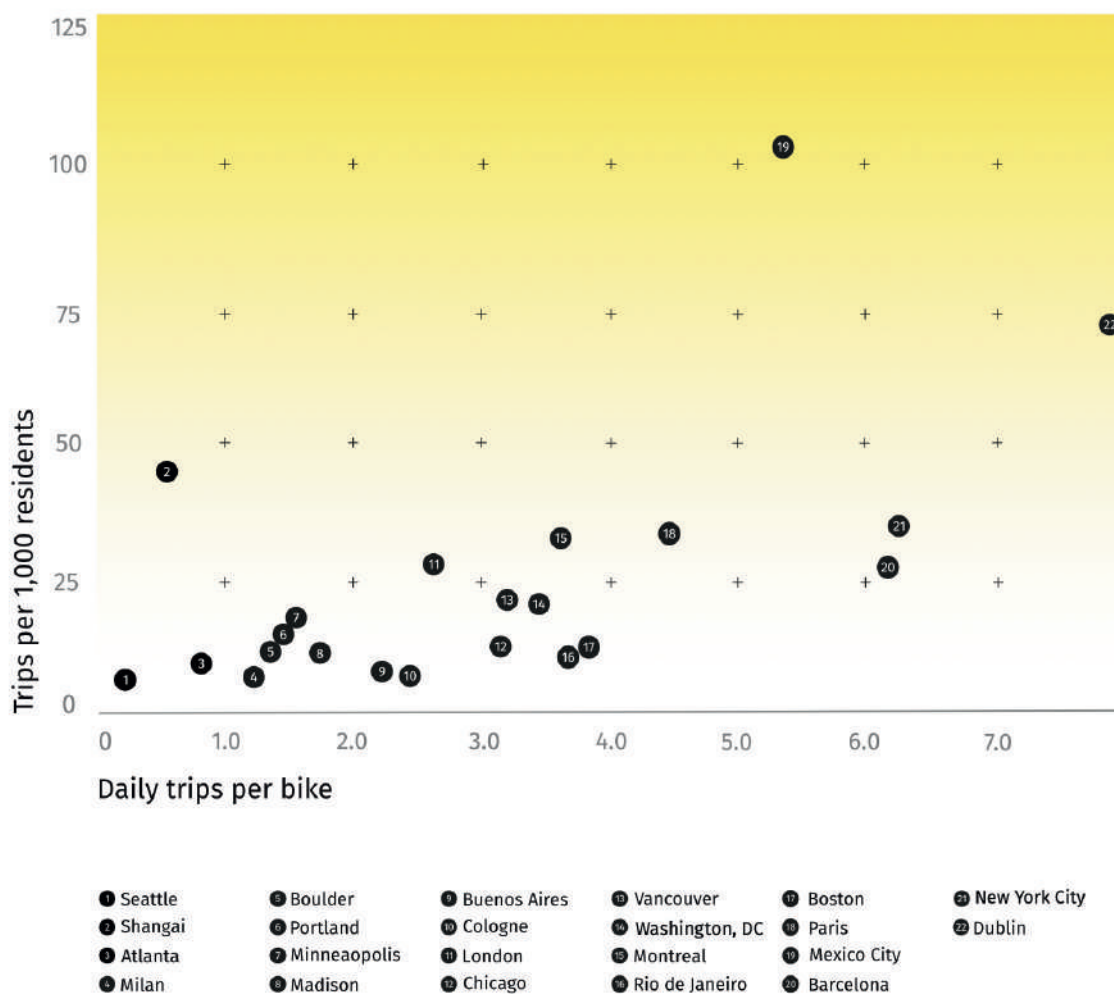


FIGURE 5.7 BIKE-SHARE SYSTEM PERFORMANCE

(Source: *The Bike-Share Planning Guide*, Institute for Transportation and Development Policy, 2018 Edition)

The implementation of a successful bike sharing program in the country poses huge challenges. Filipinos need to change their car-oriented mindset. We are used to door-to-door transportation such as using private cars or riding tricycles for short-distance trips. Active transport such as walking or cycling can provide these last mile services. Another challenge is NCR has a scattered/sprawling development pattern where cities are connected by bike unfriendly highways. It is also important to ensure that politicians and decision makers buy into the idea that bike-share is a public transportation system that when well-designed, will produce huge economic benefits to the cities.⁷ The main advantages of the bike-share system are its cost effectiveness and comparatively short implementation period. It can move more people at a lower cost, while producing more health and environmental benefits than other modes of transportation.

⁷ Bikeshare is coming to Metro Manila by Julia Nebrija, Medium.com, 12 December 2020.

5.3 Learning to Bike

Based on the ILS survey, the top three reasons for biking are for a healthy lifestyle/exercise, to get to the place of work, and for enjoyment/hobby as shown in Figure 5.8. More people should be encouraged to bike not only due to its health benefits but because it is a low-cost and zero-emission activity.

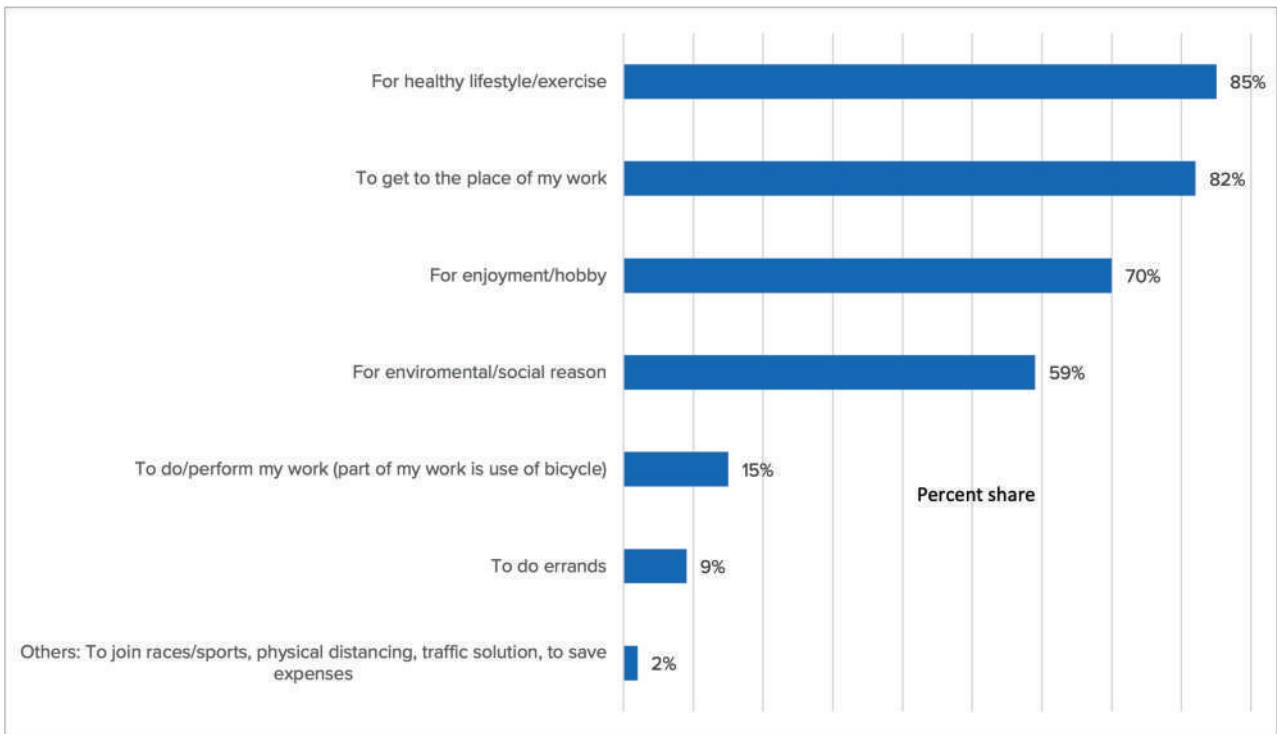


FIGURE 5.8 REASONS FOR BIKING

(Source: Bike to Work: A Survey on Use of Bike in the Time of Covid-19 Pandemic, ILS Discussion Paper)

Most of us learned how to bike when we were still children. Oftentimes, we were taught how to bike by our parents, siblings, friends, and other relatives. Presently, there are several groups offering biking lessons to newbies. One of them is the National Bicycle Organization (NBO) which offers bike lessons in the areas of Bonifacio Global City, Robinson’s Manila, and Quezon City. Newbies are charged a nominal fee of Php300 per session which runs for about two hours.

Another group which offers biking lessons is Bike Playground which is based in Circulo Verde, Bagumbayan in Quezon City. They offer both beginners and advanced lessons, which are conducted by certified professional mountain bikers. The cost of the bike lesson is Php350 per session for the beginner’s course and Php500 per session for the advanced course. Each session runs for about two hours.

In some states in the United States, bicycling lessons are part of the physical education

curriculum for grade 6 to 8 students. These programs aim to improve bicycle safety and promote student wellness through bicycling.⁸ The program includes lessons on bike basics, preparing to ride, rules of biking, and safe bicycle riding. In the JAO No. 2020-0001, safety guides for bikers, basic hand signals and basic health reminders for bicycle users were disseminated to the general public. A bike manual was also created by the DOTr in partnership with the SM Group⁹ that is published in Filipino and English. This is provided for free and may easily be downloaded for reference of users.

Bicycle commuting is a relatively new phenomenon in the Philippines. The bicycle boom in the country was a result of the restrictions on public transportation and the limited physical mobility. According to estimates by MMDA¹⁰, the number of bicycles that passed through EDSA in June and July 2020 were 100,792 and 77,484, respectively, as shown in Figure 5.9. The average number of cyclists per day were 4,060 and 2,457 for the months of June and July 2020, respectively. The bicycle count was conducted in 9 intersections along EDSA between 6am to 8am and 3pm to 5pm.

The Institute for Climate and Sustainable Cities (ICSC) believes that bicycle count conducted by the MMDA is an underestimation. According to ICSC, a conservative estimate of the average number of cyclists per day plying the roads of Metro Manila is 500,000. The ICSC conducted a bicycle count in June covering the major roads of Quezon City, Marikina City, Pasig City and San Juan City. Within a four-hour window (6am to 8am and 4pm to 6pm), their bicycle count reached 38,932 cyclists.¹¹ The summary of the results of the bicycle count is presented in Figure 5.10.

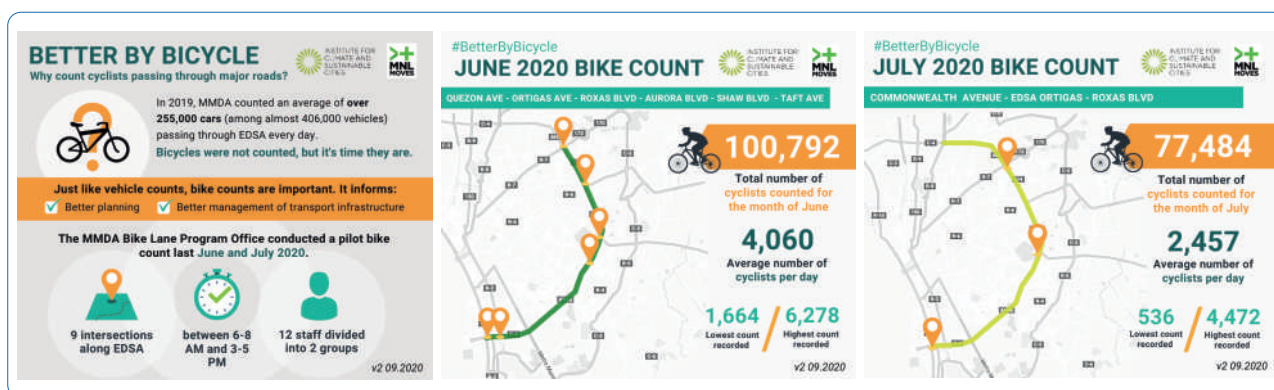


FIGURE 5.9 PILOT BICYCLE COUNT LAST JUNE AND JULY 2020
(Sources: Metro Manila Development Authority and Institute for Climate and Sustainable Cities)

⁸ Bicycle and Pedestrian Curricula Guide: Making the Case for Bicycle and Pedestrian Youth Education, Safety Routes to School National Partnership, February 2011.

⁹ <https://www.smsupermalls.com/smcares/advocacies/bike-friendly-sm/>

¹⁰ Metropolitan Manila Development Authority Bike Lane Program Office, Pilot Bicycle Counts, June and July 2020.

¹¹ Metro Manila Counts: Everyone Matters, Everyone Counts, Institute for Climate and Sustainable Cities, August 2021.

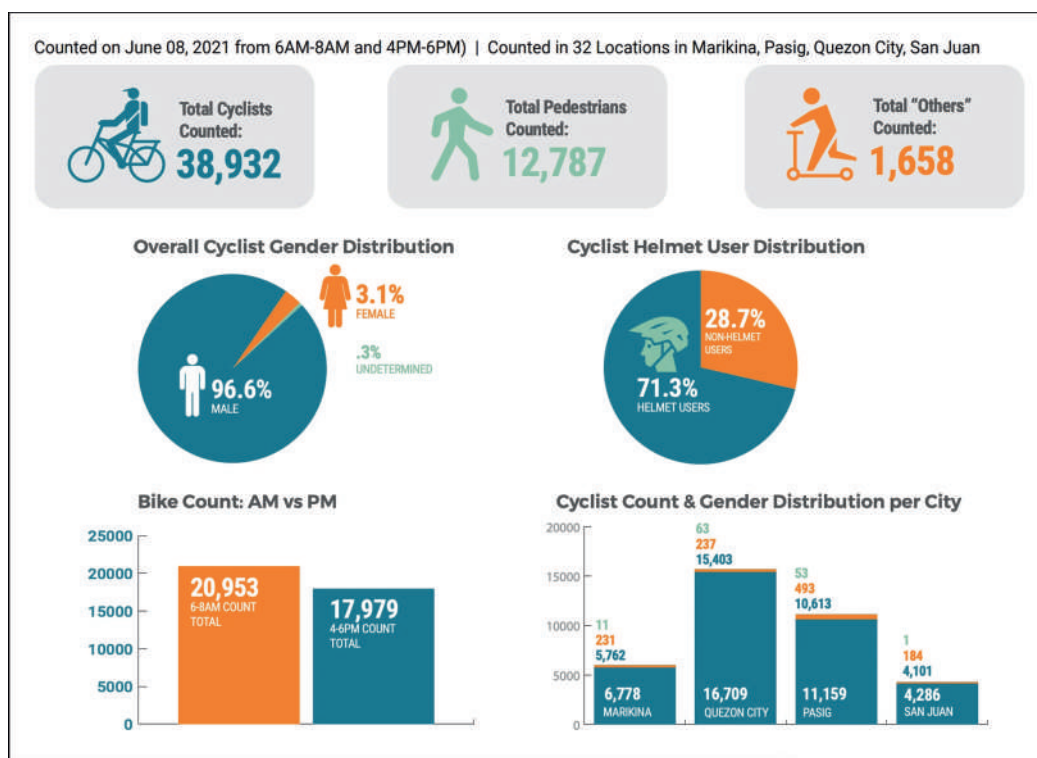


FIGURE 5.10 ICSC METRO MANILA BICYCLE COUNT
(Source: Institute for Climate and Sustainable Cities)

According to the ICSC, the Metro Manila bicycle count indicates that a mobility revolution is underway. To sustain the mobility revolution will require a proactive approach of the national government, LGUs, and civil society to encourage more Filipinos to take up cycling. More comprehensive and NCR-wide bicycle counts are needed to provide guidance to the country’s policymakers.

In the absence of a credible bicycle count before the COVID-19 pandemic, it will be difficult to determine the magnitude of increase in the number of cyclists in the NCR. The ILS survey provides a general indication of the increase in bicycle use before pandemic. The survey results show that bicycle use increased from 49.0% before the enhanced community quarantine (ECQ) to 83.1% after the ECQ (See Table 5.2). The increase was largely attributed to the restrictions in public transportation and social distancing practices.

TABLE 5.2 BICYCLE USE PRIOR AND AFTER ECQ

Use/Non-use of Bike	Prior ECQ only		After ECQ only		Prior and After ECQ	
	No.	%	No.	%	No.	%
Used bike	398	49.0	676	83.1	368	77.5
Did not use bike	415	51.0	137	16.9	107	22.5
Total	813	100.0	813	100.0	475	100.0

(Source: Bike to Work: A Survey on Use of Bike in the Time of Covid-19 Pandemic, ILS Discussion Paper)



CHAPTER 6

Implementation Plan

6. Implementation Plan

6.1 Funding and prioritization

6.1.1 Funding sources

Funding for the bikeway project can come from the national government agencies (NGAs) and the local government units (LGUs). The NGAs that can provide funding include the Department of Transportation (DOTr), the Department of the Interior and Local Government (DILG), Department of Public Works and Highways (DPWH), and the Department of Budget and Management (DBM). However, funding through these agencies need to be legislated and approved by the Senate and House of Representatives after undergoing established processes including budget hearings and the presentation of accomplishment reports and proposals. Congress may also enact new laws or policies that will support the development of active transport infrastructure and programs across the country. In February 2021, the Philippine Senate approved on third and final reading Senate Bill No. 1582 otherwise known “Safe Pathways Network Act” for cyclists. The bill proposes funding be sourced from appropriations of the DOTr and DPWH under the General Appropriations Act and the Local Road Support Fund from the Motor Vehicle User’s Charge.

Public transportation ground to a halt due the series of lockdowns in an effort to control the spread of the COVID-19 virus. People from all walks of life were forced to ride their bicycles in order to get to their places of work. This ushered in a cycling boom not only in the Philippines but in other parts of the world.

The Philippine government recognized the need to accommodate these alternative forms of transportation and protected bike lanes to augment the shortage of public transportation due to the pandemic. In this regard, Section (h) of Republic Act No. 11494 otherwise known as the “Bayanihan to Recover as One Act” provides:

“Accommodate alternative modes of transportation, including a network of bicycle lanes in all roads in every city, municipality and province for people who may opt to use the bicycle as an alternative mode of transportation to address health, environment and traffic concerns”

An Inter-Agency Technical Working Group (TWG) on Active Transport was likewise created. A Department of Health (DOH) undersecretary and a DOTr assistant secretary serve as chair and vice – chair of the TWG, respectively. The functions of the TWG include developing implementation strategies for the promotion of active transport, developing policies and standards on the use of active transport and related matters, and providing technical assistance for active transport development projects.

In addition, the DOTr was allotted Php1.13 billion in funding for the installation of bike lanes in Metro Manila, Metro Cebu, and Metro Davao as part of the pandemic recovery plan. As of 30 June 2021, the funds have been fully disbursed by the transportation department. More than 73% or Php813.89 million was allotted to the National Capital Region as shown in Table 6.1. The remainder was equally divided between Metro Cebu and Metro Davao.

TABLE 6.1 ALLOTMENT AND DISBURSEMENT OF FUNDS, AS OF 31 JUNE 2021

Region	Length (lane-km)	Allotment (PhpMn)	Obligations (PhpMn)	Disbursement (PhpMn)
National Capital Region	313.118	813.89	801.83	801.83
VII – Central Visayas	129.657	150.00	150.00	150.00
XI – Davao Region	54.744	150.00	143.37	143.37
Total	497.519	1,113.89	1,095.20	1,095.20

Source: Metropolitan Bike Lane Networks, DPWH

By the end of June 2021, a total of 497.57 kilometers (kms) of bike lane network has been installed in these three regions. Close to 63% or 313.12 kms of bike lane network are in Metro Manila. The shares of Metro Cebu and Metro Davao in the network are 26.1% and 11.0%, respectively. More than 90% of the bike lane network are classified as Classes II and III (See Table 6.2). Class II refers to separated bike lanes using pavement marking or separator. A portion of the roadway is designated for exclusive use by bicycle usually distinguished by a paint stripe, curb, or barrier. For Class III lanes or shared roadways, a part of the roadway has been officially designated and marked as a bicycle route but can also be used by motor vehicles when there is limited carriageway. Only 2.3% of the existing network is considered to be Class I or where there is a designated path, completely separated from the roadway and designated for exclusive use of bicycles. The remaining 6.2% of the bike lane network is unclassified. Close to 69% of the bike lanes are along radial roads.

TABLE 6.2 CLASSIFICATION OF BIKE LANE NETWORK, AS OF 31 JUNE 2021 (IN KILOMETERS)

Region	Class I	Class II	Class III	Unclassified	Total
National Capital Region	7.881	112.162	162.070	31.005	313.118
VII – Central Visayas	3.480	106.257	19.920	0.000	129.657
XI – Davao Region	0.056	35.733	18.955	0.000	54.744
Total	11.417	254.152	200.945	31.005	497.519

Source: Metropolitan Bike Lane Networks, DPWH

Under the 1991 Local Government Code, LGUs now have a wide array of alternatives to finance its various revenue-generating and social-economic development projects as shown in Figure 6.1. The traditional sources of capital funding include the internal revenue allotments (IRA) and locally generated revenues such real property tax, business tax, receipts from economic enterprises, and fees and charges. The main advantages of using traditional sources to pay for capital outlays are they entail no interest costs and future obligations plus they are generally not politically divisive. However, dependence on current operating income may limit the LGUs ability to undertake large and long-term infrastructure projects.

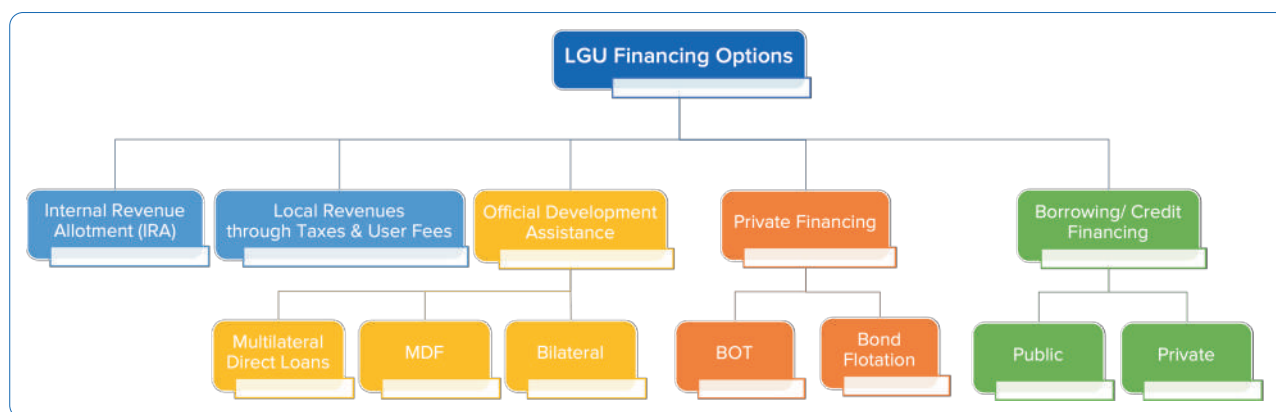


FIGURE 6.1 LGU FINANCING OPTIONS

(Source: Guide to Comprehensive Development Plan Preparation for Local Government Units, DILG)

The LGUs of Metro Manila, Metro Cebu, and Metro Davao have sufficient funds to finance the establishment of the bikeways and the relevant facilities as shown in Table 6.3. The financing of these projects will come from their internal sources (i.e., real property tax, business tax, user charges) and external sources (i.e., internal revenue allotments). Except for a few LGUs in Metro Cebu, most of them posted surpluses in their financial operations in 2020. Moreover, based on their balance sheets, these LGUs have enough cash and cash equivalents to fund these projects.

The Mandanas-Garcia ruling of the Supreme Court, which affirms that LGUs are entitled to just share of all national taxes collected and not only from the Bureau of Internal Revenue, will take effect starting fiscal year 2022. According to estimates by the World Bank¹, the IRA is programmed to increase by 55% in the 2022 budget, reaching Php1.08 trillion or 4.8% of gross domestic product (GDP) compared to 3.5% of GDP in 2021. Hence, more funds will be at the disposal of the LGUs for the effective implementation of much needed basic services and infrastructure projects.

¹ Philippines: Mandanas Ruling Provides Opportunities for Improving Service Delivery Through Enhanced Decentralization, The World Bank, 10 June 2021.

TABLE 6.3 SOURCE OF FINANCING (IN MILLION PESOS)

Local Government Units	Real Property Tax, 2018	Tax on Business, 2018	Service/ User Charges, 2018	Receipts from Econ. Enterp. 2018	Internal Revenue Allotment, 2018	Surplus for the period, 2020	Cash and Cash Equiv., 2020
Metro Manila							
Caloocan City	779.04	1,695.86	165.75	127.40	2,558.21	83.80	3,999.60
Las Piñas City	533.82	877.71	101.27	1.21	1,100.16	904.03	4,315.67
Makati City	4,244.69	8,253.27	242.77	282.43	1,138.07	2,175.71	26,194.11
Malabon City	293.90	336.84	113.27	9.71	762.82	146.51	818.80
Mandaluyong City	1,192.17	2,374.68	55.77	65.78	810.47	443.05	2,004.39
Manila City	4,804.61	4,146.58	630.48	0.00	2,881.54	15.01	16,280.10
Marikina City	458.28	703.71	121.20	207.02	887.52	103.41	1,654.37
Muntinlupa City	806.16	1,994.78	109.03	447.46	978.91	778.05	3,196.18
Navotas City	242.85	261.22	30.63	253.56	584.26	275.10	1,180.71
Parañaque City	241.02	1,087.13	58.98	14.75	914.78	1,771.68	5,183.17
Pasay City	2,416.43	1,743.80	135.46	85.23	822.67	466.62	4,340.96
Pasig City	2,063.63	5,931.42	669.74	420.85	1,359.00	1,965.81	11,879.09
Quezon City	3,551.75	10,128.68	271.75	247.54	4,650.50	123.72	21,436.71
San Juan City	330.48	832.97	32.62	108.66	395.34	432.44	2,916.52
Taguig City	2,014.06	4,873.47	211.56	194.91	1,418.25	-119.08	13,322.35
Valenzuela City	1,347.60	1,036.93	36.91	145.91	1,159.21	150.72	378.76
Pateros	24.28	39.52	4.33	15.19	130.62	23.78	193.65
Total	25,344.77	46,318.56	2,991.54	2,627.63	22,552.33	9,740.34	119,295.14
Metro Cebu							
Cebu City	897.57	1,727.89	409.28	120.15	1,814.36	-1,648.36	3,909.34
Lapu-Lapu City	480.90	875.83	58.97	12.02	843.17	-146.74	3,580.11
Mandaue City	450.49	766.32	50.80	99.89	752.66	641.09	3,090.34
Talisay City	281.89	92.70	7.71	42.13	569.18	-7.70	275.61
Cordova*	8.61	7.59	3.70	16.52	121.43	40.80	140.58
Total	2,119.46	3,470.33	530.46	290.70	4,100.80	-1,120.91	10,995.98
Metro Davao							
Davao City	1,202.58	2,141.64	408.84	173.62	4,474.13	1,618.56	11,998.00
Digos City	23.00	90.50	6.08	65.68	673.86	62.23	1,112.70
Panabo	97.04	142.15	15.53	90.05	667.05	366.45	1,154.19
Samal	28.82	25.46	17.63	20.12	589.64	129.76	563.76
Tagum	161.82	271.13	88.25	157.17	733.87	202.26	664.65
Total	1,513.26	2,670.87	536.33	506.65	7,138.55	2,379.26	15,493.30

Sources: Bureau of Local Government Finance and the Commission on Audit

* Figures for surplus for the period and cash and cash equivalents for the municipality of Cordova are for the year 2018.

The Code allows the LGUs to create indebtedness and to enter into credit and other financial transactions. Debt financing may take the form of direct borrowing² from financial institutions and the issuance of bonds and other long-term securities³. The loans of the LGUs were mostly provided by the government financial institutions (GFIs) and the Municipal Development Fund Office (MDFO). The MDFO has been the major source of long-term loans, while GFIs have been the main provider of medium-term financing. The country's leading GFIs are the Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP). Funding for the majority of the GFIs' loan programs for LGUs come from official development assistance (ODA).

Private financial institutions (PFIs) have relatively limited debt exposure to LGUs. The inability of PFIs to serve as depository banks of LGUs impedes the latter's access to the private capital markets. However, several PFIs outside of the Philippine Veterans Bank and the Philippine National Banks have started to tap the LGU market. Since most LGUs are not considered to be creditworthy, the lending programs of the private banks have focused on the top-tier provinces, cities, and municipalities.

The issuance of bonds and other long-term debt instruments is another alternative to finance revenue-generating infrastructure projects of the LGUs. Public-private partnership arrangements such as the BOT scheme and joint venture are other options available for LGUs in financing its infrastructure projects⁴. These two options are not available for the LGUs since the construction of bikeways are generally non-revenue generating infrastructure projects. Bike share, bike tourism related infrastructure and end of trip facilities, however, can potentially be revenue generating projects under public-private partnership arrangements.

An alternative source of funding identified during the focus group discussions (FGDs) was the Local Government Support Fund-Assistance to Cities (LGSF-AC) provided in the FY 2021 General Appropriations Act (GAA). A total amount of Php350 million was appropriated to fund the construction, maintenance, and/or rehabilitation of the following projects:

- a. Green spaces such as public parks and plazas, arboretum, and botanical gardens; and
- b. Infrastructure for active mobility such as physically separated bicycle lanes, bike racks, and elevated or at grade pedestrian footpaths and walkways.

² Under Section 296 of the Local Government Code, LGUs may create indebtedness, and avail of credit facilities to finance local infrastructure and other socio-economic development projects in accordance with the approved local development plan and public investment program.

³ Under Section 299 of the Local Government Code, subject to the rules and regulations of the Central Bank and the Securities and Exchange Commission, LGUs are authorized to issue bonds, debentures, securities, collaterals, notes and other obligations to finance self-liquidating, income-producing development or livelihood projects pursuant to the priorities established in the approved local development plan and public investment program.

⁴ Under Section 302 of the Local Government Code, LGUs may enter into contracts with any duly prequalified individual contractor, for financing, construction, operation, and maintenance of any financially infrastructure facilities such as the build-operate-and-transfer arrangement.

The beneficiaries of the LGSF-AC included the 16 cities in the National Capital Region, 3 cities in Metro Cebu, and Davao City. The assistance extended to the 20 LGUs amounted to Php17.5 million each. The other LGUs will have to check with the DBM if additional funding will be appropriated in the 2022 national budget.

The JAO No. 0001, Series of 2020 provides a template ordinance for the establishment of a network of bicycle lanes and improved walkways to support people's mobility in the new normal. In the said template, it proposes the following funding sources to implement the provisions of the ordinance:

1. The LGU's annual Internal Revenue Allotment;
2. Total collections from penalty fees incurred through road users' violation of traffic rules related to bicycle lane and bicycle use;
3. Local parking levies;
4. National Government subsidies to related programs, projects, and activities through relevant agencies; and/or
5. Supplemental funding requests from relevant NGAs.

The recently enacted 2022 GAA appropriated a total of Php 2 billion to the DOTr for the establishment of active transportation facilities in all road and bridge projects in Metro Manila. These will include the construction of protected bike lanes, procurement of bike racks, improvement of end-of-trip cycling infrastructure, construction of safe and accessible pedestrian pathways, and upgrading of existing pop-up bike lanes into permanent bike lanes.⁵ The DOTr will closely coordinate with the DPWH in the establishment of these active transportation facilities in Metro Manila.

On January 24, 2022, the Department of Budget and Management (DBM) released Local Budget Circular No. 142⁶, with provisions to support projects including "protected bike lanes and better pedestrian infrastructure. Indicative ceilings per LGU were stated in the budget circular such as Php 20 million for cities and Php 10 million for municipalities.

6.1.2 Prioritization Criteria

Project prioritization is a process employed by LGUs for selecting programs, projects, and activities (PPAs) that maximize the latter's value as these are delivered to their constituents given the LGUs' limited budgets. One of the prescribed tools of the DILG for projection

⁵ General Appropriations Act, Fiscal Year 2022, Department of Transportation. Official Gazette, Vol. 118, No. 1, 3 January 2022.

⁶ Department of Budget and Management, Budget Circular No. 142, "Guidelines on the Release and Utilization of the Local Government Support Fund – Financial Assistance to Local Government Units and Support for Capital Outlays and Social Programs under the FY 2022 General Appropriations Act, Republic Act No. 11639."

prioritization is the Goal Achievement Matrix (GAM). The GAM tool uses a scoring system based on a set of criteria and weights. It ranks each project in terms of its contribution to the attainment of the specified goals of the city or municipality. Table 6.4 presents some of the possible goals for a bike lane network project of a city or municipality.

TABLE 6.4 PRIORITIZATION EVALUATION CRITERIA

THEME	CRITERIA DEFINITION
Improve SAFETY	Addresses locations with bicycle collision history and emphasis on vulnerable roadway users
	Enhances bicyclist safety by promoting travel on streets with low motorist speeds and low volumes
	Addresses locations or streets that are associated with greater bicycle stress and more severe collision potential due to high motor vehicle volumes and high speeds
Enhance CONNECTIVITY	Removes barriers or closes a system gap in the bicycling network
	Makes a connection that will immediately extend the bicycle network
Address EQUITY	Serves populations that are historically underserved, including areas with higher percentage of minority populations, households below poverty, people under 18, people over 65, and households without access to automobile
	Provides a health benefit for people in areas with the greatest reported health needs, represented by obesity rates, physical activity rates (self-reported), and diabetes rates.
Increase RIDERSHIP	Provides a connection to destination clusters
	Provides a connection to areas with high population density
Enhance LIVABILITY	Reaches the greatest number of riders, but recognizes that all bicycle facilities provide a measurable benefit to at least some bicyclists
	Distribute bicycle facilities across the city so people riding bicycles can reach all destinations

Source: Seattle Bicycle Master Plan, April 2014, Seattle Department of Transportation

The steps in the GAM scoring process are as follows⁷:

1. Call and organize workshop with participants representing various stakeholders;

⁷ DILG Memorandum Circular No. 2008-156, Guide to Comprehensive Development Plan Preparation for Local Government Unit, 22 October 2008.

2. Select any ten or more projects as may be determined by the city or municipality from the preliminary list which are classified as “urgent”;
3. List these projects in the GAM Form (see Table 6.5);
4. Based on the perceived importance of each goal to the interest of the sector, assign weights to each goal. The numerical total of the weights should be 100%.
5. Rate each project according to following scale:
 - 3: Project contributes greatly to the fulfillment of the goal.
 - 2: Project contributes moderately to the fulfillment of the goals.
 - 1: Project contributes slightly to the fulfillment of the goal
 - 0: Project does not contribute to the fulfillment of the goal.
 - -1: Project slightly inconsistent with the goal.
 - -2: Project moderately inconsistent with the goal.
 - -3: Project greatly contradicts the goal.

TABLE 6.5 SAMPLE GOAL ACHIEVEMENT MATRIX

Goals	Weights	Project 1	Project 2	...	Project 9	Project 10
Improve Safety						
Enhance Connectivity						
Address Equity						
Increase Ridership						
Enhance Livability						
TOTAL	100%					

6. Multiply the rating given by the corresponding weight of the goal and enter the product (score) in the appropriate cell. Add the scores for each project proposal.
7. Arrange projects according to their total scores. The project with the highest total score is ranked as number one, the next number two, and so on. Two columns for estimated cost are displayed. One column shows the individual cost of each project and the other reflects the cumulative or running total.
8. Estimate project cost. The cost of each project must first be estimated before the list of proposed projects can be matched with the estimated available funds.

6.2 Administration and Management

The successful implementation of the bike lane network master plan will require the appointment of a responsible person (coordinator) or unit for the management of the plan and the maintenance of the network. The appointment of a responsible person or group indicates a local chief executive or head of agency who is supportive of active transport. Presently, only a few LGUs in Metro Manila, Metro Cebu and Metro Davao have established separate units for their respective active transport programs. Most of the LGUs have an ad hoc team to implement their active transport policies. The disadvantages of an ad hoc arrangement include the unclear delineation of functions and responsibilities, and poor lines of communications.

Among the LGUs with separate units on active transport are Quezon City and Pasig City. The Quezon City government has the Green Transport Office (GTO) which was established back in 2015. Although the ordinance creating the GTO does not mention bicycle lanes, its responsibilities include assessing the current set of green technology options for all types of transport and conducting studies for policy, regulatory and program recommendations on all public and utility transport vehicles.⁸

The Pasig City government has the Pasig Transport Office, which is the city's transport planning arm. The responsibilities of the office include the implementation of policies and programs on public transport, street transport, and all forms of active transport.

Six LGUs have an existing ordinance of bicycle infrastructure – Mandaluyong, Pasig, San Juan and Taguig in Metro Manila, Mandaue in Metro Cebu, and Davao City. The ordinance of Davao City on bicycle infrastructure was issued back in 2010. Other LGUs are in the process of issuing similar ordinances in the near future.

In the joint administrative order, the LGUs are strongly enjoined to:

1. Review existing transportation ordinances and local transportation plans to assist in the development of counterpart local ordinances to ensure compliance with national directive at the local level;
2. Coordinate with other LGUs to rationalize inter-city bicycle routes and walking paths in metro areas such Metro Manila, keeping mind commuters' safety and travel time;
3. Incentivize the provision of cycling racks and showers in commercial, community, and activity centers; workplaces; and buildings;
4. Provide infrastructure for active transport and walking paths;

⁸ Quezon City Council Order No. SP-2447, S-2015, An Ordinance Creating the Green Transport Office Under the Department of Public Order and Safety (DPOS), Defining Its Duties, Functions, and Responsibilities, Providing For Its Composition, Appropriating Necessary Funds Thereof and For Other Purposes, 7 September 2015.

5. Assist and coordinate with the NGA in providing and facilitating the necessary permits for the construction of bicycle lanes and walking paths within their area of jurisdiction;
6. Ensure availability of right of way for the construction of bicycle lanes and walking paths within their jurisdiction;
7. Maintain the bicycle lanes and walking paths located in their jurisdictions;
8. Coordinate with NGA in carrying out these guidelines; and
9. Ensure immediate and widest dissemination of these guidelines to all units/ sectors within their jurisdiction.

JAO No. 2020-001 also provides a template ordinance on the establishment of a network of bicycle lanes and improved pedestrian walkways. The template will be very useful for LGUs planning to issue similar ordinances. The proposed ordinance provides for the creation of an Active Mobility Committee. The committee will be tasked with identifying, establishing, and maintaining bike lane networks and pedestrian walkways. The committee will be composed of 13 members including representatives from the local cycling groups, persons-with-disability groups, and the women's groups. The chairperson of the committee will be the local chief executive or a duly appointed representative. The proposed ordinance also includes provisions on penalties for violations, reporting and monitoring, and possible funding sources.

In the DILG Memorandum Circular No. 2020-1000 issued last 17 July 2020, the LGUs are requested to revisit their existing transportation plans in the light of high priority given to the development of bicycle lanes and promotion of sidewalks. These measures are intended to promote a more sustainable and inclusive transport system that encourages active transport. The plans up for review will include the local public transport route plans, comprehensive land use plans, and comprehensive development plans. The LGUs are requested to review existing road networks in their areas of jurisdiction that may be developed into continuous bicycle lane networks with walking paths.

Moreover, in the Local Health System Health Promotion Playbook: Active Transport, an implementation plan template for the LGUs was prepared by the DOH together with the Alt Mobility and the Move as One Coalition (See Annex C). The implementation plan provides for the activation of the local Active Mobility Committee, development of a bicycle lane network master plan, installation of bicycle use facilities and the implementation of bike sharing programs.

6.3 Monitoring and Evaluation

Monitoring project performance presumes that clear outcomes and outputs have been specified at the outset. Outputs are goods and services the product is expected to deliver

to its beneficiaries, while outcomes represent the purpose or goals of the project. The monitoring and performance evaluation system will help the city or municipality determine whether the investments it made are paying off and to what extent they are paying off. These performance measures can be also used to build indices to show how the quality of life is improving in the city or municipality.

Monitoring involves tracking the inputs, activities, outputs, outcomes, and other aspects of the project to ensure its successful implementation. The monitoring process is conducted throughout the entire project implementation period and is an integral part of project management and supervision. Evaluation refers to the assessment of implementation performance and achievement of intended results. This will allow the project proponent to better understand the range of factors that contribute or constrain the achievement of the desired results. The evaluation process is conducted at specific points during the implementation period and at the completion of the project. Ex-post evaluation is also important to determine whether the expected outputs were delivered to the intended beneficiaries.

The performance indicators proposed in the bike lane network master plan must include a baseline and a target. The baseline is based on the most recent status of performance of the city or municipality. The target, on the other hand, represents the expected level of attainment for a specified goal. Good performance indicators must follow the SMART criteria:⁹

1. Specific – details on the outputs or outcomes the proposed project seeks to achieve by specifying dimensions such who, where, when, quality, quantity and costs;
2. Measurable – stated in quantifiable terms (e.g., percentage of women cyclists) and feasible to collect in the project completion report and in the project progress reports;
3. Achievable – realistic about what is to be achieved; collective judgment of the key stakeholders is needed to choose the targets that ambitious but realistic;
4. Relevant – appropriate to the result statement it measures, and useful for management information purposes; and
5. Timebound – stated with a target and baseline both with dates.

Table 6.6 presents some possible performance measures for a bike lane network project of a city or municipality.

⁹ Guidelines for Preparing and Using a Design and Monitoring Framework: Sovereign Operations and Technical Assistance, Asian Development Bank, October 2020.

TABLE 6.6 EXAMPLE PERFORMANCE MEASURE TARGETS

Goal	Performance Measure	Baseline Measurement	Performance Targets
Ridership	Number of cyclists counted at certain locations	Baseline LGU wide counts at these locations	Increase ridership between baseline and target year
Safety	Bike crash rate	Baseline crash data	Reduce bike crash rate by 50% between baseline year and target year
	No. of serious injuries and fatalities	Baseline number of injuries and fatalities	Zero fatalities by target year
Connectivity	Percentage of bike network completed	Percentage of bike final network completed	100% of final network constructed by target date
Equity	Areas lacking bike facilities	Existing conditions reports	Zero areas lacking bike facilities by target year
Livability	Percentage of households of all ages and abilities with ¼ kilometer of a bike facility	Present percentage based on built network	100% of households of all ages and abilities within the ¼ kilometer of a bike facility by target year

Source: Seattle Bicycle Master Plan, April 2014, Seattle Department of Transportation

Other goals may be formulated to expand or enhance the list in Table 6.6. These include goals pertaining to the enforcement of traffic rules and regulations (i.e., for all road users) or the compliance of road users to the same. The corresponding performance measures may be in the form of number of apprehensions per type of offence such as those involving motorists encroaching on bike lanes. The subsequent performance targets may be in the form of % annual reduction in apprehensions per nature of violation.¹⁰

In the Local Health System Health Promotion Playbook: Active Transport, a monitoring and evaluation plan template for the LGUs was prepared by the DOH together with the Alt Mobility and the Move as One Coalition.

¹⁰ Quezon City’s Green Transport Office (GTO) under its Department of Public Order and Safety (DPOS) is a good example of an LGU unit engaged in traffic enforcement for the benefit of active transport users. They are actively involved in enforcing city ordinances supporting and protecting the rights of cyclists. Typical examples of their daily activities are apprehensions of motorists encroaching or illegally parked on bike lanes.

CHAPTER 7

Strategies



7. Strategies

7.1 Investments

Investments in bicycle infrastructure are much lower compared to other modes of transportation. Moreover, the economic benefits that will be realized from these projects far outweigh the costs. The required investments will depend on the conditions of the existing road network, the length of the proposed bike lane network, the width of the path, the lane separator, and the materials to be used.

The economic benefits of the bicycle infrastructure can be summarized into the following:

1. *Reduce traffic congestion and increase non-motorized transport* – Improving bicycle infrastructure reduces traffic congestion by removing cars from the roads and increasing the speed of traffic, and persons moved across time and space.
2. *Health benefits* – Biking is a relatively low impact activity with significant benefits to both physical and mental health. According to several studies, biking reduces a person's chances for high-blood pressure, diabetes, and other forms of cardiovascular diseases. The net effect is biking reduces the number of days of sick leaves of workers, lowers medical bills and increases life expectancy.
3. *Environmental benefits and sustainability* – Motorized transport is among the largest contributors to greenhouse gas (GHG) emissions in the country. Since biking is a zero-emission mode of transportation, it will lead to a reduction in GHG emissions, improvement in air quality, and reduction in air pollution.
4. *Livability and sense of community* – The establishment of bikeways, walking paths and bicycle facilities creates a bike-friendly environment and improves the community's livability.
5. *Macroeconomic benefits* – The costs associated with the improvement of the city's bicycle infrastructure are much lower than other modes of transportation. In several cases, the implementation of bikeways and walking paths resulted in increases in property values and the sales of retail stores. It has also led to an improvement of the city's tourism potential.
6. *Equity impact* – As we have seen during the pandemic, biking is a much affordable transportation option especially for those who belong to the lower income groups. Programs that promote the improvement of bikeways and walking paths will benefit these groups and the transportation disadvantaged workers.

The DPWH issued Department Order (DO) No. 88, series 2020, and later (i.e., June 2021) provided the updated guidelines and standard drawings for bicycle infrastructure in the country. The guidelines were issued to ensure the feasibility, safety, cost effectiveness of the bicycle infrastructure. The DO noted that the updated guidelines and standard references for the LGUs in their preparation of detailed engineering design plans to suit the actual conditions of the existing roads, especially in highly urban areas where the problem in the acquisition of road right-of-way and existing traffic volume service are commonly encountered.

In the Local Health System Health Promotion Playbook: Active Transport, unit cost estimates and example calculations for bike lanes, pedestrian walkways, and end-of-trip facilities were prepared by the DOH together with the Alt Mobility and the Move as One Coalition as shown in Tables 7.1 and 7.2, respectively. These unit costs can be used by the LGUs in their development of generalized construction cost estimates, project prioritization process and preparation of the investment plan.

TABLE 7.1 BASIC RESOURCE REQUIREMENTS (IN CONSTANT 2020 PRICES)

ITEM	COST PER UNIT IN PHP	NO. OF UNITS TO BE FILLED UP LGU	TOTAL COST TO BE FILLED UP BY LGU
Development of bicycle lanes and pedestrian walkways Includes costing of signages, lane markings, separators, accessibility improvement	Php5.0 million per lane kilometer		
Bicycle units and accessories Includes costing of safety equipment (helmets / head gear, lights, locks, etc.)	Php10,000 per bicycle unit		
Bicycle racks Painted; good for at least 10 bicycles	Php20,000 per bicycle rack		
TOTAL			

Source: Local Health System Health Promotion Playbook: Active Transport by Department of Health, Alt Mobility PH and Move as One Coalition, 2020

* This is an estimate of average cost of a bike lane per kilometer. For a more granular breakdown, see the table below.

TABLE 7.2 EXAMPLE BICYCLE INFRASTRUCTURE COST (IN CONSTANT 2020 PRICES)

ITEM	COST RANGE IN PHP	UNIT	TOTAL COST
Traffic barriers	Php1,000 to Php3,000	100 barriers One barrier per meter	Php1.0 million to Php3.0 million
Lane markers	Php 50 to Php500	1,000 meters	Php50,000 to Php500,000
Signages	Php4,000 to Php7,000	200 signages One signage per 50* meters	Php800,000 to Php1.4 million
Road pavement improvement	Php1,000 to Php3,000	1,000 meters	Php1.0 million to Php3.0 million
TOTAL			Php2.85 million to Php7.90 million

Source: Local Health System Health Promotion Playbook: Active Transport by Department of Health, Alt Mobility PH and Move as One Coalition, 2020

* Revised from one signage every five meters in the original table lifted from the Active Transport Playbook

The investment plan will be based on projects identified during the prioritization process. The information provided in the investment plan must include, among others, name of project, brief description of the project, implementation period, cost estimate, and funding source. An investment plan template is shown in Annex D.

The city or municipal government will also need to prepare an annual maintenance plan for the bicycle lanes. A well-maintained bicycle infrastructure will minimize road hazards, ensure safety of riders, and increase the usage of the bike facilities.

7.2 Indicative Economic Benefits of Bicycle Infrastructure

This section of the master plan will attempt to measure the economic benefits of improvements in bicycle infrastructure in Metro Manila. The measurement will focus on three economic benefits, namely: (1) vehicle operating cost savings, (2) avoided greenhouse gas emissions, and (3) road safety benefits. Other economic benefits such as livability, sense of community and equity impact are difficult to quantify. Using data culled from the Metropolitan Manila Development Authority (MMDA), this section of the plan will estimate the economic benefits for the 2018-2020 period on the assumption that improvements in bicycle infrastructure reduced traffic volumes in the major roads of Metro Manila by an average of 10% and 15%.

The Traffic Engineering Center of the MMDA regularly releases data on annual average daily traffic (AADT) in the circumferential and radial roads of Metro Manila. MMDA's AADT estimates are classified into various types of motor vehicles such as car, public utility

jeepney, utility vehicle, taxi, public utility, truck, trailer, motorcycle, and tricycle. For purposes of the estimation of the economic benefits, only the AADT estimates for cars will be used (See Table 7.3). The AADT of cars account for more than 50% of total for all types of motor vehicles in the past three years.

TABLE 7.3 ANNUAL AVERAGE DAILY TRAFFIC FOR CARS

CIRCUMFERENTIAL AND RADIAL ROAD		2020	2019	2018
C:1	Recto	28,622	21,909	24,537
C:2	Mendoza	36,698	50,045	56,353
	Pres. Quirino Avenue	30,541	63,263	65,444
C:3	Araneta Avenue	35,696	42,708	38,740
C:4	EDSA	193,788	255,732	251,628
C:5	C.P. Garcia/ Katipunan Avenue/ Tandang Sora	100,846	124,426	133,427
R:1	Roxas Boulevard	105,863	121,467	129,475
R:2	Taft Avenue	38,695	39,103	37,789
R:3	South Superhighway	69,900	72,648	56,104
R:4	Shaw Boulevard	46,235	50,205	52,128
R:5	Ortigas Avenue	80,679	70,603	79,128
R:6	Magsaysay Boulevard	48,380	56,398	59,811
	Aurora Boulevard	40,912	39,342	37,881
R:7	Quezon Avenue	126,286	123,395	120,080
	Commonwealth Avenue	148,343	151,705	131,521
R:8	A. Bonifacio Avenue	41,356	38,149	32,136
R:9	Rizal Avenue	30,080	35,836	37,404
R:10	Del Pan	45,911	27,652	32,883
	Marcos Highway	102,714	106,031	98,705
	McArthur Highway	33,129	36,050	34,663
TOTAL		1,384,674	1,526,667	1,509,837

Source: Metropolitan Manila Development Authority

Due to the global pandemic, AADT of cars dropped by 9.3% in 2020. All circumferential and radial roads in Metro Manila registered declines in traffic volumes except for Recto Avenue, Aurora Boulevard, Quezon Avenue and Del Pan. The largest declines in traffic volumes were experienced in President Quirino Avenue (-51.7%), EDSA (-24.2%) and C.P. Garcia-Katipunan Avenue-Tandang Sora (-19.0%). As expected, EDSA had the highest traffic volume among the major roads in Metro Manila. Not far behind were Commonwealth Avenue, Quezon Avenue, Roxas Boulevard, Marcos Highway and C.P. Garcia-Katipunan

Avenue-Tandang Sora. Daily traffic volumes of these six major roads exceeded 100,000.

The conversion of AADT into annual vehicle-kilometer (km) will require information on the average car trip distance for each of the circumferential and radial roads in Metro Manila. Given such information is not available, average car trip distance was estimated to be road length divided by two. Hence, the formula used to compute for annual vehicle-km for each of the major road in Metro Manila was:

$$\text{Annual vehicle - km} = \text{AADT} * \frac{\text{Road length}}{2} * 365 \text{ days in a year}$$

The results of the computations are shown in Table 7.4.

TABLE 7.4 ANNUAL VEHICLE-KILOMETER TRAVELED

CIRCUMFERENTIAL AND RADIAL ROAD		LENGTH (KM)	VEHICLE-KM (MILLION)		
			2020	2019	2018
C:1	Recto	3.2	16.72	12.79	14.33
C:2	Mendoza	0.2	1.21	1.64	1.85
	Pres. Quirino Avenue	3.6	20.07	41.56	43.00
C:3	Araneta Avenue	5.3	34.53	41.31	37.47
C:4	EDSA	23.8	841.72	1,110.77	1,092.95
C:5	C.P. Garcia/ Katipunan Avenue/ Tandang Sora	21.9	403.06	497.30	533.27
R:1	Roxas Boulevard	7.6	146.83	168.47	179.58
R:2	Taft Avenue	2.7	18.71	18.91	18.28
R:3	South Superhighway	13.4	171.32	178.06	137.51
R:4	Shaw Boulevard	5.3	44.47	48.29	50.14
R:5	Ortigas Avenue	15.5	228.22	199.72	223.83
R:6	Magsaysay Boulevard	2.2	19.42	22.64	24.01
	Aurora Boulevard	13.0	97.06	93.34	89.87
R:7	Quezon Avenue	7.1	163.64	159.89	155.59
	Commonwealth Avenue	12.7	344.09	351.89	305.07
R:8	A. Bonifacio Avenue	3.8	28.56	26.34	22.19
R:9	Rizal Avenue	6.5	35.68	42.51	44.37
R:10	Del Pan	6.2	51.95	31.29	37.21
	Marcos Highway	7.0	131.22	135.45	126.10
	McArthur Highway	9.3	56.23	61.19	58.83
TOTAL			2,854.70	3,243.38	3,195.46

Source: Study Team's estimates

Vehicle Operating Cost Savings. Improvements in the bicycle infrastructure will result in the reduction of motor vehicle use and a decrease in vehicle operating costs. The VOC is a monetary measure for direct cost incurred during the operation of the motor vehicle. These direct costs will include fuel, oil, lubricants, batteries, tires, maintenance, repairs, and depreciation expenses. The reduction in the usage of motor vehicles will lead to lower vehicle-kilometer due to less cars on the roads and/or cars traveling shorter distances.

Based on a unit VOC of USD0.24 per kilometer and a peso-dollar rate of Php51.19-to-USD1, VOC savings can amount to Php3,542 million in 2020 given a 10% reduction in traffic volume because of the improvement in bicycle infrastructure (See Table 7.5). VOC savings will be higher at Php5,313 million for a 15% reduction in traffic volume in 2020.

TABLE 7.5 VEHICLE OPERATING COST SAVINGS (IN MILLION PESOS)

CIRCUMFERENTIAL AND RADIAL ROAD	10% REDUCTION IN TRAFFIC VOLUME			15% REDUCTION IN TRAFFIC VOLUME		
	2020	2019	2018	2020	2019	2018
C:1 Recto	20.74	15.87	17.78	31.11	23.81	26.67
C:2 Mendoza	1.50	2.04	2.30	2.24	3.06	3.45
Pres. Quirino Avenue	24.90	51.57	53.35	37.34	77.35	80.02
C:3 Araneta Avenue	42.84	51.25	46.49	64.26	76.88	69.74
C:4 EDSA	1,044.32	1,378.13	1,356.02	1,566.48	2,067.20	2,034.03
C:5 C.P. Garcia/ Katipunan Avenue/ Tandang Sora	500.07	617.00	661.63	750.11	925.50	992.45
R:1 Roxas Boulevard	182.17	209.03	222.81	273.26	313.54	334.21
R:2 Taft Avenue	23.22	23.46	22.67	34.83	35.19	34.01
R:3 South Superhighway	212.56	220.92	170.61	318.84	331.38	255.91
R:4 Shaw Boulevard	55.17	59.91	62.20	82.76	89.86	93.30
R:5 Ortigas Avenue	283.15	247.79	277.71	424.73	371.69	416.56
R:6 Magsaysay Boulevard	24.10	28.09	29.79	36.15	42.14	44.69
Aurora Boulevard	120.43	115.81	111.50	180.64	173.71	167.26
R:7 Quezon Avenue	203.02	198.37	193.04	304.53	297.56	289.57
Commonwealth Avenue	426.92	436.59	378.50	640.37	654.89	567.76
R:8 A. Bonifacio Avenue	35.43	32.69	27.53	53.15	49.03	41.30
R:9 Rizal Avenue	44.27	52.74	55.05	66.41	79.11	82.58
R:10 Del Pan	64.45	38.82	46.16	96.68	58.23	69.24
Marcos Highway	162.80	168.06	156.45	244.20	252.09	234.67
McArthur Highway	69.76	75.91	72.99	104.64	113.87	109.49
TOTAL	3,541.82	4,024.06	3,964.60	5,312.73	6,036.09	5,946.90

Source: Study Team's estimates

Avoided GHG Emissions. Biking is a zero-emission activity. A shift in the mode of transportation from driving to biking to work will lead to a reduction in greenhouse gas (GHG) emissions and improvement in air quality. According to estimates by the U.S. Environmental Protection Agency¹, carbon dioxide (CO₂) emission from a typical passenger

¹ Greenhouse Gas Emissions from a Typical Passenger Vehicles: Questions and Answers, United States Environmental Protection Agency, March 2018.

vehicle using one gallon of gasoline is about 8,887 grams. This translates into some 2,348 grams of CO₂ per liter of gasoline. Given a fuel consumption of 22.0 miles per gallon (or 9.35 kilometers per liter), the resulting CO₂ emission is 404 grams per mile or about 251 grams per kilometer. At this CO₂ emission rate, if traffic volume was reduced by 10% in 2020, then avoided CO₂ emission was about 71,655 metric tons. Assuming that the value of avoided CO₂ emission is Php1,765 per metric ton², this will amount to Php126.49 million in 2020 (See Table 7.6).

TABLE 7.6 AVOIDED GREENHOUSE GAS EMISSIONS (IN MILLION PESOS)

CIRCUMFERENTIAL AND RADIAL ROAD	10% REDUCTION IN TRAFFIC VOLUME			15% REDUCTION IN TRAFFIC VOLUME		
	2020	2019	2018	2020	2019	2018
C:1 Recto	0.74	0.57	0.63	1.11	0.85	0.95
C:2 Mendoza	0.05	0.07	0.08	0.08	0.11	0.12
Pres. Quirino Avenue	0.89	1.84	1.91	1.33	2.76	2.86
C:3 Araneta Avenue	1.53	1.83	1.66	2.29	2.75	2.49
C:4 EDSA	37.30	49.22	48.43	55.95	73.83	72.64
C:5 C.P. Garcia/ Katipunan Avenue/ Tandang Sora	17.86	22.04	23.63	26.79	33.05	35.44
R:1 Roxas Boulevard	6.51	7.47	7.96	9.76	11.20	11.94
R:2 Taft Avenue	0.83	0.84	0.81	1.24	1.26	1.21
R:3 South Superhighway	7.59	7.89	6.09	11.39	11.83	9.14
R:4 Shaw Boulevard	1.97	2.14	2.22	2.96	3.21	3.33
R:5 Ortigas Avenue	10.11	8.85	9.92	15.17	13.27	14.88
R:6 Magsaysay Boulevard	0.86	1.00	1.06	1.29	1.51	1.60
Aurora Boulevard	4.30	4.14	3.98	6.45	6.20	5.97
R:7 Quezon Avenue	7.25	7.08	6.89	10.88	10.63	10.34
Commonwealth Avenue	15.25	15.59	13.52	22.87	23.39	20.28
R:8 A. Bonifacio Avenue	1.27	1.17	0.98	1.90	1.75	1.48
R:9 Rizal Avenue	1.58	1.88	1.97	2.37	2.83	2.95
R:10 Del Pan	2.30	1.39	1.65	3.45	2.08	2.47
Marcos Highway	5.81	6.00	5.59	8.72	9.00	8.38
McArthur Highway	2.49	2.71	2.61	3.74	4.07	3.91
TOTAL	126.49	143.72	141.59	189.74	215.58	212.39

Source: Study Team's estimates

Safety Benefits. According to the MMARAS Annual Report, 65,032 road accidents were recorded in Metro Manila in 2020 (See Table 7.7). These accidents resulted in the death of 345 people and non-fatal injuries to another 16,870 people. Road accident figures in 2020

² GHG price value was lifted from World Bank Cebu BRT Project Appraisal Study (September 2012). Adjusted to 2022 prices using the annual national inflation rates.

were significantly lower compared to the previous year due the limited physical mobility resulting from the global pandemic.

TABLE 7.7 ROAD SAFETY DATA

PARTICULARS	2020	2019	2018
Actual Number of Persons Involved ^{1/}			
Fatal	345	394	394
Non-Fatal	16,870	25,229	21,893
Damage to Property (Cases)	50,230	100,933	98,632
Annual Vehicle km, car (in millions)	2,855	3,243	3,195
Number of fatalities per million vehicle-km	0.12	0.12	0.12
Number of minor injury per million vehicle-km	5.91	7.78	6.85
Number of damage to property per million vehicle-km	17.60	31.12	30.87
Value of life in Philippines (Php) (2022) ^{2/}	6,505,256		
Value of minor injury in Philippines (Php) (2022) ^{2/}	133,933		
Value of damage to property in Philippines (Php) (2022) ^{2/}	79,950		

^{1/} Metro Manila Accident Recording and Analysis System (MMRAS) Annual Reports

^{2/} Value of Life: de Leon et al. (2005), *Journal of Eastern Asia Society for Transportation Studies*, Vol. 6, pp. 3183-3198. Adjusted to 2022 prices using actual and projected real GDP growth rates.

According to a recent study³, evidence suggests that high bicycling mode cities are not only safer for cyclists but for all road users as well. The study analyzed 13 years of data from 12 of largest U.S. cities. The results of the study showed that more cyclists on the road is not as important as the infrastructure built for them. Improvements in bicycle infrastructure with more protected and separated bike facilities is significantly associated with fewer fatalities and better road safety outcomes.⁴

As previously mentioned, improvements in bicycle infrastructure will lead to lower traffic volume and eventually less road accidents. The incidence of fatalities, minor injuries and property damages were derived from the MMARAS' data on road crashes and the estimated annual vehicle-km (See Table 5). The value of safety benefits is equal to the product of the reduction in road accidents and their associated monetary values. Safety benefits associated with a 10% reduction in traffic volume in 2020 was estimated to be Php852 million (See Table 7.8).

³ Why are Bike-Friendly Cities Safer for All Road Users? by W.E. Marshall, N. Ferenchak, and B. Janson, Mountain-Plain Consortium, December 2018.

⁴ Ibid.

TABLE 7.8 SAFETY BENEFITS

PARTICULARS	10% REDUCTION IN TRAFFIC VOLUME		15% REDUCTION IN TRAFFIC VOLUME			
	2020	2019	2020	2019	2020	2019
Reduction in fatalities	35	39	39	52	59	59
Reduction of minor injury	1,687	2,523	2,189	2,531	3,784	3,284
Reduction of property damage	5,023	10,093	9,863	7,535	15,140	14,795
Value of fatalities reduced (Php million)	224.43	256.31	256.31	336.65	384.46	384.46
Value of minor injury reduced (Php million)	225.94	337.90	293.22	338.92	506.85	439.83
Value of property damage reduced (Php million)	401.59	806.96	788.56	602.38	1,210.43	1,182.84
Total (Php million)	851.96	1,401.16	1,338.09	1,277.94	2,101.74	2,007.13

Source: Study Team's estimates

7.3 Public Engagements

In order to accelerate behavioral changes, a system of material and financial incentives promoting the use of bicycles instead of motorized vehicles must be implemented by the city or municipality. The materials incentives may be in the form of information, education, and communication (IEC) materials disseminated to the cycling community. The Local Health System Health Promotion Playbook: Active Transport prepared by the DOH together with the Alt Mobility PH and Move as One Coalition in 2020 included IEC materials such as the one shown in Figure 71, and a communication plan that can be used by the LGUs for their public engagements (See Annex E).



Source: Local Health System Health Promotion Playbook: Active Transport, DOH

FIGURE 7.1 EXAMPLE INFORMATION, EDUCATION AND COMMUNICATION MATERIAL

The IEC materials covered topics such as biking in the times of COVID-19, health benefits of biking, health reminders for bicycle users, safety gears for bicycle users, and basic hand signals for bicycle users. LGUs like the Mandaue City government used the IEC materials from Active Transport Playbook to produce their own communication materials and even translated them into their local language dialect.

A PERMANENT AND REGULAR SEAT SHOULD BE ATTACHED TO EVERY BICYCLE
GIKINAHANGLAN NGA ADUNAY TARUNG NGA LINGKURANAN NGA NAKATAPOT SA BISEKLETA

ALL BICYCLISTS MUST USE HELMETS WHILE RIDING BIKES.
Pagsul-ob og helmet.

WHILE TRAVELLING AT NIGHT, AT LEAST USE REAR REFLECTORS AND REFLECTIVE MATERIAL ON THE FRONT AND REAR OF EACH PEDAL OR SIMPLY USE FRONT LAMPS.
KUNG MOBYAHE SA GABII GIKINAHANGLAN MAGBUTANG OG REFLECTOR SA ATUBANGAN OG LIKOD NGA BAHIN SA BISEKLETA

DO NOT CARRY MORE THAN WHAT IS ALLOWED FOR YOUR BIKE. (NO OVERLOADING)
GIDILI ANG SOBRA NGA GIDAGHANON SA MGA KARGAMENTO

BICYCLISTS MUST OBEY ALL TRAFFIC LAWS, INCLUDING YIELDING TO PEDESTRIANS.
ANGAY OG MATARUNG NGA MOSUNOD SA MGA LAGDA SA TRAPIKO APIL NA ANG PAGPALABANG SA MGA PEDESTRIAN

DO NOT CARRY MORE THAN WHAT IS ALLOWED FOR YOUR BIKE. (NO OVERLOADING)
GIDILI ANG SOBRA NGA GIDAGHANON SA MGA KARGAMENTO

CYCLISTS MUST SIGNAL BY HAND IF YOU HAVE ANY INTENTIONS TO STOP OR TURN AND GIVE AUDIBLE WARNINGS WHENEVER NECESSARY TO ENSURE SAFETY
GIKINAHANGLAN ANG HAND SIGNAL SA HIGAYON NGA MOHUNONG O MOLIKO

OBSERVE PROPER DISTANCE BETWEEN CYCLISTS.
MOHATAG OG GINTANG O DISTANSYA SA UBAN NGA NAG BISEKLETA

OPERATORS MUST REPORT TO LOCAL LAW ENFORCEMENT, ANY ACCIDENT INVOLVING EITHER PERSONAL INJURY OR PROPERTY DAMAGE.
GIMANDU-AN ANG MGA OPERATOR SA PAG REPORT SA OTORIDAD KONG ADUNAY MGA HITABO NGA NAGLAMBIGIT SA INJURY O DAMAGE TO PROPERTY

CYCLISTS SHOULD NEVER COUNTERFLOW. NEVER ENTER ONE WAY STREETS AND GO AGAINST ONCOMING TRAFFIC.
LIKAYAN ANG PAG COUNTERFLOW O PAGSUGAT SA DAGAN SA TRAFFIC

BIKERS MUST ALWAYS KEEP AT LEAST ONE HAND ON THE HANDLEBARS AT ALL TIMES. (NO EXHIBITION)
GIKINAHANGLAN ANG KANUNAY NGA PAGKUPOT SA KAMOT SA DUHA KA HANDLE BAR OG GIDILI ANG EXHIBITION

BICYCLISTS SHOULD ALWAYS STICK TO ONE LANE AND SHOULD NOT MANEUVER BETWEEN VEHICLES.
GIKINAHANGLAN SA MAG BISEKLETA NGA DILI MOLABANG SA LAIN NGA LUNYA PAGAWAS SA BIKE LANES

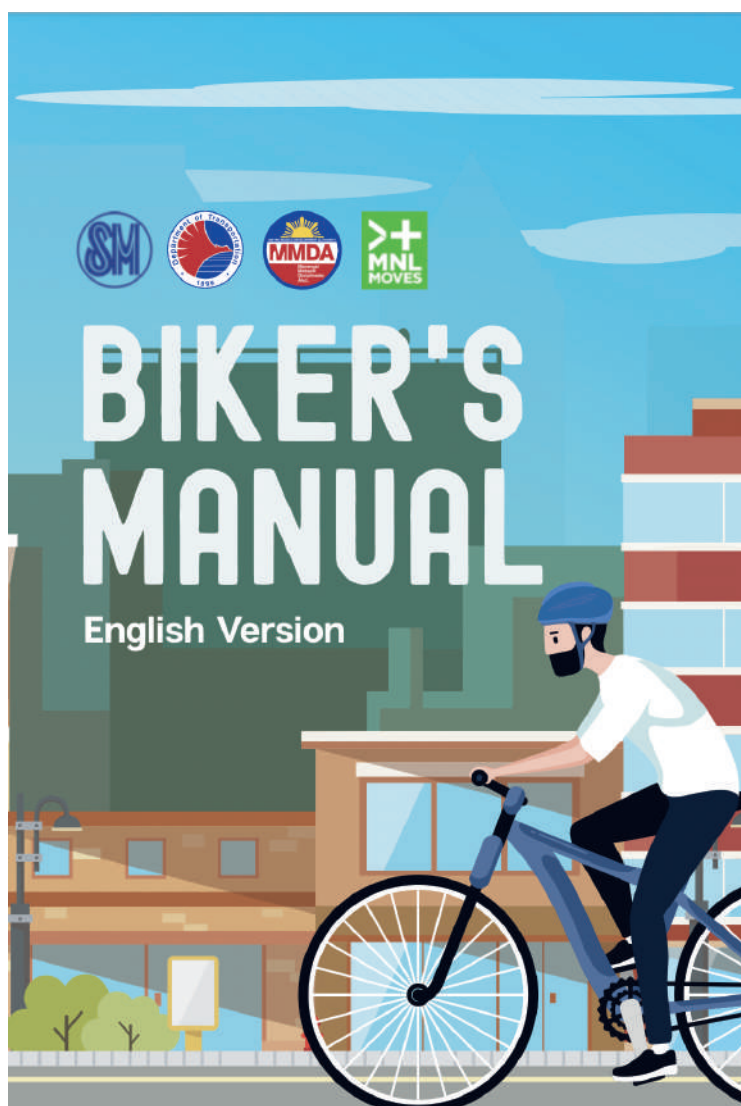
SIMPLE RULES WHEN RIDING YOUR BIKE ON THE STREETS OF MANDAUE

GUIDELINES FOR BIKE RIDING SAFETY

Alang sa luwas nga byahe ug likay sa disgrasya

FIGURE 7.2 EXAMPLE IEC MATERIAL FROM MANDAUE CITY

The SM Group collaborated with DOTr, MMDA and MNL Moves and released a 10-page bikers manual in both English and Filipino versions shown in Figure 7.3. The manual provides cyclists with a handy guide for biker's safety before and during a ride. It also provides information on personal protection, major road signs and the proper use of bike lanes. Educating cyclists on the proper use was one of the concerns raised during the series of focus group discussions conducted by the study team. It is unclear to the general public who are the rightful users of the bike lanes. Motorcycles, scooters, and even weekend joggers are regular users of the bike lanes. There are likewise frequent cases of cyclists who counterflow in the bike lanes. MNL Moves, an active transport advocacy group, also released two short videos on their Facebook page – A Biker Rider's Journey and Cycling Safety Tips. The first video tackles the importance of creating more bike friendly communities, while the second video provides a practice guide on road safety for both cyclists and motorists.



Source: SM Group, DOTr, MMDA and MNL Moves

FIGURE 7.3 BIKER'S MANUAL

The DOTr collaborated with the DPWH and the Robinsons Groups to produce a similar Biker's Manual using the materials from the DOTR D.O. 2020-14.⁵ Other initiatives by the DOTr include the first Bike Lane Awards held in November 2021⁶, feedback surveys for the 497-kilometer bike lane network for Metro Manila, Metro Cebu and Metro Davao⁷, the annual celebration of World Bicycle Day⁸, The Department also requested Google to include the Philippines' bike lanes in their maps (i.e., Google Maps, Google Earth).⁹

Last 21 May 2021, the Land Transportation Office issued Memorandum Circular No. 2021-2267¹⁰ which provides guidelines and protocols in the operation of motorcycles, cars, trucks, and other motorized vehicles that will enable the efficient and safe utilization of non-motorized transportation. The guidelines promulgated by the circular include the following:

1. No motor vehicles shall be allowed to either cross or park into bicycle lanes or pedestrian lanes. Bicycle lanes are for the exclusive use of non-motorized transport (NMT), light mobility vehicle (LMV), and personal mobility devices (PMD) users.
2. Motor vehicles are advised to give cyclists and NMT, LMV and PMD users sufficient clearance when passing.
3. Drivers must exercise caution when turning at intersections by checking if any cyclist is passing.
4. Drivers must open doors with care to make sure there are no cyclists and NMT, LMV, and PMD users approaching from behind.
5. Drivers must check blind spots and be aware at all times of motorized and non-motorized transport vehicles that could be approaching from any direction.

The circular provides the inclusion of these rules in all modules used in the prescribed driver education standards.

The Land Transportation Franchising and Regulatory Board (LTFRB) produced a manual for its driver's academy as part of their campaigns promoting road safety and active transport and in line with LTFRB and DOTr policies on active transport. The manual cover is shown in Figure 7.4.

⁵ <https://www.facebook.com/RobinsonsMalls/posts/10159870145410762>

⁶ <https://www.facebook.com/DOTrPH/posts/224362806495446>

⁷ <https://www.facebook.com/DOTrPH/posts/201805745417819>

⁸ https://www.facebook.com/permalink.php?story_fbid=2035674299905029&id=130406490431829

⁹ <https://www.facebook.com/DOTrPH/posts/223623183236075>

¹⁰ LTO Memorandum Circular No. 2021-2267: Guidelines and Protocols for Drivers in the Operation of Motorcycles, Cars, Trucks and Non-Motorized Vehicles dated 21 May 2021.

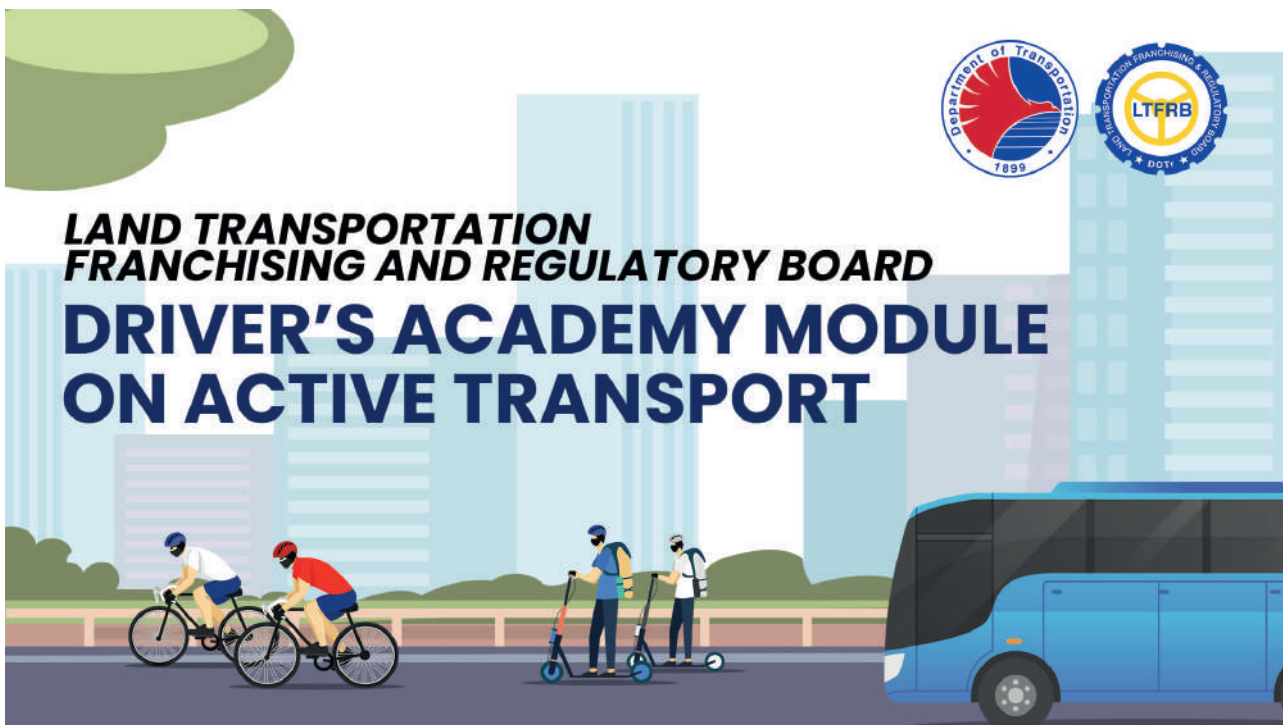


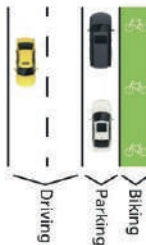
FIGURE 7.4 COVER OF LTFRB'S DRIVER'S ACADEMY MODULE ON ACTIVE TRANSPORT

The IEC materials can also include brochures, stickers and posters which can help improve the public's overall perception of biking as a mode of transportation. Maps which provide information on local biking routes, location of bike parking facilities, bicycle rental stations, bicycle stores and repair shops will likewise be helpful to the cyclists.

If data is available, more sophisticated materials such as infographics may be developed and circulated in order to reinforce the arguments for active transport infrastructure, especially bike lanes. Figure 7.5 summarizes in one graphic the benefits of building protected bike lanes; particularly from the perspective of business (i.e., economics), safety and lawfulness.

WHY BUILD PROTECTED BIKE LANES?

WHAT ARE THEY?



Protected bike lanes put a barrier between drivers and bike riders. The barrier can be parked cars, plastic posts, or planters. They are popular in cities with high amounts of bike riders for everyday use.



GOOD FOR SAFETY

89%

fewer injuries among bike riders on streets with protected bike lanes.⁵



Bike- and pedestrian-friendly street design leads to less collisions, even when there are more people out!⁶



DRIVERS don't have to worry about unexpected bike maneuvers.



PEDESTRIANS don't have to worry about bike riders on the sidewalks.

GOOD FOR BUSINESS



9th Ave in New York City saw a **49%** increase in business after protected bike lanes were installed.¹ Nearby streets only saw a 3% increase.



55% More bike traffic on Kinzie St in Chicago after a protected bike lane was installed.²

A Portland study found bike riders will *go out of their way* to a street with good bike infrastructure. That's more business exposure.³



Pedestrians and bike riders in Toronto **SPENT THE MOST MONEY** and visited stores more often.

Maybe because it costs less to walk or bike?

GOOD FOR LAWFULNESS



In Chicago, protected bike lanes have resulted in a 161% increase in the number of bike riders obeying the stoplight.⁷

GOOD FOR EVERYONE



71% of Americans have expressed interest in riding a bike more often, but find it unsafe.⁸ *Are you one of them?*

LESS

Each bike on the road is one less car in traffic, causes less pollution, less wear on the road (and therefore less taxpayer-funded maintenance), and creates a healthier population.

LIKE PROTECTED BIKE LANES? TELL YOUR LOCAL ELECTED OFFICIALS!



1. NYC DOT. Measuring the Street. New Metrics for 21st Century Streets
 2. CDOT. http://www.cityofchicago.org/city/en/depts/cdot/provdrs/bike/news/2013/sep/initia_landingpage_street_protected_bikelane.html
 3. Jennifer Dill. *Bicycling for Transportation and Health: The Role of Infrastructure*. <http://www.palgrave-journals.com/jhnp/journal/v30/n51/full/jhnp200956a.html>
 4. The Clean Air Partnership. 2009. *Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighbourhood*

5. Kay Teschke, M. Annie Harris, et. al. *Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study*
 6. <http://injuryprevention.bmj.com/content/9/3/205.abstract>
 7. Chicago Tribune. *City says Dearborn bike signals keeping cyclists in line*. June 10 2013.
 8. NHTSA. *Volume II: Findings Report National Survey of Bicyclist and Pedestrian Attitudes and Behavior*, 2008

FIGURE 7.5 EXAMPLE INFOGRAPHICS SHOWING THE BENEFITS OF BIKE LANES¹¹

¹¹ <https://transitized.com>

7.4 Bicycles and Public Transportation

Public transportation is usually not door-to-door. This is particularly true for typical fixed route modes such as trains, buses, jeepneys and vans. Taxis, rideshare and tricycles are the exceptions as they operate more similarly to private vehicles. While it is desired to have an increasing share for bicycles as a main mode of transport, the reality is most people take public transportation. Estimates for Metro Manila, for example, state that about 70% use at least one form of public transport as the main mode of transportation.¹²

Since public transportation is not usually door-to-door, it is essential to provide for what is called “last mile” or “last kilometer” transportation in the form of active transport (i.e., walking or cycling) or paratransit (i.e., tricycle, pedicabs, motorcycle taxis or even jitneys). This is in order to enhance or reinforce public transportation use; as no matter the frequency and reliability of public transport services, it won’t be as useful or attractive if there is poor access or connectivity to the origins and destinations of travelers. In the case of active transport, the options are to make the environment suitable or conducive to walking or cycling.

The revised DPWH guidelines contain provisions and example layouts for bike lanes in the vicinity of public utility vehicle stops. Another example transit stop layout is shown in Figure 7.6 based on the recommended layout in the NACTO guide.

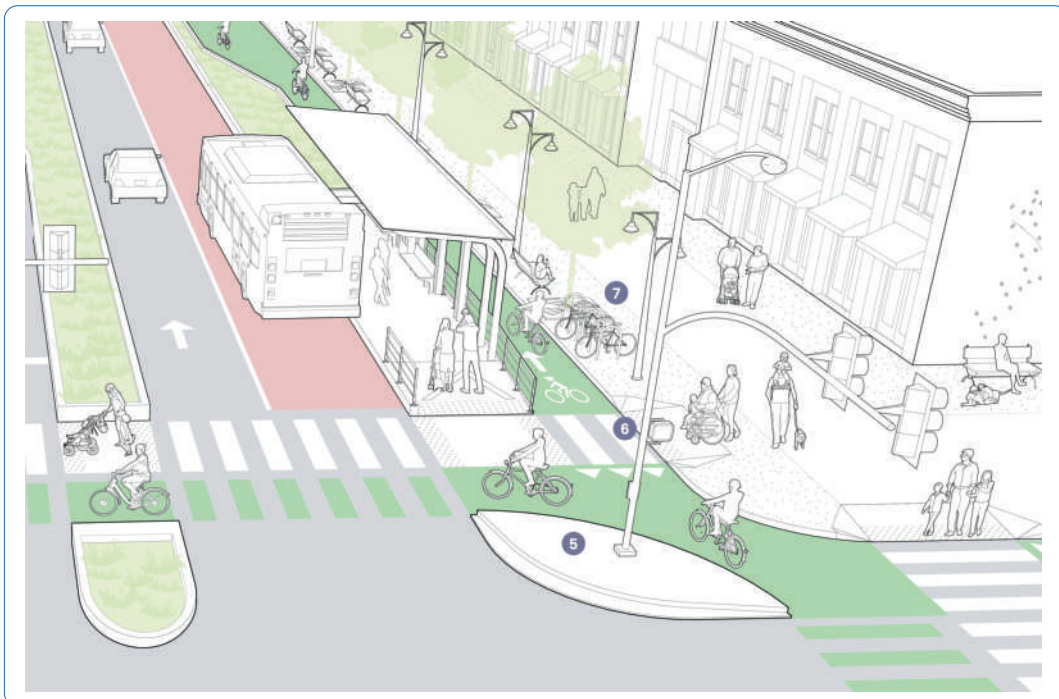


FIGURE 7.6 EXAMPLE TRANSIT STOP LAYOUT

¹² Japan International Cooperation Agency (2015) MMUTIS Update and Capacity Enhancement Project (MUCEP), Final Report.

For those opting to take their bicycles with them for the commute using public transportation, these may be accommodated through a number of ways including:

- Bike racks on buses or jitneys;
- Folded bikes on buses and trains; and
- Full bike racks on trains

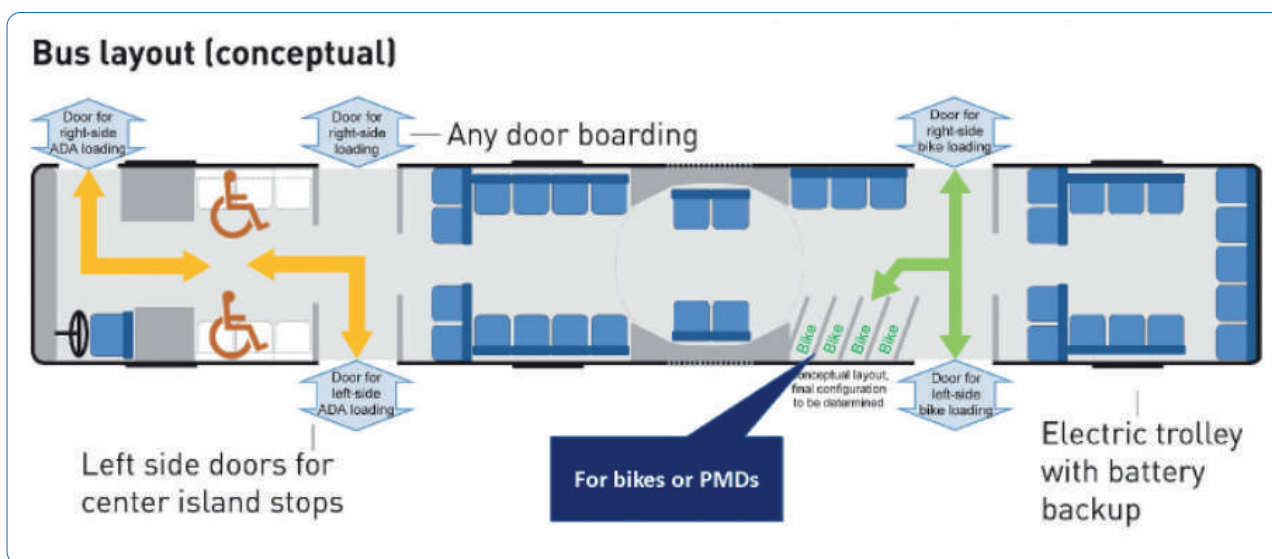
An example of a bike rack on a bus is shown in Figure 7.7. Such racks may be installed on city buses in Metro Manila and Metro Cebu as well as for future city bus services in Davao City.



Source: <https://www.govtech.com/transportation/how-can-transit-deliver-urban-equity-and-sustainability>

FIGURE 7.7 BICYCLE RACK ON BUSES

An example layout for buses is shown in Figure 7.8, where spaces may be allocated to foldable bicycles. Such layouts are not limited to typical city buses but to proposed Bus Rapid Transit (BRT) systems as well. BRT lines are proposed for Metro Manila, Metro Cebu and Metro Davao, and these layouts may be adopted for the vehicles. Similar layouts or provisions for foldable bikes may be considered for modern jitneys/jeepneys as well as these vehicles become more spacious compared to the conventional PUJs.



Source: <https://www.theurbanist.org/2016/08/09/madison-bus-rapid-transit-at-30-design/buslayout-2/>

FIGURE 7.8 BICYCLE SLOTS ON BUSES

Bicycles are already allowed on the rail transit lines in Metro Manila as long as they are foldables. While there are no specific restrictions to dimensions (i.e., bikes are allowed as long as they are folded), there are restrictions and even guides in other countries. An example of such guide found in train stations is shown in Figure 7.9.



Source: <https://bicyclethailand.com/taking-your-bicycle-on-the-mrt-subway/>

FIGURE 7.9 FOLDABLE BICYCLE DIMENSIONS ALLOWED ON BANGKOK MRT AND SUBWAYS

Full-sized bicycles are allowed on commuter trains in many European cities. These can be in each or selected cars of trains as shown in Figure 7.10 for a commuter line in Germany. Note in the photo that the maximum number of bicycles allowed per car is also indicated.



Photo credit: Prof. Roselle Leah K. Rivera

FIGURE 7.10 EXAMPLE TRAIN CAR MARKER FOR FULL-SIZED BIKES

Inside the trains, specific spaces may be provided for full-sized bikes as shown in Figure 7.11 where the spaces are conveniently located near the train car door.



Photo credit: Prof. Roselle Leah K. Rivera

FIGURE 7.11 FULL-SIZED BICYCLE LOADED ON A COMMUTER TRAIN

Although bicycle parking has been discussed in the previous Chapter 4 on end-of-trip facilities, it should be emphasized that a suitable number of parking spaces coupled with the appropriate designs need to be provided at transit stations. While parking spaces have been provided at rail stations around Metro Manila, the number of spaces and their designs need to be revisited. This is especially true for major stations including end stations of these lines where passengers will require “last mile” transport to their destinations. Parking facilities may be provided for both short and long-term purposes. The collage in Figure 7.12 shows bicycle parking at Amsterdam Central Station.



Photo credits: Dr. Jose Regín F. Regidor

FIGURE 7.12 BICYCLE PARKING AT AMSTERDAM STATION, THE NETHERLANDS

From a strategic perspective, end of trip facilities, especially parking, need to be developed and designed at transit stations and public transport terminals to effect active transport-public transport synergy. In Quezon City, for example, there are many opportunities to improve bicycle parking facilities at existing transit stations of Line 1, Line 2 and Line 3, and develop or build better ones for the future Line 7 and Metro Manila Subway stations. There are also opportunities for bike share at each station to provide this option to commuters for their last mile requirements in cases where people do not have their own bicycles.

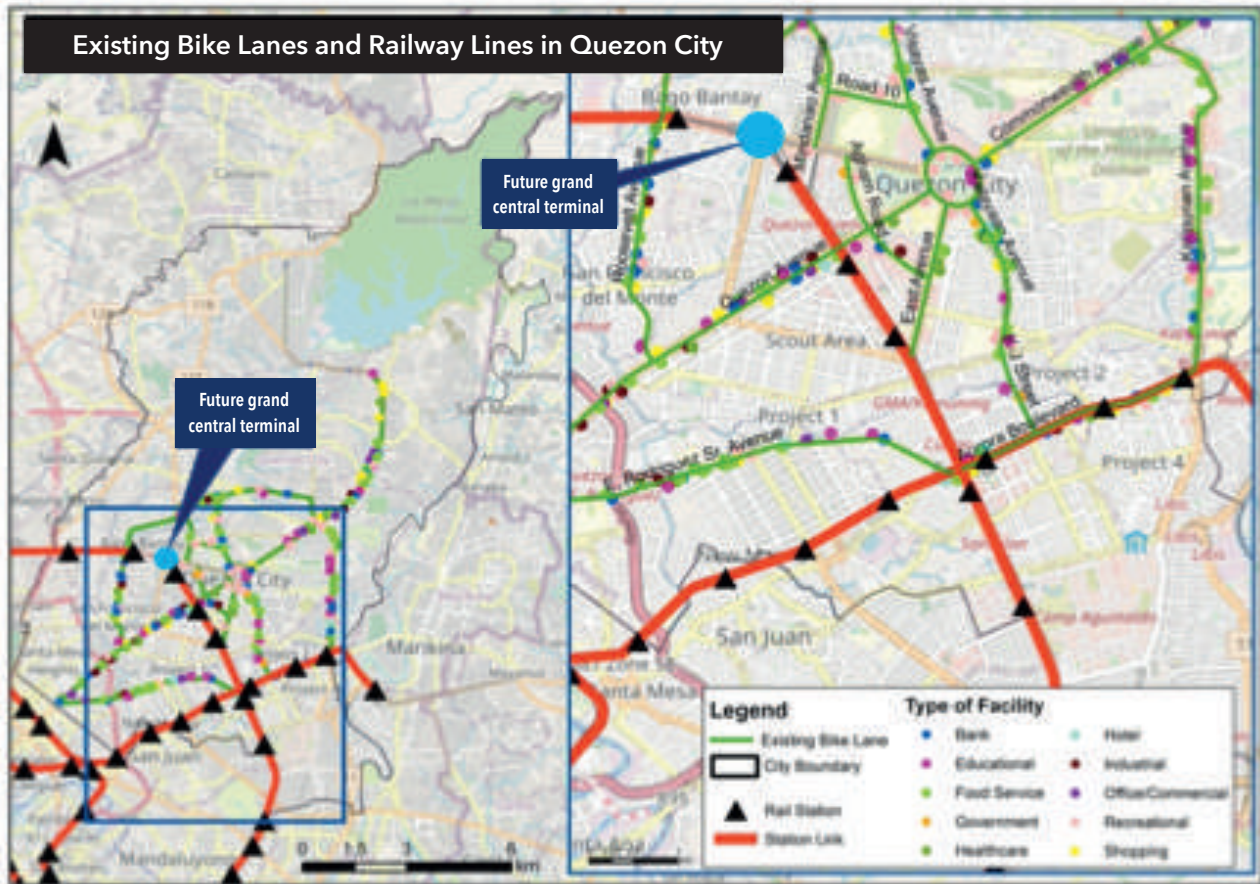


FIGURE 7.13 BICYCLE LANES AND RAILWAY TRANSIT LINES AND STATIONS IN QUEZON CITY

7.5 Actions and Targets

Table 7.9 summarizes the strategies for establishing a network of bike lanes and related facilities as well as the promotion of cycling for various purposes in the metropolitan areas. Corresponding actions and targets are also presented for the implementation or realization of these strategies that include concrete and measurable items that can be monitored for progress.

TABLE 7.9 STRATEGIES, ACTIONS AND TARGETS FOR BICYCLE FACILITIES, PROGRAMS AND PROJECTS

STRATEGIES	ACTIONS	TARGETS
1) Expand network of protected and/or exclusive bike lanes	Allocate and legislate funding for expansion of protected bike lanes (i.e., Class I and Class II) at the national level;	Annual funding for bike lane expansion, maintenance and studies at the national and local levels from 2022;
	Construct or upgrade Bayanihan bike lanes to at least Class II-Type A;	Upgrading Bayanihan bike lane network to Class II-Type A within 3 years or 2025;

STRATEGIES	ACTIONS	TARGETS ¹³
2) Develop network of streets with shared lanes	Research on the bike lane network required for bicycle commuting (i.e., bike-to-work, bike-to-school);	Metropolitan-scale transport models including bicycles as a mode of transport within 3 years or 2025;
	Collect relevant data for bike lane development including counts, travel time and trip purpose	Metro-wide database of relevant data for bicycle facilities planning and design within 3 years or 2025; Regular (annual) data collection at the institutional level within 3 years or 2025 Publish unit costs for bicycle facilities such as cost of construction of Class I bike lanes by 2022.
	Allocate and legislate funding for expansion of protected bike lanes (i.e., Class I and Class II) at the local level;	Annual funding for bike lane expansion and maintenance at the local level in the immediate term or by 2022;
	Identify and develop local streets for shared lanes (i.e., Class III);	Develop shared lanes for local streets in the immediate term (i.e., within 1 year or by 2022); Upgrading of local streets bike lane network to Class II-Type B within 3 years or by 2025;
	Implement lower speed limits;	Reduction of motor vehicle speed-related crashes and fatalities within 3 years or by 2025;
3) Develop end-of-trip facilities for all types of establishments	Research on the bike lane network required for bicycle commuting (i.e., bike to work, bike to school);	LGU-scale transport models including bicycles as a mode of transport by 2025;
	Collect relevant data for bike lane development including counts, travel time and trip purpose	LGU-wide database of relevant data for bicycle facilities planning and design at the local level by 2022;
3) Develop end-of-trip facilities for all types of establishments	Inventory survey of bicycle parking facilities for various establishments including designs, number of slots and costs;	Local ordinances providing legal basis for minimum bicycle parking for various establishments within 3 years or by 2025;
	Research on design, suitable number of slots and cost-effective bicycle parking facilities for short-term and long-term parking;	National Building Code provisions for minimum bicycle parking for various establishments within 3 years or by 2025; Publication of unit costs for parking and other end-of-trip facilities at the local level by 2022.
4) Encourage bicycle use especially for commuting (i.e., bike-to-work and bike- to-school)	Provide bicycle facilities at public transport stops, stations and terminals;	Bike racks on city buses and jitneys within 3 years or by 2025; Bike slots on commuter trains within 3 years or by 2025; Annual increase in mode share of bicycles per LGU; ¹³

¹³ This requires baseline data for each LGU as well as targets to be set by each.

STRATEGIES	ACTIONS	TARGETS*
	Provide bicycle facilities at workplaces and schools	Shower and changing facilities at workplaces and schools in the immediate term or by 2022; Annual increase in mode share of bicycles per school or workplace; ¹⁴
	Collect relevant travel data including origin-destination data, trip purpose and travel time; Research on bicycle safety including suitable assessment methodology (e.g., iRAP's Star Ratings);	Publication of unit benefits and costs for incremental improvements in safety (e.g., crash reduction in PHP per unit increase in bike activity in person-km traveled or % mode share) by 2022; Adoption of iRAP Star Ratings for active transport by 2022; Production and dissemination of IEC/C4D materials on the benefits of cycling by 2022.
	Research on the health, environmental and economic benefits of cycling	Publication of unit benefits and costs for incremental improvements in active transport activities (e.g., health savings in PHP/person per unit increase in activity in person-km traveled or % mode share) by 2022; Production and dissemination of IEC/C4D materials on the benefits of cycling by 2022.

*Note: *Three (3) years refer to one term of a local executive (i.e., governor, mayor, congressman, councilor, etc.). Six (6) years refer to one term of a national official (i.e., president, vice president, senator, department secretary, etc.)*

¹⁴ This requires baseline data for each school or workplace as well as targets to be set by each.

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