



## Global Environment Facility

**MOHAMED T. EL-ASHRY**  
CHIEF EXECUTIVE OFFICER  
AND CHAIRMAN

February 5, 2001

Dear Council Member:

The World Bank, as the Implementing Agency for the project, *Philippines: Marikina Bikeways Project: Component of Metro Manila Urban Transport Integration Project*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with World Bank procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by the Council in May 2000 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by the World Bank satisfactorily details how Council's comments and those of the STAP reviewer have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at [www.gefweb.org](http://www.gefweb.org). If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

cc: Alternates, Implementing Agencies, STAP

Document of  
The World Bank

Report No: 20767-PH

PROJECT APPRAISAL DOCUMENT  
ON A  
PROPOSED LOAN  
IN THE AMOUNT OF US\$55.0 MILLION  
AND A GLOBAL ENVIRONMENT FACILITY GRANT  
OF SDR 1.0 MILLION  
TO THE  
REPUBLIC OF THE PHILIPPINES  
FOR THE  
METRO MANILA URBAN TRANSPORT INTEGRATION PROJECT  
JANUARY 23, 2001

**Transport Sector Unit  
East Asia and Pacific Region**

## CURRENCY EQUIVALENTS

(Exchange Rate Effective January 23, 2001)

Currency Unit = Philippine Pesos (PhP)

1 PhP = US\$0.02

US\$1 = PhP 50

## FISCAL YEAR

January 1 December 31

## ABBREVIATIONS AND ACRONYMS

|          |   |
|----------|---|
| ADB      | Asian Development Bank                              |
| CAS      | Country Assistance Strategy                         |
| DBM      | Department of Budget and Management                 |
| DENR     | Department of Environment and Natural Resources     |
| DPWH     | Department of Public Works and Highways             |
| DOTC     | Department of Transportation and Communications     |
| ECC      | Environmental Clearance Certificate                 |
| EDSA     | Epifanio de los Santos Avenue                       |
| EIAPO    | Environmental Impact Assessment Project Office      |
| GEF      | Global Environment Facility                         |
| GHG      | Greenhouse Gas                                      |
| ICB      | International Competitive Bidding                   |
| LGU      | Local Government Unit                               |
| LRT      | Light Rail Transit                                  |
| MARIPAS  | Marikina, Rizal, Pasig                              |
| MMDA     | Metropolitan Manila Development Authority           |
| MMURTRIP | Metro Manila Urban Transport Integration Project    |
| MMUTIS   | Metro Manila Urban Transport Integration Study      |
| NCB      | National Competitive Bidding                        |
| NCTS     | National Center for Transportation Studies          |
| NEDA     | National Economic Development Authority             |
| NGO      | Non-Governmental Organization                       |
| NMT      | Non-Motorized Transport                             |
| NRIMP-1  | First National Roads Improvement and Manag. Project |
| PMO      | Project Management Office                           |
| QCBS     | Quality- and Cost-Based Selection                   |
| TEC      | Traffic Engineering Center                          |
| URPO     | Urban Roads Project Office                          |
| VOC      | Vehicle Operating Cost                              |

|                   |                     |
|-------------------|---------------------|
| Vice President:   | Jemal-ud-din Kassum |
| Country Director: | Vinay K. Bhargava   |
| Sector Director:  | Jitendra N. Bajpai  |

Task Team Leader: Sally L. Burningham

**PHILIPPINES**  
**METRO MANILA URBAN TRANSPORT INTEGRATION PROJECT**

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PHILIPPINES

Metro Manila Urban Transport Integration Project

**Project Appraisal Document**

East Asia and Pacific Region

EASTR

|   |  |
|---|--|
| <b>Date:</b> January 23, 2001                             | <b>Team Leader:</b> Sally L. Burningham            |
| <b>Country Manager/Director:</b> Vinay K. Bhargava        | <b>Sector Manager/Director:</b> Jitendra N. Bajpai |
| <b>Project ID:</b> P057731                                | <b>Sector(s):</b> TU - Urban Transport             |
| <b>Lending Instrument:</b> Specific Investment Loan (SIL) | <b>Theme(s):</b>                                   |
|   | <b>Poverty Targeted Intervention:</b> N            |

|  |  |
|--|--|
| <b>Global Supplemental ID:</b> P066509 | <b>Team Leader:</b> Sally L. Burningham            |
|  | <b>Sector Manager/Director:</b> Jitendra N. Bajpai |
| <b>Supplement Fully Blended?</b> Yes   | <b>Sector(s):</b> TU - Urban Transport             |

|   |  |                                       |   |  |
|---|--|---------------------------------------|---|--|
| <b>Project Financing Data</b>                                       |  |                                       |   |  |
| <input checked="" type="checkbox"/> <b>Loan</b>                     | <input type="checkbox"/> <b>Credit</b> | <input type="checkbox"/> <b>Grant</b> | <input type="checkbox"/> <b>Guarantee</b> | <input type="checkbox"/> <b>Other:</b> |
| <b>For Loans/Credits/Others:</b>                                    |  |                                       |   |  |
| <b>Amount (US\$m):</b> US\$55 million                               |  |                                       |   |  |
| <b>Proposed Terms:</b> Fixed-Spread Loan (FSL)                      |  |                                       |   |  |
| <b>Grace period (years):</b> 7.5                                    |  | <b>Years to maturity:</b> 20          |   |  |
| <b>Commitment fee:</b> 0.85% the first four years; 0.75% thereafter |  |                                       |   |  |
| <b>Front end fee on Bank loan:</b> 1.00%                            |  |                                       |   |  |

| <b>Financing Plan:</b>      | <b>Source</b> | <b>Local</b> | <b>Foreign</b> | <b>Total</b> |
|-----------------------------|---------------|--------------|----------------|--------------|
| BORROWER                    |               | 31.15        | 0.00           | 31.15        |
| IBRD                        |               | 17.75        | 37.25          | 55.00        |
| GLOBAL ENVIRONMENT FACILITY |               | 0.50         | 0.80           | 1.30         |
| <b>Total:</b>               |               | 49.40        | 38.05          | 87.45        |

|  |
|--|
| <b>Borrower/Recipient:</b> REPUBLIC OF PHILIPPINES   |
| <b>Responsible agency:</b> DPWH  |
| Department of Public Works and Highways  |
| <b>Address:</b> Bonifacio Drive, Port Area, Metro Manila, Philippines  |
| <b>Contact Person:</b> Mr. Teodoro Encarnacion, Undersecretary for Technical Services                          |
| <b>Tel:</b> 63-2-527 4808  |
| <b>Fax:</b> 63-2-527 4105  |
| <b>Email:</b> n/a  |
| <b>Other Agency(ies):</b>  |
| Metro Manila Development Authority   |
| <b>Address:</b> MMDA Building, EDSA Corridor, Orense Street, Guadalupe, Makati City, Metro Manila, Philippines |
| <b>Contact Person:</b> Mr. Jejomar C. Binay, Chairman  |
| <b>Tel:</b> 63-2-818 8464  |
| <b>Fax:</b> 63-2-818 8490  |
| <b>Email:</b> mmdagm@evoservecom   |
| City of Marikina, Metro Manila   |
| <b>Address:</b> Brgy. Sta. Elena, Shoe Avenue, Marikina City, Metro Manila, Philippines                        |
| <b>Contact Person:</b> Mayor Bayani Fernando   |
| <b>Tel:</b> 63-2-646 1634  |
| <b>Fax:</b> 63-2-646 5277  |
| <b>Email:</b> marikina@Mozcom.com  |

**Estimated disbursements ( Bank FY/US\$M):**

| <b>FY</b>         | 2001  | 2002  | 2003  | 2004  |  |  |  |  |
|-------------------|-------|-------|-------|-------|--|--|--|--|
| <b>Annual</b>     | 11.55 | 23.75 | 15.20 | 4.50  |  |  |  |  |
| <b>Cumulative</b> | 11.55 | 35.30 | 50.50 | 55.00 |  |  |  |  |

**Project implementation period:** 5 years**Expected effectiveness date:** 03/01/2001 **Expected closing date:** 03/01/2006

OCS PAD Form: Rev. March, 2000



## **A. Project Development Objective**

### **1. Project development objective:** (see Annex 1)

The project development objective of the Metro Manila Urban Transport Integration Project (MMURTRIP) is to assist the Government of Philippines in enhancing the economic productivity and quality of life of Metro Manila residents by improving the operational efficiency and safety of the transport system with better opportunities to use public transport and nonmotorized transport (NMT), the dominant transport modes of low-income residents. In support of this objective, the project will aim to:

- Improve travel conditions, including the related safety and environmental aspects, along the three most heavily used public transport corridors in Metro Manila (LRT [light rail transit]3-EDSA [Epifanio de los Santos Avenue], LRT2-Aurora Boulevard, and the Southern Expressway).
- Enhance transport access in outer areas in the east (Marikina Valley).
- Improve traffic conditions within the city through better use of the secondary road network.
- Promote the use of nonmotorized transport through a pilot demonstration in one of the local government units (LGUs), the City of Marikina.
- Strengthen metropolitan governance in the management of traffic.

To this end, the project will implement schemes of traffic management to improve access to newly opened LRT stations and transfer opportunities between road-based public transport modes, pedestrian circulation, road frontage controls, street lighting, and traffic circulation in general. Physical measures in the project corridors/areas will also improve critical interchanges and provide road access and missing links. To promote the use of nonmotorized transport, the project will implement a local bike path network and a supporting awareness campaign. Institutional measures will aim to strengthen the Metro Manila Development Authority (MMDA), the agency responsible for coordinating development plans and programs, and specifically, traffic management across the 12 cities and five municipalities of Metro Manila.

### **2. Global objective:** (see Annex 1)

The global environment objective of the proposed Nonmotorized Transport Global Environment Facility (GEF)- supported component is to reduce greenhouse gas emissions by promoting the use of zero-emission bicycle and pedestrian transport in the City of Marikina as an alternative to greenhouse gas-emitting motorized transport. A second objective is to demonstrate and publicize the benefits and viability of bicycles as an alternative transport mode to encourage replication of this pilot program in other parts of Metro Manila, elsewhere in the Philippines, and in other countries.

### **3. Key performance indicators:** (see Annex 1)

The key performance indicators, to be measured along the project corridors, are:

- Reduced travel time.
- Sustained proportion of public transport use.
- Improved satisfaction of public transport users.

## **B. Strategic Context**

### **1. Sector-related Country Assistance Strategy (CAS) goal supported by the project:** (see Annex 1)

**Document number:** R99-55(IFC/R99-46)

**Date of latest CAS discussion:** 05/11/99

To help the Philippines achieve its overarching goal of poverty reduction, the World Bank Country Assistance Strategy (CAS) policies and programs are directed to seven areas consistent with the Medium-Term Philippines Development Plan:

1. Address crisis effects and promote economic recovery.
2. Enhance human development and social services for the poor.
3. Accelerate environmentally sustainable rural development.
4. Promote sustainable urban development and combat urban poverty.
5. Develop infrastructure, particularly in the provinces.
6. Enable expansion of the private sector.
7. Improve governance and transparency and combat corruption.

Among medium-term development priorities of the Government of the Philippines, the CAS highlights the need to target transport problems in Metro Manila. The MMURTRIP project will improve and develop the basic transport infrastructure (item 5) and indirectly promote sustainable urban development (item 4) by providing necessary transport access to fast-growing outer areas, particularly to the low-income population that depends on public transport modes.

### **1a. Global Operational strategy/Program objective addressed by the project:**

The Nonmotorized Transport component is consistent with the objectives of Global Environment Facility (GEF) Operational Program 11 on Transportation, which states that “GEF will promote, amongst others, nonmotorized transport technologies and measures, especially in medium-scale growing cities.” The Nonmotorized Transport component will demonstrate that bicycle networks are a low-cost, convenient, and acceptable alternative method of city transportation over short-to-moderate distances and have excellent prospects of sustainability. This component has strong local government and nongovernmental organization (NGO) support and is a national priority for GEF assistance.

### **2. Main sector issues and Government strategy:**

Urban transport congestion, with its related impacts, is one of the most pressing problems in the Philippines. The key area for concern is Metro Manila, now a massive, gridlocked urban area that accommodates 10.2 million people (1997), produces over one-third of national GDP, and contains 17 Local Government Units (LGUs), of which 12 are cities and five are municipalities. By 2015 Manila is expected to become a massive conurbation of 13 million (MMUTIS 1996). Economic prosperity in recent years has accelerated motorization and the demand for mobility, causing severe traffic congestion and environmental problems. Residents perceive traffic congestion as their number one problem, followed by air pollution (the primary source of which is the transport sector), garbage collection, flood control, and the need for security.

The Metro Manila Transportation and Traffic Situation Study Household Interview Survey (MMUTIS 1996) involved interviews of 235,000 people, or 50,000 households (about 2.5 percent sampling). The survey showed that about 20 percent of households in Metro Manila own cars, fewer than in many other large cities in the region. Despite a trend of rising car ownership in recent years, public transport has always been the dominant transport mode in Metro Manila, and the population depends heavily on road-based public transport modes in the form of jeepneys and more recently FXs.

**Table B.1 Metro Manila socioeconomic profile**

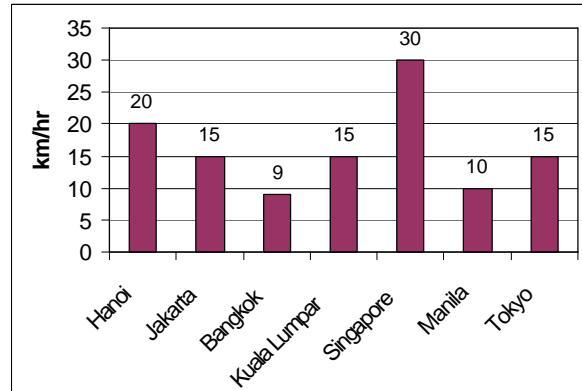
|                                     |                       |
|-------------------------------------|-----------------------|
| Philippines GDP per capita (1999)   | PhP <<?>>; US\$1,020  |
| Metro Manila GRDP per capita (1996) | PhP 59,580; US\$1,490 |
| Population of Metro Manila (1997)   | 10.2 million          |

|   |                                   |
|---|-----------------------------------|
| Percentage of households owning cars (1996) | 20                                |
| Car ownership per 1000 population (1996)    | 59                                |
| Household income, average per month (1996)  | PhP 12,356; US\$309 per household |
| Households below poverty line (1996)        | 6.5 percent                       |

Source: Population: World Bank documents; car ownership and poverty: MMUTIS 1996.

The level of congestion in Metro Manila is severe enough to cause an average travel speed only slightly faster than that of Bangkok, which has the slowest travel speed of any major Asian city (figure B.1).

**Figure B.1 Average travel speed in major Asian cities**



**Figure B.2 Typical traffic congestion on EDSA in Metro Manila, May 27, 2000**



Data from the 1996 MMUTIS household interviews show that 79 percent of *motorized trips* were made by public transport (41 percent by jeepney, 13 percent by bus, 19 percent by tricycle, 2 percent by light rail transit, 5 percent by taxi, and a negligible proportion by the Philippines National Railway), while only 21 percent were made by private car or utility vehicle; 20 percent of *total trips* were walking trips. This split is unlikely to be influenced by the completion of the two new LRT Lines 2 and 3. The existing LRT Line 1 operates at capacity, carrying about 350,000-400,000 passengers per day. The LRT Line 3 along EDSA opened in December 1999 and averages about 65,000 passengers a day. The LRT Line 2 is under construction and due to open in 2002. The prediction of a dramatic increase in the percentage of private car use from 22 to 34 percent and decrease in the percentage of public transport use from 79 to 66 percent

(Table B.2) by 2015 is worrying.

**Table B.2 Trip modal split in Metro Manila**

| <b>Transport</b> |         | <b>1996</b>                       | <b>2015</b>                        | <b>2015/1996</b> |
|------------------|---------|-----------------------------------|------------------------------------|------------------|
| Motorized        | Public  | 18.5 million/day (79%)            | 28.9 million/day (66%)             | 1.57             |
|                  | Private | 4.6 million/day (21%)             | 14.8 million/day (34%)             | 2.82             |
|                  | Total   | 23.1 million/day (100%)           | 43.7 million/day (100%)            | 1.84             |
| Walking          |         | 6.5 million/day<br>(22% of total) | 10.8 million/day (20% of<br>total) | 1.66             |

Source: MMUTIS 1996

The main sector issues and the Government's strategy to address them are described below.

**The need for traffic management.** In general, road construction in Metro Manila has not taken into account the stop and dropoff sites, transfer points, and waiting areas needed by buses, jeepneys, and tricycle services. The resulting chaotic traffic along major corridors and near road junctions severely affects the overall traffic flow, causes delays, and increases safety hazards. Because of insufficient sidewalks and crossings, pedestrians often encounter hostile and dangerous street conditions. Given Metro Manila's high dependency on road-based public transport (buses and jeepneys), improved traffic flows would directly affect the capacity of the public transport system and related environmental and safety conditions. Without efficient street-level collection and dispersal of light rail passengers, and efficient traffic to and from expressways, mega-investments will not be fully effective. Traffic management deserves the highest priority in the sector and should become the most essential housekeeping function of Metro Manila. Whereas European cities have done much to encourage the return of walking and cycling through innovative pedestrianization, traffic-calming schemes, and other initiatives, walking and cycling are being squeezed out of Asian cities (especially developing Asian cities) through increasingly hostile traffic and urban environments and lack of policy attention. Only Japan and Singapore are trying to enhance conditions for these modes.

Such an approach requires strong coordination among agencies in the Philippines responsible for physical improvement (the Department of Public Works and Highways, or DPWH, and local government units, traffic operations and control (the DPWH, the Metro Manila Development Authority, or MMDA, and local government units), and enforcement of regulations (the police and the Department of Transport and Communications, or DOTC). To address this issue, the MMDA was assigned the responsibility of coordinating traffic operational enforcement. Though the MMDA has made some progress, there is room for considerable improvement. In addition to adequate human and financial resources in the MMDA, strong government commitment is needed to streamline the overlapping roles of national agencies and the MMDA in Metro Manila.

**The need for enhanced access from outer areas.** As Metro Manila rapidly expands outside the circumferal boundary of EDSA, the constraints posed by current transport access to these outer areas are becoming more evident. People seeking work in Metro Manila experience long commutes, and residents perceive accessibility and public transport services as poor. For example, vehicle ownership in both the Marikina Valley and Rizal Province, despite lower-than-average household incomes, is 24 percent compared with about 20 percent in Metro Manila, because people see private transport as a necessity to combat these constraints.

**The need to improve the road network hierarchy.** To facilitate better dispersal of traffic over the

network and reduce traffic on arterial roads, overall network capacity needs improved connectivity and enhanced capacity of existing secondary roads. These can be achieved by implementing missing links; rehabilitating pavements, sidewalks, and drainage; and controlling/removing encroachments.

**The need to address air pollution: local impacts and global impacts.** Residents rate air pollution as the area's number two quality of life problem, after traffic congestion. Mobile source air pollution from the transport sector is the major cause of air pollution in Metro Manila. The Government is pursuing a combination of pricing and administrative control measures to bring mobile emissions down to a healthier level. The ongoing Metro Manila Air Quality Improvement Sector Development Program, with US\$300 million financing from the Asian Development Bank, aims to promote the use of cleaner fuels and a vehicle inspection program directed mainly toward local impact pollutants. The program includes a motor vehicle inspection system, an industrial air emissions pollution abatement program, production of cleaner fuels, introduction of antipollution devices such as catalytic converters, anti-smoke belching, road rehabilitation, ambient air quality monitoring, public awareness raising, capacity building, and institutional development. The Air Quality Improvement Program does not address nonmotorized transport. In the less congested outer areas of Metro Manila, such as the City of Marikina, about 2 percent of all trips are by bicycle, but the anticipated increase in traffic will likely cause the disappearance of this mode of transportation. This pattern has already been experienced in inner Metro Manila (and in many other Asian metropolises) where bicycles have been crowded out by overwhelming traffic, resulting in the loss of a nonpolluting means of transport.

The contribution of motorized forms of transport to global greenhouse gases is significant. The Philippines has ratified the United Nations Framework on Climate Change Convention (UNFCCC) and is a cosignatory to the 1997 Kyoto Protocol. This reflects the country's strong commitment to addressing its contribution to GHG emissions. On a global scale, motor vehicles play a significant role in the emission of GHGs, with the greatest contribution made by carbon dioxide (CO<sub>2</sub>), the greenhouse gas so far most responsible for atmospheric change. Road transport contributes 15 to 20 percent of CO<sub>2</sub> emissions worldwide. Since the amount of CO<sub>2</sub> resulting from the combustion of a given quantity of gasoline remains constant regardless of emission controls, trends in CO<sub>2</sub> emissions will directly follow increases in the use of these fuels. Therefore, motor vehicles have the potential to play an even greater role in enhancing the greenhouse gas effect in the future ("Transport and the Global Environment," 11 November 1999, p. 52). Thus preserving or reversing the modal split to less polluting and nonpolluting modes is an important objective from both a local and a global point of view.

**The need for implementation of an urban transport strategy in Metro Manila.** To date in Metro Manila, national agencies have sponsored mode-specific plans and policies, with limited regard for developing an integrated, intermodal transport system. Due to land acquisition and fiscal constraints, road network expansion has been limited (only about 75 kilometers of new roads have been constructed since 1982). To address infrastructure and development issues that transcend the municipal boundaries of the 17 LGUs comprising Metro Manila, the Government established the MMDA in March 1995. To date, the MMDA has been less effective in its mandated role in metropolitan transport planning and traffic operations management. Strengthening under both the Metro Manila Air Quality Improvement Sector Development Program and the MMURTRIP project will contribute to the efficacy of the MMDA. The Government recently (<<date?>>) approved a reorganization of the agency. The MMDA's Letter of Sector Policy outlines its action plan for implementing the MMUTIS study (see Annex 11). To develop a long-term strategy, the Government undertook the Metro Manila Urban Transportation Improvement Study (MMUTIS), sponsored by the Department of Transport and Communication (DOTC) and funded by the Japan International Corporation Agency (JICA). Completed in March 1999, the MMUTIS study defines a Master Plan to 2015 and a Medium-Term Transport Development Plan from 1999 to 2004. MMURTRIP

is one of the projects recommended in the Medium-Term Transport Development Plan. The MMDA is the lead agency tasked to coordinate and monitor the implementation of the recommendations of the MMUTIS.

**The need to realize the underutilized asset of the railway (Philippines National Railways).** Rail corridors extend throughout Metro Manila and have significant potential to address the area's congestion problems. However, these assets are underutilized, and the performance of the Philippines National Railways is inadequate to serve the needs. The need to preserve this asset is critical to develop sustainable commuter rail operations both in the north and south of Metro Manila. The Government is pursuing possible privatization and concession options with the support of United States Technical Development Assistance and the Asian Development Bank, however little progress has been made.

### **3. Sector issues to be addressed by the project and strategic choices:**

Among the various sector issues, the MMURTRIP project will address:

**The need for traffic management** by improving jeepney, bus, and light rail transit interchange on the LRT Lines 2 and 3 corridors and at the interchanges on the South Super Highway.

**The need for enhanced access from outer areas** by implementing a series of projects in Marikina Valley.

**The need for an improved road network hierarchy** by investing in strategic secondary roads.

**The need to address air pollution** by means of a nonmotorized transport component that will test and demonstrate the benefits of pedestrian and bicycle facilities in selected areas.

**The need for implementation of an urban transport strategy in Metro Manila** by helping develop the capacity of the MMDA in the area of traffic management. Developed by an interagency committee under the lead and chairmanship of the MMDA, the MMURTRIP project has been a vehicle to allow the MMDA to undertake its mandated role as the metropolitan transport planning agency. To further develop this capacity and to allow the MMDA to maintain its strategic role in the development of the project and other related activities, the Government is strongly committed to the role of the MMDA in project implementation, including planning and coordinating strategic metrowide investments and formulating and implementing strategic traffic management and enforcement measures. A stronger, well-equipped MMDA would enhance the effectiveness of the present project and in turn further strengthen the role of the MMDA in Metro Manila. The MMDA has little experience in managing implementation of works contracts. The project will give the MMDA the opportunity to develop this capacity. Such an authority should have the role of implementing traffic management works.

The MMURTRIP complements the ongoing Metro Manila Air Quality Improvement Sector Development Program and therefore does not repeat efforts underway in that project. Issues related to local air pollution and the railways are addressed by projects with the financial assistance of other donors.

The strategic choices made in MMURTRIP's development include a focus on:

- Including MMDA as an implementing agency.
- Corridors that carry the heaviest traffic and public transport passengers.
- Interventions that complement the committed megaprojects rather than major investments.
- Project components that encourage public transport.



- Development of access from the outer areas.
- Project components that minimize resettlement and land acquisition. All components that involved major resettlement were removed at the project concept stage. The two remaining components involving land acquisition are the Marikina Bridge and Access Roads component and the Don Mariano Marcos Avenue Extension component.
- Project components that can be implemented within the planned time scale.
- Limiting the nonmotorised transport component to one city for a demonstration effect. Since political commitment is the key to the success of such initiatives, the component was pursued on the basis of a proposal from the Department of Public Works and Highways (DPWH) and the Urban Roads Project Office (URPO), as well as a subsequent direct request from the Mayor of the City of Marikina. The nonmotorized transport component was not promoted by the World Bank, but rather initiated by the parties in the country themselves. While a barrier to such implementation exists at the country level, local support is being tapped to address this barrier. The proposal has been endorsed and confirmed as a national priority for GEF assistance by the GEF Focal Point in the Department of Environment and Natural Resources of the Philippines.

## C. Project Description Summary

### 1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

The Metro Manila Urban Transport Integration Project (MMURTRIP) has been agreed by the interagency project steering committee, the Department of Public Works and Highways (DPWH) as the executing agency, and the Metro Manila Development Authority (MMDA), and endorsed by the Council of the Mayor of Metro Manila under the chairmanship of the MMDA. The project includes the following components in the 5 municipalities and 12 cities of the Metro Manila area:

- A. **Traffic Management Improvements** on the Light Rail Transport (LRT) Line 2 corridor; the EDSA (Epifanio de los Santos Avenue)-LRT Line 3 corridor; and the Bicutan and Alabang interchange on the southern corridor. Project components include public transport improvements such as integration of modes; improvement of interchange facilities and measures to introduce public transport priority; traffic management both at and between intersections; measures to control inappropriate frontage activity; measures to improve road safety for pedestrians by providing sidewalks, pedestrianized areas, and traffic calming; and provision of bicycle access and pedicab bicycle parking at stations.
- B. **Marikina, Rizal, Pasig (MARIPAS) Access Improvements** in the Marikina Valley, including the Marikina Bridge and Access Roads component and the Marcos Highway and Ortigas Avenue Extension.
- C. A **Secondary Roads Program** for 15 road sections (listed in annex 2), including pavement rehabilitation, drainage and sidewalk improvements, traffic management, and construction of missing links for comprehensive corridor treatment so that secondary roads can fulfill their function on the road hierarchy.
- D. **Nonmotorized Transport** in the City of Marikina in Metro Manila.
- E. **Institution Building/Technical Assistance** to establish and strengthen institutions responsible for future urban transport management in Metro Manila. This is the underlying goal of the MMURTRIP project to improve traffic and environmental conditions and increase use of public transport. The institution building component will strengthen the capacity of the MMDA to effectively carry out the traffic

engineering and management responsibilities it was given under the MMDA Act. The MMURTRIP project will complement the assistance extended under the Metro Manila Air Quality Improvement Sector Development Program by supporting a capacity building program for 2001 to 2005. The MMDA, in consultation with the DPWH, has developed a year-by-year institutional plan including a description of its expanding functions and staffing requirements.

The design of the project components addresses the desire of the local government units to install signages, provide street lighting along the LRT corridors, and introduce their respective city motifs in the beautification and design of sidewalks and medians. Project components include the greening and landscaping plans of the MMDA, the local government units, and the Metro Manila Green Ladies (spouses of the 17 Metro Manila mayors). These components aim to improve the urban environment in the heavily trafficked areas to make them more user friendly for pedestrians and public transport users. As 22 percent of car journeys and 32 percent of jeepney journeys are less than 2 kilometers long, a better urban environment and walking areas might persuade people to walk rather than drive or take transport. These short trips, many of them on the main arterial network, are considered a major contributor to local traffic congestion (MMURTRIP 1997).

This MMURTRIP project complements the ongoing Metro Manila Air Quality Improvement Sector Development Program and therefore does not repeat efforts underway in that project.

A feasibility study on all these components was completed in July 1998 under Policy and Human Resources Development (PHRD) grant funding from the Japanese government. The project has two phases. The detailed engineering for the phase I components is complete. The detailed engineering for the phase II components will begin in October 2001.

| Component  | Sector                    | Indicative Costs (US\$M) | % of Total | Bank financing (US\$M) | % of Bank financing | GEF financing (US\$M) | % of GEF financing |
|--|---------------------------|--------------------------|------------|------------------------|---------------------|-----------------------|--------------------|
| A. Traffic Management Improvements                 | Urban Transport           |                          | 0.0        |                        | 0.0                 | 0.00                  | 0.0                |
| LRT Line 2 Corridor                                | Urban Transport           | 5.40                     | 6.2        | 3.95                   | 7.2                 | 0.00                  | 0.0                |
| EDSA-LRT Line 3 Corridor                           | Urban Transport           | 5.80                     | 6.6        | 4.40                   | 8.0                 | 0.00                  | 0.0                |
| Southern Corridor-Bicutan Interchange Improvements | Urban Transport           | 0.60                     | 0.7        | 0.40                   | 0.7                 | 0.00                  | 0.0                |
| Southern Corridor-Alabang Interchange Improvements | Urban Transport           | 1.70                     | 1.9        | 1.10                   | 2.0                 | 0.00                  | 0.0                |
| B. MARIPAS Access Improvements                     | Urban Transport           |                          | 0.0        |                        | 0.0                 | 0.00                  | 0.0                |
| Marikina Bridge and Access Roads                   | Urban Transport           | 17.90                    | 20.5       | 11.00                  | 20.0                | 0.00                  | 0.0                |
| Marcos Highway                                     | Urban Transport           | 15.30                    | 17.5       | 10.10                  | 18.4                | 0.00                  | 0.0                |
| Ortigas Avenue Extension                           | Urban Transport           | 5.20                     | 5.9        | 4.00                   | 7.3                 | 0.00                  | 0.0                |
| C. Secondary Roads                                 |                           | 32.50                    | 37.2       | 18.50                  | 33.6                | 0.00                  | 0.0                |
| D. Nonmotorized Transport (NMT)                    | Urban Transport           | 1.51                     | 1.7        | 0.00                   | 0.0                 | 1.26                  | 100.0              |
| E. Institution Building/Technical Assistance       | Institutional Development | 1.00                     | 1.1        | 1.0                    | 1.8                 | 0.00                  | 0.0                |
| <b>Total Project Costs</b>                         |                           | 86.91                    | 99.4       | 54.45                  | 99.0                | 1.26                  | 100.0              |
| <b>Front-end fee</b>                               |                           | 0.55                     | 0.6        | 0.55                   | 1.0                 | 0.00                  | 0.0                |



|                                 |  |       |       |       |       |      |       |
|---------------------------------|--|-------|-------|-------|-------|------|-------|
| <b>Total Financing Required</b> |  | 87.46 | 100.0 | 55.00 | 100.0 | 1.26 | 100.0 |
|---------------------------------|--|-------|-------|-------|-------|------|-------|

Note: Discrepancies in project costs are the result of figures being rounded. The cost of detailed engineering design, supervision, Project Management Office engineering overhead, and advisory services is included in the cost of each component. The Nonmotorized Transport component will have Global Environment Facility (GEF)-World Bank-executed funding.

### **1a. Description of the Global Environment Facility (GEF) supported component:**

Global Environment Facility (GEF) grant funding will support the design and implementation of a system of bikeways and related facilities designated for the Nonmotorized Transport component in the City of Marikina, one of the cities of Metro Manila. This incremental component of the overall MMURTRIP project will demonstrate the benefits of this alternative mode of transport. Nonmotorized transport here includes bicycle lanes for both bicycles and pedicabs (nonmotorized passenger transport) and facilities for walking trips. The Nonmotorized Transport component will include the following:

- A network of about 66 Km of bikeways of which 50 kilometers will be developed along existing roads and 16 kilometers of bikeways along the Marikina River banks. The Network will connect the residential areas with the main trip attractors (factories, schools, hospitals, market areas and shopping malls) and public transport terminals including the new LRT line 3 stations.
- Traffic calming and pedestrianization measures and facilities around schools and market areas and provision of bicycle parking facilities.
- Street lighting where necessary to ensure safety after hours.
- Training and Capacity Building of the Marikina bicycle officials working staffing the Bikeway Program Office, with particular focus on planning capacity and M&E activities.
- Education and public awareness campaigns targeted to potential users as well as car users and city's traffic management/enforcement personnel.
- Replication campaigns targeted to neighboring Municipalities and other cities that are suitable for bikeway development.

### **2. Key policy and institutional reforms supported by the project:**

The central theme of the project is the need to coordinate relevant institutional roles and physically integrate various modes. With this view, the project will demonstrate the role of Government and the importance of complementary investments in enhancing the full potential of public or private investments.

Recognizing that metropolitan governance is critical for Metro Manila, the project will strengthen local government functions and serve as a vehicle to allow the MMDA to play its mandated role by addressing the sector issues listed above. The MMDA is the metropolitan authority for the 17 LGUs, which include twelve cities, of the Metro Manila area. During the project preparation phase, coordination was initiated among the key agencies of the DPWH, the DOTC, the MMDA and the National Economic Development Authority (NEDA), with the MMDA chairing the project development committee. Although the coordination mechanism was maintained over the preparation period, the effectiveness of the MMDA needs further strengthening. The MMURTRIP project will address this need through institution building and making the MMDA ultimately responsible for implementing civil works contracts.

In addition, policy changes in the road sector and the DPWH as a whole are being pursued through the parallel IBRD funding of the First National Roads Improvement and Management Program (NRIMP-1), which will help the Government of the Philippines in commercializing the road sector and separate road sector-specific policymaking and regulation from operations. The NRIMP-1 project, effective March 2000,

will also help the DPWH build capacity and develop its operations, including procurement and financial management systems as well as support to the Environmental Impact Assessment Project Office (EIAPO). These actions will further support the implementation of the MMURTRIP project.

Physical integration of various modes is most clearly demonstrated in the recently opened LRT Line 3, developed under private sector financing arrangements. The MMURTRIP project will develop the complementary access infrastructure, such as pedestrianized areas and interchange for jeepney and LRT passengers. Moreover, the project stresses the importance of traffic management measures as a cost-effective way to reduce congestion.

### **3. Benefits and target population:**

**Travel time savings.** The project's major quantified benefit would be travel time savings as a result of the proposed interventions (see para. E1). For example, on the LRT Line 2 corridor, the overall travel speed on Aurora Boulevard/R. Magsaysay Boulevard would rise from the present average of about 8 kilometers an hour to 13 kilometers an hour. Similarly, on the EDSA-Line 3 corridor, one of the busiest bus corridors in the world, the total delay for buses that pass through all intersections between North Avenue and Roxas Boulevard would be 15 minutes once the proposed measures are in place. This is an overall improvement in bus journey times of around 35 percent. Vehicle operating cost savings have also been quantified. (Source: MMURTRIP Feasibility Study, 1998)

**Improved urban environment.** A major unquantified benefit of the project will be an improved urban environment and increased safety. The LRT schemes will generate considerable access/egress at the stations. But inadequate facilities will expose pedestrians to road traffic, causing a safety hazard and disrupting road traffic. The project will provide facilities to safeguard pedestrians in and around these stations.

**Public transport users.** The project is targeted at public transport users, many of whom are poor "captive" users. Although almost all households use public transport in some form, the lower-income groups primarily use buses and jeepneys. For example, people with household income under PhP3,000 per month (US\$100, or US\$1,200 per year) make 85 percent of total trips by public transport. People with household income of PhP 40,000 to PhP50,000 per month (US\$1,333 to 1,667, or US\$16,000 to 20,000 per year) make fewer than 50 percent of trips by public transport. These numbers indicate the strong link between poverty and public transport use in Metro Manila. While there is a growing concentration of wealth in Metro Manila, with the average household income estimated at PhP173,600, a little over twice the national average, 31 percent of the population in Metro Manila live below the poverty line of PhP11,230 per capita per year (US\$1,826 per household per year). The 1997 Traffic Survey indicates that "Socio-economic class is a very significant factor in differentiating the commuting experience. Among ABC Metro Manilans, or the middle class and up, 62% use their own vehicle for commuting to work and only 38% use public transportation. Those who take public transportation for going to work, are 86% among Class D, and 82% among Class E." (Social Weather Station, Bulletin 97-22).

**Lower income groups.** A significant impact of the project will be access improvements for the Marikina Valley (MARIPAS area), where the average family income is lower than that in the central parts of Metro Manila. Only one of the 17 MMUTIS traffic zones in the Marikina Valley has an average household income higher than the Metro Manila average of PhP13,968 per month, and ten of the 17 zones have an average household income of less than PhP10,000 per month (US\$340, or US\$4,000 per year). In central Metro Manila lower-income groups and squatters are not concentrated in any particular geographic area but rather spread throughout the city. Therefore, project components could not be geographically targeted

in these areas.

**Pedestrians.** Space for pedestrians will make it possible for people to switch short-distance trips to walking trips, potentially reducing motorized congestion, and allow safe access to employment and other facilities for the large percentage of the poor who walk.

### **3a. Global benefits of the GEF supported component:**

The direct benefits of the Nonmotorized Transport component will be less motorized traffic and congestion and the consequent decrease in emissions of greenhouse gases and other pollutants relative to the situation without the project. This reduction is estimated at more than 30,000 tons of carbon dioxide equivalent per year (see Annex 13 for a detailed quantitative analysis of direct benefits). An indirect benefit of no less value will be a demonstration of the advantages and viability of bicycle and nonmotorized transport so that similar facilities might be adopted/developed elsewhere in Metro Manila and in the Philippines. The benefits of this form of transport (sustainability, lack of pollution, low cost, good alternative for commuting ) may thus be realized over a wider area.

### **4. Institutional and implementation arrangements:**

**Implementation period.** Five years, from March 2001 to March 2006.

**Project concept development.** The project has been developed by an interagency steering committee under the lead and chairmanship of the Metro Manila Development Authority (MMDA).

**Project implementation.** There are three implementing agencies for the project. Each will undertake its own procurement and award of contracts, have its own financial management, have its own special account, produce its own Project Management Reports (PMRs), and monitor the impact of its own components against defined monitoring criteria. Each will procure its own consultant services for construction supervision and for advisory services related to these components. The three implementing agencies are:

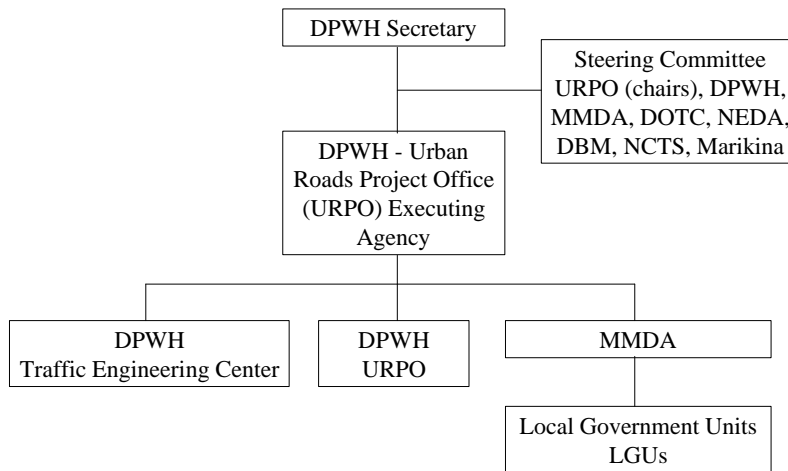
- The Department of Public Works and Highways (DPWH)-Urban Roads Project Office (URPO) is responsible for the MARIPAS Access Improvements components and for 10 of the Secondary Roads Program components. Established in 1973 as a special projects office, the URPO has extensive project implementation experience. It also has a good understanding of World Bank-funded projects, having been involved in such Bank-assisted projects as the Metro Manila Urban Transport Strategy Planning Project (MMUSTRAP) and Metro Manila Urban Transportation Project (MUTP) phase 1. The DPWH-Traffic Engineering Center (TEC) is responsible for the traffic signals package to be applied to most project components.
- The Metro Manila Development Authority (MMDA) is responsible for the Traffic Management Improvements components, for five of the Secondary Roads Program components, and for the Institution Building component. A project implementation team headed by the Assistant General Manager for Operations will manage the implementation of the components and coordinate the procurement of works, goods, and services to be undertaken by existing units of the MMDA.
- The City of Marikina is responsible for the Nonmotorised Transport component. The City is one of the 17 local government units of the Metro Manila area and an autonomous unit headed by a democratically elected mayor. The City will establish a Bikeways Program Office (BPO), which will be part of the City Administrator's Office. This BPO will be in charge of coordinating the

implementation and the monitoring of the program. In particular, it will coordinate with the relevant departments of the City, with the NGOs and with the other stakeholders. The BPO will also be responsible for the M&E activities. The evaluation activities in particular will focus on the project as well as on the methodology applied to estimate the benefits deriving from the resulting saving in GHG emissions. A five-year plan for the development of the bikeways is also part of the responsibilities of the BPO.

Participating local government units (LGUs) have created local project implementation and monitoring teams under the coordination of the MMDA project implementation team. These LGU teams have been active in detailed engineering and in mobilizing public participation in their constituencies. The teams shall be responsible for field supervision and monitoring of the Secondary Roads Program components.

**Project execution.** The DPWH assume a role of overall executing agency of the project, through its Urban Roads Project Office (URPO). DPWH will monitor works and activities to be undertaken by the MMDA and DPWH and the City of Marikina (figure C.1). The DPWH shall report quarterly to the steering committee on the progress of works. A memorandum of agreement has been signed between the DPWH and MMDA, and the City of Marikina outlining their various responsibilities.

**Figure C.1 MMURTRIP project implementation structure**



**Monitoring.** The interagency steering committee will monitor and direct the project during project implementation. The relevant Metro Manila LGUs will be invited to join this advisory committee. The interagency steering committee consists of representatives from the DPWH, the MMDA, the DOTC, the National Economic and Development Authority (NEDA), the Department of Finance (DOF), and the Department of Budget and Management (DBM). The committee shall meet at least quarterly to discuss and resolve implementation issues and concerns.

**Environment.** The Environment Impact Assessment Project Office (EIAPO) in the DPWH has undertaken the environmental assessment and documentation for the MMURTRIP and has secured the clearances for the project from the Department of Environment and Natural Resources (DENR). The EIAPO will be responsible for monitoring project compliance with the environmental assessment for all project components. The unit has the capacity to undertake such work and has been strengthened under the First National Roads Improvement and Management Project (NRIMP-1) supported by the World Bank.

**Project implementation plan.** The DPWH and MMDA jointly prepared the project implementation plan of July 2000 (see project files), which will be used to guide the implementation.

## **D. Project Rationale**

### **1. Project alternatives considered and reasons for rejection:**

To combat the rapidly growing imbalance between transport capacity and demand, the Government of the Philippines has embarked on building several light rail lines and expressways, mostly with financing from private developers. Although only three of these megaprojects are under implementation, from the outset they have conflicted physically with other improvements undertaken by sector agencies, the Department of Transport and Communications (DOTC), the Department of Public Works and Highways (DPWH), and private sponsors. Specifically, the megaprojects have paid limited attention to:

- Transfers between Light Rail Transit (LRT) Lines 1 and 2 and Lines 2 and 3.
- The need for LRT terminals as major transfer stations between LRT and bus, jeepney, and tricycle services.
- Safe and efficient access and egress near LRT stations and expressways.
- Better general traffic flow along major corridors to improve the efficiency of bus, jeepney, and other traffic.

The Metro Manila Urban Transport Integration Project (MMURTRIP) will address the above issues by developing measures to complement the megaprojects to ensure maximum benefit and better service for the traveling public. An alternative option, further financing megainvestments, was rejected because other donors (particularly the Japan Bank for International Cooperation, or JBIC) are investing in such projects, and their continued sole application is not considered a long-term solution without complementary measures. In addition, the almost impossible task of implementing resettlement and land acquisition in Metro Manila eliminated components that require major construction. The use of an adaptable program lending (APL) facility was not considered to offer any advantages over a sector investment loan (SIL).

#### **1a. Alternative GEF supported components considered and reasons for rejection:**

In the framework of the MMURTRIP, another possible component that could have received GEF support was a strategy to promote and introduce cleaner fuel and improved engine technology, and a system of emissions control for both private and public transportation modes in the entire metropolitan area. Because the Government of the Philippines is already promoting initiatives in this area with the support of a US\$300 million program loan from the Asian Development Bank, this aspect is adequately addressed. The more complex component of cleaner fuel, improved engine technology, and emissions control would have required an extensive preparation period, thus affecting the timetable of the whole MMURTRIP. Therefore the project decided to focus on a less complex component, but one that is innovative in the Philippines and in the Asian context and is potentially rewarding, particularly in terms of changing the approach to transportation policy.

**2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).**

| Sector Issue   | Project  | Latest Supervision (PSR) Ratings<br>(Bank-financed projects only) |                            |
|--|--|---|----------------------------|
|  |  | Implementation Progress (IP)                                      | Development Objective (DO) |
| <p><b>Bank-financed</b></p> <p>The need for management systems in the DPWH for effective management of the national roads network</p> <p>Private participation in infrastructure development</p>   | <p>First National Roads Improvement and Management Project (NRIMP-1): US\$150 million</p> <p>IFC/MIGA-Manila North Tollways Corporation-North Luzon Expressway: IFC loan of up to US\$46 million</p>   | S   | S                          |
| <p><b>Other development agencies</b></p> <p>Urban air pollution and the harmful effects of mobile source air pollution</p> <p>Replacement of poorly functioning traffic control system</p> <p>Lack of an urban transport strategy</p> <p>Development of light rail systems to enhance transit capacity</p> <p>Private financing</p> <p>Development of light rail systems to enhance transit capacity</p> | <p>Metro Manila Air Quality Improvement Sector Development Program: US\$300 million from the Asian Development Bank</p> <p>SMART signal project: Australian Aid Grant</p> <p>MMUTIS transport study: JICA</p> <p>LRT Line 2 development: JBIC</p> <p>LRT Line 3 development: private financing</p> |   |                            |

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

**3. Lessons learned and reflected in the project design:**

During the past decade, no World Bank operation was undertaken in the Metro Manila urban transport sector. Projects funded by other agencies have indicated the difficulties of resettlement in Metro Manila. The components of this project have therefore sought to minimize the need for resettlement, and several subprojects have been deleted from the original project proposal.

The World Bank has experience with urban transport projects throughout the world. Several of these projects have demonstrated the benefits of the traffic management approach to improving urban congestion, including high rates of return. An Urban Transport Improvement Project that started in November 1998 in Vietnam consists solely of traffic management interventions.

**3a. Lessons learned and reflected in the GEF-supported component design:**

The experience of cities in Japan, the Netherlands, Germany, and several other European and Latin American nations demonstrates that modernizing urban transportation requires not total motorization but the appropriate integration of walking, nonmotorized transport, and motorized transport. People in these cities make most of their trips on foot or by bicycle. Nonmotorized transport could also play an important role in the urban transportation system of Metro Manila in the coming decades. However, the future of nonmotorized transport in Manila and in many Asian cities is threatened by growing motorization, loss of street space for safe nonmotorized vehicle use, and changes in urban form prompted by motorization with major negative effects on air pollution, energy use, urban sprawl, and the employment and mobility of low-income people.

#### **4. Indications of borrower and recipient commitment and ownership:**

The MMURTRIP project was first proposed in 1997 by an interagency steering committee chaired by the MMDA and including the MMDA, DPWH, DOTC, DOF and NEDA. Subsequent workshops of this committee and consultations with Metro Manila local governments developed a list of investments that now form the key components of the project. A feasibility study was completed with Policy and Human Resources Development (PHRD) grant funding and an initial project proposal was presented to the Investment Coordination Committee (ICC) of the NEDA Board in July 1998. The ICC endorsed a detailed project proposal in August 1999, subject to the more direct involvement of the MMDA. Subsequent proposals for the involvement of the MMDA have been endorsed. Political commitment to the project is strong, particularly in support of the development and involvement of the MMDA. The ICC approved the project on March 28, 2000. The DPWH included the MMURTRIP project in its three-year rolling priority investment program for 1999-2001.

The local governments of Marikina, Rizal, and Pasig, in an association called MARIPAS, drew up a plan with the DPWH regional office to tackle their common transport problems. The MMURTRIP project will implement the Marikina Bridge and Access Roads, Marcos Highway, and Ortigas Avenue Extension components of this plan.

#### **4a. Indications of recipient commitment and ownership of the GEF supported component:**

The Nonmotorized Transport component of MMURTRIP was proposed by the Department of Public Works, Urban Roads Project Office and subsequently endorsed by the mayor of the City of Marikina in a request to the World Bank for GEF funding support for this incremental cost. The City of Marikina administration demonstrates exceptional commitment to nonmotorized transport and related environmental improvements. It has funded preliminary diagnostic work on the component and set up a counterpart team composed of staff of the various city offices (Settlement, Health, Engineering, Administration). This team will be responsible for liaison and coordination among the various administrative units and with the consultants and contractors.

To inform the public of the design process and implementation of the Nonmotorized Transport component of the project, focus group discussions have been held with stakeholders from the communities and businesses that will be affected by the component. The discussions have confirmed strong support for the use of bicycles and the need for appropriate facilities. The local newspaper has published an article on the so-called Marikina Bicycle Network. The information campaign that is envisaged as part of the component, as well as continued promotion and awareness building, will help maintain momentum.

#### **5. Value added of Bank and Global support in this project:**



The value added of World Bank support has been to stress the importance of multimodalism, traffic management, and supporting institutional arrangements at the metropolitan level, at a stage when the government had committed to several megaprojects and the transport sector regularly confronted poor traffic management, fragmented institutions, and physical conflicts between rail and highway projects and privately and publicly funded projects. The World Bank has supported urban transport projects in many large cities of developing countries. The Operations Evaluation Department (OED) of the World Bank, recommends in its Country Assistance Review that the World Bank remain active in the transport sector because of the sector's important strategic role, institutional weaknesses, and need for public investment, as well as the considerable experience of the World Bank in transport. The value of global support in this project lies in supporting an innovative incremental project component that otherwise would likely not find funding.

## **E. Summary Project Analysis** (Detailed assessments are in the project file, see Annex 8)

### **1. Economic (see Annex 4):**

- Cost benefit NPV=US\$53145 million; ERR = 142 % (see Annex 4)
- Cost effectiveness
- Incremental Cost
- Other (specify)

**Methodology.** The economic evaluation of the components was carried out using a standard cost-benefit analysis with a 15 percent discount rate. In accordance with standard practice in evaluating transport projects, the benefits are derived from vehicle operating cost (VOC) savings and from value of time (VOT) savings. The benefits arising from accident cost savings have not been included because of the difficulty of this type of calculations. However, improved safety will result from fewer potential conflicts between vehicles and pedestrians, and will lead to more benefits. The costs of the project include initial construction costs, right-of-way acquisition costs, and future maintenance costs.

**Benefits.** The greatest benefits of the project are derived from VOT savings, with relatively fewer benefits from VOC savings. The VOT savings include the valuation of work travel time, commuting travel time, and leisure travel time. Commuting and leisure time has been valued at 50 percent of work time. Assigning a value to leisure travel time is in line with World Bank practice in evaluating urban transport projects. Local evidence indicates that the seemingly high value of 50 percent (the usual average is 25-30 percent of work time) is not unwarranted in the Manila context. The value of work time ranges from PhP41 to 52 per hour (at 1997 prices of US\$1 = 29.4 PhP, US\$1.39-\$1.76 per hour) and is based on Metro Manila Urban Transportation Improvement Study (MMUTIS) 1996 household interview survey data.

**Assumptions.** The analysis assumes a 5-year life span for traffic management improvements, mainly on Light Rail Transport (LRT) 2 and EDSA, and a 20-year life span for the more substantial components. The assumed traffic growth rate of 2 percent within and along the EDSA corridor and 5 percent outside the EDSA corridor reflects the current situation, population growth differentials, and network capacity constraints.

**Results.** The results of the analysis (Table E.1) show high returns. World Bank experience with similar traffic management projects in other countries shows that such projects consistently produce high returns because of their significant benefits, such as improvements generated with relatively small investments.



**Table E.1 Economic evaluation summary**

| <b>Component</b>                         | <b>Cost (millions of US\$)</b> | <b>Cost (millions of PhP)</b> | <b>Length (km)</b> | <b>EIRR<sup>a</sup> (VOC) (%)</b> | <b>EIRR (VOC/VOT) (%)</b> | <b>NPV (15%) (PhP)</b> |
|--|--------------------------------|-------------------------------|--------------------|-----------------------------------|---------------------------|------------------------|
| <b>A. Traffic management improvement</b> |                                |                               |                    |                                   |                           |                        |
| LRT Line 2 Corridor                      | 5.4                            | 245.2                         | 12                 | 64                                | 142                       | 980.8                  |
| EDSA-LRT Line 3 Corridor                 | 5.8                            | 261.9                         | 18                 | 18                                | 155                       | 1,025.8                |
| Bicutan Interchange                      | 0.6                            | 27.5                          | n/a                | 37                                | 192                       | 489.6                  |
| Alabang Interchange                      | 1.7                            | 75.8                          | n/a                | 56                                | 119                       | 407.5                  |
| <b>B. MARIPAS Access Improvements</b>    |                                |                               |                    |                                   |                           |                        |
| Marikina Bridge and Access Roads         | 17.9                           | 805.2                         | n/a                | 4                                 | 19                        | 808.8                  |
| Marcos Highway                           | 15.4                           | 691.5                         | 4.6                | 22                                | 162                       | 5,575.6                |
| Ortigas Avenue Extension                 | 5.2                            | 232.0                         | 6.8                | 133                               | 565                       | 7,485.7                |
| <b>C. Secondary Roads Program</b>        |                                |                               |                    |                                   |                           |                        |
| Romualdez                                | 0.2                            | 7.5                           |                    | 8                                 | 30                        | 96.2                   |
| Legarda                                  | 0.2                            | 9.9                           |                    | 63                                | 117                       | 27.2                   |
| Quezon Boulevard                         | 0.2                            | 10.1                          |                    | 135                               | 243                       | 428.8                  |
| Pasong Tamo                              | 2.9                            | 131.6                         |                    | 45                                | 57                        | 216.1                  |
| Pedro Gil/New Panaderos                  | 1.9                            | 84.8                          |                    | 180                               | 288                       | 409.8                  |
| Tayuman                                  | 1.0                            | 44.1                          |                    | 39                                | 41                        | 68.3                   |
| M. de la Fuente (Trabajo)                | 0.2                            | 6.9                           |                    | n.a.*                             | 15                        | 30.5                   |
| Jacobo Fajardo                           | 0.1                            | 5.5                           |                    | n.a.                              | 15                        | 2.4                    |
| SSH West/East Service Road               | 7.8                            | 351.7                         |                    | 95                                | 111                       | 1,179.9                |
| Quirino Highway                          | 7.0                            | 314.4                         |                    | 79                                | 248                       | 33,145.1               |
| 10th Avenue                              | 1.2                            | 52.4                          |                    | 47                                | 58                        | 16.7                   |
| Don Mariano Marcos Ave Extension         | 5.6                            | 251.7                         |                    | 35                                | 107                       | 692.7                  |
| Antonio Arnaiz Avenue                    | 1.0                            | 45.8                          |                    | n.a.                              | 15                        | 30.5                   |
| Sen. Gil Puyat Avenue                    | 1.6                            | 73.6                          |                    | 99                                | 118                       | 19.1                   |
| Banaue Avenue                            | 1.6                            | 72.3                          |                    | n.a.                              | 15                        | 37.5                   |
| <b>Project total</b>                     | <b>84.5</b>                    | <b>3,801.4</b>                |                    | <b>49</b>                         | <b>142</b>                | <b>53,174.6</b>        |

\* n.a.=not applicable.

<sup>a</sup> Economic international rate of return.

*Note:* Section length is not so relevant in certain sections because works are concentrated at points. For example, the traffic management improvements are largely at LRT stations, and the Bicutan and Alabang Interchange improvements are concentrated at the interchange. ERR was calculated excluding taxes.

#### **1-A. GEF supported component (see annex 14) :**

A GEF PDF Block A Grant partly financed a pre-feasibility study to determine the economic viability of the project. The preliminary results of the study and the data collected were used as input for a simple incremental cost analysis (see annex 14). This analysis focuses on the cost of achieving the main global benefits (reduced greenhouse gas emissions) by implementing the Nonmotorised Transport component (the GHG case) compared with a baseline case in which the component is not implemented.

## 2. Financial (see Annex 4 and Annex 5):

NPV=US\$ million; FRR = % (see Annex 4)

No financial evaluations of the components were carried out since this is not appropriate for the project.

### Fiscal Impact:

Both the Department of Public Works and Highways (DPWH) and the Metro Manila Development Authority (MMDA) are national government agencies. The DPWH was organized and established through Executive Order 124 (1987), and the MMDA through Republic Act 7924 (date?). Both agencies receive project funds through the annual budget allocations. Funds are not on-lent to these agencies. The Department of Budget and Management (DBM) included provision for the MMURTRIP project in both the DPWH and MMDA budget allocations for the financial year 2001. The project is included in the 3-year rolling budget cycle of the agencies, as required by the DBM. The full project cost (that is, both the Government of the Philippines part and the loan proceeds) is included in the budget. About PhP 156.800 million (US\$ 3.92 million) is assigned for DPWH for MMURTRIP for 2001 and about PhP 83.900 million (US\$2.1 million) for MMDA for MMURTRIP for 2001 (table E.2).

**Table E.2 Project budget for 2000 and 2001 approved by the Government of the Philippines**

| Agency                           | 2000        |              | 2001        |              |
|----------------------------------|-------------|--------------|-------------|--------------|
|                                  | PhP million | US\$ million | PhP million | US\$ million |
| DPWH                             |             |              |             |              |
| Total agency                     | 44,000.0    | 1,100.0      | 36,000.0    | 900.0        |
| MMURTRIP                         | -           | -            | 156.8       | 3.92         |
| MMDA                             |             |              |             |              |
| Total agency                     | 1,719.0     | 43.0         | 1,989.0     | 49.7         |
| of which National gov't. subsidy | 639.5       | 16.0         | 965.6       | 24.1         |
| MMURTRIP                         | -           | -            | 83.9        | 2.1          |

Note: Budget for 2001 to be confirmed when budget is approved by Congress in April 2001.

Source: Department of Budget and Management.

## 3. Technical:

The project aims to demonstrate the cost-effectiveness of traffic management measures to reduce congestion. Little of this approach has been used to date in Metro Manila, where most projects have been on megainvestments. Traffic management is a recognized tool in urban transport for maximizing the efficiency of existing road space and is suitable where the scope for expanding road space is limited due to cost and environmental concerns. A road safety audit is included for all project components.

## 4. Institutional:

### 4.1 Executing agencies:

The Department of Public Works and Highways (DPWH) is the designated executing agency and will be responsible for reporting to the World Bank and to the project steering committee. The DPWH-Urban Roads Project Office (URPO) will implement about 75 percent, the MMDA will implement about 23 percent, and the City of Marikina will implement about 2 percent of the value of civil works. The DPWH-Traffic Engineering Centre (TEC) is responsible for the signals equipment package. The project is implemented by existing structures of the agencies. No special offices have been set up for the project.

#### 4.2 Project management:

The Director of the DPWH-URPO, under the Undersecretary for technical services of the DPWH, will be responsible for managing the DPWH components. The Assistant General Manager for Operations, under the General Manager of the MMDA, will be responsible for managing the MMDA components. Both the DPWH-URPO and the MMDA will be assisted by a project advisor (funded by the project) who will report to the director of the DPWH-URPO and of the MMDA.

#### 4.3 Procurement issues:

World Bank staff undertook a procurement assessment (see project file) of the DPWH-URPO, the MMDA and the City of Marikina as the implementing agencies. The assessment was fully discussed and agreed with the agencies in May 2000. The DPWH-URPO prepared a Microsoft Project procurement implementation schedule (see project file) for the whole project. Overall risk assessment: Average Risk category (see annex 6).

#### 4.4 Financial management issues:

World Bank staff undertook a financial management assessment (see project file) of the DPWH-URPO, the MMDA, and the City of Marikina as the implementing agencies. The assessment was fully discussed and agreed with the agencies in May 2000. Each implementing agency will have a special account for the components for which they are responsible. The overall financial management of the DPWH (and its URPO), the MMDA, and the City of Marikina satisfies the World Bank minimum financial management requirements. Project Management Report (PMR)-based reporting will be implemented. However, PMR-based disbursement is targeted at a later stage in the project execution to coincide with the improvement of financial management for DPWH as a whole under the assistance of the NRIMP project. (see annex 6).

### **5. Environmental:** Environmental Category: B (Partial Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

**Environment.** The project is rated category B. The environmental issues are of a lesser concern since identified projects aim to:

- Improve the urban environment for pedestrians and public transport users.
- Improve public transport service ancillary facilities, which would have a positive impact on the environment.
- Include landscaping and greening programs.

All project components comply with all environmental clearance requirements of the Government of the Philippines and World Bank Operational Policy OP 4.01 on Environmental Assessment. The Environmental and Social Unit (EIAPO) of the DPWH, in conjunction with an independent environmental consultant, has produced an environmental assessment (EA) report covering each project component. The Department of Environment and Natural Resources (DENR) has cleared all project components by either issuing Certificates of NonCoverage (CNC) or Environmental Clearance Certificates as applicable. The Environmental Assessment (see project file) was published by the World Bank Infoshop, the World Bank Office in Manila Public Information Center, and publicly in-country by the DPWH and local newspapers on August 14, 2000.

**Resettlement and Land Acquisition.** All project components are identified and have had feasibility studies

completed. Only two project components involve resettlement and land acquisition. A Resettlement Action Plan (RAP) for each (see project file) was published in the World Bank Infoshop, World Bank Office in Manila Public Information Center, and publicly in-country by the DPWH and in local newspapers on August 14, 2000. The project components involving resettlement and land acquisition are:

- The Marikina Bridge and Access Roads component. The resettlement and land acquisition has largely been completed and a review is documented in the Resettlement Action Plan (RAP).
- The Don Mariano Marcos Avenue Extension Secondary Roads component which involves land acquisition. No resettlement is involved as no parties live on the land. The land acquisition will be completed prior to component implementation. The component cost is PhP40 million (about US\$1 million) and land acquisition PhP 200 million (about US\$4.4 million).

The resettlement and land acquisition is in line with World Bank Operational Directive 4.30 on Involuntary Resettlement and in accordance with the comprehensive Policy Framework for Land Acquisition, Resettlement and Rehabilitation (November 1999) of the DPWH, which was agreed with the World Bank in the context of the NRIMP project and endorsed to the MMURTRIP. Any resettlement and land acquisition issues encountered during implementation of the MMURTRIP project will be dealt with in accordance with the above policy framework.

**Urban Air Quality and Transport.** The Metro Manila Air Quality Improvement Sector Development Program (refer to the Asian Development Bank Project Report of November 1998, RRP: PHI 30480) is ongoing. Leaded gasoline was phased out in Metro Manila on April 1, 2000 in line with the Clean Air Act and as part of the ongoing work on the air quality project. The Air Quality project also promotes the use of cleaner fuels (particularly important for the jeepneys, which run on diesel and are a major cause of particulate pollution) and a vehicle inspection and anti-smoke-belching program.

#### 5.2 What are the main features of the EMP and are they adequate?

All construction contracts for project components will have appropriate clauses dealing with the short-term environmental impacts during construction. The supervision consultants are responsible for ensuring that the provisions of the DPWH with respect to environment are enforced on site. The supervision documents include appropriate clauses, and the supervision consultant includes a social/environment specialist in the team.

#### 5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: July 31, 2000

The final draft was transmitted to the World Bank on July 31, 2000.

#### 5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

The DPWH developed a plan for stakeholder consultation (Operational Framework for Public Participation and Consultation, DPWH, EIAPO, June 1999), which was agreed with the World Bank in the context of the NRIMP project and endorsed to MMURTRIP. The Environmental Assessment and the two Resettlement Action Plans were announced in local newspapers on August 14, 2000. The institutional framework for the project has ensured the full involvement of local government units in the development of the project.

## 5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

The EIAPO in the DPWH is mandated to monitor the environmental impacts of the project. In accordance with DPWH Department Order (DO) 220 of November 9, 1999, the EIAPO is mandated as the environmental service arm of the the DPWH to provide environmental and social assessment support and to implement and oversee the Environmental Management Plan (EMP) for projects executed by the DPWH. The supervision consultant is also required to report on compliance with the EMP.

## 6. Social:

### 6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

The project will entail social risks associated with disruption caused by the works. The project does target low-income groups, as discussed under the section on targeted population, but does not meet the requirements of a “poverty-targeted” project.

### 6.2 Participatory Approach: How are key stakeholders participating in the project?

The development of the MARIPAS Access Improvements component has been based on consultations with the local government units of Marikina, Rizal, and Pasig. These units have formed an association called MARIPAS and with the DPWH regional office have drawn up a plan to tackle their various common transport problems. This plan will be implemented under the project.

The mayors and officials of the local government units are key stakeholders in the project. The MMDA has played a key role in ensuring their participation. Each local government unit has set up a counterpart team for the project. The Environmental Assessment documents the consultation meetings with local government officials. The local government units have participated actively in the detailed designs of the project. Their common priorities are the installation of signages, street lighting along the LRT corridors, and use of their respective city motifs in the design and beautification of sidewalks and medians. The local government units have consulted affected commercial and other establishments on the designs to ensure their acceptance before construction.

The Operational Framework for Public Participation and Consultation (DPWH, EIAPO, June 30, 1999), agreed with the World Bank in the context of the NRIMP project, was endorsed by DPWH to the MMURTRIP project. The DPWH submitted the Environmental Assessment and the two Resettlement Action Plans for public review on August 14, 2000. The availability of the documents was announced in at least one local newspaper and one national newspaper. The DPWH requires at least two public meetings to invite comments and discussion from stakeholders and affected individuals.

### 6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Each local government unit is responsible for consultation with the affected public members and beneficiaries of the MMURTRIP project. The mayor of each local government unit is democratically elected in a 3-year election cycle. Focus group discussions and user surveys were conducted for the Nonmotorized Transport component of the MMURTRIP project. These are documented separately in the Feasibility Study for the Marikina Bikeways Network.

For the phase I project components, the local government units are consulting regularly with civil society. Each local government unit has a defined system of consultation and information dissemination. The consultative system of Quezon City, documented in the Environmental Assessment, is an example. The planning officer of Quezon City has developed clear guidelines for consultations including the following:

- A community relations office to handle routine inquiries, with a staff member assigned as a full-time information officer to answer inquiries. Every Monday the mayor’s office sponsors a “People’s Hour,” a kind of open townhall meeting where the public can raise issues.
- Information provided by the planning office routinely at no cost, or by a lending service that releases documents temporarily so that users can make copies. The planning office helps users find documents from other agencies that are not in their records. Some maps are also available on request.

The project will follow the existing consultation system. It will expand this system when necessary beyond simple information dissemination to soliciting public feedback to improve the design process.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

The institutional arrangement (see figure C.1) ensures the direct involvement of the MMDA local government units in the project, thus serving as a bridge between the national government agency, the DPWH, and the local level. This arrangement, strongly promoted by the National Economic Development Authority (NEDA), has already shown benefits during project preparation and will ensure that the project achieves its social development outcomes by incorporating local needs.

6.5 How will the project monitor performance in terms of social development outcomes?

The EIAP0 in the DPWH will monitor the social development outcomes of the project.

**7. Safeguard Policies:**

7.1 Do any of the following safeguard policies apply to the project?

| <b>Policy</b>   | <b>Applicability</b>  |
|---|---|
| <b>Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)</b>         | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| <b>Natural habitats (OP 4.04, BP 4.04, GP 4.04)</b>                 | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Forestry (OP 4.36, GP 4.36)</b>                                  | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Pest Management (OP 4.09)</b>                                    | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Cultural Property (OPN 11.03)</b>                                | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Indigenous Peoples (OD 4.20)</b>                                 | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Involuntary Resettlement (OD 4.30)</b>                           | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| <b>Safety of Dams (OP 4.37, BP 4.37)</b>                            | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)</b> | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| <b>Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)</b>       | <input type="radio"/> Yes <input checked="" type="radio"/> No |

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

The EIAP0 in the DPWH will monitor compliance of the project with the Environmental Assessment and Involuntary Resettlement Operational Directives.

## F. Sustainability and Risks

### 1. Sustainability:

The project aims to demonstrate the effectiveness of traffic management measures, however, the sustainability of these measures will depend on the willingness and effectiveness of the Metro Manila Development Authority (MMDA), local government units, and related agencies in enforcing traffic management measures. The effectiveness of the MMDA during and after project implementation is a critical risk for the sustainability of the project. To mitigate this risk, the MMDA's participation was ensured throughout the project preparation. The risk is weighed against the considerable benefits derived from the involvement of MMDA.

### 2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

| Risk  | Risk Rating                | Risk Mitigation Measure   |
|---|----------------------------|---|
| <p><b>From Outputs to Objective</b></p> <p>Implementation of complementary traffic enforcement measures such as control of frontage activities, adherence to traffic rules, proposed traffic circulation strategies, and general traffic management by the MMDA and related responsible agencies and local government units.</p> <p>Participation and cooperation of local government units.</p> <p>Continued commitment of the City of Marikina to socially and environmentally sustainable transport policies and planning.</p> | <p>M</p> <p>M</p> <p>S</p> | <p>The MMDA's participation was ensured throughout the project preparation. The MMDA is a direct participant in project implementation and thus a key stakeholder that will have an interest in ensuring the sustainability of the project's impact.</p> <p>Local government units will continue to be consulted regularly and involved in project implementation. Local government units have provided input into the inception report for the detailed engineering.</p> <p>The DPWH as the national executing agency is committed to the component in the Loan Agreement.</p>                     |
| <p><b>From Components to Outputs</b></p> <p>MMDA implementation of some key components of the project with no experience implementing a project under World Bank funding.</p> <p>Procurement delays under both the Department of Public Works and Highways (DPWH) and the MMDA.</p>   | <p>M</p> <p>M</p>          | <p>Institution-building support will be provided to the MMDA. Components of the current Air Quality Project are implemented by the MMDA, and institution-building activities under that project will aid the MMURTRIP project.</p> <p>The DPWH is revising its procurement systems (under NRIMP) and the Government system as a whole will streamline procurement. Changes include using postqualification instead of prequalification, which should speed processing. The World Bank Manila office provides direct assistance and training. A detailed procurement schedule will be developed.</p> |



|  |   |   |
|--|---|---|
| Timely provision of counterpart funds. | M | The country team reviews the Government budget situation. Counterpart funding is part of the multi-year program discussions of the DPWH and the Government in their annual review and consultations |
| <b>Overall Risk Rating</b>             | M |   |

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

### 3. Possible Controversial Aspects:

No controversial aspects are identified for the project. The World Bank report “Combating Corruption in the Philippines” (May 3, 2000) indicates that of the total corruption complaints received by the Ombudsman's Office from 1993 to 1998, 27 percent (1,762 complaints) were about the Department of Public Works and Highways (Ombudsman’ Office 2000). Procurement in the DPWH is typically done for large and complex works, and difficulties do arise. Under the NRIMP project the department is making a major effort to develop and streamline transparent systems of procurement and financial management, which will be expanded nationwide. Under the MMURTRIP project all contracts are subject to prior review by the World Bank. Although the World Bank report mentioned above does not address the MMDA , all contracts in the MMDA will also be subject to such prior review. The institutional framework of the MMURTRIP project (a steering committee and the involvement of the MMDA and local government units) will also contribute to transparency.

## G. Main Conditions

### 1. Effectiveness Condition

The standard effectiveness condition of the legal opinion from the Philippines Department of Justice applies. The following are specified as additional matters, to be included in the legal opinion or options to be furnished to the World Bank:

- That the Project Agreement has been duly authorised or ratified by MMDA, is legally binding upon MMDA in accordance with its terms.
- That the Resettlement Action Plan for Marikina Bridge and Access Roads component and the Resettlement Action Plan for Don Mariano Marcos Avenue Extension is legally binding upon the Borrower in accordance with its terms.

A special effectiveness condition is that the Subsidiary Finance Agreement has been executed on behalf of the Borrower and MMDA.

The following were the conditions of negotiations:

1. Endorsement of the Environmental Assessment report.
2. Endorsement of the Resettlement Action Plan for Don Mariano Marcos Avenue Extension component.
3. Endorsement of the Resettlement Action Plan for Marikina Bridge and Access Roads component.
4. Endorsement of the Policy Framework for Land Acquisition, Resettlement, and Rehabilitation of the Department of Public Works and Highways, November 1999, to the MMURTRIP project.
5. Endorsement of the Framework for Public Participation and Consultation of the Department of Public Works and Highways, DPWH, EIAPO, June 1999, to the MMURTRIP project.
6. Clearance of the project by the Department of Environment and Natural Resources. The Department



of Environment and Natural Resources issued certificates of noncoverage for all project components. Clearance for the Don Mariano Marcos Avenue Extension component and the Non-Motorised Transport component is not included. The clearance of these components is expected to be received prior to Board approval.

7. Statement of compliance with the Project Readiness Filters.

## 2. Other [classify according to covenant types used in the Legal Agreements.]

Legal covenants include:

1.
  - (a) The Borrower shall maintain the Steering Committee (See Section C.4 of the Loan Agreement) to monitor the progress of the Project and to coordinate its components.
  - (b) The Borrower shall maintain the PMO in each of DPWH and MMDA headed by a Project manager with qualifications and experience satisfactory to the World Bank, assisted by such other competent staff in adequate numbers having such functions, responsibilities, funds and other facilities as shall be required to enable the PMO to undertake the overall supervision and monitoring of the Project.
2.
  - (a) The Borrower will implement the Project in accordance with the Project Implementation Plan; and
  - (b) The Borrower will only amend the Project Implementation Plan in agreement with the World Bank.

## H. Readiness for Implementation

- 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1. b) Not applicable.
- 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4. The following items are lacking and are discussed under loan conditions (Section G):

## I. Compliance with Bank Policies

- 1. This project complies with all applicable Bank policies.
- 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

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Sally L. Burningham  
**Team Leader**  
Transport Engineer

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Jitendra N. Bajpai  
**Sector Manager**

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Vinay K. Bhargava  
**Country Manager**

## Annex 1: Project Design Summary

### PHILIPPINES: Metro Manila Urban Transport Integration Project

| Hierarchy of Objectives  | Key Performance Indicators  | Monitoring & Evaluation   | Critical Assumptions  |
|--|---|---|---|
| <p><b>Sector-related CAS Goal:</b><br/>CAS Objective: Poverty reduction: “Develop infrastructure” and “Promote sustainable urban development.”</p> <p><b>Sector-related CAS Goal:</b><br/>Improve deteriorating urban transport situation in Metro Manila.</p>                 | <p><b>Sector Indicators:</b></p> <ul style="list-style-type: none"> <li>● Improved transit capacity and modal integration in Metro Manila.</li> </ul>   | <p><b>Sector/ country reports:</b></p> <ul style="list-style-type: none"> <li>● Traffic and public transport studies and surveys in Metro Manila.</li> </ul>  | <p><b>(from Goal to Bank Mission)</b><br/>Maintenance of favorable macroeconomic environment.</p>                                   |
| <p><b>GEF Operational Program:</b></p>   |   |   |   |
| <p><b>Project Development Objective:</b><br/>To improve the operational efficiency and safety of the transport system of Metro Manila, with better opportunities to use public transport and nonmotorized transport, the dominant transport modes of low-income residents.</p> | <p><b>Outcome / Impact Indicators:</b></p> <ul style="list-style-type: none"> <li>● Reduced travel time experienced by public transport users on the project corridors. &lt;&lt;? &gt;&gt; percent from 2000 to 2005.</li> <li>● Sustained current proportion of public transport use on the project corridors (&lt;&lt;? &gt;&gt; percent). Target = &lt;&lt;?&gt;&gt;percent.</li> <li>● Improved satisfaction of public transport users on the project corridors.</li> </ul> | <p><b>Project reports:</b></p> <ul style="list-style-type: none"> <li>● MMUTIS initial and monitoring data on mobility patterns, travel time/costs, and modal shares in Metro Manila and other specific surveys.</li> <li>● Public transport operators and association records, data, and annual reports.</li> <li>● Public opinion and transport usage surveys to be conducted at project inception and one year after works completion on project corridors. Responsible agency: MMDA.</li> </ul> | <p><b>(from Objective to Goal)</b><br/>Effective coordination between the DPWH, local government units, the DOTC, and the MMDA.</p> |
| <p><b>Output from each Component:</b></p>  | <p><b>Output Indicators:</b></p>  | <p><b>Project reports:</b></p>  | <p><b>(from Outputs to Objective)</b></p>   |

**A. Traffic Management Improvements**

Complementary traffic enforcement measures such as control of frontage activities and adherence to traffic rules, proposed traffic circulation strategies, and general traffic management implemented by the MMDA and related responsible agencies and LGUs have improved the effectiveness of the corridors and their elements, including intersections, public transport interchanges, and passenger and pedestrian facilities.

**B. MARIPAS Access Improvements** have improved the accessibility of the Marikina Valley.

**C. Efficient organization of the Secondary Roads in a hierarchy** has improved traffic dispersal and increased capacity.

- Improved level of service of the corridors measured by average travel speed of all through-vehicles along the corridors. Current = <<?>>. Target = <<?>>.
  - Improved level of service for bus and jeepneys along the corridors measured in terms of productive capacity average. Current = <<?>>. Target = <<?>>.
  - Improved level of service of walkways and public transport queuing areas. Current = <<?>> . Target = <<?>>.
  - Decreased average travel time and cost (across modes) for trips with O-D <<?>> in the Marikina Valley. Current = XX. Target = YY.
  - Increased level of service of the secondary roads measured by average travel speed of all through-vehicles. Current = <<?>>. Target = <<?>>.
  - Increased capacity at intersections between secondary roads and project corridors. Current = <<?>>. Target = <<?>>.
- Travel time surveys on project corridors at project inception and one year after works completion. Responsible agency: MMDA.
  - Modal share surveys on project corridors at project inception and one year after works completion. Responsible agency: MMDA.
  - Specific surveys at project inception and one year after works completion. Responsible agency: MMDA with DPWH-TEC.

The MMDA is a direct participant in project implementation and thus a key stakeholder with an interest in ensuring sustainability of the project's impact.

Local government units continue to be consulted regularly, involved in project implementation, and empowered to provide their input/feedback for specific project actions through the coordination mechanisms.

|   |   |   |   |
|---|---|---|---|
| <p><b>D. Development of Nonmotorized Transport Facilities</b> has improved public transport accessibility and mobility of low income users.</p> <p><b>E. Increased Institutional Capacity</b> has improved metropolitan governance and strengthened local government functions.</p> | <ul style="list-style-type: none"> <li>● Increased nonmotorized transport mode share for trips within Marikina and nonmotorized transport-public transport combined mode share for trips originating in Marikina. Current = &lt;&lt;?&gt;&gt; percent. Target = &lt;&lt;?&gt;&gt; percent.</li> <li>● Effective coordination mechanism in place between the key agencies and LGUs.</li> <li>● Effective traffic management and enforcement measures planned and designed by the relevant agencies.</li> </ul> | <ul style="list-style-type: none"> <li>● Travel surveys and traffic counts for the city of Marikina to be conducted at project inception and one year after works completion. Responsible agency: City of Marikina with the assistance of MMDA .</li> <li>● Regular travel and traffic surveys (including users' satisfaction indicators) along major corridors and at intersections and public transport facilities by the relevant agencies.</li> </ul> | <p>The City of Marikina remains committed to socially and environmentally sustainable transport policies and planning.</p>  |
| <p><b>Project Components / Sub-components:</b></p> <p>A. Traffic Management Improvements</p> <p>B. MARIPAS Access Improvements</p> <p>C. Secondary Roads Program</p> <p>D. Nonmotorized Transport</p>   | <p><b>Inputs: (budget for each component)</b></p> <p>US\$13.6 million</p> <p>US\$38.4 million</p> <p>US\$32.5 million</p> <p>US\$1.3 million</p>  | <p><b>Project reports:</b></p> <ul style="list-style-type: none"> <li>● Supervision reports from supervision consultants</li> <li>● Quarterly Project Management Reports (PMRs) from implementing agencies.</li> </ul>  | <p><b>(from Components to Outputs)</b></p> <p>Institution-building support is provided to the MMDA, which demonstrates sufficient implementation capacity despite lack of experience with World Bank projects.</p> <p>Revision of procurement systems, under way in the DPWH, and the Government system as a whole, streamline procurement.</p> |

|                         |                  |                         |   |
|-------------------------|------------------|-------------------------|---|
| E. Institution Building | US\$1.0 million  | • Project audit reports | Timely availability of counterpart resources. |
| TOTAL                   | US\$86.8 million |                         |   |

**Annex 2: Detailed Project Description**  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**

**By Component:**

**Project Component 1 - US\$13.60 million**

PhP 544.1 million including all physical and price contingencies.

**Traffic Management Improvements.**

The Metro Manila Development Authority (MMDA) is the implementing agency for these Traffic Management Improvements components. MMDA will undertake their own procurement and award of contracts, have their own financial management, have their own special account, produce their own Project Management Reports (PMRs), and monitor impact of these components against defined monitoring criteria. MMDA will procure their own consultant services for construction supervision and for advisory services related to these components. The procurement methods are indicated in Annex 6.

The project component includes public transport improvement measures comprising integration between modes, improvement of interchange facilities, and measures for introducing public transport priority; traffic management (both at and between intersections); measures for controlling inappropriate frontage activity and measures for improving road safety for pedestrians by providing sidewalks and other facilities; measures for bicycles and pedicabs; and safe bicycle parking at stations.

**Table 2.1 Components of Traffic Management Improvements**

| <b>Component</b>   | <b>Local government units involved</b>                                  | <b>Agency</b> | <b>km</b> | <b>Cost (US\$ m)</b> | <b>Cost (PhP m)</b> |
|--|---|---------------|-----------|----------------------|---------------------|
| LRT Line 2 corridor-CM Recto to Marcos Bridge (Santolan) | City of Manila, San Juan, Quezon City, City of Marikina, and Pasig City | MMDA          | 12        | 5.8                  | 261.9               |
| EDSA LRT Line 3 corridor-North Avenue to Roxas Boulevard | Quezon City, Mandaluyong, Makati, and Pasay City                        | MMDA          | 18        | 5.4                  | 245.2               |
| Southern corridor-Bicutan interchange improvements       | Paranaque   | MMDA          | n/a       | 0.7                  | 27.5                |
| Southern corridor-Alabang interchange improvements       | Muntinlupa  | MMDA          | n/a       | 1.9                  | 75.8                |

Note: "Agency" indicates the agency implementing the civil works.

- *LRT Line 2 corridor - CM Recto-Marcos Bridge (Santolan).* This component aims to integrate at street level the current investments on the LRT (light rail transit) Line 2 under Japanese Bank for International Cooperation (JBIC) financing. In the environs of Recto Station, the project will improve pedestrian access between the station and surrounding attractions, including bus terminals, Quiapo Church and the nearby LRT Line 2 corridor; improve roads used for bus and jeepney circulation in the area; and improve interchange arrangements between LRT Line 2 and passing jeepney routes. In the environs of Legarda Station, the project will improve pedestrian routes

between the station and surrounding land uses (predominantly universities); enhancements include possible closure of the road leading to the station to create a pedestrianized station approach. From Nagtahan to Araneta, the project will provide pedestrian crossings and sidewalks with an emphasis on the Nagtahan intersection, where existing pedestrian facilities are inadequate. The project will improve the Old Santa Mesa intersection (the confluence of two busy jeepney routes and the site of the Stop and Shop jeepney terminal) and the Araneta intersection. From Araneta to Cubao, Cubao to Katipunan, and Katipunan to Marcos Bridge, the project will improve pedestrian facilities, institute traffic management measures at intersections, and improve access to the LRT stations.

- *EDSA LRT Line 3 corridor - North Avenue to Roxas Boulevard.* This component aims to integrate at street levels the LRT 3 system, which started operating in December 1999. This system was implemented under private financing arrangements. The objective of this project component is to reduce delays to public transport by generally improving intersection operations and bus stopping arrangements.
- *Southern corridor - Bicutan interchange improvements.* These interchanges on the South Super Highway currently function as major public transport interchanges between bus services on the expressway and jeepney feeder services on the adjacent service roads and other major access routes. The project proposals center on traffic management improvements to facilitate the modal transfer and improve sidewalk provision and crossings for pedestrians interchanging at these points.
- *Southern corridor - Alabang interchange improvements.* These interchanges on the South Super Highway function as major public transport interchanges between bus services on the expressway and jeepney feeder services on the adjacent service roads and other major access routes. The project proposals center on traffic management improvements to facilitate the modal transfer and improve sidewalk provision and crossings for pedestrians interchanging at these points.

**Summary of travel characteristics ('linked' person trips; MMUTIS study area)**

| <b>Predominant travel mode</b> | <b>Total trips</b> | <b>Trips &lt; 2 km</b> | <b>Percent</b> |
|--------------------------------|--------------------|------------------------|----------------|
| Car + UV                       | 4,658,760          | 1,057,398              | 22.7           |
| Tricycle-motorized             | 4,307,129          | 2,425,283              | 56.3           |
| Taxi                           | 1,152,654          | 184,361                | 16.0           |
| Jeepney                        | 9,574,501          | 3,067,772              | 32.0           |
| Bus                            | 3,034,977          | 126,289                | 4.2            |
| LRT                            | 442,164            | 8,108                  | 1.8            |
| Rail (PNR)                     | 7,275              | 369                    | 5.1            |
| Total private                  | 4,658,760          | 1,057,398              | 22.7           |
| Total public                   | 18,518,700         | 5,812,182              | 31.4           |
| <b>Grand total</b>             | <b>23,177,460</b>  | <b>6,869,580</b>       | <b>29.6</b>    |

**Project Component 2 - US\$38.40 million**



PhP1,728.6 million, including all physical and price contingencies.

### MARIPAS Access Improvements.

The Department of Public Works and Highways - Urban Roads Project Office (URPO) is the implementing agency for these MARIPAS Access Improvements. DPWH-URPO will undertake their own procurement and award of contracts, have their own financial management, have their own special account, produce their own Project Management Reports (PMRs), and monitor impact of these components against defined monitoring criteria. DPWH-URPO will procure their own consultant services for construction supervision and for advisory services related to these components. The procurement methods are indicated in Annex 6.

The MARIPAS-Marikina Valley area is characterized by large commuter flows, as local residents seek work in central and western parts of Metro Manila. The local government units (Marikina City, Rizal province, and Pasig City) jointly produced a plan to tackle their various common transport problems. The components emerging from the plan (table 2.2) will be addressed under the project.

**Table 2.2 Components of MARIPAS Access Improvements**

| Component   | Local government units involved   | Agency       | km  | Cost (US\$ m) | Cost ( PhPm) |
|---|-----------------------------------|--------------|-----|---------------|--------------|
| Marikina Bridge and Access Roads (linking C5 to Marcos Highway) | Marikina, Quezon City             | DPWH<br>URPO | n.a | 17.9          | 805.2        |
| Marcos Highway (Marcos Bridge/Santolan to Masinag)              | Marikina, Pasig, Cainta, Antipolo | DPWH<br>URPO | 4.6 | 15.4          | 691.5        |
| Ortigas Avenue Extension (C5-Manggahan-Tikling)                 | Pasig, Cainta, Taytay             | DPWH<br>URPO | 6.8 | 5.2           | 232.0        |

Note: "Agency" indicates the agency implementing the civil works. n.a.= not applicable.

- Marikina Bridge and Access Roads component (linking C5 to Marcos Highway).* This link is an alternative route between the C-5 circumferential route and the Marcos Highway. The alignment runs from the E. Rodriquez Avenue/Boni Serrano intersection to Marcos Highway in the vicinity of the Marcos Bridge. The scheme will relieve the Marcos Highway/Aurora Boulevard corridor and provide an alternative route for C-5, thus improving access to the east of Metro Manila. LRT Line 2 is being constructed as far as the terminal/depot at Santolan (adjacent to the Marcos Highway); the project proposes to ensure that jeepneys can function as feeder services to this station. Four hundred jeepneys an hour pass the site in each direction. Once the station is established, at least 100 jeepneys an hour should be able to turn around at the station, thus acting as a feeder service to the LRT rather than going all the way downtown. The project therefore includes jeepney dropoff and turnaround facilities.
- Marcos Highway (Marcos Bridge/Santolan to Masinag).* This component begins adjacent to the final station of the LRT Line 2. A 4-meter-wide median for future eastward expansion of the LRT 2 line is included in the designs. This road extension is one of the most critical in the whole Marikina Valley and provides one of the few access roads to the eastern areas of Metro Manila. The designs include automated and coordinated traffic control systems, and intersection and

corridor management measures including adequate sidewalks, pedestrian crossings, and public transport priority.

- *Ortigas Avenue Extension (C5-Manggahan-Tikling)*. This road section is one of the most critical in the whole Marikina Valley and provides one of the few access roads to the eastern areas of Metro Manila. Proposed improvements include automated and coordinated traffic control systems, and intersection and corridor management measures including adequate sidewalks, pedestrian crossings, lighting, and public transport priority.

**Project Component 3 - US\$ 32.50 million**

PhP1,462.3 million, including all physical and price contingencies.

**Secondary Roads Program.**

The Department of Public Works and Highways - Urban Roads Project Office (URPO) is the implementing agency for ten of the Secondary Roads Program components as given in Table 2.3 below. DPWH-URPO will undertake their own procurement and award of contracts, have their own financial management, have their own special account, produce their own Project Management Reports (PMRs), and monitor impact of these components against defined monitoring criteria. DPWH-URPO will procure their own consultant services for construction supervision and for advisory services related to these components. The procurement methods are indicated in Annex 6.

The Metro Manila Development Authority (MMDA) is the implementing agency for five of the Secondary Roads Program components as given in Table 2.3 below. MMDA will undertake their own procurement and award of contracts, have their own financial management, have their own special account, produce their own Project Management Reports (PMRs), and monitor impact of these components against defined monitoring criteria. MMDA will procure their own consultant services for construction supervision and for advisory services related to these components. The procurement methods are indicated in Annex 6.

The proposed interventions of this program (Table 2.3) component include a wide range of actions for comprehensive corridor treatment to allow secondary roads to fulfill their function in the road hierarchy. These actions include pavement rehabilitation, drainage and sidewalk improvements, traffic management measures, and construction of missing links. While proposals for major widening and major right-of-way acquisition issues have been removed from the project, the project includes the remaining set without major widening but with missing links, on the basis of the priority drawn up by the DPWH. One road link, the Don Mariano Marcos Avenue Extension, involves acquisition of a strip of land 18 meters by 500 meters from a commercial landowner.

**Table 2.3 Components of the Secondary Roads Program**

| Component               | Local government units involved | Agency | km | Cost (US\$ m) | Cost (PhPm) |
|-------------------------|---------------------------------|--------|----|---------------|-------------|
| D. Romualdez            | City of Manila                  | DPWH   |    | 0.2           | 7.5         |
| Legarda                 | City of Manila                  | DPWH   |    | 0.2           | 9.9         |
| Quezon Boulevard        | City of Manila                  | DPWH   |    | 0.2           | 10.1        |
| Pasong Tamo             | Makati                          | MMDA   |    | 2.9           | 131.6       |
| Pedro Gil/New Panaderos | City of Manila                  | DPWH   |    | 1.9           | 84.8        |

|  |                              |      |  |     |       |
|--|------------------------------|------|--|-----|-------|
| Tayuman                                    | City of Manila               | DPWH |  | 1.0 | 44.1  |
| M. de la Fuente (Trabajo)                  | City of Manila               | DPWH |  | 0.2 | 6.9   |
| Jacobo Fajardo                             | City of Manila               | DPWH |  | 0.1 | 5.5   |
| South Super Highway West/East Service Road | Pasay, Paranaque, Muntinlupa | DPWH |  | 7.8 | 351.7 |
| Quirino Highway                            | Quezon City                  | DPWH |  | 7.0 | 314.4 |
| 10 th Avenue                               | Caloocan                     | DPWH |  | 1.2 | 52.4  |
| Don Mariano Marcos Ave Ext                 | Quezon City                  | MMDA |  | 5.6 | 251.7 |
| Antonio Arnaiz Avenue                      | Makati                       | MMDA |  | 1.0 | 45.8  |
| Sen. Gil Puyat Avenue                      | Makati                       | MMDA |  | 1.6 | 78.3  |
| Banaue Avenue                              | Quezon City                  | MMDA |  | 1.6 | 72.3  |

Note: "Agency" indicates the agency implementing the civil works

#### **Project Component 4 - US\$1.40 million**

PhP million, including all physical and price contingencies.

#### **Nonmotorised Transport (NMT) component.**

The City of Marikina will implement this component and the Global Environment Facility (GEF) will provide funding support. The City of Marikina will undertake their own procurement and award of contracts, have their own financial management, have their own special account, produce their own Project Management Reports (PMRs), and monitor impact of this component against defined monitoring criteria.

*Background.* The DPWH proposed a pilot component for a nonmotorized pedestrian and bicycle path in Marikina Valley to connect communities with employment centers and LRT stations. This proposal stemmed from the work of the DPWH-Urban Roads Project Office (URPO) with the NGO Green Forum. Statistics show that 20 percent of total trips are walking trips in the MARIPAS area, where the component is proposed. People in this area make more trips on foot and by tricycle than on average throughout Metro Manila. Twenty-two percent of all trips are made on foot and 30 percent by tricycle, compared with 20 percent on foot and 14 percent by tricycle in Metro Manila, where tricycles are banned on many major corridors.

The City of Marikina, one of the 17 municipalities of Metro Manila, is a medium-size city of about 360,000 people situated at the eastern border of the Metro Manila administrative area. Metro Manila has a population of 9,447,156, of which Marikina accounts for 357,231 (MMUTIS 1995). Because the city is located somewhat on the periphery of Metro Manila, levels of congestion have not yet reached the intolerable levels of inner Metro Manila. About 2.9 percent (10,500) of all trips in Marikina are made by bicycle, compared with 1.7 percent (160,200) in Metro Manila. In terms of ratio to population, 1.7 percent of the Metro Manila population uses bicycles for trips compared with 2.9 percent in Marikina. But predicted increase in traffic will likely cause the level of bicycle use in Marikina to decline to the current levels in most of Metro Manila. In Metro Manila 20 percent of households own cars, while in Marikina only 15 percent of households own cars.

*Objective.* Given Marikina's current high and accepted bicycle use and lower levels of congestion, the project considers it an ideal city in which to implement a bicycle network to preserve this mode of transport in the face of the inevitable creep of congestion by motorized transport. This pattern has already been experienced in inner Metro Manila and many other Asian metropolises, where bicycles have been crowded

out as a viable mode of transport. The net result of the dominance of motor vehicles in Metro Manila has been severe congestion accompanied by air pollution and severe constraints on transportation, especially for the poor, who then become captive users of unpleasant, expensive, and unreliable public transport.

*Benefits.* Given the present growth trends in transport demand and motorization, the direct benefits of developing the bikeway system proposed under the project will be a reduction in expected traffic and congestion and a consequent decrease in emissions of pollutants compared with the situation without the project. An additional indirect benefit, of no lesser value, will be to demonstrate the benefits and viability of bicycles and nonmotorized transport so that similar facilities might be adopted/developed elsewhere in Metro Manila and in the Philippines once people recognize that this form of transport is sustainable, nonpolluting, inexpensive, and a good alternative for commuting.

The contribution of motorized forms of transport to global greenhouse gases is significant. The Philippines has ratified the United Nations Framework on Climate Change Convention and is a cosignatory to the 1997 Kyoto Protocol. These actions reflect the government's strong commitment to addressing its contribution to greenhouse gas emissions. The main greenhouse gases are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxides (N<sub>2</sub>O). Others include carbon monoxide (CO), nonmethane volatile organic compounds (NMVOCs), and oxides of nitrogen (NO<sub>x</sub>).

On a global scale, motor vehicles play a significant role in the emissions of greenhouse gases, with the greatest contribution made by CO<sub>2</sub>, the greenhouse gas that so far has had the greatest effect on atmospheric change. Road transport contributes 15 to 20 percent of CO<sub>2</sub> emissions worldwide. Since the amount of CO<sub>2</sub> resulting from the combustion of a given quantity of gasoline remains constant regardless of emission controls, trends in CO<sub>2</sub> emissions will directly follow increases in the use of these fuels. Therefore motor vehicles can play an even greater role in the enhanced greenhouse effect in the future. ("Transport and the Global Environment," 11 November 1999, p. 52).

Road transport also contributes 1 percent of methane emissions worldwide. The contribution of road transport to nitrous oxide emissions is small but significant. General Motors Research Laboratories have concluded that vehicular emissions of nitrous oxide are about 200,000 tons worldwide, corresponding to about 3 percent of global nitrous oxide emissions.

Other emissions of motor vehicles, nitrogen, volatile organic compounds, and carbon monoxide, contribute to increasing tropospheric ozone, which is an important greenhouse gas. Therefore motor vehicles are indirect contributors to global warming. Ozone in the free troposphere above the boundary layer (beyond 1,500 meters) is steadily increasing on a global scale. These background levels have doubled over the last century, and global monitoring programs have revealed that long-term ozone concentrations are increasing by about 2 to 3 percent a year in the higher troposphere of the western hemisphere (Volz and Kley, 1988; Ciborowski, 1989). Concentrations of ozone in the troposphere are approaching levels at which environmental damage occurs, further contributing to global climate change.

*Description.* The Nonmotorised Transport (NMT) component in the City of Marikina will include the following:

- A network of about 66 Km of bikeways of which 50 kilometers will be developed along existing roads and 16 kilometers of bikeways along the Marikina River banks. The Network will connect the residential areas with the main trip attractors (factories, schools, hospitals, market areas and shopping malls) and public transport terminals including the new LRT line 3 stations.
- Traffic calming and pedestrianization measures and facilities around schools and market areas and provision of bicycle parking facilities.

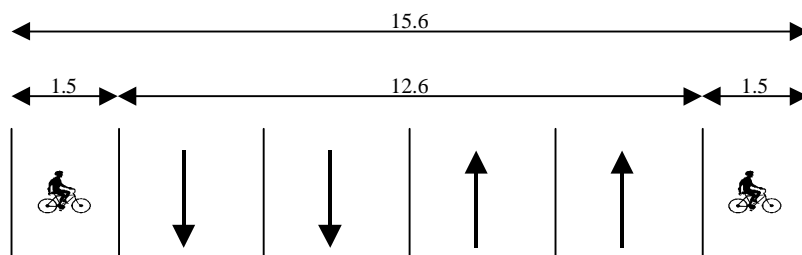
- Street lighting where necessary to ensure safety after hours.
- Training and Capacity Building of the Marikina bicycle officials working staffing the Bikeway Program Office, with particular focus on planning capacity and M&E activities.
- Education and public awareness campaigns targeted to potential users as well as car users and city's traffic management/enforcement personnel.
- Replication campaigns targeted to neighboring Municipalities and other cities that are suitable for bikeway development.

The 66-kilometer bikeway network will connect residential communities with schools, employment centers, the new LRT station, and other public transport terminals, where appropriate parking facilities will be created. Its development will help prevent the crowding-out of nonmotorized transport seen in other large cities. Moreover, the connection with public transport terminals will promote the use of nonmotorized transport combined with LRT/bus for trips between Marikina and the rest of Metro Manila. A series of pedestrianized areas and traffic calming measures will preserve walking trips. Street lighting in some areas will improve the safety of both cyclists and pedestrians.

The current road network within the municipal boundary covers 300 kilometers. The 66-kilometer bicycle network connecting key attractors, schools, industrial sites, the new LRT metro terminal, markets, and malls will be implemented in three phases over three years. The proposed network will include 49.7 kilometers on existing roads, of which 30.8 kilometers are within the existing roadway width and 18.9 kilometers require some road widening to accommodate the bicycle lanes. Sixteen kilometers will be along the banks of the Marikina River (connecting to the LRT station), of which 8.4 kilometers are new construction and 8.2 kilometers involve upgrading existing walking paths.

The bicycle lanes will be physically separated from other traffic but largely within the existing roadway, with flow largely on each side of the road on two-way roads and on one side on one-way roads. The lanes will be 1.5 meters wide, with a physical barrier provided between adjacent traffic and the bicycle lanes (figure 2.2). Traffic counts done at seven strategic locations in the City of Marikina in October 1999 showed about 70 bicycles in the peak hour. Thus the proposed 1.5 meter width is considered sufficient (the Netherlands recommends 1.5 meters for 0-150 bicycles per hour in peak hour). Issues of roadside access to shops and properties will be addressed during the detailed design stage. Where pavement has deteriorated, reconstruction may be necessary. Green asphalt or concrete will be used to designate the bicycle lanes. Where necessary some new facilities will be constructed to facilitate access, for example in the access to the new LRT station on the southern boundary of the City of Marikina. This facility will link to the main components of the MMURTRIP project, namely the Marikina Bridge and Access Roads component and the Marcos Highway component.

**Figure 2.2 Typical cross section, Bayan-Bayaan Road (metres)**



*Training, Capacity Building, Education and Replication Campaigns.* The City of Marikina will establish

a Bikeway Program Office (BPO) within the City administration. The BPO will consist of a core team of six people including a Program Manager, an Education Program and Coordinator, and an Events and Promotions Coordinator. These officers will be assisted and trained so that they can properly develop, implement, and monitor the Bikeways Program. Moreover, they will coordinate the educational and promotion campaigns that will be carried out in Marikina as well as in its neighboring municipalities and in other Philippines cities. These campaigns will be prioritized and will first target cities that are well suited for bikeway development. These will be cities that are similar to Marikina in terms of modes of transport, high-density building, lack of space, and where a bicycle culture already exists. The BPO in collaboration with local NGOs will carry out a Baseline Research which will provide inputs for the implementation of the Bikeway Program as well the foundation for the M&E activities. The evaluation activities in particular will focus on the project as well as on the methodology applied to estimate the benefits deriving from the resulting saving in GHG emissions. A five-year plan for the development of the bikeways will also be part of the responsibilities of the BPO. TA will be provided to enhance the capacity of the BPO to the mentioned planning and M&E activities.

*Costing.* The cost of the Nonmotorized Transport component is estimated at US\$1.51 million, of which Global Environment Facility (GEF) grant financing is US\$1.26 million. The City of Marikina will provide the million counterpart (Table 2.4). The breakdown of the costs is given in the table below. The cost of detailed engineering design, surveys costs and supervision is estimated at 10 percent of the cost of the works and included in the cost of the component. Works will be executed by local contractors, so taxes are estimated at 20% of the total amount of works and 7% of the services. This will be paid by the Administration so a total of about 16% of project costs will be covered by the City of Marikina. In particular 20% of the cost of the public dissemination and bicycle safety campaign will be covered by the City of Marikina. This work will be done by the the Bikeway Program Office staff and considered as their counterpart to the project cost.

**Table 2.4 Components of the Nonmotorised Transport component**

| Component                                 | Sector          | Indicative costs (US\$m) | GEF financing (US\$m) | City of Marikina (US\$m) | City of Marikina (%) |
|---|-----------------|--------------------------|-----------------------|--------------------------|----------------------|
| Bikeways (66 kilometers)                  | Urban Transport | 1.08                     | 0.92                  | 0.16                     | 15%                  |
| Traffic calming and pedestrianisation     | Urban Transport | 0.18                     | 0.14                  | 0.04                     | 22%                  |
| Lighting                                  | Urban Transport | 0.10                     | 0.08                  | 0.02                     | 20%                  |
| Training and capacity building at the BPO | Urban Transport | 0.05                     | 0.04                  | 0.01                     | 20%                  |
| Education Campaigns                       | Urban Transport | 0.05                     | 0.04                  | 0.01                     | 20%                  |
| Replication Campaigns                     | Urban Transport | 0.05                     | 0.04                  | 0.01                     | 20%                  |
| <b>Total financing</b>                    |                 | <b>1.51</b>              | <b>1.26</b>           | <b>0.25</b>              | <b>16.5%</b>         |

*Beneficiaries.* A series of focus group discussions were held on successive weekends in October 1999 to gauge public perceptions of bicycling in the City of Marikina and of the proposals for a bicycle network. Residents use bicycles significantly and clearly voiced the benefits of this mode of transport. They considered this mode beneficial for the poor. The participants in the discussions felt that congestion in Marikina was still relatively low, making cycling a still-viable mode of transport. Having seen other parts of Metro Manila, however, they felt this situation would not last. Some already felt that cycling was hazardous (few women cycle, for that reason), and felt strongly that bicycle lanes physically protected from other traffic were needed. Participants also strongly demanded a bicycle safety and education campaign. Residents said they would be prepared to pay fees for bicycle parking and security facilities.

The Marikina City Workers Affairs Office surveyed 12 companies involved in food manufacturing; shoe manufacturing; marketing, sales, and rental of heavy equipment; and other sectors in October and November 1999. The surveys found that 53 percent of the workers in these companies live within the City of Marikina and the rest in adjacent municipalities. Thus the average travel distance in Marikina is within what is considered viable for bicycle travel (bicycle trips up to 6 or 7 kilometers long are considered viable). The current modal share of trips of workers in Marikina (table 2.5) is 11 percent bicycles, 3 percent pedicabs, and 28 percent walking.

**Table 2.5 Modes of transport to work used by Marikina workers**

| <b>Mode of transportation to work</b> | <b>Number of trips by mode</b> | <b>Percentage</b> |
|---------------------------------------|--------------------------------|-------------------|
| Company shuttle                       | 48                             | 1                 |
| Public transport                      | 1,479                          | 41                |
| Tricycle (motorized)                  | 309                            | 9                 |
| Pedicab (nonmotorized)                | 111                            | 3                 |
| Bicycle                               | 410                            | 11                |
| Walking                               | 1,019                          | 28                |
| Others                                | 239                            | 7                 |
| <b>Total</b>                          | <b>3,615</b>                   | <b>100</b>        |

*Source:* Marikina City Workers Affairs Office 1999.

**Project Component 5 - US\$1.00 million**

PhP 63 million, including all physical and price contingencies

**Institution Building/Technical Assistance component.** The Metro Manila Air Quality Improvement Sector Development Program supported by the Asian Development Bank includes a component to strengthen the MMDA’s traffic management function in 2000 to 2004. The MMURTRIP project will complement this program by supporting capacity building in 2001 to 2005. The MMDA (in consultation with the DPWH) is developing a year-by-year institutional plan, including a description of its expanding functions and staffing requirements. Moreover, this component aims to ensure that effective coordination mechanisms are in place between the key agencies and LGUs. These coordination will favour the balanced integration among modes, including Nonmotorised Transport (NMT).

**Annex 3: Estimated Project Costs**  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**

| Project Cost By Component                          | Local<br>US \$million | Foreign<br>US \$million | Total<br>US \$million |
|--|-----------------------|-------------------------|-----------------------|
| A. Traffic management improvements                 |                       |                         | 0.00                  |
| LRT Line 2 corridor                                | 1.90                  | 2.80                    | 4.70                  |
| EDSA LRT Line 3 corridor                           | 2.00                  | 3.30                    | 5.30                  |
| Southern corridor-Bicutan interchange improvements | 0.20                  | 0.30                    | 0.50                  |
| Southern corridor-Alabang interchange improvements | 0.70                  | 0.70                    | 1.40                  |
| B. MARIPAS Access Improvements                     |                       |                         | 0.00                  |
| Marikina Bridge and Access Roads                   | 9.40                  | 6.40                    | 15.80                 |
| Marcos Highway                                     | 7.30                  | 6.00                    | 13.30                 |
| Ortigas Avenue                                     | 1.60                  | 3.10                    | 4.70                  |
| C. Secondary Roads Program                         | 16.70                 | 10.80                   | 27.50                 |
| D. Nonmotorised Transport (NMT) pilot              | 1.20                  | 0.31                    | 1.51                  |
| E. Technical Assistance/Institution Building       | 1.00                  | 0.00                    | 1.00                  |
| <b>Total Baseline Cost</b>                         | 42.00                 | 33.71                   | 75.71                 |
| <b>Physical Contingencies</b>                      | 3.00                  | 1.80                    | 4.80                  |
| <b>Price Contingencies</b>                         | 4.40                  | 1.99                    | 6.39                  |
| <b>Total Project Costs</b>                         | 49.40                 | 37.50                   | 86.90                 |
| Front-end fee                                      |                       | 0.55                    | 0.55                  |
| <b>Total Financing Required</b>                    | 49.40                 | 38.05                   | 87.45                 |

| Project Cost By Category                             | Local<br>US \$million | Foreign<br>US \$million | Total<br>US \$million |
|--|-----------------------|-------------------------|-----------------------|
| <b>Civil Works</b>                                   | 38.60                 | 24.60                   | 63.20                 |
| <b>Equipment</b>                                     | 0.00                  | 6.10                    | 6.10                  |
| <b>Services</b>                                      | 2.80                  | 6.80                    | 9.60                  |
| <b>PMO engineering overhead and Land Acquisition</b> | 8.00                  | 0.00                    | 8.00                  |
| <b>Total Project Costs</b>                           | 49.40                 | 37.50                   | 86.90                 |
| Front-end fee  |                       | 0.55                    | 0.55                  |
| <b>Total Financing Required</b>                      | 49.40                 | 38.05                   | 87.45                 |

Note: Discrepancies in project costs are the result of figures being rounded.

The component costs are made up of construction costs, provision of street lighting, and provision of traffic signals. The costs include all detailed engineering costs, construction supervision costs, PMO engineering overhead, advisory services and taxes.

1. Detailed engineering cost for phase I was PhP23,053,200 (about US\$576,330 equivalent)
2. Detailed engineering costs for phase II are estimated at 6 percent of civil works costs
3. Construction supervision costs are estimated at 10 percent of civil works costs
4. PMO engineering overheads are estimated at 3.5 percent of civil works costs
5. Advisory Services are estimated at 3 percent of civil works costs
6. Local taxes and duties on works are estimated at 20 percent (based on a study of actual contracts under the Highway Management Project), on services at 7 percent, and on vehicles and computers at 30 percent.
7. Civil works: Foreign cost: 40 percent; local cost: 60 percent (for TEC related works local cost is



- 100 percent)
8. Services: Foreign cost: 80 percent; local cost: 20 percent; PMO engineering overhead, 100 percent local cost.
  9. Signal equipment: Foreign cost: 100 percent.
  10. Foreign inflation is estimated at 3 percent per annum (based on the World Bank's Development EC Planning Assumptions Note November 2000); local inflation rate is estimated at 7 percent per annum.
  11. Land acquisition costs are estimated at total of US\$ 6.0 million for two project components.
  12. IBRD cost sharing limit is 75 percent of total project cost, net of taxes.
  13. Front end fee is 1 percent of IBRD amount.

<sup>1</sup> Identifiable taxes and duties are 12.5 (US\$m) and the total project cost, net of taxes, is 73.65 (US\$m). Therefore, the project cost sharing ratio is 74.68% of total project cost net of taxes.

## Annex 4: Cost Benefit Analysis Summary

### PHILIPPINES: Metro Manila Urban Transport Integration Project

The economic evaluation has been carried out utilizing a standard cost benefit analysis (CBA). The evaluation covers the Project's major investment components: Traffic Management Improvements, MARIPAS Access Improvements, and Secondary Roads Program. These components account in total for about 94 percent of the project cost. Given their specific nature, two other components are not considered in this analysis: Nonmotorized Transport (NMT) Pilot and Institution Building/Technical Assistance. The Nonmotorized Transport component was the subject of a detailed incremental cost analysis (ICA), which is described in Annex 14.

In the framework of the CBA approach, the investments in each of the project's subcomponents were evaluated separately to ensure that each is economically viable. The results were then aggregated at project level. Whenever possible, costs and benefits were quantified by comparing "with" and "without" project scenarios. Benefits are derived from vehicle operating cost (VOC) and value of time (VOT) savings. Costs include initial construction costs, right-of-way acquisition and future maintenance costs.

The basic data, main assumptions, and methodology used in the evaluation, as well as an example of their application and the results of the evaluation (table 4.1), are summarized in the following sections. Full details of the economic evaluation can be found in the MMURTRIP Feasibility Study carried out in 1998 by local and international consultants (see project file).

**Table 4.1 Costs and benefits of the MMURTRIP project**

[For projects with benefits that are measured in monetary terms]

|                      | Present Value of Flows |                                 | Fiscal Impact |           |
|----------------------|------------------------|---------------------------------|---------------|-----------|
|                      | Economic Analysis      | Financial Analysis <sup>1</sup> | Taxes         | Subsidies |
| <b>Benefits:</b>     | 1095.6                 |                                 |               |           |
| <b>Costs:</b>        | 84.9                   |                                 | 19.6          |           |
| <b>Net Benefits:</b> | 878.9                  |                                 |               |           |
| <b>IRR:</b>          | 142%                   |                                 |               |           |

\* All figures in US\$ million.

\*\*Present value of flows discounted at 15 percent .

<sup>1</sup> If the difference between the present value of financial and economic flows is large and cannot be explained by taxes and subsidies, a brief explanation of the difference is warranted, e.g. "The value of financial benefits is less than that of economic benefits because of controls on electricity tariffs."

#### Summary of Benefits and Costs:

#### Data Sources

The evaluation relies heavily on the data available from the Japan Bank for International Cooperation (JICA)-funded Metro Manila Urban Transport Integration Study (MMUTIS) from March 1997. These data are recent and comprehensive and cover most of the needs for the CBA approach. The MMUTIS study includes the whole of Metro Manila together with the surrounding municipalities that make up the Greater Manila metropolitan area.

The main types of data used from this source are origin-destination (O-D) trips, including land-use and socioeconomic information; cordonline and screenline vehicle and passenger counts; public transport (bus and jeepney) frequency data; public transport boarding, alighting, and terminal use data; and travel speed data.

For the evaluation of some specific components, MMURTRIP Study consultants used more detailed traffic data than is available from MMUTIS. These data include traffic counts at signalised and nonsignalised intersections obtained from the Traffic Engineering Center (TEC) of the DPWH.

### **Transport Models**

MMUTIS developed a state-of-the-art recursive transportation model for Metro Manila. In this model, the network conditions were specified separately for each of the vehicle types, allowing bus lanes and truck bans to be modeled. However, the capacity restraint procedures in the model could refer only to network links, and delays at junctions were not simulated for individual turning movements. There were also some limitations in the way the model dealt with the choice between different transport modes.

Moreover, at the time of this economic evaluation the model was not sufficiently developed to be of use in analyzing travel demand patterns in the MMURTRIP corridors. Therefore, the MMURTRIP Study consultants integrated the information of the MMUTIS model with a series of basic assumptions to quantify the existing transport situation along the project corridors and to make predictions about the future. These assumptions are summarized in the next sections.

### **Transport Demand Forecasts**

While basing its conclusions on present-day transport requirements in Metro Manila, the MMURTRIP Study addresses the impact of future changes in distribution of land uses and pattern of transport provision in order to evaluate the feasibility of the proposed components. However, as noted above, neither the development of future land use scenarios nor the development of the analytical transport model were sufficiently advanced for the purposes of the economic evaluation. Therefore the evaluation was based on figures for future transport demand patterns estimated by the MMURTRIP Study Team, assuming the possible development scenarios considered by MMUTIS. Generally this has amounted to applying simple growth factors and ad hoc analyses of the diversionary effects of new transport infrastructure, tempered by professional judgment and detailed knowledge of the existing situation.

### **Intersection Analysis**

The TRANSYT/10 suite of programs was used extensively to analyze signalised intersections, calculate revised signal timing/phasing, and test the impact of revised geometric layouts for the design of the new installations. The outputs included accumulated delay and other performance indicators, which provided useful inputs to the evaluation.

### **Main Assumptions:**

#### **Traffic Flows**

The estimation of benefits depends on the traffic flows through each project. Given the lack of a model

capable of assessing either traffic growth or reassignment resulting from network modifications, it has been necessary to use uniform growth factors inside Epifanio de los Santos Avenue (EDSA) and outside to estimate future traffic flows. Traffic within EDSA is assumed to grow at a 2 percent rate, and traffic outside EDSA at a 5 percent rate. This assumption is based on past experience with different schemes in Metro Manila.

In accordance with normal practice, these growth rates have only been applied up to the point where the existing network can accommodate traffic flows. The growth rate assumption is conservative, because it ignores the benefits enjoyed by road users who take up the additional capacity provided by the project. Hence it reduces the possibility of overestimation of benefits.

In the case of road projects, the study used Metro Manila Urban Transport Interview Study (MMUTIS) “unlinked” trip survey data to analyze travel patterns in the relevant corridor, together with simple diversion curves to predict reallocation of corridor traffic to new roads. For the public/private modal split, the study assumed the overall growth would not change the respective modal shares of private and public transport, even with growing car ownership. This assumption is justified by the fact that improvements to the public transport system to be implemented in future years would enhance the attractiveness of public transport services, which in turn is expected to offset higher car ownership levels.

In the corridors where new fixed public transport facilities were installed between 1997 and the project implementation date, the flows have been assessed holding the assumption of a simple 30 percent reduction in the road-based public transport line flows at the introduction of the new rail services. This assumption is justified by the fact that corridor-specific mode changes relate to corridors where new light rail transit (LRT) lines would be introduced, such as the LRT2 and LRT3 corridors. Hence, some reduction in bus or jeepney traffic is expected once the LRT lines becomes operational.

The actual level of transfer onto the rail services will of course depend critically on interchange possibilities and convenience, and on fare levels and integration. This factor is slightly lower than the passenger transfers to LRT Line 1 observed on its opening, but reflects the potential for load factor reductions on existing services.

The above assumptions remain relatively crude and ignore the possibility of trip generation with new schemes. Moreover, no allowance for trip redistribution was made because of the lack of local evidence. But the congested state of the network reduces the possibility of overestimation of traffic flows.

### **Intersections**

A metrowide project (SMART) to replace all existing signal equipment and to install new signals is under way in Manila. This project will include optimization of the signal settings (including synchronization of some junctions) and will be completed by the end of 2000. SMART phasing has yet to be determined, but for the purposes of the evaluation it was assumed that signals would be installed and working optimally in the relevant corridors before the MMURTRIP actions are undertaken. Hence, benefits from the MMURTRIP project would be incremental and would depend on geometric improvement and improved management of intersections rather than improved signal timing. Where management improvements alone were involved, the evaluation depended on a demonstration that only very small per vehicle time savings would be required to achieve economic viability.

### **Peak and Off-peak Periods**

Peak and off-peak periods were modeled separately where possible, as data was often available. Since the majority of traffic counts were for less than 24 hours, suitable factors were adopted to convert these to daily and annual values. Where benefits were deemed to accrue over the whole day, a factor of 1.3 was used to convert the 14-hour counts, obtained from the TEC, to average weekday flows.

At intersections, the analysis of time savings was carried out for three distinct time periods: AM peak (four hours), PM peak (four hours) and inter-peak (six hours). Aggregate benefits were then accumulated over the same 14-hour period.

Other components, such as pedestrian and public transport improvements, were also evaluated over this 14-hour period. In addition, an annualization factor of 330 was used to reflect the fact that most available traffic data relates to an average weekday, not an average day.

### Value of Time

The Department of Public Works and Highways (DPWH) and the World Bank have different approaches to benefit estimation (particularly in the valuation of time). Rather than parallel appraisals for each project component, a simple comparison of the two evaluation methods was made. The assumptions of each methodology are discussed in detail in the relevant chapters of the MMUTIS study. The main differences between the two methodologies are the computation of vehicle operating costs, namely fuel and oil consumption, spare parts, and maintenance labor costs. Other differences concern vehicle occupancy factors, vehicle use characteristics, and the value of time.

Another difference concerns the factors used to estimate distribution of trip types: The DPWH model only considers work trips and commuting trips to have a value. However, World Bank practice is to assume that people place a value on all time spent traveling. Hence “leisure” trips are also included in the evaluation. Leisure trips include all nonwork and noncommute trips, for example, shopping, school, and church trips. This difference made the DPWH model and its coefficients less appropriate than the alternatives adopted by the consultants for the application in an urban context.

Therefore, in the evaluation the travel time savings included the valuation of business travel time, commuting travel time, and leisure travel time (table 4.2). Commuting and leisure time were valued at 50 percent of business time. Local evidence indicates that this seemingly high value is not unwarranted in the Manila context (the average normally used is 25 to 30 percent of work time).

**Table 4.2 Value of time (US\$ and PhP per hour)**

| Users                                  | Work time     |              | Commuting and leisure time |              |
|--|---------------|--------------|----------------------------|--------------|
|  | US\$ per hour | PhP per hour | US\$ per hour              | PhP per hour |
| Car drivers (nonprofessional)          | 1.77          | 52           | 0.89                       | 26           |
| Car passengers                         | 1.64          | 48           | 0.82                       | 24           |
| High-occupancy vehicle/taxi passengers | 1.64          | 48           | 0.82                       | 24           |
| Jeepney passengers                     | 1.40          | 41           | 0.70                       | 20.5         |
| Bus passengers                         | 1.40          | 41           | 0.70                       | 20.5         |

Note: US\$1=PhP29.3 (1996)

### Other assumptions

Additional assumptions were made for interest charges, GDP growth and project life. To reflect the current interest rate and assumptions about future movements, the evaluations assumed an interest rate of 15 percent throughout. This rate was based on the National Economic Development Authority (NEDA) assumptions of the opportunity cost of capital. Real GDP per capita was assumed to increase by 2 percent per annum. The value of time was assumed to increase in line with the growth in per capita GDP.

Project life assumptions vary according to component. Traffic engineering schemes were assumed to have a 5-year life, whilst most infrastructure was assumed to have a 20-year life. Bridges were assumed to have a 30-year life and asphalt road surfaces were assumed to need significant rehabilitation after seven years.

Cost provisions were made for the bridge and asphalt roads assumptions where relevant. The evaluation excluded some nonquantifiable benefits, such as accident reduction or enhanced accessibility to particular development areas. This exclusion should preclude undervaluation of overall scheme benefits.

### **Sensitivity analysis / Switching values of critical items:**

#### **Methodology**

*Approach.* The MMURTRIP Study team developed a common framework for assessing costs and benefits. In many cases the “without projects” scenario would not be the same as the actual situation, because other actions were expected to occur before project implementation. Where this was the case, subcomponents were not assessed against a “do-nothing” situation but against the most likely prior situation. Nevertheless, the various components of the MMURTRIP project, each with a range of benefits, was complex to evaluate. For example, some benefits could not be quantified, and in many situations costs are so small that, given the large number of users of the facility, the benefits for each would only have to be very small (that is, 15 percent) to achieve a satisfactory economic internal rate of return (EIRR). Therefore, the project components that have been evaluated are those in which evaluation was simple, costs are large, or benefits are not obviously very large. The main benefits stem from time savings rather than vehicle operating cost savings. On links between intersections, time savings were estimated with reference to changes in volume/capacity ratio (the extent to which proposed actions lead to increased road capacity). Time savings at intersections (or groups of intersections) were assessed using the TRANSYT suite of traffic signal design programs.

Where relevant, or useful to understand the evaluations, a top-down approach was adopted by estimating the number of vehicles that would generate enough savings to achieve a 15 percent rate of return. This approach is particularly useful where benefits are very high (for example, corridor improvements along the EDSA or LRT Line 2 corridors) or where development (or traffic generation and redistribution) is expected (for example, on the MARIPAS radial roads).

The following section summarizes the evaluation of benefits of different typologies of project subcomponents.

#### **Application to Specific Scheme Types**

*Improvements to bus stops and off-road jeepney and FX waiting areas.* The purpose of these interventions is to improve waiting conditions for passengers at the roadside and to remove the people and stopping vehicles from the carriageway. This will improve traffic flow on the section of road and reduce the risk of accidents. Benefits are computed on the basis of the total number of passengers using the facility and the estimated value each of these passengers places on the improvement. The benefits also come from the increased traffic speed once pedestrians are removed from the road. The benefits are assessed on the basis of the time saving to vehicles resulting from increased road capacity and higher travel speeds, compared with the do-nothing alternative.

*Intersection improvements and bus priority schemes at intersections.* The purpose of these components is to improve the flow of traffic through an intersection and reduce overall delay at the signals. The bus priority schemes are designed to use road space more efficiently, maximizing the passenger throughput of the intersection and ensuring the attractiveness of public transport. They will also reduce the time taken for public transport vehicles to traverse each intersection, compared with private vehicles. The benefits are estimated on the basis of the reduced delay to vehicles at the intersection. “With-project” travel delays at the intersections are estimated on the basis of TRANSYT simulations, with optimal signal timings. Co-

ordination of adjacent signals is considered, where appropriate. The time savings are then converted into vehicle operating cost and occupant time savings using the Consultant's revised model. Where signal co-ordination is considered, scheme evaluation is performed at an "aggregate" level, over all the intersections involved. Where the junctions are not signalised, or where traffic enforcers are used, estimates of travel demand in the "without project case cannot be made reliably. In these cases, the top down approach is used.

*Sidewalk improvements, prohibition of on-street parking, and provision of off-street truck parking* - The purpose of these components is to improve the flow of traffic by reducing the interaction between pedestrians or parked vehicles and moving vehicles. While at intersections it is assumed that these benefits are modeled in the optimized signal timings. Between intersections the benefits are derived from moving pedestrians off the carriageway and onto sidewalks, and moving car parking from the curbside lane. This is assumed to increase roadway capacity and increase average vehicle speeds. On-site observations have been used to estimate the extent of the road space that could be released by sidewalk improvements and prevention of parking. Benefits are assessed on the basis of the time saving to vehicles brought about by the increased road capacity and higher travel speeds, compared with the "do-nothing" alternative.

*Pedestrian bridges* - Pedestrians currently cross many roads in Metro Manila at grade. This can be time consuming (as pedestrians are forced to wait for a safe gap in the traffic flow) and dangerous (since traffic and pedestrians are forced to share road space). MMURTRIP will introduce some pedestrian bridges between intersections and near the Light Rail Transit stations. These will make crossing safer and eliminate the waiting. It is acknowledged that the actual crossing time for the pedestrian may be higher with the bridge, but the reduction in waiting time will outweigh this, especially on wide roads with high traffic flows. The benefits of the bridge are determined by the number of people crossing in the vicinity of the bridge site and the extent of their wait. Given average pedestrian bridge costs, a certain number of pedestrians is required to ensure that the internal rate of return on the project would be greater than 15 percent, at which point the project could be justified in economic terms. Other benefits will accrue to vehicular traffic that experiences less delay when pedestrians are removed from the roadway. Before deciding to provide a pedestrian overbridge, alternative options have been explored such as signalised at-grade crossings, where the pedestrian signal timings are co-ordinated with those of upstream or downstream signalised intersections. These can often be more convenient to pedestrians, while not adding significantly to vehicle journey times. However, in many cases the benefit to pedestrians will be outweighed by the disbenefit to public transport passengers. Exceptions to this rule include locations where public transport vehicles are stopped anyway (bus stops, jeepney terminals), and those close to major signalised intersections.

*Upgrading of existing roads* - The purpose of these interventions is to improve the flow of traffic, reduce the wear and tear on vehicles and improve ride quality and passenger comfort. On most of the roads to be upgraded (e.g. secondary roads), there will be a variety of actions ranging from pavement rehabilitation to sidewalk and public transport improvements – in line with the overall MMURTRIP objectives. The benefits therefore come from a combination of increased speed and reduced surface roughness (i.e. reduced operating costs). Benefits are assessed by comparing vehicle operating costs and time savings in the "with scheme" and "without scheme" situations. Savings in maintenance expenditure are estimated from average maintenance costs for different surface types and conditions provided by the DPWH Bureau of Maintenance.

*New road infrastructure.* The purpose of these components is to provide missing links in the network, relieve alternative routes, and increase accessibility in the city. The benefits are estimated on the basis of reduced travel time (and operating costs) for the users of the route compared with those on the most direct

alternative. There will also be benefits (for example, reduced congestion and travel time) for users who remain on the alternative routes. The time and vehicle operating cost savings are then used as the basis of the evaluation.

### **Evaluation Summary of the LRT 2 Line Corridor**

To clarify the methodological approach used in the economic evaluation, this section outlines the detailed findings of the LRT2 Line Corridor. The section briefly spells out the evaluation approach and its inputs and presents the economic internal rate of return (EIRR) and net present value (NPV) figures for the component project, together with the benefit and cost streams.

*Approach.* Benefits are derived from sidewalk improvements and intersection management improvements. The sidewalk improvements valued are only those along major roads in the corridor (Claro M.Recto, Legarda, R. Magsaysay and Aurora Boulevard) where extensive pedestrian infringement of the carriageway has been observed. Typically pedestrians do not impinge on the carriageway for more than about 100 meters in any one location, since they bunch around attractions such as bus stops or pedestrian bridges. The evaluation reflects this. Elsewhere sidewalk improvements are proposed to improve the quality of existing sidewalks or allow pedestrians to walk along the sidewalk rather than on frontage parking areas. Such improvements have no quantifiable benefits, although pedestrian safety will be enhanced and the general environmental improvements for pedestrians will also be important.

Improvements to side roads are designed to allow better operation of the main intersections along the corridor or to allow for safe public transport interchange. However, for consistency, since traffic counts are not always available in these locations, none of these benefits was evaluated. With the existing traffic flows the corridor is at capacity, and no traffic growth was therefore assumed. This will tend to underestimate benefits because traffic generation or reassignment from other routes would be expected to accompany improved travel conditions in the corridor.

Benefits from the sidewalk improvements were derived from a reduction in carriageway infringement and hence improved speeds for traffic through the road section involved. Benefits from the improved management of intersections were assessed from TRANSYT analysis of individual intersections, assuming that management actions will increase saturation flows by about 10 to 15 percent. Public transport priority measures are provided between C-3 and C-2 only.

The project will be undertaken in two stages, relating to the opening of the LRT Line 2 project. Cubao to Katipunan projects will be constructed between July 2000 and June 2001 (opening in July 2001), and projects from Cubao to Recto will be built during 2001 and early 2002 (opening in April 2002).

Benefits accrue from July 2001 for the Cubao to Katipunan section and from April 2002 for the Cubao to Recto section. No additional maintenance costs are incurred and the improvements are evaluated over five years.



## Results

Table 4.3 outlines the summary of the economic evaluation and costs and benefit for the subcomponent.

**Table 4.3 Cost benefit analysis summary for the LRT 2 Corridor  
(US\$ million undiscounted)**

| Year                     | Without scheme |      | With scheme |      | Savings |      | Total VOC and VOT savings | Total cost | Net economic benefits |
|--------------------------|----------------|------|-------------|------|---------|------|---------------------------|------------|-----------------------|
|                          | VOC            | VOT  | VOC         | VOT  | VOC     | VOT  |                           |            |                       |
| 2000                     |                |      |             |      |         |      |                           | 0.06       | -2                    |
| 2001                     |                |      |             |      |         |      |                           | 2.6        | -103                  |
| 2002                     | 1.5            | 5.6  | 1.1         | 4.2  | 0.4     | 1.5  | 1.9                       | 3.0        | -45                   |
| 2003                     | 6.3            | 26.7 | 4.3         | 18.4 | 1.9     | 8.3  | 10.2                      |            | 409                   |
| 2004                     | 6.1            | 32.1 | 4.2         | 22.0 | 1.9     | 10.1 | 12.1                      |            | 482                   |
| 2005                     | 6.6            | 32.2 | 4.5         | 22.0 | 2.1     | 10.2 | 12.3                      |            | 490                   |
| 2006                     | 7.1            | 32.3 | 4.9         | 22.1 | 2.2     | 10.2 | 12.5                      |            | 498                   |
| 2007                     | 5.9            | 26.5 | 3.3         | 15.1 | 2.5     | 11.4 | 13.8                      |            | 554                   |
| 2008                     | 1.1            | 5.2  | 0.7         | 3.4  | 0.4     | 1.8  | 2.2                       |            | 88                    |
| Summary                  |                |      |             |      |         |      |                           |            |                       |
| NPV = 969<br>EIRR = 142% |                |      |             |      |         |      |                           |            |                       |

## Sensitivity Analysis

A sensitivity analysis was performed to test the robustness of the results as well as the appropriateness of the approach. Again, given the different nature of the subcomponents and the complexity of some of them, the sensitivity tests were conducted only for those subcomponents in which the sensitivity analysis was simple to undertake, the costs are large, or the benefits are not obviously very large. The sensitivity test assumptions used were:

- The subcomponent is implemented one year earlier.
- The corridor is open one year later.
- The costs are 10 percent higher than predicted.
- The benefits total 10 percent less than expected (every year).

The individual results for each of the sub-component analyzed are presented in the MMURTRIP Study. These results indicate in general a strong viability and confirm the correctness of the approach.

## Project Results

The results of the cost benefit analysis (table 4.4) show in general high returns for each of the subcomponents and for the project as a whole. Whether considering VOC savings only, or combined VOC/VOT savings, the rate of return is well above the 15 percent threshold. World Bank experience with similar traffic management projects in other countries demonstrates that such projects consistently produce high returns because of the significant benefits, particularly in term of VOT savings, and that they generate with relatively small investments.

**Table 4.4 Economic evaluation summary**

| Component                                | Cost (US\$ m) | Cost (PhP m)   | Length (km) | EIRR <sup>a</sup> (VOC) (percent) | EIRR (VOC/ VOT) (percent) | NPV <sup>b</sup> (15%) (PhP) |
|--|---------------|----------------|-------------|-----------------------------------|---------------------------|------------------------------|
| <b>A. Traffic Management Improvement</b> |               |                |             |                                   |                           |                              |
| LRT Line 2 corridor                      | 5.4           | 245.2          | 12          | 64                                | 142                       | 980.8                        |
| EDSA LRT Line 3 corridor                 | 5.8           | 261.9          | 18          | 18                                | 155                       | 1,025.8                      |
| Bicutan interchange                      | 0.6           | 27.5           | n.a.        | 37                                | 192                       | 489.6                        |
| Alabang interchange                      | 1.7           | 75.8           | n.a.        | 56                                | 119                       | 407.5                        |
| <b>B. MARIPAS Access Improvements</b>    |               |                |             |                                   |                           |                              |
| Marikina Bridge and access roads         | 17.9          | 805.2          | n.a.        | 4                                 | 19                        | 808.8                        |
| Marcos Highway                           | 15.4          | 691.5          | 4.6         | 22                                | 162                       | 5,575.6                      |
| Ortigas Avenue Extension                 | 5.2           | 232.0          | 6.8         | 133                               | 565                       | 7,485.7                      |
| <b>C. Secondary Roads Program:</b>       |               |                |             |                                   |                           |                              |
| <b>D. Romualdez</b>                      |               |                |             |                                   |                           |                              |
| Legarda                                  | 0.2           | 7.5            |             | 8                                 | 30                        | 96.2                         |
| Quezon Boulevard                         | 0.2           | 9.9            |             | 63                                | 117                       | 27.2                         |
| Pasong Tamo                              | 0.2           | 10.1           |             | 135                               | 243                       | 428.8                        |
| Pasong Tamo                              | 2.9           | 131.6          |             | 45                                | 57                        | 216.1                        |
| Pedro Gil/New Banaderos                  | 1.9           | 84.8           |             | 180                               | 288                       | 409.8                        |
| Tayuman                                  | 1.0           | 44.1           |             | 39                                | 41                        | 68.3                         |
| <b>M. de la Fuente (Trabajo)</b>         |               |                |             |                                   |                           |                              |
| Jacobo Fajardo                           | 0.2           | 6.9            |             | n.a.                              | 15                        | 30.5                         |
| Jacobo Fajardo                           | 0.1           | 5.5            |             | n.a.                              | 15                        | 2.4                          |
| SSH West/East Service Road               | 7.8           | 351.7          |             | 95                                | 111                       | 1,179.9                      |
| Quirino Highway                          | 7.0           | 314.4          |             | 79                                | 248                       | 33,145.1                     |
| 10th Avenue                              | 1.2           | 52.4           |             | 47                                | 58                        | 16.7                         |
| Don Mariano Marcos Ave Extension         | 5.6           | 251.7          |             | 35                                | 107                       | 692.7                        |
| Antonio Arnaiz Avenue                    | 1.0           | 45.8           |             | n.a.                              | 15                        | 30.5                         |
| Sen.Gil Puyat Avenue                     | 1.6           | 73.6           |             | 99                                | 118                       | 19.1                         |
| Banaue Avenue                            | 1.6           | 72.3           |             | n.a.                              | 15                        | 37.5                         |
| <b>Project total</b>                     | <b>86.8</b>   | <b>3,908.1</b> |             | <b>49</b>                         | <b>142</b>                | <b>53,174.6</b>              |

n.a.= not applicable. <sup>a</sup> Economic internal rate of return. <sup>b</sup> Net present value.

**Annex 5: Financial Summary**  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**

Years Ending  
to be completed....

|                                 | IMPLEMENTATION PERIOD |        |        |        |        |        |        |
|---------------------------------|-----------------------|--------|--------|--------|--------|--------|--------|
|                                 | Year 1                | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 |
| <b>Total Financing Required</b> |                       |        |        |        |        |        |        |
| <b>Project Costs</b>            |                       |        |        |        |        |        |        |
| Investment Costs                | 0.0                   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| Recurrent Costs                 | 0.0                   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| <b>Total Project Costs</b>      | 0.0                   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| Front-end fee                   | 0.0                   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| <b>Total Financing</b>          | 0.0                   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

|                                |     |     |     |     |     |     |     |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|
| <b>Financing</b>               |     |     |     |     |     |     |     |
| IBRD/IDA                       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Government                     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Central                        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Provincial                     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Co-financiers                  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User Fees/Beneficiaries        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Others                         | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| <b>Total Project Financing</b> | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

|                                 | OPERATIONAL PERIOD |        |        |        |        |        |        |
|---------------------------------|--------------------|--------|--------|--------|--------|--------|--------|
|                                 | Year 1             | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 |
| <b>Total Financing Required</b> |                    |        |        |        |        |        |        |
| <b>Project Costs</b>            |                    |        |        |        |        |        |        |
| Investment Costs                | 0.0                | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| Recurrent Costs                 | 0.0                | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| <b>Total Project Costs</b>      | 0.0                | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| Front-end fee                   | 0.0                | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| <b>Total Financing</b>          | 0.0                | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

|                                |     |     |     |     |     |     |     |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|
| <b>Financing</b>               |     |     |     |     |     |     |     |
| IBRD/IDA                       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Government                     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Central                        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Provincial                     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Co-financiers                  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User Fees/Beneficiaries        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Others                         | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| <b>Total Project Financing</b> | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Main assumptions:**



## **Annex 6: Procurement and Disbursement Arrangements**

### **PHILIPPINES: Metro Manila Urban Transport Integration Project**

#### **Procurement**

Procurement of all works and goods under the project will follow the Guidelines-Procurement under IBRD Loans and IDA Credits published by the World Bank in January 1995, and revised January and August 1996, September 1997, and January 1999.

Procurement of all services under the project will follow the Guidelines-Selection and Employment of Consultants by World Bank Borrowers published by the World Bank in January 1997 and revised September 1997 and January 1999.

Procurement for the Global Environment Facility grant for the Non-Motorised Transport component is required to follow all World Bank procurement guidelines as above.

Procurement will be undertaken by the project's implementing agencies as follows:

- The Department of Public Works and Highways (DPWH)-Urban Roads Project Office (URPO). The DPWH-Traffic Engineering Center will manage procurement of one package of traffic signal equipment.
- The Metropolitan Manila Development Authority (MMDA).
- The City of Marikina local government unit will undertake procurement for the Nonmotorised Transport, GEF- financed, component of the project.

**Summary of the Procurement Capacity Assessment.** World Bank staff undertook a procurement assessment of the implementing agencies. The procurement assessment (see project files) was fully discussed and agreed with the agencies in May 2000. A MS Project-based procurement implementation schedule for the whole project was prepared by DPWH-URPO (see project files). Overall risk assessment for the project: average risk category.

*The Department of Public Works and Highways (DPWH)-Urban Roads Project Office (URPO).* The assessment found that the procurement capacity is in the average risk category. The results of the assessment indicated that although DPWH can be considered a professional organization in terms of executing projects funded by the World Bank, both URPO, and the Traffic Engineering Center (TEC), have only implemented limited World Bank projects before. They have implemented World Bank assisted projects, such as the Metro Manila Urban Transport Strategy Planning Project (MMUSTRAP) and the Metro Manila Urban Transportation Project (MMUTAP)-Phase I, and other foreign assisted projects, and therefore are not new to this business. For efficient implementation, the MMURTRIP project will need to strengthen the procurement functions in the URPO and TEC. Formal and hands-on training in World Bank procurement guidelines, policies, and procedures will be undertaken by the procurement staff of each of the units. It should be emphasized to all personnel involved that the procurement process to be followed for the project must be in accordance with the loan agreement, procurement side letter and World Bank procurement guidelines.

*The Metropolitan Manila Development Authority (MMDA).* The assessment found that the procurement capacity is in the average risk category. The MMDA, which will be implementing a World Bank-funded project for the first time, has however implemented numerous locally funded traffic-related projects and is

becoming involved in projects funded by other international funding institutions. Contracts presently implemented by the MMDA under Asian Development Bank and local financing are in the same cost range as those to be financed under the MMURTRIP project. Hence, in terms of contract amounts, MMDA staff should not have difficulty implementing this project. Based on the assessment, it is clear that the capacity of the MMDA to undertake procurement of the components of the MMURTRIP project requires formal and hands-on training in procurement guidelines. Overall, efficient implementation of the project will require strengthening of the procurement function in the MMDA. Such training has been started by the World Bank Manila office and will be facilitated by the appointment of a project advisor in the MMDA.

*The City of Marikina.* The assessment found that the procurement capacity is in the average risk category. The performance of the city government has been satisfactory in the implementation of the two Global Environment Facility (GEF) grants for the project, and no difficulty is anticipated in procurement for the relatively small proposed Nonmotorised Transport component of US\$1.4 million (the funding authority from GEF is US\$1.26 million). The maximum contract that the city government has implemented amounted to about US\$1.0 million. This amount is larger than the contracts expected for the project, so no difficulty is expected related to contract size in the implementation of the project.

**Conflicts between the procurement procedures of the Government of the Philippines and procedures acceptable to the World Bank.** Several such conflicts, related to national competitive bidding and procurement of consultant services, are fully addressed in the Supplemental Letter, Representations and Assurances on Procurement to the Loan Agreement, as well as in the Project Implementation Plan. The borrower is required to conform with this agreement and waive all procedures unacceptable to the World Bank.

The following procedures will apply to all goods and works contracts to be financed by the World Bank for the above-noted project following the Philippines national competitive bidding (NCB) procedures:

- a. National competitive bidding opportunities, including those which are invited by local government units, shall be advertised in national newspapers of general circulation, with sufficient time for bidders to prepare offers, which is normally 30 days, unless different venues and time are specifically agreed upon by the World Bank.
- b. Foreign suppliers and contractors from eligible countries will be allowed to participate, if interested, without first being required to associate or enter into a joint venture with local firms.
- c. Except for major or complex works, where prequalification is required, prequalification of contractors may be conducted upon prior concurrence of the World Bank.
- d. If any bidder is denied access to the bidding process for reasons unrelated to its financial and technical qualifications to perform the contract, the World Bank shall be consulted prior to such denial.
- e. Bid submission deadlines, times, and location specified in the bidding documents will be strictly adhered to; and bids submitted after the specified date and time and location shall be returned unopened to the bidder.
- f. The World Bank's domestic or regional preferences will not be applied in the evaluation of bids, and other preferences in effect in the Philippines will not be used except with the prior concurrence of the World Bank.

- g. Bracketing will not apply, unless specifically agreed by the World Bank in advance of bidding.
- h. Single responsive bids will not be rejected without prior World Bank concurrence, and rebidding will not be mandatorily required when fewer than three responsive bids are received.
- i. Bid opening shall be open to those who wish to attend; and the deadline for submission of bids should be the same as that for bid opening, or immediately thereafter.
- j. Suppliers and contractors will not be required to purchase local goods or supplies or to hire local labor, except unskilled labor.
- k. Explicit bid evaluation criteria will be set forth in the bid documents.
- l. Material modifications of contract scope and conditions during implementation require prior World Bank concurrence.

The Philippines further assures that, unless otherwise agreed to in writing by the World Bank, the following procedures will be adhered to in respect of the procurement of all works contracts to be financed by the World Bank for the MMURTRIP project and procured according to national competitive bidding procedures:

- a. Prior registration, licensing, and/or other government authorization will not be a requirement for purposes of participating in bidding competitions; such registration, licensing, and/or other government authorization may, however, be required from the selected bidder as a prior condition to signing the contract.
- b. All contractors will be allowed to compete for contracts to the upper limit of their classification.

The Philippines also assures that, unless otherwise agreed to in writing by the World Bank, the following procedures will be adhered to in respect of the procurement of consultant services to be financed by the World Bank for the MMURTRIP project:

- a. Mandatory joint venture or association with Philippine consulting firms will only be required if (i) there are sufficient number of capable domestic firms available to allow reasonable freedom of choice for the invited foreign firms; (ii) the desirable contribution by either firm will not be constrained by any prescribed manner or extent or participation; and (iii) association with specified named firms selected by the borrower will not be required.
- b. Qualified consulting firms that come to the attention of the agency requiring services by means other than a specific expression of interest in response to an announcement of a future project for consulting services will also be eligible for the shortlist.
- c. When circumstances warrant and with prior World Bank no objection, consulting firms may be asked to continue working on a project beyond the phase for which their services were originally contracted.
- d. Price adjustments in consultant contracts will remain in effect whether budgetary funds are available or not; in addition, there will be no ceiling on price adjustments under World Bank-financed contracts.

e. The World Bank's Standard Forms of Contract for Consultants' Services for Complex Time-Based Assignments and for Lump Sum Remuneration shall be used for contracts financed by the World Bank.

f. The "percentage of construction" cost method will not be used to determine the compensation of World Bank-financed consultancy services.

g. When consultancy services include the provision of vehicles, their origin shall not be restricted to Philippine sources.

A General Procurement Notice will be updated annually in the *Development Business*. The first General Procurement Notice was published 30 April 2000 in Issue No 533. Specific Procurement Notices for Supervision Services were published 16 May 2000 in Issue No 534 and for Civil Works on 16 December 2000 in Issue No 548.

#### **Procurement methods (Table A)**

**1. Works:** about US\$63.0 million (PhP [*to be finalized at project negotiations*] million), including contingencies.

International competitive bidding (ICB) will be used for all civil works contracts greater than US\$2.5 million equivalent per contract (about US\$50.8 million including contingencies). National competitive bidding (NCB) *may* be used for works less than US\$2.5 million equivalent per contract (approximately US\$11.2 million for IBRD-funded works and US \$1.0 million for GEF-funded works) where these are localized works of small value and unlikely to attract foreign contractors. Foreign contractors are, however, not excluded from participating. For two contracts below this US\$2.5 million limit, ICB procedures will still apply as defined in the procurement assessment.

The following works contract packages (table 1) will be procured under the project both by ICB and NCB procedures.

- The DPWH-URPO will procure eight civil works packages (six ICB and two NCB packages) with a total value of about US\$ 47.4 million (PhP [*to be finalized at project negotiations*] million), equivalent to about 75 percent of the total value of all civil works components.
- The MMDA will procure nine civil works packages (two ICB and seven NCB packages) with a total value of about US\$ 14.6 million (PhP [*to be finalized at project negotiations*] million), equivalent to about 23 percent of the total value of all civil works components.
- The City of Marikina will procure five civil works packages (five NCB packages) with a total value of about US\$1.0 million (PhP [*to be finalized at project negotiations*] million), equivalent to about 2 percent of the total value of all civil works components. The average contract size is expected to be about US\$200,000 each for the contracts. The contracts are split up since they will be implemented at different times.

World Bank Standard Bidding Documents will be used for all works contracts as follows:

- The Procurement of Works document, January 1995, revised January 1999 and revised May 2000, applicable for contracts over US\$10 million, will be used for one ICB package, the Marikina Bridge and Access Road under the DPWH-URPO.
- The Procurement of Works: Smaller Contracts document, January 1995, (with Corrigendum No. 1



to No. 4) will be used for all other ICB works. The same document will be used for all NCB works, modified for NCB use.

- The Standard Bid Evaluation Form, Procurement Goods or Works, April 1996, will be used for all works.
- The Standard Prequalification Document for Procurement of Works, September 1999 revised March 2000, will be applied for the one contract with prequalification.

Prequalification will be used for one civil works contract, for Marikina Bridge and Access Roads, since it is valued over US\$10 million and considered complex because of the bridge construction involved.

Postqualification will be applied for all other civil works contracts.

**2. Goods:** about US\$6.20 million (PhP [*to be finalized at project negotiations*] million), including contingencies.

The following goods contract packages will be procured under the project:

- The DPWH-URPO will procure vehicles with a total value of about US\$100,000 and computer equipment with a total value of about US\$50,000. These will be procured by National Shopping.
- The MMDA will procure vehicles with a total value of about US\$100,000 and computer equipment valued with a total value of about US\$50,000. These will be procured by National Shopping.

These above packages are not grouped since they will be procured by two independent implementing agencies.

- The DPWH-TEC will procure traffic signal equipment under one contract with a total value of about US\$5.9 million (*PhP XX.X million*), under ICB procedures.

World Bank Standard Bidding Documents will be used for the goods contracts as follows:

- The World Bank's Standard Bidding Documents Supply and Installation of Equipment, November 1997, revised January 1999, will be used for the procurement of the traffic signal equipment.
- The Standard Bid Evaluation Form, Procurement of Goods or Works, April 1996, will be used for all goods.

**3. Services:** about US\$9.7 million (PhP [*to be finalized at project negotiations*] million), including contingencies.

The following consultant services will be procured under the project:

- The DPWH-URPO will procure four consultant services contracts with a total value of about US\$ 6.5 million (*PhPxx.x million*) under Quality-and-Cost-Based-Selection (QCBS) procedures. The consultants will be tasked with the following:
  1. Construction supervision of DPWH-URPO components of phase I - Marikina Bridge and Access Roads (ICB-3), Marcos Highway (ICB-4) Ortigas Avenue Extension (ICB-5) and D. Romualdez/Legarda/Quezon Boulevard (NCB-3)).
  2. Construction supervision of DPWH-URPO components of phase II - ICB-6, ICB-7, ICB-8, NCB-5).
  3. Advisory services.

4. Detailed engineering design of phase II components.
- The DPWH-TEC will procure one consultant service contract through sole-source selection for a lump sum amount not to exceed US\$50,000.
  - The MMDA will procure three consultant services contracts with a total value of about US\$ 2.7 million (*PhPxx.x million*) under Quality and Cost-Based Selection (QCBS) procedures. The consultants will be tasked with the following:
    1. Construction supervision of MMDA components of phase I - (LRT Line 2 corridor (ICB-1); EDSA LRT 3 corridor (ICB-2), Pasong Tomo (NCB-4).
    2. Construction supervision of MMDA components of phase II - (NCB-1, NCB-2, NCB-6, NCB-7, NCB-8, NCB-9).
    3. Advisory services.
  - The MMDA will procure consultant services for the Institution Building component with a total value of about US\$1.0 million (*PhPXX million*) under Quality and Cost-Based Selection (QCBS) procedures and Selection of Individual consultant procedures.
  - The City of Marikina will procure consultant services contracts valued at about US\$0.4 million (*PhP [to be finalized at project negotiation]*) for the Nonmotorized Transport component. There is provision for recruitment of individual consultants or sole-source recruitment for the Nonmotorised Transport component. Four such consultants will be recruited under separate contracts ranging in value from US\$50,000 to US\$100,000, with a cumulative maximum of US\$0.4 million. The selection of individual consultants will be based on their qualifications for the assignment (see section V of the Guidelines). Consultants may be selected on the basis of references or through comparison of the qualifications of people expressing interest in the assignment or approached directly by the borrower. Sole-source recruitment may be applied for tasks that represent a natural continuation of previous work carried out by the firm, or where only one firm is qualified or has experience of exceptional worth for the assignment.

The World Bank's standard documents will be used.

- Standard Request for Proposals-Selection of Consultants, July 1997 and updated April 1998 and July 1999, will be used for all consultant contracts. All contracts above US\$200,000 will be advertised in *Development Business* requesting expressions of interest prior to developing a shortlist.
- Standard Sample Form of Evaluation report may be used for the evaluation of proposals at the Borrower's discretion.

There is provision for single-source selection for contracts less than US\$ 100,000, for tasks that represent a natural continuation of previous work carried out by the firm, or where only one firm is qualified or has experience of exceptional worth for the assignment.

**4. Project Management Office Engineering Overhead and Land Acquisition:** about US\$7.9 million (*PhP[to be finalized at project negotiations]* million), including contingencies). About US\$1.9 million (*PhPxx.x million*) is allocated to cover the incremental Project Management Office engineering overhead operating costs related to managing the project, including staff travel and office utilities. These would be procured according to normal commercial procedures. Expenditures will be financed 100 percent by the Government of the Philippines. About US\$6.0 million (*PhPxx.x billion*) is

allocated to cover the cost of land acquisition. Land will be acquired for two project components and will be paid in accordance with the relevant Resettlement Action Plan. Expenditures will be financed 100 percent by the Government of the Philippines.

Procurement arrangements for each of the components of the MMURTRIP project are given in table 6.1.

**Table 6.1 Procurement arrangements and packaging (including contingencies)**

| Package No. | Contract package                            | Local government unit involved | Cost (millions of US\$) | Cost (millions of PhP) | Implementing unit | Procurement method | Ratio | WB Review |
|-------------|---|--------------------------------|-------------------------|------------------------|-------------------|--------------------|-------|-----------|
| <b>1.</b>   | <b>Works</b>                                |                                |                         |                        |                   |                    |       |           |
|             | <i>Phase I components</i>                   |                                |                         |                        |                   |                    |       |           |
| ICB-1       | LRT 2 Corridor                              | /a                             | 3.3                     |                        | MMDA              | ICB Small Works /b | n.a.  | Prior     |
| ICB-2       | LRT 3 Corridor                              | /c                             | 3.8                     |                        | MMDA              | ICB Small Works    | n.a.  | Prior     |
| ICB-3       | Marikina Bridge and Access Roads            | Marikina                       | 16.3                    |                        | DPWH-URPO         | ICB Large Works /d | n.a.  | Prior     |
| ICB-4       | Marcos Highway                              | Marikina                       | 8.2                     |                        | DPWH-URPO         | ICB Small Works    | n.a.  | Prior     |
| ICB-5       | Ortigas Avenue Extension                    | /e                             | 2.2                     |                        | DPWH-URPO         | ICB Small Works    | n.a.  | Prior     |
| NCB-3       | D. Romualdez/ Legarda/Quezon Blvd.          | Manila                         | 0.4                     |                        | DPWH-URPO         | NCB Small Works    | n.a.  | Prior     |
| NCB-4       | Pasong Tamo                                 | Makati                         | 1.5                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
|             | <i>Subtotal phase I</i>                     |                                | <b>41.9</b>             |                        |                   |                    |       |           |
|             | <i>Phase II components</i>                  |                                |                         |                        |                   |                    |       |           |
| NCB-1       | Bicutan                                     | Paranaque                      | 0.4                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
| NCB-2       | Alabang                                     | Muntinlupa                     | 1.3                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
| ICB-6       | Pedro Gil/Tayuman/ M.dela Fuente/J. Fajardo | Manila                         | 2.3                     |                        | DPWH-URPO         | ICB Small Works    | n.a.  | Prior     |
| ICB-7       | South Super Highway                         | /f                             | 6.7                     |                        | DPWH-URPO         | ICB Small Works    | n.a.  | Prior     |
| ICB-8       | Quirino Highway                             | Quezon                         | 5.3                     |                        | DPWH-URPO         | ICB Small Works    | n.a.  | Prior     |
| NCB-5       | 10th Avenue                                 | Caloocan                       | 1.0                     |                        | DPWH-URPO         | NCB Small Works    | n.a.  | Prior     |
| NCB-6       | Don Mariano Marcos Avenue Extension         | Quezon                         | 0.5                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
| NCB-7       | Antonio Arnaiz                              | Makati                         | 0.6                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
| NCB-8       | Gil Puyat                                   | Makati                         | 1.1                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
| NCB-9       | Banawe                                      | Quezon                         | 0.8                     |                        | MMDA              | NCB Small Works    | n.a.  | Prior     |
|             | <i>Subtotal phase II</i>                    |                                | <b>20.0</b>             |                        |                   |                    |       |           |

|           |   |  |              |  |                  |                          |       |       |
|-----------|---|--|--------------|--|------------------|--------------------------|-------|-------|
| 6 NCB s   | Nonmotorized Transport                            |  | 1.0          |  | City of Marikina | NCB Small Works          | n.a.  | Prior |
|           | <i>Total works</i>                                |  | <b>62.9</b>  |  |                  |                          |       |       |
| <b>2.</b> | <b>Goods</b>                                      |  |              |  |                  |                          |       |       |
| ICB-9     | Traffic signal equipment                          |  | 5.9          |  | DPWH-TEC         | ICB-SIPE                 | n.a.  | Prior |
| NS-1      | Vehicles  |  | 0.1          |  | DPWH-URPO        | National Shopping        | n.a.  | Post  |
| NS-2      | Computers   |  | 0.05         |  | DPWH-URPO        | National Shopping        | n.a.  | Post  |
| NS-3      | Vehicles  |  | 0.1          |  | MMDA             | National Shopping        | n.a.  | Post  |
| NS-4      | Computers   |  | 0.05         |  | MMDA             | National Shopping        | n.a.  | Post  |
|           | <i>Subtotal</i>                                   |  | <b>6.2</b>   |  |                  |                          |       |       |
| <b>3.</b> | <b>Services</b>                                   |  |              |  |                  |                          |       |       |
| CS-IA     | Construction supervision phase I                  |  | x            |  | DPWH-URPO        | QCBS /g                  | 80/20 | Prior |
| CS-IB     | Construction supervision phase I                  |  | x            |  | MMDA             | QCBS                     | 80/20 | Prior |
| DE-II     | Detailed engineering phase II                     |  | 1.5          |  | DPWH-URPO        | QCBS                     | 80/20 | Prior |
| CS-IIA    | Construction supervision phase II                 |  | x            |  | DPWH-URPO        | QCBS                     | 80/20 | Prior |
| CS-IIB    | Construction supervision phase II                 |  | x            |  | MMDA             | QCBS                     | 80/20 | Prior |
| AS-A      | Advisory services - DPWH                          |  | 1.2          |  | DPWH-URPO        | QCBS                     | 80/20 | Prior |
| AS-B      | Advisory services - MMDA                          |  | 0.4          |  | MMDA             | QCBS                     | 80/20 | Prior |
| Various   | Institution building -MMDA                        |  | 1.0          |  | MMDA             | QCBS/<br>Individual Con. | n.a.  | Prior |
| Various   | Nonmotorized transport                            |  | 0.4          |  | City of Marikina | QCBS/<br>Individual Con. | n.a.  | Prior |
|           | <i>SubTotal</i>                                   |  | <b>9.7</b>   |  |                  |                          |       |       |
| <b>4.</b> | <b>PMO engineering overhead; land acquisition</b> |  | <b>7.9</b>   |  |                  |                          |       |       |
| 5.        | Front-end Fee                                     |  | 0.55         |  |                  |                          |       |       |
|           | <b>Grand total cost</b>                           |  | <b>87.45</b> |  |                  |                          |       |       |

Note: n.a. = not applicable.

/a Local government units covered include Manila, San Juan, and Quezon City

/b Small works refers to Smaller Contracts in the World Bank Standard Bidding Documents for Procurement of Works.

/c Local government units covered include Quezon City, San Juan, Mandaluyong, and Makati

/d Large Works refers to World Bank Standard Bidding Documents for Procurement of Works (used for contracts estimated to cost US\$10 million and over).

/e Local government units covered include Pasig, Cainta, and Taytay.

/f Local government units covered include Pasay, Paranaque, and Muntinlupa.

/g QCBS refers to the World Bank's Quality-and Cost-Based Selection procedures for selection of consultants.

**Table 6.2 Summary procurement implementation schedule.**

**Table A: Project Costs by Procurement Arrangements**  
(US\$ million equivalent)

| Expenditure Category                                     | Procurement Method <sup>1</sup> |                 |                    | N.B.F.         | Total Cost       |
|--|---------------------------------|-----------------|--------------------|----------------|------------------|
|  | ICB                             | NCB             | Other <sup>2</sup> |                |                  |
| <b>1. Works</b>  | 50.80<br>(33.75)                | 11.20<br>(6.30) | 0.00<br>(0.00)     | 1.00<br>(0.00) | 63.00<br>(40.05) |
| <b>2. Goods</b>  | 5.90<br>(5.90)                  | 0.00<br>(0.00)  | 0.40<br>(0.20)     | 0.00<br>(0.00) | 6.30<br>(6.10)   |
| <b>3. Services</b>                                       | 0.00<br>(0.00)                  | 0.00<br>(0.00)  | 9.30<br>(8.30)     | 0.40<br>(0.00) | 9.70<br>(8.30)   |
| <b>4. PMO Engineering<br/>Overhead; Land Acquisition</b> | 0.00<br>(0.00)                  | 0.00<br>(0.00)  | 7.90<br>(0.00)     | 0.00<br>(0.00) | 7.90<br>(0.00)   |
| <b>5. Front-end fee</b>                                  | 0.00<br>(0.00)                  | 0.00<br>(0.00)  | 0.55<br>(0.55)     | 0.00<br>(0.00) | 0.55<br>(0.55)   |
| <b>Total</b>   | 56.70<br>(39.65)                | 11.20<br>(6.30) | 18.15<br>(9.05)    | 1.40<br>(0.00) | 87.45<br>(55.00) |

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and (i) incremental operating costs related to managing the project US\$ 1.9 million equivalent, and (ii) US\$6.0 million equivalent of land acquisition costs.

N.B.F = Non-Bank Financed NMT component of US\$ 1.4 million with GEF financing of US\$ 1.3 million equivalent. The GEF financing will be World Bank-Executed.

**Table A1: Consultant Selection Arrangements (optional)**  
(US\$ million equivalent)

| Consultant Services Expenditure Category | Selection Method |                |                |                |                |                |                | Total Cost <sup>1</sup> |
|--|------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------------|
|  | QCBS             | QBS            | SFB            | LCS            | CQ             | Other          | N.B.F.         |                         |
| <b>A. Firms</b>                          | 9.30<br>(8.30)   | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 9.30<br>(8.30)          |
| <b>B. Individuals</b>                    | 0.00<br>(0.00)   | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.40<br>(0.00) | 0.40<br>(0.00)          |
| <b>Total</b>                             | 9.30<br>(8.30)   | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.00<br>(0.00) | 0.40<br>(0.00) | 9.70<br>(8.30)          |

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection

QBS = Quality-based Selection

SFB = Selection under a Fixed Budget

LCS = Least-Cost Selection

CQ = Selection Based on Consultants' Qualifications

Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.

N.B.F = Non-Bank Financed NMT component of US\$ 1.4 million with GEF financing of US\$ 1.3 million equivalent. The GEF financing will be World Bank-Executed.

N.B.F. = Not Bank-financed

Figures in parenthesis are the amounts to be financed by the Bank Loan.

**Prior review thresholds (Table B)**

**1. Works.** Each civil works contract will be subject to the World Bank's prior review. Prior review for works will cover 100 percent of the combined value of works. Prior review of civil works includes bidding documents including detailed designs, cost estimates and technical specifications, evaluation reports, and draft contracts.

**2. Goods.** Each goods contract of more than US\$ 200,000 equivalent per contract will be subject to the World Bank's prior review. This will involve the review of one contract, namely that for traffic signal equipment. Prior review for goods will cover 95 percent of the combined value of goods. Prior review of goods includes bidding documents, evaluation reports, and draft contracts. There will be no prior review of the contracts for vehicles and computer equipment.

**3. Services.** Each consultant contract of more than US\$50,000 equivalent per consultant contract and estimated to total about US\$ [to be finalized at project appraisal] million equivalent, and each contract of firms more than US\$200,000 equivalent per contract and estimated to total US\$ [to be finalized at project appraisal] million will be subject to the World Bank's prior review. All terms of reference, request for proposals, shortlist, evaluation reports, draft negotiated contracts, sole-source contracts, contracts of a special nature for consultant services, and final contracts with substantial differences to the original draft will be subject to prior review.

**Table B: Thresholds for Procurement Methods and Prior Review <sup>1</sup>**

| <b>Expenditure Category</b> | <b>Contract Value Threshold<br/>US\$ (thousands)</b> | <b>Procurement Method</b>                      | <b>Contracts Subject to Prior Review<br/>(US\$ millions)</b> |
|-----------------------------|--|--|--|
| <b>1. Works</b>             | All contracts  | International and National Competitive Bidding | 63.0   |
| <b>2. Goods</b>             | 200  | International Competitive Bidding              | 5.90   |
| <b>3. Services</b>          | 200  | Quality Cost Based Selection                   | 9.30   |
| <b>4. Miscellaneous</b>     |  |  |  |
| <b>5. Miscellaneous</b>     |  |  |  |
| <b>6. Miscellaneous</b>     |  |  |  |

**Total value of contracts subject to prior review:** 90 percent of all contracts

**Overall Procurement Risk Assessment**

**Average**

**Frequency of procurement supervision missions proposed:** One every 6 months (includes special procurement supervision for post-review/audits)

<sup>1</sup>Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.



## Disbursement

### Allocation of loan proceeds (Table C)

The World Bank financing will cover a maximum of 75 percent of the project cost net of taxes in line with financing guidelines for IBRD countries.

**Table C: Allocation of Loan Proceeds**

| <b>Expenditure Category</b>   | <b>Amount in US\$million</b> | <b>Financing Percentage</b>  |
|---|------------------------------|--|
| 1. Works  | 0.00                         |  |
| DPWH  | 24.90                        | 100 percent of foreign expenditures;<br>60 percent of local expenditures |
| MMDA  | 9.20                         | 100 percent of foreign expenditures;<br>60 percent of local expenditures |
| 2. Goods  | 0.00                         |  |
| DPWH  | 5.60                         | 100 percent of foreign expenditures;<br>70 percent of local expenditures |
| MMDA  | 0.10                         | 100 percent of foreign expenditures;<br>70 percent of local expenditures |
| 3. Services   | 0.00                         |  |
| DPWH  | 5.60                         | 100 percent  |
| MMDA  | 2.30                         | 100 percent  |
| 4. Project Management Office<br>engineering overhead;<br>land acquisition | 0.00                         | 0 percent  |
| Unallocated-physical and price<br>contingencies                           | 6.75                         |  |
| <b>Total Project Costs</b>  | 54.45                        |  |
| <b>Front-end fee</b>  | 0.55                         | 100 percent  |
| <b>Total</b>  | 55.00                        |  |

**Table C-1: Allocation of Global Environment Facility Grant Proceeds**

| <b>Expenditure Category</b>                          | <b>Amount in US\$ million</b> | <b>Financing Percentage</b> |
|--|-------------------------------|-----------------------------|
| 1. Works   | 0.80                          | 80 percent of expenditures  |
| 2. Goods   | 0.00                          |                             |
| 3. Services  | 0.40                          | 100 percent of expenditures |
| 4. Project Management Office<br>engineering overhead | 0.00                          | 0 percent                   |
| Unallocated-physical and price<br>contingencies      | 0.10                          |                             |
| <b>Total</b>   | 1.30                          |                             |

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Note: The Global Environment Facility (GEF) amount is approximately US\$1.3 million equivalent. The Grant Agreement is expressed in Special Drawing Rights (SDR).

### **Use of statements of expenditures (SOEs):**

The Statement of Expenditures (SOEs) method will be used. SOE limits are for Civil Works, US\$1 million; Goods, US\$200,000; and Consultant Services, US\$200,00 for Firms and US\$ 50,000 for Individuals.

### **Special account:**

There will be three Special Accounts, two for the IBRD loan, (one for the DPWH and one for the MMDA), and one for the GEF grant, for the City of Marikina for the Nonmotorized Transport component. To facilitate loan disbursements, the DPWH, MMDA, and City of Marikina will each open and maintain a separate dollar special deposit account in a commercial bank specifically authorized for this purpose by the Bangko Sentral ng Pilipinas, on terms and conditions satisfactory to the World Bank, including appropriate protection against set-off, seizure, and attachment. The Special Accounts will cover the World Bank's share of eligible expenditures in all disbursement categories. Applications to replenish the Special Accounts, supported by appropriate documentation, will be submitted regularly by each (preferably monthly, but not less than quarterly) or when the amounts withdrawn equal 50 percent of the initial deposit.

The DPWH Special Account will have an authorized allocation amounting to US \$3.0 million with an initial withdrawal of US\$1.5 million to be withdrawn from the Loan Account and deposited in the Special Account. The balance shall be withdrawn when the amounts disbursed and committed total US \$18.0 million.

The MMDA Special Account will have an authorized allocation amounting to US\$1.0 million with an initial withdrawal of US\$0.6 million to be withdrawn from the Loan Account and deposited in the Special Account. The balance shall be withdrawn when the amounts disbursed and committed total US\$5 million.

The City of Marikina Special Account will have an authorized allocation amounting to US\$100,000 with an initial withdrawal of US\$100,000 to be withdrawn from the Grant Account and deposited in the Special Account.

### **Accounting, Financial Reporting and Auditing Arrangements:**

*Financial Management Assessment.* World Bank staff undertook a Financial Management Assessment of the DPWH-URPO, MMDA, and City of Marikina as the implementing agencies. The assessment (see Financial Management Assessment, June 2000 in project files) was fully discussed and agreed with the agencies in May 2000. Overall the financial management of the DPWH (and its Project Management Office), the MMDA, and the City of Marikina satisfies the World Bank minimum financial management requirements. Project Management Report (PMR)-based reporting will be implemented. However, the project does not have in place an adequate project financial management system that can provide, with reasonable assurance, accurate and timely information on the status of the project as required by the World Bank for Project Management Report (PMR)-based disbursements. PMR-based disbursement is targeted at a later stage in project execution to coincide with the improvement of financial management implemented for the DPWH as a whole under the assistance of the NRIMP project.

*Action plan.* Certain issues found in the Financial Management Systems of the agencies have been addressed prior to World Bank Board approval by remedial actions as described below.

### **DPWH-Urban Roads Project Office**

| <b>Issues</b>   | <b>Remedial actions</b>   |
|---|---|
| 1. The Finance and Budget Section (FBS) of the URPO is staffed by engineers and no accountants. | 1. The URPO FBS hired two accountants.  |
| 2. There is no documented manual on policies and procedures.                                    | 2. A Financial Management Manual acceptable to the World Bank was prepared.   |
| 3. There are inherent deficiencies in the DPWH financial management system under the CFMS.      | 3. The Interim Financial Management System of IBRD used for the NRIMP was adapted and the URPO was made part of overall financial management improvement under the NRIMP. |

### **Metropolitan Manila Development Authority (MMDA)**

| <b>Issues</b>  | <b>Remedial actions</b>  |
|--|--|
| 1. The financial management rank and file lacks capacity due to inappropriate background and experience.                                       | 1. Organize the financial management function, including assignment of the necessary people as specified in the assessment report).  |
| 2. There is no documented manual on policies and procedures.   | 2. Prepare a Financial Management Manual acceptable to the World Bank.   |
| 3. The accounting system is manual and financial reports are delayed because two sets of books are maintained and because of lack of capacity. | 3. Install a simple interim computer system to handle the project's separate books of accounts as well as its own reports, both the regulatory and the PMRs.                           |
| 4. Procurement is under the Treasury.  | 4. Make procurement independent of finance.  |
| 5. The internal audit function is under the Finance and Administration Service.  | 5. Have an internal audit function for the project and the MMDA as a whole report to the chairman or, preferably, the Council. (This will be done six months after Loan effectiveness. |

*Reporting Arrangements.* Even before the PMR based disbursement system is effective, each implementing agency will prepare in accordance with the Loan Administration Change Initiative (LACI) handbook the following reports: (i) summary uses and sources of funds (Report 1-A of PMR); and (ii) Procurement Monitoring Reports (Reports 3 A, B, C, and D). When the PMR disbursement-based system is in force, each implementing agency will also produce a report on the use of funds by project activity (Report 1-B). DPWH Controllership and Financial Management Services (CFMS) will always have the responsibility of consolidating these reports and producing an annual Project Balance Statement.

*Auditing Arrangements.* The Government of Philippines Commission on Audit (COA) will be responsible for annual audit of the implementing units' consolidated financial statements, withdrawal applications and supporting Statement of Expenditures (SOEs), documentation of the operations of the Special Account, and the PMRs when operational. The audited financial statements will be submitted to the World Bank within six months of the end of the project financial year. The annual audit will be conducted in accordance with the requirements of the Audit Manual for World Bank Financed Projects issued by the East Asia and Pacific Region of the World Bank in July 1998.

*Funds Flow and Disbursement Arrangements.* For loan proceeds, funds will flow, upon approval by the Department of Budget and Management, from the coffers of the Bureau of Treasury of the Department of Finance (DOF) to the Special Accounts. The counterpart fund of the Government of the Philippines will go to a separate bank account and will not be mixed with the loan proceeds. In the DPWH, expenditures for the project will be paid from the CFMS to contractors, suppliers, or consultants either upon incurrence or

through replenishment, whereby the Department advances the money first. The latter would generally be the mode of disbursement.

**Annex 7: Project Processing Schedule**  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**

| <b>Project Schedule</b>                           | <b>Planned</b> | <b>Actual</b> |
|---|----------------|---------------|
| <b>Time taken to prepare the project (months)</b> | 27             |               |
| <b>First Bank mission (identification)</b>        | 11/02/98       |               |
| <b>Appraisal mission departure</b>                | 10/01/2000     | 10/05/2000    |
| <b>Negotiations</b>                               | 10/10/2000     | 01/23/2001    |
| <b>Planned Date of Effectiveness</b>              | 01/01/2001     | 03/30/2001    |

**Prepared by:**

Department of Public Works and Highways, Urban Roads Project Office and Traffic Engineering Center; and Metro Manila Development Authority and the 17 municipal local government units of Metro Manila, and the City of Marikina. The Transport Sector Unit of the East Asia and the Pacific Region of the World Bank.

**Preparation assistance:**

A Preparation and Human Resources Development (PHRD) grant of US\$1.0 million provided by the Japanese government was used largely for the feasibility study that developed the project components. Detailed engineering design for phase I was funded under the World Bank loan for the Highway Management Project, which closed June 30, 2000, and the First National Roads Improvement and Maintenance Project, which became effective July 7, 2000.

**Bank staff who worked on the project included:**

| <b>Name</b>           | <b>Speciality</b>   |
|-----------------------|---|
| Jitendra N. Bajpai    | Pr. Transport Specialist, Sector Director                                 |
| Sally Burningham      | Sr. Transport Engineer, Task Team Leader                                  |
| Rene SD. Manuel       | Procurement officer   |
| Joseph Reyes          | Operations officer - Financial specialist                                 |
| Maya Villaluz         | Operations officer - Environment  |
| Zhi Liu               | Sr. Transport economist   |
| Francesco Addis       | Transport economist   |
| Karen Alexandra Hudes | Sr. Legal counsel   |
| Hung Kim Phung        | Sr. Disbursement officer  |
| Glenn Morgan          | Sr. Environmental Specialist, Environmental and Social clearance          |
| Chaohua Zhang         | Sr. Social Sector Specialist, Resettlement and Land Acquisition clearance |
| Paul Guitink          | Sr. Transport Specialist, Peer reviewer                                   |
| Kenneth Gwilliam      | Advisor, Peer reviewer  |
| Gerhard Menckhoff     | Peer reviewer   |
| Christopher De Serio  | Program assistant   |

**Annex 8: Documents in the Project File\***  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**

**A. Project Implementation Plan**

Project Implementation Plan, DPWH, July 2000  
Procurement Implementation Schedule, DPWH, March 2000

**B. Bank Staff Assessments**

Procurement Assessment July 31, 2000  
Financial Management Assessment July 31, 2000  
World Bank mission Aide-memoire November 2-7, 1998  
World Bank mission Aide-memoire February 16-23, 1999  
World Bank mission Aide-memoire May 10-14, and June 1-11, 1999  
World Bank mission Aide-memoire November 8-12, 1999  
World Bank mission Aide-memoire February 7, 8 and 17, 18, 2000  
World Bank mission Aide-memoire May 8-12, 2000  
World Bank mission Aide-memoire Appraisal October 5-13, 2000

**C. Other**

Feasibility Study for MMURTRIP, Halcrow Fox, volumes I and II, July 1998  
Detailed Engineering for MMURTRIP, Inception Report, DPWH, June 30, 2000  
Detailed Engineering for MMURTRIP report, DPWH, October 2000  
Environmental Impact Assessment of MMURTRIP, EIAPO-DPWH, July 2000  
Resettlement Action Plan, Marikina Bridge and Access Roads component, December 2000  
Resettlement Action Plan, Don Mariano Marcos Avenue Extension component, November 2000  
Project information brochure in English and Tagalog  
Institutional Plan and Terms of Reference for Technical Assistance, MMDA, December 20, 2000  
Marikina Bicycle Network, Feasibility Study, December 1999, National Center for Transportation Studies, Philippines  
Marikina Bicycle Network, Inception Report, Interface for Cycling, July 8, 2000  
Operational Program 11, Global Environment Facility  
Global Environment Facility (GEF)-supported NMT Component - Marikina Bicycle Network. STAP Review.  
Metro Manila Urban Transportation Integration Study (MMUTIS), Final Report, DPWH, ALMEC, Philippines, March 1999  
Metro Manila Air Quality Improvement Sector Development Program, Asian Development Bank Project Report, November 1998 RRP: PHI 30480  
A 1997 Survey about Traffic, November 1997, Social Weather Station Bulletin 97-22  
[\\*Including electronic files](#)

**Annex 9: Statement of Loans and Credits**  
**PHILIPPINES: Metro Manila Urban Transport Integration Project**  
**Jan-2001**

| Project ID    | FY   | Purpose                                  | Original Amount in US\$ Millions |              |             | Cancel.       | Undisb.        | Difference between expected and actual disbursements <sup>a</sup> |              |       |
|---------------|------|--|----------------------------------|--------------|-------------|---------------|----------------|---|--------------|-------|
|               |      |  | IBRD                             | IDA          | GEF         |               |                | Orig  | Frm          | Rev'd |
| P066069       | 2001 | LAND ADMIN & MANAGEMENT                  | 4.79                             | 0.00         | 0.00        | 0.00          | 4.79           | 0.00  | 0.00         |       |
| P039019       | 2000 | FIRST NATL ROADS IMPROV./MGNT. PROJECT   | 150.00                           | 0.00         | 0.00        | 0.00          | 143.50         | 4.50  | 0.00         |       |
| P059933       | 2000 | COASTAL MARINE                           | 0.00                             | 0.00         | 1.25        | 0.00          | 1.29           | 0.51  | 0.00         |       |
| P058842       | 2000 | MINDANAO RURAL DEV                       | 27.50                            | 0.00         | 0.00        | 0.00          | 25.65          | 1.40  | 0.00         |       |
| P065113       | 2000 | PH-SOCIAL EXPENDITURE MANAGEMENT PRJ     | 100.00                           | 0.00         | 0.00        | 0.00          | 81.43          | 20.07   | 0.00         |       |
| P057598       | 1999 | RURAL FINANCE III                        | 150.00                           | 0.00         | 0.00        | 0.00          | 121.68         | 56.68   | 0.00         |       |
| P048588       | 1999 | PHIL-LGU FINANCE AND DEVELOPMENT PROJECT | 100.00                           | 0.00         | 0.00        | 0.00          | 96.49          | 5.29  | 0.00         |       |
| P039022       | 1999 | PHIL-LGU URBAN WATER & SANITATION PROJ   | 23.30                            | 0.00         | 0.00        | 0.00          | 20.09          | 5.79  | 0.00         |       |
| P056524       | 1999 | BANK'G SYS REF (FSAL                     | 300.00                           | 0.00         | 0.00        | 0.00          | 200.00         | 200.00  | 0.00         |       |
| P051386       | 1998 | SZOPAD SOCIAL FUND                       | 10.00                            | 0.00         | 0.00        | 0.00          | 1.52           | 1.52  | 0.00         |       |
| P004566       | 1998 | PH-EARLY CHILD DEV.                      | 19.00                            | 0.00         | 0.00        | 0.00          | 16.86          | 6.86  | 0.00         |       |
| P004595       | 1998 | COMMUNITY BASED RESO                     | 50.00                            | 0.00         | 0.00        | 0.00          | 47.08          | 18.38   | 0.00         |       |
| P004576       | 1998 | PHIL-WATER DISTRICTS DEVELOPMENT PROJECT | 56.80                            | 0.00         | 0.00        | 0.00          | 36.56          | 46.26   | 3.46         |       |
| P040981       | 1997 | SECOND SUBIC BAY                         | 60.00                            | 0.00         | 0.00        | 0.00          | 55.26          | 55.26   | 9.78         |       |
| P037079       | 1997 | AGRARIAN REFORM COMM                     | 50.00                            | 0.00         | 0.00        | 0.00          | 23.20          | 2.70  | 0.00         |       |
| P004613       | 1997 | WATER RESOURCES DEVE                     | 58.00                            | 0.00         | 0.00        | 7.27          | 36.06          | 35.33   | -1.32        |       |
| P004602       | 1997 | PH-THIRD ELEMENTARY EDUCATION            | 113.40                           | 0.00         | 0.00        | 20.10         | 83.43          | 70.63   | 0.00         |       |
| P004614       | 1996 | RURAL FINANCE II                         | 150.00                           | 0.00         | 0.00        | 0.00          | 13.56          | 2.56  | 0.00         |       |
| P004611       | 1996 | PHIL-MANILA SEWERAGE PROJECT II          | 57.00                            | 0.00         | 0.00        | 9.00          | 45.93          | 52.93   | 13.73        |       |
| P004571       | 1996 | TRANS GRID REINFORCE                     | 250.00                           | 0.00         | 0.00        | 45.52         | 102.71         | 105.42  | 13.75        |       |
| P004567       | 1995 | PH-WOMENS HEALTH & SAFE MOTHERHOOD       | 18.00                            | 0.00         | 0.00        | 4.30          | 5.56           | 7.86  | 3.82         |       |
| P004403       | 1994 | CONS. OF PRIORITY PR                     | 0.00                             | 0.00         | 0.00        | 0.00          | 9.72           | 10.75   | 0.00         |       |
| P004568       | 1993 | PH-URBAN HEALTH & NUTRITION              | 0.00                             | 70.00        | 0.00        | 20.16         | 19.06          | 41.99   | 12.85        |       |
| P004589       | 1993 | IRRIG OPER SUPP II                       | 51.30                            | 0.00         | 0.00        | 0.00          | 5.67           | 5.67  | 3.29         |       |
| P004592       | 1992 | PHIL-MUNICIPAL DEVELOPMENT PROJECT III   | 68.00                            | 0.00         | 0.00        | 0.00          | 10.18          | 10.18   | 10.18        |       |
| <b>Total:</b> |      |  | <b>1867.09</b>                   | <b>70.00</b> | <b>1.25</b> | <b>106.35</b> | <b>1207.27</b> | <b>768.53</b>   | <b>69.54</b> |       |



PHILIPPINES  
STATEMENT OF IFC's  
Held and Disbursed Portfolio  
Jan-2001  
In Millions US Dollars

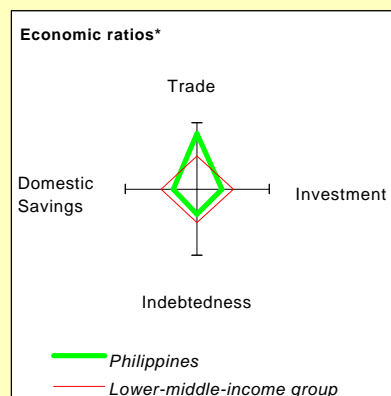
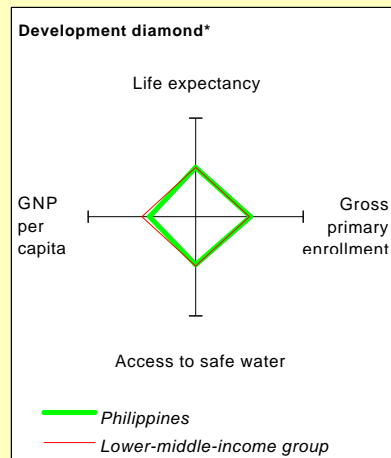
| FY Approval         | Company                 | Committed     |              |              |               | Disbursed     |              |              |               |
|---------------------|-------------------------|---------------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|
|                     |                         | IFC           |              |              |               | IFC           |              |              |               |
|                     |                         | Loan          | Equity       | Quasi        | Partic        | Loan          | Equity       | Quasi        | Partic        |
| 1980/82/89/90/94/95 | AACT                    | 0.00          | 1.70         | 0.00         | 0.00          | 0.00          | 1.70         | 0.00         | 0.00          |
| 1996                | All Asia Growth         | 0.00          | 4.00         | 0.00         | 0.00          | 0.00          | 4.00         | 0.00         | 0.00          |
| 1996                | All Asia Manager        | 0.00          | 0.04         | 0.00         | 0.00          | 0.00          | 0.04         | 0.00         | 0.00          |
| 1996                | All Asia Venture        | 0.00          | 0.01         | 0.00         | 0.00          | 0.00          | 0.01         | 0.00         | 0.00          |
|                     | BPI Philippines         | 0.00          | 0.00         | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 0.00          |
| 0/97/98             | Bataan P/E              | 30.00         | 0.00         | 10.00        | 138.00        | 30.00         | 0.00         | 10.00        | 117.25        |
| 1997                | Drysdale Food           | 15.00         | 0.00         | 0.00         | 10.00         | 9.60          | 0.00         | 0.00         | 6.40          |
| 1998                | General Milling         | 0.00          | 0.65         | 0.00         | 0.00          | 0.00          | 0.65         | 0.00         | 0.00          |
| 1979/90             | H&Q PV III              | 0.00          | 7.50         | 0.00         | 0.00          | 0.00          | 3.74         | 0.00         | 0.00          |
| 1998                | H&QPV-I                 | 0.00          | 0.61         | 0.00         | 0.00          | 0.00          | 0.61         | 0.00         | 0.00          |
| 1989                | H&QPV-II                | 0.00          | 1.43         | 0.00         | 0.00          | 0.00          | 1.43         | 0.00         | 0.00          |
| 1993                | MERALCO                 | 1.85          | 0.00         | 0.00         | 0.00          | 1.85          | 0.00         | 0.00         | 0.00          |
| 1967/88             | Mariwasa                | 11.66         | 0.00         | 3.00         | 0.00          | 11.66         | 0.00         | 3.00         | 0.00          |
| 1970/72/00          | Mindanao Power          | 0.00          | 0.00         | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 0.00          |
| 1993/94             | PLDT                    | 1.79          | 0.00         | 0.00         | 2.39          | 1.79          | 0.00         | 0.00         | 2.39          |
| 1970/86/88/89       | Pagbilao                | 39.00         | 10.00        | 0.00         | 5.40          | 39.00         | 10.00        | 0.00         | 5.40          |
| 1993                | PlantersBank            | 15.00         | 0.00         | 8.66         | 0.00          | 15.00         | 0.00         | 0.00         | 0.00          |
| 2000                | Pryce Gases             | 10.00         | 0.00         | 3.00         | 5.00          | 10.00         | 0.00         | 3.00         | 5.00          |
| 1998                | STRADCOM                | 12.00         | 0.00         | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 0.00          |
| 2000                | Sual Power              | 29.35         | 17.50        | 0.00         | 182.06        | 29.35         | 17.50        | 0.00         | 182.06        |
| 1995                | TRP                     | 0.00          | 0.05         | 0.00         | 0.00          | 0.00          | 0.05         | 0.00         | 0.00          |
| 1999                | UPPC                    | 30.00         | 0.00         | 0.00         | 0.00          | 30.00         | 0.00         | 0.00         | 0.00          |
| 1999                | Union Cement            | 1.40          | 5.63         | 0.00         | 1.00          | 1.40          | 5.63         | 0.00         | 1.00          |
| 1992                | Walden Mgmt             | 0.00          | 0.05         | 0.00         | 0.00          | 0.00          | 0.05         | 0.00         | 0.00          |
| 1994                | Walden Ventures         | 0.00          | 3.75         | 0.00         | 0.00          | 0.00          | 3.75         | 0.00         | 0.00          |
| 1994                | ePlanters               | 0.00          | 0.22         | 0.00         | 0.00          | 0.00          | 0.12         | 0.00         | 0.00          |
| 2000                |                         |               |              |              |               |               |              |              |               |
|                     | <b>Total Portfolio:</b> | <b>197.05</b> | <b>53.14</b> | <b>24.66</b> | <b>343.85</b> | <b>179.65</b> | <b>49.28</b> | <b>16.00</b> | <b>319.50</b> |

| FY Approval | Company                          | Approvals Pending Commitment |                 |                |                 |
|-------------|----------------------------------|------------------------------|-----------------|----------------|-----------------|
|             |                                  | Loan                         | Equity          | Quasi          | Partic          |
| 1997        | PT&T                             | 30000.00                     | 0.00            | 5000.00        | 30000.00        |
| 2000        | Asian Hospital                   | 14000.00                     | 0.00            | 0.00           | 5000.00         |
| 1999        | Cepalco                          | 16000.00                     | 6000.00         | 0.00           | 0.00            |
| 1998        | Far East Bank II                 | 0.00                         | 0.00            | 0.00           | 15000.00        |
| 2000        | LTO Project                      | 0.00                         | 8000.00         | 0.00           | 20000.00        |
| 2000        | MFI MEP                          | 0.00                         | 0.00            | 0.00           | 0.00            |
| 2001        | Manila Tollways                  | 46000.00                     | 0.00            | 0.00           | 0.00            |
|             | <b>Total Pending Commitment:</b> | <b>106000.00</b>             | <b>14000.00</b> | <b>5000.00</b> | <b>70000.00</b> |

## Annex 10: Country at a Glance

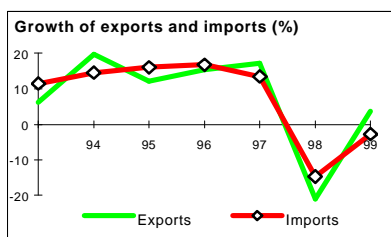
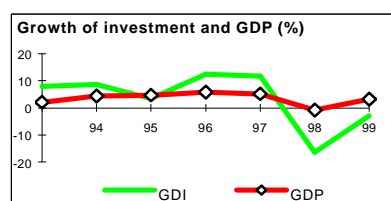
### PHILIPPINES: Metro Manila Urban Transport Integration Project

| POVERTY and SOCIAL   | Philippines    | East Asia & Pacific | Lower-middle-income |             |                |
|--|----------------|---------------------|---------------------|-------------|----------------|
| <b>1999</b>  |                |                     |                     |             |                |
| Population, mid-year (millions)                              | 76.8           | 1.837               | 2.094               |             |                |
| GNP per capita (Atlas method, US\$)                          | 1,020          | 1,000               | 1,200               |             |                |
| GNP (Atlas method, US\$ billions)                            | 78.0           | 1.833               | 2,513               |             |                |
| <b>Average annual growth, 1993-99</b>                        |                |                     |                     |             |                |
| Population (%)   | 2.2            | 1.2                 | 1.1                 |             |                |
| Labor force (%)  | 2.7            | 1.3                 | 1.2                 |             |                |
| <b>Most recent estimate (latest year available, 1993-99)</b> |                |                     |                     |             |                |
| Poverty (% of population below national poverty line)        | 37             | ..                  | ..                  |             |                |
| Urban population (% of total population)                     | 58             | 34                  | 43                  |             |                |
| Life expectancy at birth (years)                             | 69             | 69                  | 69                  |             |                |
| Infant mortality (per 1,000 live births)                     | 32             | 35                  | 33                  |             |                |
| Child malnutrition (% of children under 5)                   | 30             | 22                  | 15                  |             |                |
| Access to improved water source (% of population)            | 83             | 84                  | 86                  |             |                |
| Illiteracy (% of population age 15+)                         | 5              | 15                  | 16                  |             |                |
| Gross primary enrollment (% of school-age population)        | 117            | 119                 | 114                 |             |                |
| Male   | ..             | 121                 | 114                 |             |                |
| Female   | ..             | 121                 | 116                 |             |                |
| <b>KEY ECONOMIC RATIOS and LONG-TERM TRENDS</b>              |                |                     |                     |             |                |
|  | <b>1979</b>    | <b>1989</b>         | <b>1998</b>         | <b>1999</b> |                |
| GDP (US\$ billions)  | 27.4           | 42.6                | 65.5                | 76.6        |                |
| Gross domestic investment/GDP                                | 33.2           | 21.6                | 20.2                | 18.6        |                |
| Exports of goods and services/GDP                            | 21.6           | 28.5                | 51.9                | 51.2        |                |
| Gross domestic savings/GDP                                   | 28.1           | 19.8                | 13.6                | 19.6        |                |
| Gross national savings/GDP                                   | 29.7           | 21.1                | 18.6                | 25.1        |                |
| Current account balance/GDP                                  | -5.5           | -3.4                | 7.7                 | 14.7        |                |
| Interest payments/GDP  | 1.8            | 3.9                 | 3.0                 | 2.5         |                |
| Total debt/GDP   | 48.4           | 67.2                | 73.0                | 68.2        |                |
| Total debt service/exports                                   | 24.6           | 25.9                | 10.3                | 10.8        |                |
| Present value of debt/GDP                                    | ..             | ..                  | 69.2                | ..          |                |
| Present value of debt/exports                                | ..             | ..                  | 90.5                | ..          |                |
|  | <b>1979-89</b> | <b>1989-99</b>      | <b>1998</b>         | <b>1999</b> | <b>1999-03</b> |
| <i>(average annual growth)</i>                               |                |                     |                     |             |                |
| GDP  | 0.8            | 3.0                 | -0.8                | 3.2         | 4.3            |
| GNP per capita   | -2.0           | 1.3                 | -2.0                | 1.3         | 2.3            |
| Exports of goods and services                                | 4.1            | 7.8                 | -21.0               | 3.6         | 9.3            |



#### STRUCTURE of the ECONOMY

|                                | 1979           | 1989           | 1998        | 1999        |
|--------------------------------|----------------|----------------|-------------|-------------|
| <i>(% of GDP)</i>              |                |                |             |             |
| Agriculture                    | 27.4           | 22.7           | 17.4        | 17.7        |
| Industry                       | 37.0           | 34.9           | 31.3        | 30.3        |
| Manufacturing                  | 25.1           | 24.9           | 21.8        | 21.5        |
| Services                       | 35.6           | 42.4           | 51.3        | 52.0        |
| Private consumption            | 62.5           | 70.6           | 73.1        | 67.4        |
| General government consumption | 9.4            | 9.5            | 13.2        | 12.9        |
| Imports of goods and services  | 26.6           | 30.3           | 58.5        | 50.2        |
|                                | <b>1979-89</b> | <b>1989-99</b> | <b>1998</b> | <b>1999</b> |
| <i>(average annual growth)</i> |                |                |             |             |
| Agriculture                    | 0.9            | 1.4            | -7.3        | 6.2         |
| Industry                       | -1.2           | 3.0            | -2.1        | 0.3         |
| Manufacturing                  | -0.3           | 2.7            | -1.1        | 1.6         |
| Services                       | 2.6            | 3.8            | 3.5         | 4.1         |
| Private consumption            | 1.9            | 3.9            | 6.9         | 0.4         |
| General government consumption | -0.2           | 3.5            | -1.9        | 5.3         |
| Gross domestic investment      | -4.1           | 3.5            | -16.3       | -2.9        |
| Imports of goods and services  | 2.0            | 8.9            | -14.7       | -2.8        |
| Gross national product         | 0.6            | 3.7            | 0.2         | 3.5         |

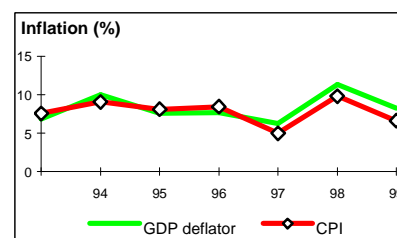


Note: 1999 data are preliminary estimates.

\* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

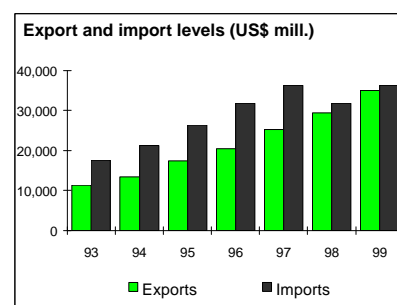
**PRICES and GOVERNMENT FINANCE**

|  | 1979 | 1989 | 1998 | 1999 |
|--|------|------|------|------|
| <b>Domestic prices</b><br>(% change)                             |      |      |      |      |
| Consumer prices  | ..   | 12.2 | 9.8  | 6.6  |
| Implicit GDP deflator  | 14.8 | 9.0  | 11.3 | 8.2  |
| <b>Government finance</b><br>(% of GDP, includes current grants) |      |      |      |      |
| Current revenue  | ..   | 16.5 | 26.9 | 25.6 |
| Current budget balance   | ..   | 1.0  | 4.5  | 2.7  |
| Overall surplus/deficit  | ..   | -2.1 | -0.9 | -2.7 |



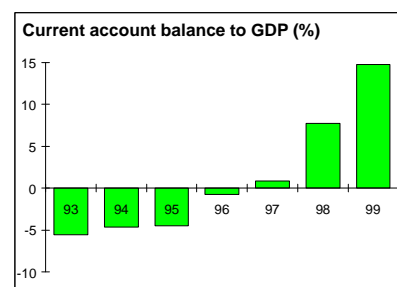
**TRADE**

|                               | 1979 | 1989   | 1998   | 1999   |
|-------------------------------|------|--------|--------|--------|
| <i>(US\$ millions)</i>        |      |        |        |        |
| Total exports (fob)           | ..   | 7,821  | 29,496 | 35,081 |
| Coconut oil                   | ..   | 377    | ..     | ..     |
| Sugar                         | ..   | 89     | ..     | ..     |
| Manufactures                  | ..   | 5,192  | 25,866 | 31,097 |
| Total imports (cif)           | ..   | 10,419 | 31,848 | 36,276 |
| Food                          | ..   | 521    | 1,774  | 1,982  |
| Fuel and energy               | ..   | 1,397  | 2,148  | 3,395  |
| Capital goods                 | ..   | 2,424  | 12,818 | 14,555 |
| Export price index (1995=100) | ..   | 88     | ..     | ..     |
| Import price index (1995=100) | ..   | 86     | ..     | ..     |
| Terms of trade (1995=100)     | ..   | 103    | ..     | ..     |



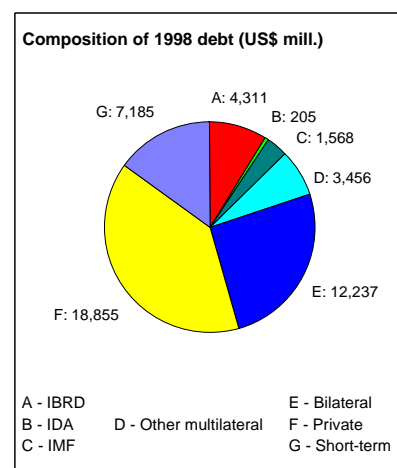
**BALANCE of PAYMENTS**

|   | 1979   | 1989   | 1998   | 1999   |
|---|--------|--------|--------|--------|
| <i>(US\$ millions)</i>                  |        |        |        |        |
| Exports of goods and services           | 5,678  | 10,674 | 43,413 | 47,886 |
| Imports of goods and services           | 7,305  | 11,845 | 42,302 | 41,179 |
| Resource balance                        | -1,627 | -1,171 | 1,111  | 6,707  |
| Net income                              | -223   | -1,332 | 3,530  | 4,104  |
| Net current transfers                   | 355    | 1,045  | 435    | 481    |
| Current account balance                 | -1,495 | -1,458 | 5,076  | 11,292 |
| Financing items (net)                   | 1,811  | 1,758  | -3,717 | -7,351 |
| Changes in net reserves                 | -316   | -300   | -1,359 | -3,941 |
| <b>Memo:</b>                            |        |        |        |        |
| Reserves including gold (US\$ millions) | ..     | ..     | 10,684 | 14,988 |
| Conversion rate (DEC. local/US\$)       | 7.4    | 21.7   | 40.9   | 39.1   |



**EXTERNAL DEBT and RESOURCE FLOWS**

|                                      | 1979   | 1989   | 1998   | 1999   |
|--------------------------------------|--------|--------|--------|--------|
| <i>(US\$ millions)</i>               |        |        |        |        |
| Total debt outstanding and disbursed | 13,282 | 28,653 | 47,817 | 52,212 |
| IBRD                                 | 731    | 3,492  | 4,311  | 4,040  |
| IDA                                  | 32     | 102    | 205    | 206    |
| Total debt service                   | 1,584  | 3,244  | 5,166  | 6,026  |
| IBRD                                 | 86     | 536    | 654    | 642    |
| IDA                                  | 0      | 2      | 4      | 4      |
| Composition of net resource flows    |        |        |        |        |
| Official grants                      | 58     | 380    | 184    | ..     |
| Official creditors                   | 427    | 874    | -6     | -38    |
| Private creditors                    | 703    | -275   | 419    | 3,991  |
| Foreign direct investment            | 7      | 563    | 1,713  | ..     |
| Portfolio equity                     | 0      | 253    | 454    | ..     |
| World Bank program                   |        |        |        |        |
| Commitments                          | 273    | 801    | 679    | 128    |
| Disbursements                        | 213    | 465    | 301    | 163    |
| Principal repayments                 | 25     | 269    | 389    | 387    |
| Net flows                            | 188    | 196    | -88    | -224   |
| Interest payments                    | 61     | 269    | 268    | 259    |
| Net transfers                        | 127    | -73    | -356   | -483   |



**Additional  
Annex 11**

**PHILIPPINES: Metro Manila Urban Transport Integration Project**

**Institutional Framework for Traffic Engineering and Transport Planning**

**1. Introduction**

As highlighted in a recent policy study,<sup>1</sup> the planning, implementation, operation, maintenance, and regulation of city transport is a complex process encompassing numerous modes, users, and agencies. Above all, urban transport is a highly political and visible activity. Failure to deliver an acceptable transport system is immediately evident to transport system users—symptoms such as passenger queues, traffic congestion, slow journey times, accidents, and an ugly traffic-related environment are immediately evident. Concerns by users of poor-quality transport systems are usually high on the list of complaints against a city administration.

Achieving an adequate balance between competing transport modes and interests requires competent transport institutions working within a clearly defined framework of responsibilities. While there is no single ideal or model institutional framework for traffic and transport administration, any urban area should in broad terms have an organizational framework that deals with the basic functions of:

- Strategic transport planning - development of transport strategies in the urban development context leading to realistic policies, short- and long-term investment programs and so on.
- Infrastructure for transport - planning, design, financing, construction, and maintenance of road, public transport, and other related infrastructure.
- Public transport - development of the public transport system, including planning, design, management, regulation, licensing, franchising, and, in some cases, operation.
- Traffic operations and management - management of roads and road use for all vehicular and nonvehicular modes, including Nonmotorised Transport. Traffic operations and management activities include planning, design, implementation, operation, and maintenance of the traffic management systems and facilities.
- Regulations - enforcement of traffic regulations, driver and vehicle licensing, vehicle testing, and so on.

These functions can be addressed in many ways. The institutional structure for any urban area is determined by its particular political and cultural context and its size. Changes depend very much on current institutional arrangements or “starting point” in a city. The range of organizational arrangements is almost infinite: government ministries and departments, metropolitan transport authorities, public transit authorities, independent commissions, institutes, municipal departments, local/district agencies, task forces, and many other agencies are used. Agencies need not, and most do not, carry out all functions themselves—many functions are outsourced while remaining under the supervision of the responsible agency.

**2. Current responsibilities in Metro Manila**

In Metro Manila most transport planning and traffic management responsibilities have been shared by the national Departments of Public Works and Highways (DPWH) and Transport and Communications

(DOTC), the Philippine National Police, local governments, and the Metro Manila Development Authority (MMDA).

The prime responsibility of the DPWH is the construction and maintenance of main roads throughout the Philippines. In Manila, the DPWH is also charged with traffic engineering functions. Over the years, the department has built up an effective Traffic Engineering Center (TEC), which among other measures developed and operated a centrally controlled traffic signal system.

The DOTC is responsible for motor vehicle registration, driver licensing, and bus route franchising, in accordance with the Land Transportation and Traffic Code of 1964. The DOTC establishes national policies, enforces its regulations, and oversees public transport provision, including rail mass transit and the setting of fares.

The National Police are responsible for enforcing traffic rules and issuing fines. The local government units have overall responsibility for local roads, pedestrian facilities, and bikeways; they also issue the operating permits of pedicabs and motorized tricycles.

The MMDA was established in 1996 and took over several functions of the earlier Metro Manila Authority. In the transport field its new responsibilities included such key aspects as traffic engineering, education, and enforcement and the formulation of policies of urban transport in general, including the provision for mass transport. Its functions are to be carried out over the entire area of Metro Manila, but the MMDA Act also specifies that the new functions not imply the “diminution of the autonomy of the local government units concerning purely local matters.”<sup>2</sup>

The past decade has seen an explosion of rail mass transit and expressway “megaprojects,” which were largely financed and built by private developers. In most cases, either the DOTC or DPWH carried out some planning of the facilities and awarded long-term concessions to the private sector companies. Despite its wide-ranging powers over metropolitan transport, the MMDA has played a minor role in planning and operational supervision of these megaprojects.

#### *Governance issues in Metro Manila transport sector management*

Managing Metro Manila is at least as complex as the problems facing it. It is composed of 17 autonomous cities and municipalities. This autonomy allows each local government to respond to problems such as traffic management based on its own plans, priorities, and programs.

Local governments play a significant role in developing the transport and traffic environments in their respective areas. But this role is not exercised uniformly, as local transport investments must respond to local needs and priorities. Some local government units take on the responsibility for public transport terminals, regulating their use and providing the necessary infrastructure. Others provide terminals only on a temporary basis, permitting vehicles to use sidewalks and other road space as terminals.

The absence of a development framework in the past has resulted in uncoordinated development and contributed to widespread congestion and environmental degradation. Also, many inappropriate residential, commercial, and other developments are allowed to proceed unchecked, which has further weakened the ability of the authorities to manage the traffic situation. A 20-year Metro Manila Physical Framework Plan was completed in 1996, followed three years later by a transport plan produced by the Metro Manila Urban Transportation Integration Study (MMUTIS).

The recent government focus on large projects has left critical activities like traffic management and enforcement and public transport regulation lacking attention and funding. Plans and policies have normally been mode-specific, as they were sponsored by national government agencies with little regard for the development of an integrated multimodal transport system.

Because of the absence of an effective transport planning framework at the metropolitan level, the responses to Manila's traffic and transport crisis have consisted largely of stop-gap measures and opportunistic financing solutions. A number of impressive flyovers and interchanges have been built to solve traffic congestion at particular critical points with the effect in some cases of shifting the congestion to other points. The absence of comprehensive planning has resulted in sometimes insurmountable problems when elevated rail structures could no longer be fitted satisfactorily through recently built road interchanges.

Reliance on private finance for major transport investments makes thorough transport planning and coordination all the more important, lest future governments find themselves loaded with heavy contingent liabilities. A recent background paper prepared as part of the World Bank's new urban transport strategy stresses the importance of adequate preparation of rail mass transit projects and of integrated rail and urban development. With reference to Manila, this paper states:

Private sector participation focuses on the most lucrative routes, leaving less attractive ones to the public sector, which tends to lead to a "piece-by-piece" approach. Although private provision of rail services is desirable in appropriate cases, given the governmental financial constraints, the piece-by-piece approach may result in inconsistency or a lack of coordination across modes and systems, both technical and institutional (e.g., in terms of operational integration, interline transfer, fare coordination, and diseconomies of scale). The Philippine Government has used government guarantees to motivate private sector lending by mitigating risks that the private sector either cannot evaluate or will not bear. These guarantees have been an integral feature of private sector participation and, in helping to solve the country's power crisis, has been extended to transport projects. The government must of course be adequately prepared to meet contingent liabilities should they arise. Some observers have argued that such guarantees are too onerous for the government and effectively transfer the risk from the private sector back to the public sector. It may also consign the government to redeeming ill-conceived projects. Moreover, in creating an attractive environment for private participation in ventures that require high capital costs, the principles of private sector risk can be eroded. When costs rise unexpectedly and ridership levels are disappointing, exacerbated further by fare increases, the government, which was keen to involve private capital, can in this way become liable for debt repayments. The private sector may realize returns on its investment but the government may be left with an expensive scheme that does not adequately serve its citizens.<sup>3</sup>

The government has recognized that the inadequate planning and institutional framework are largely responsible for Manila's worsening internal accessibility and mobility. In July 2000 it approved the conclusions of a comprehensive transport study, which endorses the MMDA's role as coordinator of metropolitan-wide transport planning and development.

### **3. Future role of the MMDA**

Two pillars support the expanded functions that the MMDA will carry in Manila's transport development. The first is the MMDA Act, which became effective in 1996, and the second is the recently completed MMUTIS study. Both the World Bank and the Asian Development Bank will play important roles in strengthening the MMDA in two parallel lending operations: this proposed project

and the Asian Development Bank's Metro Manila Air Quality Improvement Sector Development Program.

As mentioned, the MMDA Act<sup>4</sup> gives the MMDA wide-ranging responsibilities for traffic engineering and transport planning in Metro Manila, in addition to other functions such as general development planning, urban renewal, land-use planning, solid waste management, flood control, drainage, sewerage management, and abatement of environmental pollution. The act defines MMDA's services to include "transport and traffic management which includes the formulation, coordination and monitoring of policies, standards, programs and projects to rationalize the existing transport operations, infrastructure requirements, the use of thoroughfares, and promotion of safe and convenient movement of persons and goods; provision for the mass transit system and the institution of a system to regulate road users; administration and implementation of all traffic enforcement operations, traffic engineering services and traffic education programs, including the institution of a single ticketing system in Metropolitan Manila."

With regard to street traffic, the MMDA is responsible for policy formulation and "shall coordinate and regulate the implementation of all programs and projects concerning traffic management, specially pertaining to enforcement, engineering and education ...." Until now, however, the centralized traffic signal system and most other traffic engineering functions have been carried out by the TEC of the DPWH. It was agreed during project preparation to define a timetable prior to appraisal for transferring the TEC's function to the MMDA. This transfer is consistent with a memorandum of understanding signed by the DPWH and MMDA in 1995 stating that "[the] primary aim of the DPWH and MMDA [was] to transfer the existing TEC Operation and Maintenance functions and facilities of the TEC/TEAM-PMO including such appropriations, funds, record, equipment, or other assets and personnel as may be necessary to sustain the operation and maintenance of the Metro Manila Traffic Control System completed under the TEAM Projects (Phases I, II and III) except for such equipment, facilities, appropriations, funds and personnel which by mutual agreement shall be retained by the DPWH."

In its chapter on project implementation, the Final Report of the MMUTIS study<sup>5</sup> confirms that the MMDA should be the central metropolitan agency for the implementation of the Master Plan. This chapter recommends that "transport and development planning process should be established, mega projects coordinated, public transport regulatory process improved, city officials trained, institutional fragmentation rectified. An adequate set of database and planning tools are also needed. An increasingly important approach to infrastructure development is the integration of transport modes and facilities as well as between transport and urban planning and development."

The new transport-related responsibilities represent a great challenge to the MMDA's management and staff, and it is one of the functions of multilateral institutions to provide assistance in this vital capacity-building process. The training component of this project includes technical assistance to the MMDA to build up its capacity in this regard. In addition, the government has established a year-by-year institutional plan, which the World Bank's supervision missions will closely monitor during project implementation.

The MMDA is also receiving assistance from the Asian Development Bank for a US\$122.3-million sector investment project aimed at reducing air pollution emanating from mobile and stationary sources in Metro Manila.<sup>6</sup> About 59 percent of total base costs are assigned to physical improvements for traffic

engineering and road rehabilitation, and 3 percent (US\$2.8 million) for technical assistance to the MMDA for traffic engineering and management training, and for public transport and traffic policy studies. The technical assistance component is expected to commence in early 2001; the terms of reference for the MMDA assistance under the World Bank project are being drafted to complement the Asian Development Bank training component.

## 5. Institutional program and policy letter

The underlying goal of this project, which aims to improve traffic and environmental conditions and increase the use of public transport, is to establish and strengthen institutions responsible for future urban transport management in Metro Manila. The project thus addresses the following two key issues:

- How to strengthen the Metro Manila Development Authority's capacity to effectively carry out its traffic engineering and management responsibilities under the MMDA Act.
- How to improve the framework of overall urban transport planning and decisionmaking, including the integration of various public transport systems and the development of investment and policy priorities.

Regarding the first issue, the Metro Manila Air Quality Improvement Sector Development Program supported by the Asian Development Bank includes a component to strengthen the MMDA's traffic management function for 2000 to 2004. The MMURTRIP project will complement this program by supporting capacity building for 2001 to 2005. The MMDA (in consultation with the DPWH) is developing a year-by-year institutional plan, including a description of its expanding functions and staffing requirements.

Regarding the second issue, the recently completed MMUTIS study was finalized at a workshop in May 2000 and officially approved by the government in July 2000. Based on the findings of the MMUTIS and earlier studies, the government is expected to define its future transport strategy—including the institutional functions and coordination among key players such as the DOTC, DPWH, MMDA, and others. The government is drafting a policy letter on its intended future actions with regard to transport investments and policy measures.

<sup>1</sup> Cracknell, J. 2000. *Experience in Urban Traffic Management and Demand Management in Developing Countries*, Background Paper for World Bank Urban Transport Strategy Review, prepared with funding from the U.K. Department of International Development (draft).

<sup>2</sup> Republic of the Philippines, Office of the President, Metropolitan Manila Development Authority. 1996. *An Act Creating the Metro Manila Development Authority, Defining its Powers and Functions, Providing Funding therefor and for other Purposes (R.A. 7924)*. (Effective June 8, 1996.)

<sup>3</sup> PADECO Co. Ltd. 2000. *Study on Urban Transport Development, Draft Final Report*, conducted with financial support from the Japanese Government, Tokyo, July 2000.

<sup>4</sup> *Op.cit.*

<sup>5</sup> ALMEC Corporation, Pacific Consultants International and Yachiyo Engineering Co., Ltd. March 1999. *Metro Manila Urban Transportation Integration Study, Final Report*, prepared for the Republic of the Philippines and the Japan International Cooperation Agency.

<sup>6</sup> Asian Development Bank. November 1998. *Proposed Loans and Technical Assistance Grant, Metro Manila Air Quality Improvement Sector Development Program*, Report and Recommendation of the President to the Board of Directors, Manila.



**Additional  
Annex 12**

**PHILIPPINES: Metro Manila Urban Transport Integration Project**

**Project Information Brochure**

**Additional  
Annex 13**

**PHILIPPINES : Metro Manila Urban Transport Integration Project**

**Global Environment Facility (GEF)-supported Nonmotorized Transport component  
Marikina Bicycle Network**

**Estimate of benefits deriving from the resulting savings in greenhouse gas emissions**

Growth in population, employment, and scholastic enrollment will increase both inter- and intra-zonal transport demand in the city of Marikina. The increased demand, coupled with increased car ownership, will boost greenhouse gas emissions unless alternative measures to control these emissions are developed and successfully implemented at an early stage. The Marikina Bikeways Project (MBP) supported by the Global Environment Fund (GEF) will help contain the increase of emissions by promoting the shift of the newly generated transport demand toward less polluting modes.

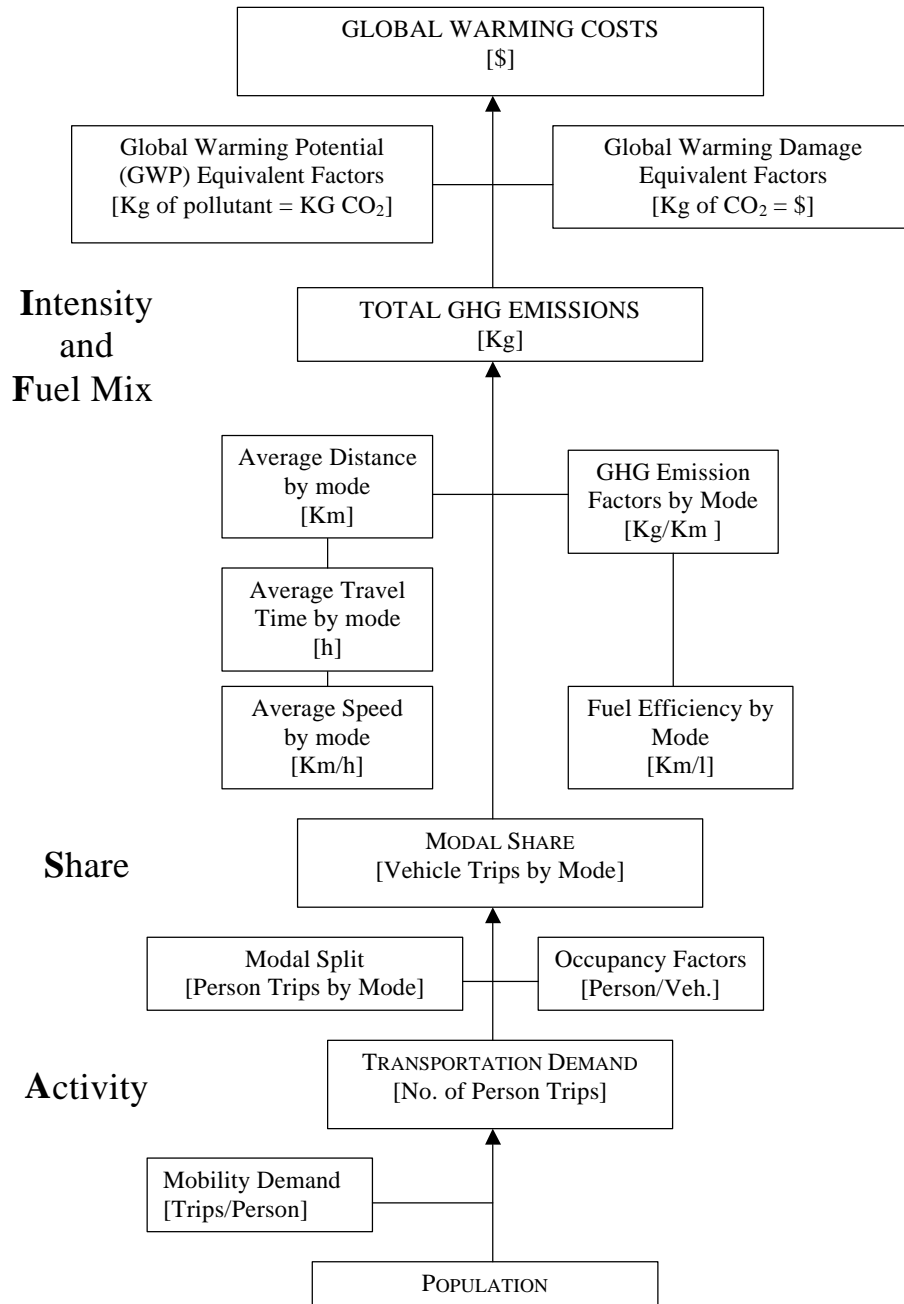
To help evaluate the feasibility of the project, emissions were analyzed. The objective of the analysis was to estimate the global benefits in terms of greenhouse gas emissions reduction through the GEF project. The reduction was computed by comparing the level of emissions in two scenarios: baseline or business-as-usual and with implementation of the Marikina Bikeways Project.

Greenhouse gas emissions reduction is calculated by applying the ASIF methodology.<sup>1</sup> This methodology analyzes the following four components: (i) transportation *Activity (A)*, modal *Shares (S)*, energy *Intensity (I)* of each mode, and the *Fuel (F)* mix of each mode with its greenhouse gas emissions characteristics.

This application of the methodology developed a transport simulation model based on traffic data from recent studies and on a simple set of assumptions for the City of Marikina and the broader metropolitan area of Manila. The simulation estimates future Activities and modal Shares in terms of transport demand, vehicle trips, and average distance by mode. The estimates are combined with the relevant values for energy Intensity and fuel Mix of each mode. As a result, approximate levels of transport-generated greenhouse gas emissions are obtained. By varying the set of assumptions while simulating the GEF and the base case, the model allows some sensitivity analysis to assess the robustness of the findings. The previous section describes an attempt to evaluate benefits in terms of reduced levels of Global Warming Damage (GWD), as expected in the framework of the global overlays assessment approach.<sup>2</sup>

This annex describes the details of the analysis, the simulation model, and the underlying assumptions. A flow diagram illustrating the factors used in the model and their relationships is presented in figure 13.1.

**Figure 13.1 Flow diagram of the transport simulation model**



## 2. Forecast of Travel Demand to Estimate Activity (A)

*Population growth.* The metropolitan area of Manila has been growing rapidly. Its population of less than 2 million in 1950 increased to 5.9 million in 1980 and 9.5 million in 1995. Total population today is estimated to be above 10 million. This increase in population has been coupled with an expansion of the urbanized area, which today has reached about 800 square kilometers, far exceeding the 636 square kilometers of the metropolitan administrative area (or Metro Manila). The total population of the broad metropolitan area, including the adjoining urbanized areas, is about 16 million today. Population growth is expected to continue and the total population of the wide metropolitan area to reach 25 million by 2015, 13 million living in Metro Manila and 12 million in the adjoining areas.

As Manila becomes more densely populated, commercial developments intensify, and the living environment degrades further. Land use in the central areas, once very densely inhabited, gradually changes. Dwellers move to outer areas while commercial and business developments take their place. Manila has experienced this movement since the 1980s. The number of trips and trip distances increase as more households opt to live outside the inner area, and as jobs and school are farther away.

The City of Marikina, situated at the eastern border of Metro Manila, exhibits all the features of this urbanization trend. Its population between 1980 and 1995 increased faster than the Metro Manila average (table 1).

**Table 1 - Trends in Population**

| Area                                   | No. ('000) |            |            | Avg. Growth 1995-2015 (% per year) |
|--|------------|------------|------------|------------------------------------|
|  | 1995       | 2000       | 2015       |                                    |
| Metro Manila ( <i>excl. Marikina</i> ) | 9,097      | 9,897      | 12,744     | 1.7%                               |
| Adjoining Areas                        | 4,914      | 6,212      | 12,550     | 4.8%                               |
| <b>Marikina</b>                        | <b>357</b> | <b>418</b> | <b>670</b> | <b>3.2%</b>                        |

**Source:** NSO and City of Marikina

*Trends in passenger travel demand.* Population growth is associated with increased demand for mobility, both within Marikina's administrative borders and to and from central and other districts of Manila. Changes in the social composition and in the car ownership ratio, which tend to level to the values for the inner urbanized areas, contribute to further amplify the upward trends.

In 2015 the population of the City of Marikina is expected to be 5.1 percent of that of Metro Manila, compared with from 3.8 percent in 1996. Total travel demand for Marikina is expected to be about 6 percent of the total demand generated in the Metro Manila area, compared with only 2.8 percent in 1995. Between 1995 and 2015, the compounded effect of increased population and mobility will result in a 4.7 percent yearly growth rate of passenger travel demand generated in Marikina (table 2, expressed in *passenger trips per day*). These figures are based on the estimates of the Metro Manila Urban Transport Improvement Study (MMUTIS), an ongoing study whose databases provide detailed travel demand figures by origin and destination for the broad metropolitan area.

**Table 2 – Expected Passenger Travel Demand**

| Area                                   | No. of Passenger Trips per Day<br>(‘000) |        |        | Avg. Growth 1995-2015<br>(% per year) |
|--|--|--------|--------|---------------------------------------|
|  | 1995                                     | 2000   | 2015   |                                       |
| Metro Manila ( <i>excl. Marikina</i> ) | 17,258                                   | 18,925 | 22,367 | 1.2%                                  |
| Adjoining Areas                        | 6,842                                    | 8,697  | 18,845 | 5.2%                                  |
| Marikina                               | 496                                      | 710    | 1,274  | 4.7%                                  |

**Source:** Project Team Elaboration based on MMUTIS data.

### 3. Modal Split (S)

*Assumptions and scenarios construction.* In the absence of city-specific forecasts of the future distribution of transport demand between the various modes, the first key assumption is that ***mobility in Marikina will follow patterns similar to those experienced in the inner residential districts of Metro Manila without specific measures favoring the utilization of some modes.***

Modal shares will be similar to those now experienced in Metro Manila central residential areas without a project such as the Marikina Bicycle Network Project, which would induce a change in the mobility patterns. Consequently, two scenarios for modal distribution are simulated to evaluate the effect of the development of the project. A ***first scenario*** (baseline) envisages no significant changes in traffic management policy in the City of Marikina. A ***second scenario*** (GEF Alternative) represents a situation in which the Bikeway Project has been successfully developed, at a minimum maintaining the current share of Nonmotorized Transport traffic and likely inducing its increased use.

An additional assumption is applied in the case of the GEF Alternative, to take into account the effect of the project on interzonal trips modal split. This assumption is that ***the more efficient intermodal connections between the bicycle and the bus/rail modes resulting from the development of the project will favor the use of the bus/rail modes as an alternative to the use of cars and jeepneys.*** Finally, to perform some sensitivity analysis and assess the robustness of the findings, ***three different modal compositions*** (Low, Medium, and High cases) resulting from more or less successful project developments are considered for the GEF Alternative.

*Modal composition.* Essentially, the project will affect intrazonal modal split by maintaining or increasing the current shares of nonmotorized modes and reducing the modal shares of the alternative modes, particularly two-/three-wheel motorized, car, taxi, and jeepney. The project will also affect interzonal modal split with increased shares for the light rail transit and public bus modes (table 3).

**Table 3 – Current and assumed Modal Split Composition**  
(% of Passenger Trips by Mode)

| Mode               | 2000         |                   | 2015            |              |              |
|--------------------|--------------|-------------------|-----------------|--------------|--------------|
|                    | Current      | Baseline Scenario | GEF Alternative |              |              |
|                    |              |                   | Low             | Medium       | High         |
| <b>Private</b>     |              |                   |                 |              |              |
| Bicycle            | 1.6          | 0.0               | 2.0             | 2.8          | 3.5          |
| Motorcycle         | 0.7          | 0.7               | 0.7             | 0.7          | 0.7          |
| Car/Jeep/UV        | 17.5         | 20.5              | 19.2            | 18.5         | 16.4         |
| Truck              | 2.4          | 2.4               | 2.3             | 2.2          | 2.1          |
| <b>Semi Public</b> |              |                   |                 |              |              |
| Taxi               | 4.9          | 5.4               | 4.9             | 4.8          | 4.7          |
| HOV Taxi           | 1.6          | 2.2               | 1.7             | 1.5          | 1.2          |
| Private Bus        | 2.5          | 2.5               | 2.3             | 2.0          | 1.9          |
| <b>Public</b>      |              |                   |                 |              |              |
| N.M. Tricycle      | 0.3          | 0.0               | 1.2             | 1.5          | 2.0          |
| M. Tricycle        | 11.8         | 7.0               | 6.0             | 6.0          | 6.0          |
| Jeepney            | 41.9         | 42.9              | 41.5            | 39.3         | 38.3         |
| Bus                | 14.9         | 14.4              | 16.2            | 18.2         | 20.2         |
| LRT                | 0.0          | 2.0               | 2.0             | 2.5          | 3.0          |
| <b>Total</b>       | <b>100.0</b> | <b>100.0</b>      | <b>100.0</b>    | <b>100.0</b> | <b>100.0</b> |

**Source:** Project Team Elaboration based on MMUTIS and Feasibility Study Data.

*Vehicle occupancy factors and average trip distance and speed.* The greenhouse gas emissions level is a function of vehicle trips and average trip distance. The model computes vehicle trips by mode by dividing the number of passenger trips by mode by the assumed vehicle occupancy factors for each mode. The main assumption is still held. The average trip distance is the product of the average travel speed times the average travel time. MMUTIS data were used to calculate the actual and expected figures for these averages (table 4). The main assumption is still valid, meaning that, with time, all these factors will tend to level off to the current values registered in the central residential areas.

**Table 4 – Vehicle Occupancy and Average Travel Speed and Time**

| Mode         | 2000                        |                      |                         | 2015                        |                      |                         |
|--------------|-----------------------------|----------------------|-------------------------|-----------------------------|----------------------|-------------------------|
|              | Vehicle Occupancy (Pax/Veh) | Average Speed (Km/h) | Average Travel Time (h) | Vehicle Occupancy (Pax/Veh) | Average Speed (Km/h) | Average Travel Time (h) |
| Private      |                             |                      |                         |                             |                      |                         |
| Bicycle      | 1.0                         | 12                   | 0.30                    | 1.0                         | 13                   | 0.53                    |
| Motorcycle   | 1.1                         | 18                   | 0.44                    | 1.1                         | 18                   | 0.44                    |
| Car/Jeep/UV  | 2.2                         | 14                   | 0.97                    | 1.8                         | 12                   | 1.13                    |
| Truck        | 2.1                         | 14                   | 1.04                    | 2.1                         | 13                   | 1.04                    |
| Semi Public  |                             |                      |                         |                             |                      |                         |
| Taxi         | 2.2                         | 14                   | 0.47                    | 2.2                         | 13                   | 0.53                    |
| HOV Taxi     | 4.7                         | 16                   | 0.55                    | 4.7                         | 16                   | 0.70                    |
| Private Bus  | 22.3                        | 16                   | 0.75                    | 22.3                        | 16                   | 0.95                    |
| Public       |                             |                      |                         |                             |                      |                         |
| N.M Tricycle | 2.5                         | 12                   | 0.30                    | 2.5                         | 13                   | 0.47                    |
| M. Tricycle  | 2.5                         | 12                   | 0.30                    | 2.5                         | 12                   | 0.30                    |
| Jeepney      | 15.1                        | 11                   | 0.72                    | 15.1                        | 11                   | 0.72                    |
| Bus          | 46.5                        | 11                   | 1.30                    | 46.5                        | 15                   | 1.03                    |

**Source:** Project Team Elaboration based on MMUTIS and Feasibility Study Data.

#### 4. Energy Intensity (I) and Fuel Mix (F)

*Assumptions on average fuel efficiency and emission factors.* The greenhouse gases considered by the model are **carbon dioxide** (CO<sub>2</sub>), **methane** (CH<sub>4</sub>), **nitrous oxide** (N<sub>2</sub>O), **carbon monoxide** (CO), **nonmethane volatile organic compounds** (NMVOCs), and **nitrogen oxides** (NOx). The main effect of this latter group of gases is to contribute to increasing tropospheric ozone, an important greenhouse gas. Greenhouse gas emissions are related to the efficiency of the vehicle engine and the type of fuel used. Therefore, an additional set of assumptions is made for the shares of fuel/engine type for each mode and for the average fuel efficiency. These assumptions are based on MMUTIS data on the vehicles circulating in Manila and on traffic counts conducted in Marikina during the execution of the Marikina Bikeways Project feasibility study.

Since knowledge of emission factors representative of the present technology level of Asian cities is limited, to select the emission factor this analysis collected references from the *Metro Manila Report*, prepared in the framework of the Urban Air Quality Management Strategy in Asia (URBAIR).<sup>3</sup> Average emission factors were selected and used in the simulation (table 5). These factors fall in the ranges tabulated in the IPCC Guidelines for the inventory of greenhouse gas emissions.<sup>4</sup>

**Table 5 –Fuel/Engine type shares by mode, Average Fuel Efficiency and Emission Factors**

| Mode         | % of mode by fuel/engine type |      | Avg. Fuel Efficiency (Km/l) |      | Average Emission Factors (g/Km) |                 |        |      |                  |                 |     |
|--------------|-------------------------------|------|-----------------------------|------|---------------------------------|-----------------|--------|------|------------------|-----------------|-----|
|              | 2000                          | 2015 | 2000                        | 2015 | NO <sub>x</sub>                 | CH <sub>4</sub> | NM VOC | CO   | N <sub>2</sub> O | CO <sub>2</sub> |     |
| Private      |                               |      |                             |      |                                 |                 |        |      |                  |                 |     |
| Bicycle      | 100%                          | 100% | 0.0                         | 0.0  | 0.00                            | 0.000           | 0.0    | 0.0  | 0.000            | 0               |     |
| Motorcycle   | 2-stroke                      | 90%  | 50%                         | 41.7 | 37.5                            | 0.05            | 0.100  | 6.5  | 10.0             | 0.001           | 57  |
|              |                               | 10%  | 50%                         | 19.6 | 17.6                            | 0.30            | 0.200  | 3.9  | 20.0             | 0.002           | 120 |
| Car/Jeep+UV  | Non-Catalyst                  | 50%  | 10%                         | 12.0 | 10.8                            | 2.30            | 0.070  | 4.5  | 19.0             | 0.005           | 200 |
|              | Catalyst                      | 40%  | 80%                         | 11.8 | 10.6                            | 0.50            | 0.020  | 0.5  | 2.9              | 0.005           | 260 |
|              | Diesel                        | 10%  | 10%                         | 13.7 | 12.3                            | 0.70            | 0.005  | 0.2  | 0.7              | 0.010           | 190 |
| Truck        |                               | 100% | 100%                        | 3.3  | 3.0                             | 10.00           | 0.060  | 1.9  | 9.0              | 0.030           | 770 |
| Semi Public  |                               |      |                             |      |                                 |                 |        |      |                  |                 |     |
| Taxi         | Non -Catalyst                 | 30%  | 10%                         | 12.0 | 10.8                            | 2.30            | 0.070  | 4.5  | 19.0             | 0.005           | 200 |
|              | Catalyst                      | 70%  | 90%                         | 11.8 | 10.6                            | 0.50            | 0.020  | 0.5  | 2.9              | 0.005           | 260 |
| HOV Taxi     |                               | 100% | 100%                        | 7.4  | 6.7                             | 2.90            | 0.080  | 6.1  | 37.0             | 0.006           | 535 |
| Private Bus  |                               | 100% | 100%                        | 7.4  | 6.7                             | 2.90            | 0.080  | 6.1  | 37.0             | 0.006           | 535 |
| Public       |                               |      |                             |      |                                 |                 |        |      |                  |                 |     |
| N.M Tricycle |                               | 100% | 100%                        | 0.0  | 0.0                             | 0.00            | 0.000  | 0.0  | 0.0              | 0.000           | 0   |
| M. Tricycle  | 2-stroke                      | 90%  | 50%                         | 25.0 | 22.5                            | 0.08            | 0.150  | 16.0 | 22.0             | 0.002           | 95  |
|              | 4-stroke                      | 10%  | 50%                         | 19.6 | 17.6                            | 0.30            | 0.200  | 3.9  | 20.0             | 0.020           | 120 |
| Jeepney      |                               | 100% | 100%                        | 4.0  | 3.6                             | 1.32            | 0.150  | 6.4  | 35.8             | 0.023           | 601 |
| Bus          |                               | 100% | 100%                        | 3.3  | 3.0                             | 10.00           | 0.060  | 1.9  | 9.0              | 0.030           | 770 |
| LRT          |                               | -    | -                           | -    | -                               | -               | -      | -    | -                | -               | -   |

## 5. Calculation of Emissions

Based on the previous figures (Travel Demand, Vehicle Occupancy factors, Average Travel Speed and Time, and Average Emission factors) the daily emissions associated with each subcategory (mode, fuel, and emissions control technology type) can be obtained. These can then be aggregated to estimate total emissions from mobile sources.

This process can be expressed formulaically as:

$$\text{Total Daily Emissions} = \sum (E_{fem} \times V_{fem} \times D_{fem})$$

|        |   |   |   |
|--------|---|---|---|
| Where: | E | = | Average Emission Factor                               |
|        | V | = | Vehicle Trips per Day                                 |
|        | D | = | Average Distance Driven per Trip                      |
|        | f | = | fuel type (diesel, gasoline, non motorized)           |
|        | e | = | emission control technology (catalyst, non catalyst), |
|        | m | = | mode (type of vehicle)                                |

The calculation is repeated for the year 2000 current situation and for the four 2015 forecast conditions: the baseline and the three different cases (high, low, medium) under the GEF Alternative scenario.

The effectiveness of a specific greenhouse gas warming the atmosphere depends on both its concentration and on the amount of time it remains in the atmosphere. The contribution of a greenhouse gas to global warming is measured by its global warming potential (GWP), a ratio of the global warming effect from one kilogram of a greenhouse gas relative to that from one kilogram of CO<sub>2</sub> over a specified period of time. To estimate the combined GWP impact of greenhouse gas transport-related emissions, all mass emissions of



these non-CO<sub>2</sub> greenhouse gases are converted into an equivalent mass amount of CO<sub>2</sub> emissions, using the GWP factors recommended by the IPCC (table 6).

**Table 6** – Global Warming Potential of transport related GHGs

| NO <sub>x</sub> | CH <sub>4</sub> | NMVOG | CO | N <sub>2</sub> O | CO <sub>2</sub> |
|-----------------|-----------------|-------|----|------------------|-----------------|
| 1               | 24.5            | 1     | 1  | 320              | 1               |

Source: IPCC Guidelines for National Greenhouse Gas Inventories.

Table 7 below summarizes the result of the simulation and conversion. Aggregate GHG emission is expressed in terms of Kg per day of CO<sub>2</sub> equivalent.

**Table 7** –GHG Emissions Kg per day of CO<sub>2</sub> equivalent

| GHG Type         | 2000           | 2015              |                          |                |                |
|------------------|----------------|-------------------|--------------------------|----------------|----------------|
|                  | Current        | Baseline Scenario | GEF Alternative Scenario |                |                |
|                  |                |                   | Low                      | Medium         | High           |
| NO <sub>x</sub>  | 2,994          | 6,231             | 5,983                    | 5,842          | 5,517          |
| CH <sub>4</sub>  | 2,306          | 4,545             | 4,261                    | 4,115          | 3,852          |
| NMVOG            | 5,516          | 10,368            | 9,599                    | 9,279          | 8,670          |
| CO               | 20,060         | 42,162            | 39,329                   | 37,729         | 34,923         |
| N <sub>2</sub> O | 4,311          | 8,731             | 8,369                    | 8,122          | 7,695          |
| CO <sub>2</sub>  | 434,475        | 925,316           | 877,290                  | 848,040        | 792,893        |
| <b>Total</b>     | <b>469,660</b> | <b>997,353</b>    | <b>944,832</b>           | <b>913,127</b> | <b>853,550</b> |

## 7. Estimation of Global Warming Damages

The estimate of the emissions obtained from the simulation allow computation of an estimate of the GWD expressed in monetary terms, which can be used to carry out a conventional cost-benefit analysis in the framework of a global overlay assessment approach. For the Marikina Bikeways Project, the cost of implementation is strictly compared with the incremental global benefit of greenhouse gas emission reduction in Marikina. This essentially involves comparing negative and positive project impacts in the form of monetary costs and benefits. Project benefits have to be expressed in monetary terms, as nearly as possible. To determine the monetary values of reduced climate change damages, the GWD conversion factor was used. The GWD factor is the equivalent expected damage in US\$ caused by an additional ton of CO<sub>2</sub> emitted. *For the value of this factor there is no single figure, since the global climate has not yet given any scientifically (or consensus) based value.* The IPCC considers on the basis of a 1995 study<sup>5</sup> a range of values from US\$2.7 to 67.5 per ton of CO<sub>2</sub>. Another study<sup>6</sup> suggests that higher order damages

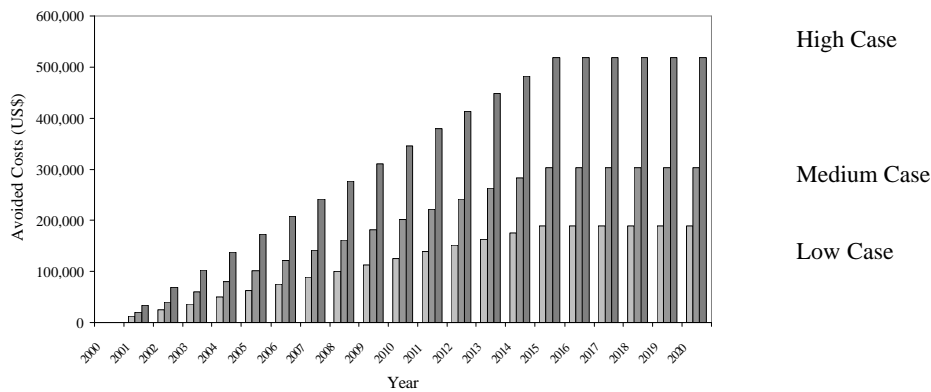
like famine and war may be considerable and should be included in the damage estimates. The studies suggest a much higher value of US\$91.8 per ton of CO<sub>2</sub>. A third, more recent study<sup>7</sup> suggests that *"a range of US\$2 to 20 per ton of CO<sub>2</sub> seems reasonable...most of the estimates tend, as an order of magnitude, towards US\$10 per ton of CO<sub>2</sub>."* This analysis considers the latter assumption. Therefore, the simulation assumes that the damage or cost of an additional kilogram of CO<sub>2</sub> in the atmosphere is US\$0.01.

To carry out the analysis, estimated values in kilograms per day of CO<sub>2</sub> for the baseline and the other four cases are annualized and converted in monetary values through the GWD factor. The difference between the annual total cost of greenhouse gas emissions in the baseline case and in the three With Project cases (figure 13.2) is an avoided cost and therefore a benefit. Its value is then compared with the total cost of the project. In this simplified analysis the monetary values are not discounted.

The following assumptions are made to perform a simplified analysis:

- The total cost of the project is US\$2.1 million.
- The economic life of the project is 20 years (2001 to 2020).
- The increase in the emissions is assumed linear for the first 15 years.
- The level of emissions is then considered constant for the remaining 5 years of economic life.

**Figure 13.2 Yearly values for GWDs avoided during the economic life of the project for three scenarios.**



The difference between the aggregate value of the avoided GWDs and the cost of the project development in the global overlay assessment would be equal to the project benefit (table 8).

**Table 8 – Comparison between Costs and Aggregate Benefits (US\$)**

| <i>GEF Alternative cases of</i>         | <b>Low</b> | <b>Medium</b> | <b>High</b> |
|---|------------|---------------|-------------|
| Aggregate Benefits of reduced emissions | 2,457,983  | 3,941,777     | 6,729,980   |
| Cost of the Project                     | 2,100,000  | 2,100,000     | 2,100,000   |
| Difference                              | 357,983    | 1,841,777     | 4,629,980   |

<sup>1</sup> Schipper, L., and Céline Marie-Lilliu. 1998. *Transportation and CO<sub>2</sub> Emissions: Flexing the Link. A Path for the World Bank*. Draft paper. Washington, D.C.: World Bank.

<sup>2</sup> Halsnaes K., A. Markandya, and J. Sathaye J. 1999. *Transport and the Global Environment: Global Overlays for the Transportation Sector*. Draft report. Washington, D.C.: World Bank.

<sup>3</sup> *Metro Manila Report*. 1997. URBAIR. World Bank Technical Paper N. 380. Washington D.C.

<sup>4</sup> Intergovernmental Panel on Climate Control. 1996. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Vol. 3, IPCC WGI Technical Support Unit, Bracknell, U.K.

<sup>5</sup> Fankhauser, S. 1995. *Valuing Climate Change: the Economic of the Greenhouse*. London: Earthscan.

<sup>6</sup> Friederich, R., P. Bickel, and W. Krewitt, eds. 1998. *The External Costs of Transport*. Band 46, IER, University of Stuttgart, Germany.

<sup>7</sup> Delucchi, M. 1998. *Summary of the Non Monetary Externalities of Motor Vehicle Use*. Institute of transportation Studies, University of California, Davis.

**Additional  
Annex 14**

**PHILIPPINES: Metro Manila Urban Transport Integration Project**

**Global Environment Facility (GEF)-supported NonMotorized Transport component  
Marikina Bicycle Network  
Incremental Cost Analysis**

**1. Development Goals and Global Environmental Objectives**

Metro Manila is a massive urban area that is made up of 17 municipalities, of which 13 are cities, and accommodates about 10.2 million people (1997). Its population has grown rapidly in recent years. By 2015 Metro Manila is expected to become a massive conurbation of 13 million (MMUTIS 1997). This increase in population has accompanied expansion of the urban area, which today covers about 800 square kilometers, far exceeding its administrative area. As Metro Manila becomes more and more densely populated, commercial developments intensify and the living environment degrades further. Land use in city centers, once densely inhabited, gradually changes. Dwellers move to outer areas while commercial and business developments take their place. With more households opting to live outside the inner area of Metro Manila, and with jobs and schools farther away, the number of trips and trip distances are expected to increase.

Moreover, economic prosperity has accelerated motorization and the demand for mobility, causing severe traffic congestion and serious air pollution, particularly in the inner areas. Without effective action, these problems will worsen over time as the area continues to grow. Residents currently rate traffic congestion as the number one quality of life problem, and air pollution, mainly caused by motor vehicles, as problem number two.

The City of Marikina, one of the municipalities of Metro Manila, is a rapidly growing municipality of about 360,000 people on the eastern border of the Metro Manila administrative area. Marikina shows all the features of the urbanization trend described above. Its population increased from 1980 to 1995 faster pace than the Metro Manila average. Marikina's growth in population is associated with an increased demand for mobility, both within its administrative borders and to central and other districts of Metro Manila. The number of passenger trips is expected to increase from the current average of 496,000 a day to about 1,200,000 a day. At the same time, changes in social composition influence the car ownership ratio, which tends to level to compare with the values for the inner areas.

Increased demand coupled with increased car ownership will boost greenhouse gas (GHG) emissions unless alternative measures to control these emissions are developed and successfully implemented at an early stage. Moreover, while more than 2 percent of all trips in the City of Marikina are now by bicycle, the anticipated increase in traffic and pollution will likely cause the disappearance of this mode of transportation. This pattern is already experienced in inner Metro Manila (and in many other Asian cities), where bicycles have been crowded out.

**2. The Metro Manila Urban Transport Integration Project**

With funding from the World Bank and the Government of the Philippines, the Metro Manila Urban Transport Integration Project (MMURTRIP) is being prepared to address the deteriorating urban transport situation and the resultant detrimental environmental situation. The development objective of the MMURTRIP project is to reduce congestion and travel time and improve environmental and safety

conditions, particularly for public transport users, most of whom are poor “captive” users. This objective will be achieved through implementing effective traffic management measures along major travel corridors. These measures include improving street-level interchange among buses, jeepneys, and light rail transit (LRT) lines together with increasing access to outer areas and improving the road network hierarchy. At the same time, the project aims to demonstrate the value of such traffic management measures as cost-effective ways to reduce congestion along the main travel corridors, thus enhancing the use of public transport and the efficacy of private sector-sponsored “megaprojects.”

The major quantified benefit of the MMURTRIP project will be reduced congestion and travel time along the main travel routes, leading to more use of public transport. A major unquantified benefit of the project will be an improved urban environment and increased safety. The project would provide facilities to safeguard pedestrians in and around LRT stations and other public transport interchanges, where pedestrians disrupt road traffic and are exposed to safety hazards because of inadequate facilities.

The Government of the Philippines has pursued a combination of megaprojects and flyovers to solve traffic congestion, with limited results. The aim of the MMURTRIP project is to demonstrate alternatives to these measures. National government planners currently resist such alternative measures as bus lanes, concentration on traffic management, integration of modes, and priority for public transport trips. By demonstrating the efficacy of these alternatives the project hopes to overcome this resistance, which until now has been difficult to do because such examples did not exist in the Philippines. Ideally the public will demand such approaches once they see their impact.

Moreover, the policy thrust of the project is to bring into focus at the planning stage the need to coordinate relevant institutional roles, physically integrate various modes, and consider environmental and safety hazards. By demonstrating the government's role and the importance of complementary investments to enhance the full potential of public or private investments, the project hopes to remove barriers to recognizing the importance of metropolitan governance and complementary traffic management measures to realize the potential of public or private investments.

### **3. The Proposed GEF-Supported Component**

The proposed Global Environment Facility (GEF)-supported project, or the GEF Alternative, will be implemented as a component of the broader MMURTRIP project. The GEF Alternative consists of designing and operating a system of bicycle trails and designated lanes for nonmotorised transport (NMT). These trails and lanes will connect residential communities with schools, employment centers, the new metropolitan train station, and other public transport terminals, where appropriate parking facilities will be created. The project's development will help keep bicycles from being crowded out of the urban area. Furthermore, connection to the public transport terminals will promote the use of NMT combined with trains and buses for trips between Marikina and the rest of the Manila metropolitan area.

The global benefits of the project consist of a reduction in expected traffic and congestion and a consequent decrease in emissions of greenhouse gases and other pollutants compared with those Metro Manila faces today. An additional indirect benefit, of no less value, will be to demonstrate the benefits and viability of bicycles and nonmotorized transport. The project hopes that recognition of the sustainability, lack of pollution, and low cost of this form of transport for commuting will encourage the adoption and development of similar facilities elsewhere in Metro Manila and in the Philippines.

### **2. Role of the GEF Alternative in removing barriers to the use of nonmotorized transport**

The project requests GEF support to overcome barriers in addressing global emissions from motorized transport by making nonmotorised transport a viable alternative means of transportation. The primary

objective of the GEF bicycle network project component is to contain the increase of greenhouse gas emissions by maintaining the current share served by nonmotorised modes and by shifting some of the new transport demand toward less polluting modes. A secondary objective is to demonstrate and publicize the benefits and viability of bicycles as an alternative transport mode to encourage replication of this pilot program in other parts of Metro Manila, elsewhere in the Philippines, and in other countries.

Under the GEF Alternative, the City of Marikina would modify its transport development program, which currently focuses exclusively on road expansion and improvement, to actively promote greater use of bicycles and walking as alternatives to motorised transport, and thereby to encourage a shift from motorised transport to these environmentally-friendly options. The barriers to this shift are travelers' perceptions and the reality that bicycles and walking are relatively slow, inconvenient, and sometimes unsafe transport options. These barriers are largely caused by the lack of appropriate facilities for bicyclists and walkers. With GEF support, the project would overcome these barriers by constructing a pilot network of bicycle and pedestrian lanes and paths along well-traveled commuter routes (adjacent to existing roads and public access areas) in low-income areas, installing bicycle storage facilities at light rail stations to make these transport modes safer and more convenient, and publicizing and promoting these alternative transport modes through an awareness campaign and safety program.

Other barriers to a move to environmentally-friendly nonmotorized transport include the failure of accepted transport economic analysis to capture environmental externalities when assessing the feasibility of such investments and political pressure and planning mentality that encourage investing in expanding motor vehicle road capacity rather than bicycle facilities to alleviate congestion. Both the Philippines National Economic Planning Agency (NEDA) and the World Bank consider that transport economic benefits derive from vehicle operating cost savings of existing and future traffic, time cost savings, and accident cost savings. Current methodologies that focus on evaluating motorized traffic options use only vehicle operating cost savings and time cost savings. These analytical methods do not capture other transport-related externalities caused by congestion and pollution.

There have been several attempts to promote analytical consideration of other benefits, such as social benefits and benefits from nonmotorised transport. Although most people accept that nonmotorized transport has environmental benefits, no accepted method exists to justify these benefits. The MURTRIPP project aims to develop a methodology for calculating the benefits from savings in greenhouse gas emissions, to implement a bicycle network, and to demonstrate its impact on motorized traffic levels. Because both agencies require a minimum 15 percent economic rate of return (ERR) for any investment based on accepted methods, this viable mode of transport is excluded in many countries and World Bank-financed projects. The opportunity to reduce and limit the increase in greenhouse gas emissions from transport is therefore lost.

The GEF Alternative will help remove additional barriers to the use of nonmotorized transport and its consideration and acceptance at planning stage. In Metro Manila and the City of Marikina these barriers include travelers' perceptions and the danger and dominance of motorized transport that make bicycles and walking unsafe without appropriate facilities for bicyclists and walkers and solutions to traffic congestion. Under the GEF Alternative, the City of Marikina would modify its transport development program, which currently focuses exclusively on road expansion and improvement, to include developing appropriate facilities and promoting greater use of bicycles and walking as alternatives to motorised transport.

The development of the GEF Alternative will help demonstrate that nonmotorized expansion has an impact on motorized traffic levels and helps limit the increase in greenhouse gas emissions without negatively affecting generalized transport costs (time and operating costs) and mobility. The model developed to estimate emissions based on current and future transport activities and the monitoring activities envisaged as part of the GEF-supported project will help establish an alternative, more comprehensive framework for

the economic analysis of transport operations in general and for transport operations that include components that support the expansion of nonmotorized transport in particular.

#### **4. GEF Strategic Context**

The Nonmotorised Transport Global Environment Facility-supported component of MMURTRIP was proposed by the Department of Public Works, Urban Roads Project Office and subsequently endorsed by the mayor of the City of Marikina in a request to the World Bank for assistance with GEF funding for incremental cost. The project made a strategic choice to limit the bicycle network intervention to one city for a demonstration effect. Since political commitment is crucial for the success of such initiatives, the City of Marikina was chosen for the exceptional commitment to nonmotorized transport and related environmental issues shown by its current administration. Marikina has funded preliminary diagnostic work on the component and has set up a counterpart team composed of staff of various city offices (Settlement, Health, Engineering, and Administrative). This team will be responsible for liaison and coordination among the various units of the administration and with consultants and contractors to encourage a shift from motorized transport to these environmentally friendly options.

#### **5. Incremental Cost Analysis**

The incremental cost of achieving the global benefits of the GEF Alternative is based on developing a system of bicycle trails and designated lanes for nonmotorized transport (the GEF case) compared to the base case.

##### *Base case scenario*

Although the anticipated MMURTRIP components to be implemented in the City of Marikina take into consideration modal integration and environmental and safety hazards, they do not specifically address nonmotorized transport. Moreover, the current city transport development plan does not include any investment in bikeways or other nonmotorized transport facilities. Therefore, without GEF support to remove the barriers to a transport policy approach in favor of nonmotorized transport, and development of adequate facilities to encourage bicycle use, the changes described in the previous section will produce a modal choice pattern similar to the present modal composition in the inner residential districts of metropolitan Manila.

By 2015 the combined effect of increased transport demand and modal split changes in favor of motorized transport will sharply increase congestion and pollution, and will probably force the disappearance of bicycles and other forms of nonmotorized transport. Car and utility vehicles trips are forecast to increase from the actual average of 53,000 trips a day to more than 120,000. Walking trips are expected to drop significantly, with more pedestrians choosing to use semipublic modes such as taxis or private buses and jeepneys, which will further increase traffic congestion.

In the base case scenario, the daily emissions of greenhouse gases are forecast to almost double, reaching about 1 million tons of carbon dioxide (CO<sub>2</sub>). This will happen even if the average fuel efficiency of the motorized vehicle fleet improves considerably and people use public transport more efficiently.

##### *GEF case*

The GEF grant and the contribution of the City of Marikina will fund the development of bikeways and related facilities. The Nonmotorised Transport component in the City of Marikina will include:

- Fifty kilometers of bikeways on existing roads and 16 kilometers of bikeways along the Marikina River banks, connecting to the new LRT station.
- Traffic calming and pedestrianization around schools and market areas and provision of bicycle parking facilities.
- Street lighting where necessary to ensure safety after hours.
- Public awareness.
- Bicycle safety.

The 66-kilometer bikeway network will connect residential communities with schools, employment centers, the new light rail transit station, and other public transport terminals. On all sections and main attractors of the bikeways system, road and surface markings will be traced, signs placed, and parking and safety facilities installed. A series of pedestrianized areas and traffic calming measures will increase the safety of the bikeway network and help preserve walking trips. Street lighting in some areas will improve the safety of both cyclists and walkers.

The city administration will launch a public awareness campaign, including a monitoring component. The campaign, which will begin at project preparation stage and continue through the development of the project, will promote the use of bicycles and other nonmotorized transport and receive feedback from users. A safety campaign will sensitize motorized vehicle drivers and encourage them to respect bikers and other nonmotorized transport users.

The incremental cost of the component is estimated at US\$1.51 million, of which US\$1.26 million will be financed by the GEF grant. The City of Marikina will provide the US\$0.25 million counterpart funds. (Table 14.1).

**Table 14.1 Total costs of the Metro Manila Urban Transport Integration Project (US\$ million)**

| <b>Component</b>                                      | <b>Indicative Costs (US\$ million)</b> | <b>IBRD</b>  | <b>GEF</b>  | <b>GOP</b>  |
|---|--|--------------|-------------|-------------|
| 1. Traffic Management Improvements                    | 13.6                                   | 11.0         | -           | 2.6         |
| 2. MARIPAS Access Improvements                        | 38.4                                   | 28.6         | -           | 9.8         |
| 3. Secondary Roads Program                            | 32.5                                   | 21.0         | -           | 11.5        |
| 4. Non-Motorized Transport                            | 1.51                                   | -            | 1.26        | 0.25        |
| 4.1. <i>Bikeways (66 kilometers)</i>                  | Urban Transport                        | 1.08         | 0.92        | 0.16        |
| 4.2. <i>Traffic calming and pedestrianisation</i>     | 0.18                                   | -            | 0.14        | 0.04        |
| 4.3. <i>Lighting</i>                                  | 0.10                                   | -            | 0.08        | 0.02        |
| 4.4. <i>Training and capacity building at the BPO</i> | 0.05                                   | -            | 0.04        | 0.01        |
| 4.5. <i>Education Campaigns</i>                       | 0.05                                   | -            | 0.04        | 0.01        |
| 4.6. <i>Replication Campaigns</i>                     | 0.05                                   | -            | 0.04        | 0.01        |
| 5. Institution Building/Technical Assistance          | 1.0                                    | 1.0          | -           | -           |
| Front end fee   | 0.62                                   | 0.62         |             |             |
| <b>Total Costs</b>                                    | <b>87.42</b>                           | <b>62.00</b> | <b>1.26</b> | <b>24.2</b> |



The development of the GEF-supported component will help remove barriers to the use of bicycles and other nonmotorized transport. The City administration will consider nonmotorized transport in its transport policy and will give priority to integrating bicycles with public transportation. Nonmotorized transport users will have a safe and efficient system for mobility over short and medium distances, and this mode of transport will not be crowded out. Parking facilities and connections with public transport terminals will promote the use of nonmotorized transport combined with light rail and bus for trips between Marikina and the rest of the metropolitan area.

Implementation of the GEF supported component is expected to shift the modal choice pattern away from that experienced in the inner district of Metro Manila and many Asian cities where nonmotorized transport shares are declining or disappearing. The nonmotorized transport modes will maintain or increase their quota as well as that of public transport on light rail and buses. Consequent avoidance of many car trips outside the area and many jeepney trips over short-medium distances will help reduce congestion and, together with other traffic calming measures, make nonmotorized transport even more attractive, thus triggering a virtuous cycle that will be exportable to other areas of Metro Manila or other medium cities in the Philippines and abroad.

Global benefits

By 2015 the daily emissions of greenhouse gases in the GEF case scenario are forecast to increase substantially less than under the base case scenario. With some reasonable assumptions, the savings in greenhouse gas emissions (only for the City of Marikina) are estimated at about 100 tons of CO<sub>2</sub> equivalent a day. Assuming that the project has an economic life of 20 years (2001-2020) and a linear increase of transport demand during the first 15 years, the greenhouse gas savings are estimated at about 400,000 tons of CO<sub>2</sub> equivalent (see annex 4).

Local environmental benefits

In the GEF case scenario, additional local benefit will result from reduced motor vehicle-produced pollutants other than greenhouse gases (oxides of sulfur [SO<sub>x</sub>], lead, benzene, and ethylene), leading to lower ambient levels of pollution in the project area.

Incremental cost matrix

The incremental cost analysis can thus be summarized (table 14.2).

**Table 14.2 Incremental cost matrix of the Metro Manila Urban Transport Integrated Project**

|                    | <b>Base case</b>   | <b>GEF case</b>   | <b>Increment</b> |
|--------------------|--|---|------------------|
| <b>Description</b> | With an increase in motorized traffic and congestion, the use of nonmotorized transport will decline and eventually disappear by 2015. | The actual quota of nonmotorized transport will be maintained or increased. | n.a.             |

|                                    |      |  |                   |
|------------------------------------|------|--|-------------------|
| <b>Global environment benefits</b> | None | Greenhouse gas emissions will decrease by about 400,000 tons of CO <sub>2</sub> equivalent during the 20-year life span of the project.  | n.a.              |
| <b>Local environment benefits</b>  | None | Reduced motor vehicle-produced pollutants other than greenhouse gases will lead to lower ambient levels of pollution in the project area.  | n.a.              |
| <b>Indirect benefits</b>           | None | Demonstration of nonmotorized transport as a sustainable, nonpolluting, and inexpensive form of transport and as a viable alternative for commuting will induce the development of similar facilities elsewhere in the Philippines and in other countries. | n.a.              |
| <b>Costs</b>                       | 0    | US\$ 1.51 million  | US\$ 1.51 million |

## City to have bike lanes

By Ike Cruz

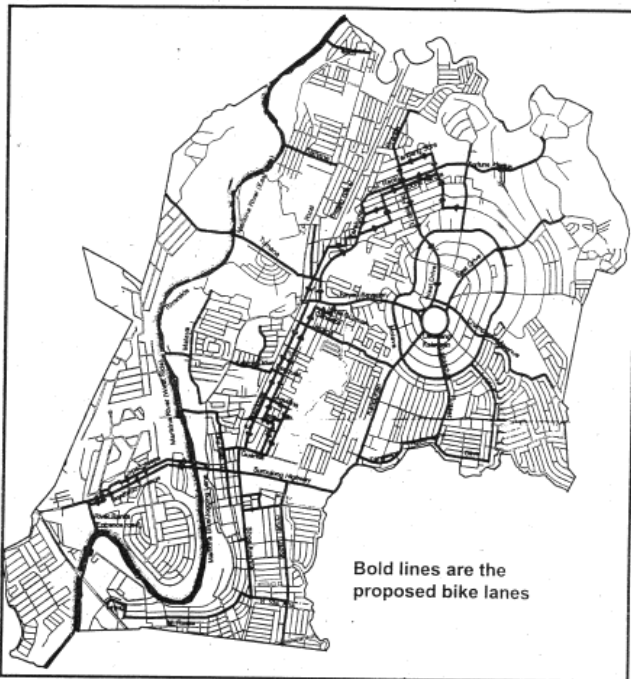
The City Government of Marikina has engaged recently the services of the UP-NCTS Foundation Inc. to study the feasibility of establishing a network of bicycle lanes within the city. The study was funded by a P1 million grant from the World Bank.

Conceived by Mayor Bayani "BF" Fernando, the project is aimed at promoting low-cost and environment-friendly alternative means of transport. By providing space for bicycle lanes in existing

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RIVER CITY **Garffe**



City to have . . .

roads, the project aims to encourage residents to use bicycles in making short distance trips to their workplaces, schools and government, commercial and recreational centers within the city.

The project consists of a citywide bikeway network, including a combined jogging lane cum bikeway along the 22-kilometer stretch on both sides of the Marikina River. The total length of existing

roads where bikeways shall be designated is 49.7 kms. Of the total length, 30.8 kms. will involve only road repairs and asphalt toppings of delineated bikeways, while 18.9 kms. will necessitate road widening. The riverside bikeways will involve the rehabilitation and improvement of 8.2 kms. of existing jogging/bike lanes and the construction of an additional 8.4 kms. of new lanes.

An adjunct to this project

is the setting-up of parking spaces complete with bicycle racks and sheds in strategic places all over the city.

In its study submitted to the World Bank, the consultants believe the project is "financially and environmentally sound and feasible." The project is expected to be implemented within this year, costing an estimated P89 M grant from the World Bank.

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