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Japan International Cooperation Agency (JICA)

METRO MANILA URBAN TRANSPORTATION INTEGRATION STUDY

TECHNICAL REPORT NO. 6

URBAN ROAD DEVELOPMENT IN METRO MANILA

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mmutis

MMUTIS STUDY TEAM

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1. INTRODUCTION

1.1 Background

This study concerns urban road development in Metro Manila where many infrastructure development plans have encountered social (e.g. land acquisition, squatter eviction) and financial (e.g., fund shortages) problems to become less implementable. Many infrastructure development programs have either been shelved or suspended because of these constraints.

Urban infrastructure development projects are generally implemented in several phases. Social and technical difficulties are usually encountered in these various phases. The degree of difficulties usually increases in the built-up area because few projects can be implemented on a stand-alone basis. These difficulties can be classified into two factors, namely general factors that universally make a project less implementable physically, technically, institutionally, and financially, and particular factors that are artificially caused by lack of coordination and human manipulation.

It is difficult to systematically address all these general and particular constraints. However, it may be possible to analyze them from a technical viewpoint in order to make urban road development plans more implementable.

1.2 Objective of the Paper

The objective of this study is primarily to provide adequate information regarding urban road development in Metro Mania so as to expedite implementation. The paper also aims to summarize current road problems and introduce practical measures through technical assessment.

2. ROAD DEVELOPEMNT

2.1 Network Configuration

2.1.1 Background

Several attempts at developing a comprehensive road classification for the road network system in Metro Manila have been made since 1950s. It has been an established fact that the effective use and management of the road system requires a thorough knowledge of the design elements and criteria of the system as well as a recognition of the roles and functions of each segment of the system.

As far as the road network in Metro Manila is concerned, the following two studies have come up with the classification system:

- Metro Manila Urban Expressway System Study (MMUES) was conducted by DPWH / JICA in 1993 to formulate the master plan for urban expressway network in Metro Manila.

- Figure 2.1 shows the urban expressway network in Metro Manila and its surroundings as proposed by the MMUES. After the Philippine Government has adopted the policy of expressway development by BOT scheme, some links were reviewed and deferred.

2.1.2 Road Classification

2.1.2.1 Functional Classification in Urbanized Areas

1) Urban Freeway

Urban freeways serve as the principal network of traffic flow throughout the urban area. They provide direct service to the principal traffic generators such as the central business district, major employment centers, goods distribution and transfer centers, transportation terminals and interconnect all portions of the urban area. They also provide connections to and extensions of rural arterial or rural collector highways. Such provisions include both internal penetrating routes and circumferential or by bypass routes.

2) Primary Arterial

The primary arterial system carries the major portion of trips entering and leaving the urban area as well as the majority of through movements desiring to bypass the central city. In addition, significant intra-urban travel, such as between central business districts and outlying residential areas, between major inner city communities or between major sub-urban centers is served by Primary Arterial Roads. Finally, this system urbanize areas provides continuity for all rural arterial that intercept the urban boundary.

FIGURE 2.1
PRIMARY / SECONDARY ARTERIAL AND COLLECTORS

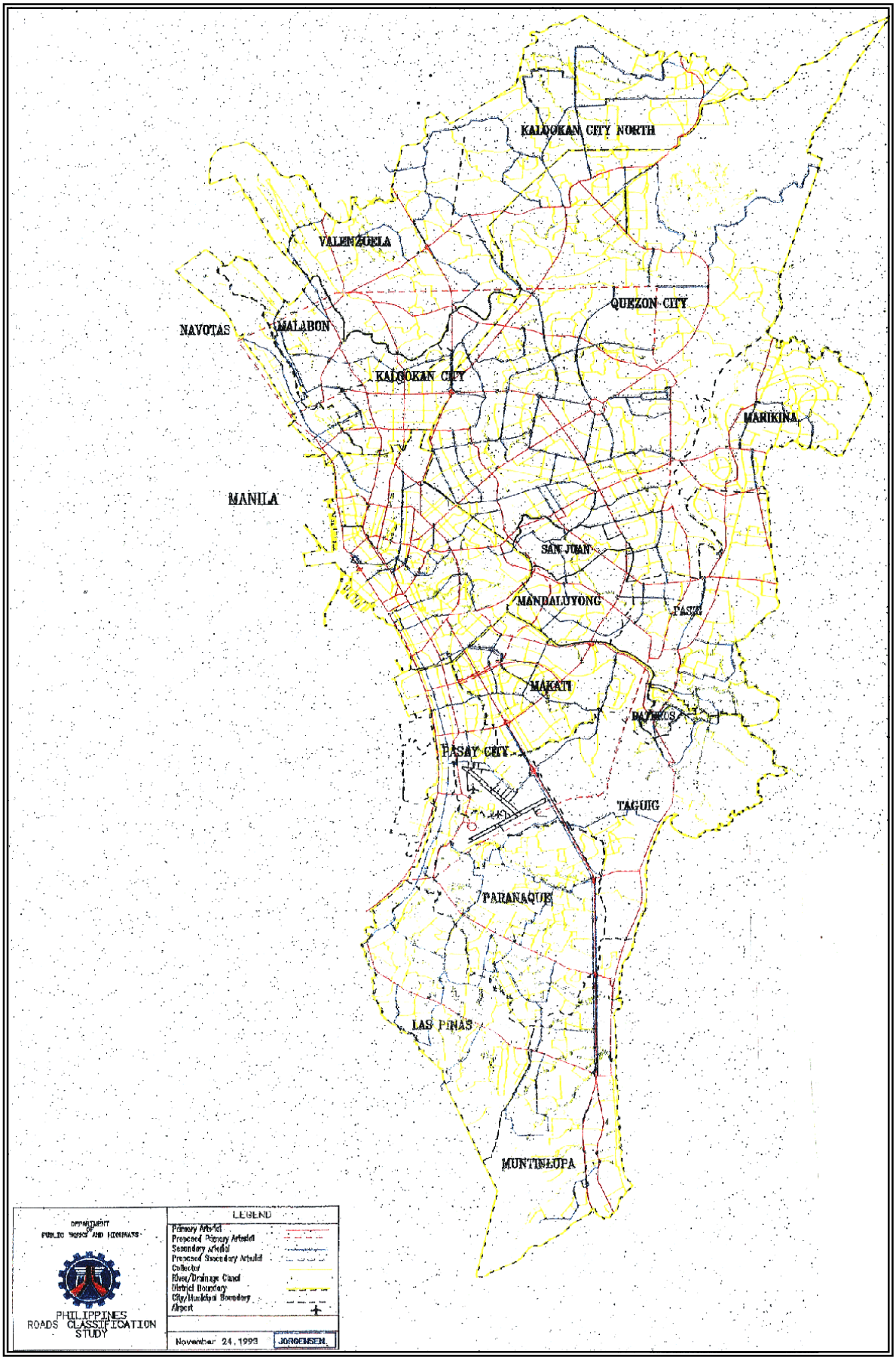
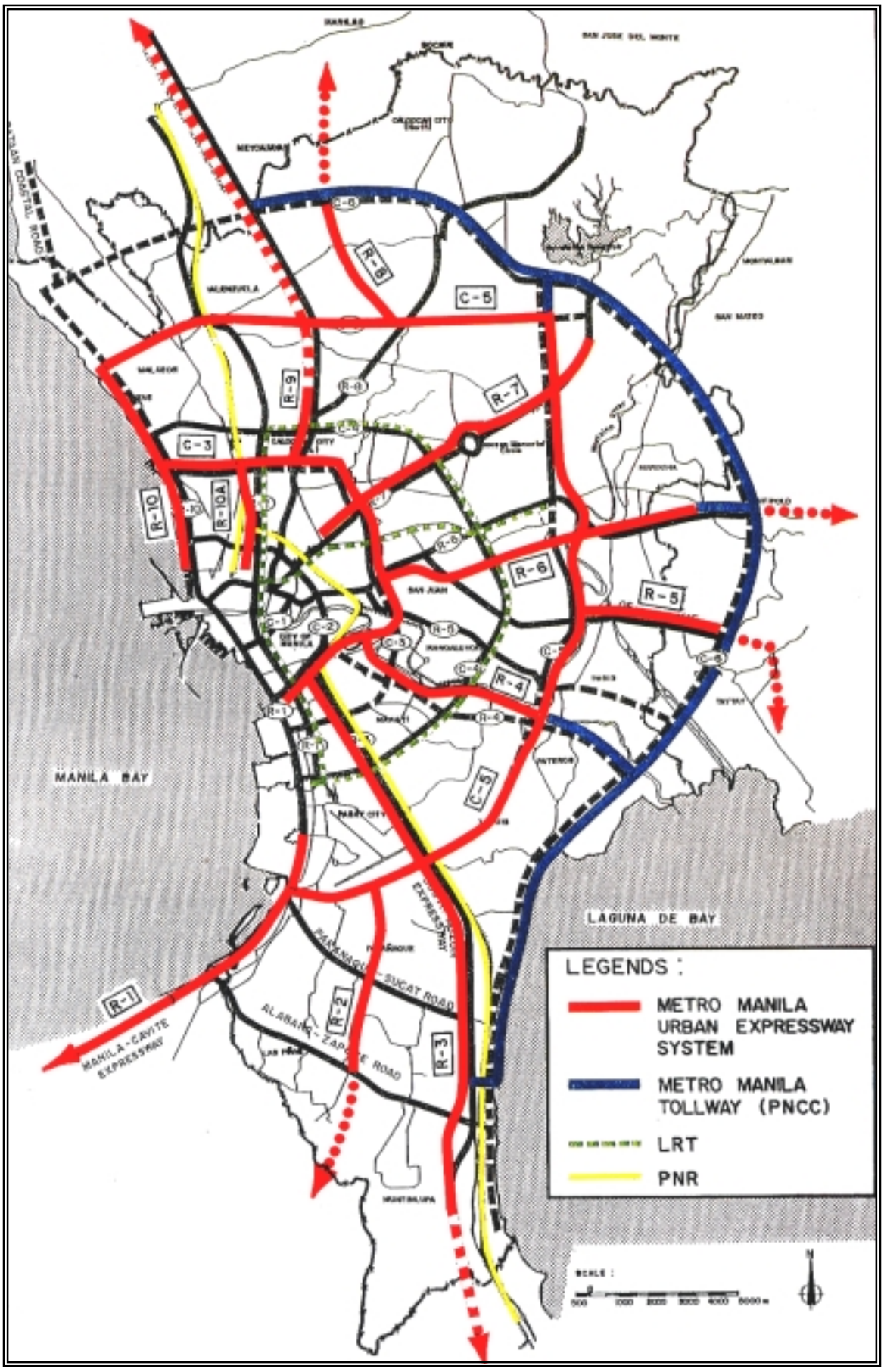


FIGURE 2.2
PROPOSED METRO MANILA EXPRESSWAY SYSTEM



3) Secondary Arterial

The secondary arterial street interconnect with and augment the urban primary arterial system and provides service to trip of moderate length at a somewhat lower level of travel mobility than primary arterial. This system also distributes travel to geographic areas that are smaller than those identified with the higher system.

The secondary arterial street system includes all arterial not classified as primary and contains facilities that place more emphasis on land access than higher systems, but offer a lower level of traffic mobility. Such facilities carry local bus routes and provide intra-community continuity, but do not penetrate identifiable neighborhoods. This system includes urban connector to rural collector roads where such connections have not been classified to internal reasons as urban primary arterial. The spacing of secondary arterial streets varies from 0.2 - 0.4 km in the central business districts to 3-5 km in sub-urban fringes.

4) Collectors

The collector system penetrates neighborhoods, distribute trips from the arteries through the area to the ultimate destination which may be on a local or collector streets. The collector also collects traffic from local streets in the neighborhoods and channels it into the arterial system. In some cases, due to the design of the overall street system, a minor amount of through traffic is allowed on some collector streets.

5) Local streets are all streets not otherwise classified as arterial or collector. Their principal function is to provide access to property located along their immediate length.

Some local streets having commercial frontage serve fairly substantial volumes of traffic. However, this traffic is of terminal nature rather than providing movement through the area.

2.1.2.2 Administrative Classification

1) National Road

National roads are all roads that form part of the main trunk line system. They are continuous in extent and include all roads leading to national ports, national seaport, national parks or coastal-to coastal roads. National roads can be designated as national primary or national secondary. This classification may also include any other roads that are designated as such by the Secretary of Public Works and Highways.

2) Provincial Road

Provincial roads are roads that are not identified as national roads, connecting one municipality with another, the termini to the public plazas. It also includes all roads extending from a municipality or province to another or any other road designated as such.

3) City Road

City roads are those roads / streets within the urban area of a city.

4) Municipal Road

Municipal roads are those roads / streets within a municipality.

5) Barangay Road

Barangay roads are rural roads located either outside the urban area of a city or outside industrial, commercial or residential sub-divisions that act as feeder or farm-to-market roads and which are not classified as national, provincial, city or municipal roads. Roads located outside the designated area of a municipality and those roads located outside the urban area of a city are o be designated as such by the Barangay Council concerned.

6) Private Road

Private roads are roads that are not classified as national, provincial, city municipal or barangay road, yet serve the main purpose of proving a surface transportation link. Several examples of this area are Ayala Avenue in Makati and South Super Highway, as well as streets within private sub-divisions.

2.2 Existing Road Facilities and Conditions

2.2.1 General Condition

Roads in Metro Manila are relatively in fair conditions in terms of quantity and quality compared with other major cities in the Philippines. It is obvious that considerable investment have been made for a long span of tine by DPWH and local governments in order to secure the hub of national commerce and capital region as well. However, road conditions are far from satisfactory due to rapid increase in traffic and the converging vehicles on limited number of arterial roads. These unsatisfactory conditions are among the major causes of traffic problems that are aggravated by constraints such as lack of facilities, network deficiency or driver's behavior.

2.2.2 Present Road Conditions

This section provides an analysis of road conditions based on the following elements:

- Road Network
- Traffic Obstacles
- Intersections
- Lack of Facilities

2.2.2.1 Road Network

1) Poor Hierarchy of Roads

Road traffic needs mobility and accessibility. Arterial roads have high mobility by certain degree of access control, while local road requires high level of access to destination or egress from origin. Predominant ribbon development as well as exclusive villages adjacent to arterial roads seem to discourage development of collectors / distributors.

2) Low Substantial Road Density

Many private roads are found in Metro Manila especially in private subdivision or "villages". Some private roads are open to public, but most of private roads in exclusive villages are limited to residents thus forcing through traffic to make detour. From the road transport planning perspective, substantial road density in areas where exclusive villages exist has remained low.

3) Poor East-West Connection

Since only four (4) bridges cross the Marikina River and the Mangahan Floodway, east-westward traffic converges on Aurora Avenue and Ortigas Avenue. Number of east-westward bridge are small compared with eleven (11) north-southward bridges crossing the Pasig River, even though traffic capacity in both two axis cannot accommodate existing traffic volume.

4) Lack of Crossing Streets with Arterial Roads

U-turn movements are generated considerably to compensate for left-turn movement due to lack of crossing streets with arterial roads.

2.2.2.2 Traffic Obstacles

1) Facilities Along Arterial Street

Through traffic flow are affected by many kinds of obstacles such as roadside establishments, physical constraints, multipurpose use of road, road users behavior, among others.

Road vendors, vehicle repair shops, stockyard of adjacent factories, shopping centers, schools, warehouse, bus stops and terminals are among the major obstacles. Inflow and outflow of the traffic at these facilities, the lack of parking spaces and direct use of access / frontage roads cause traffic congestion on arterial roads.

2) Physical and Engineering Constraints

Deep potholes, cracks with significant vertical gaps, floodwater and deep excavation by on-road construction works are among the major physical constraints. Curing of concrete paving works on existing roads that usually last for two weeks is also a traffic obstacle. Reduction of lateral clearance by electric poles, traffic sign boards, among others, also traffic obstacles.

Another engineering constraint is the discontinuity of lane numbers in the carriageway. Carriageway lane numbers vary over a whole length of roads with no relation to the traffic demand. Traffic congestion usually occurs at the traffic bottleneck section.

2.2.2.3 Intersection

1) Small roundabout and staggered intersections

Many small radius roundabout and staggered intersections bring about additional traffic congestion on arterial roads.

2) Unbalance number of lane at intersections

The same number of lanes should be provided for inflow and outflow of through traffic at intersections.

3) Improper geometric standards at intersections

Short sight-distance, steep access gradient, small radius of horizontal curvature, etc., can be observed at the vicinity of at grade intersection.

2.2.2.4 Lack of Road Incidental Facilities

Lack of traffic signals, pedestrian sidewalks, guardrails, traffic islands / markings, drainage, traffic signs also disturb traffic flows. Traffic capacity decreases considerably by various side frictions, especially because of the occupation of pedestrian sidewalk by squatters.

2.3 Accomplishment (1984-1995) and Development Direction

2.3.1 Accomplishment

2.3.1.1 Public Road Development

Serious problems related to land acquisition, property compensation and squatter evacuation / relocation had led to delays in road construction activities. This explains why public sector road development in Metro Manila has fallen short of the planned road length targets.

Figure 2.3 show road development in Metro Manila from 1984 to 1995. On the other hand, urban development by private sector including residential development has intensively progressed and road development (i.e. local street / collector road within their premises) associated with these urban development has taken place.

However, road improvements including grade separation structures, widening and pavement / drainage rehabilitation has been intensively carried out for one and a half decades. Figure 2.2 shows road improvement projects in Metro Manila.

2.3.1.2 Urban Expressway Development

Table 2.1 shows the status of planned and on-going BOT Projects in Metro Manila as part of urban expressway development. The Toll Regulatory Board (TRB), which is the autonomous organization for toll road development in compliance with PD 1112 is responsible for public sector's roles.

2.3.2 Development Direction

Private sector groups have undertaken urban development activities including road construction within their premises. These private roads are directly connected to primary or secondary arterial roads. Recent road projects by the public sector have been observed to converge at certain corridors and not intended to induce a desirable urban structure and disperse concentrated traffic.

C-5 is located at the western side of the Marikina River where dense built-up urban facilities exist. Only a few radial arteries accommodate increasing traffic from urban facilities in the eastern side of Marilina River where residential development have lately gained momentum. To cope with such increasing traffic on the radial arteries, several grade separation structures are being constructed at major intersections.

These trends in urban road development may direct traffic demand to rely on road transport on certain routes, and would result to traffic congestion at their terminals.

FIGURE 2.2
MAJOR ROADS COMPLETED DURING 1984-1996

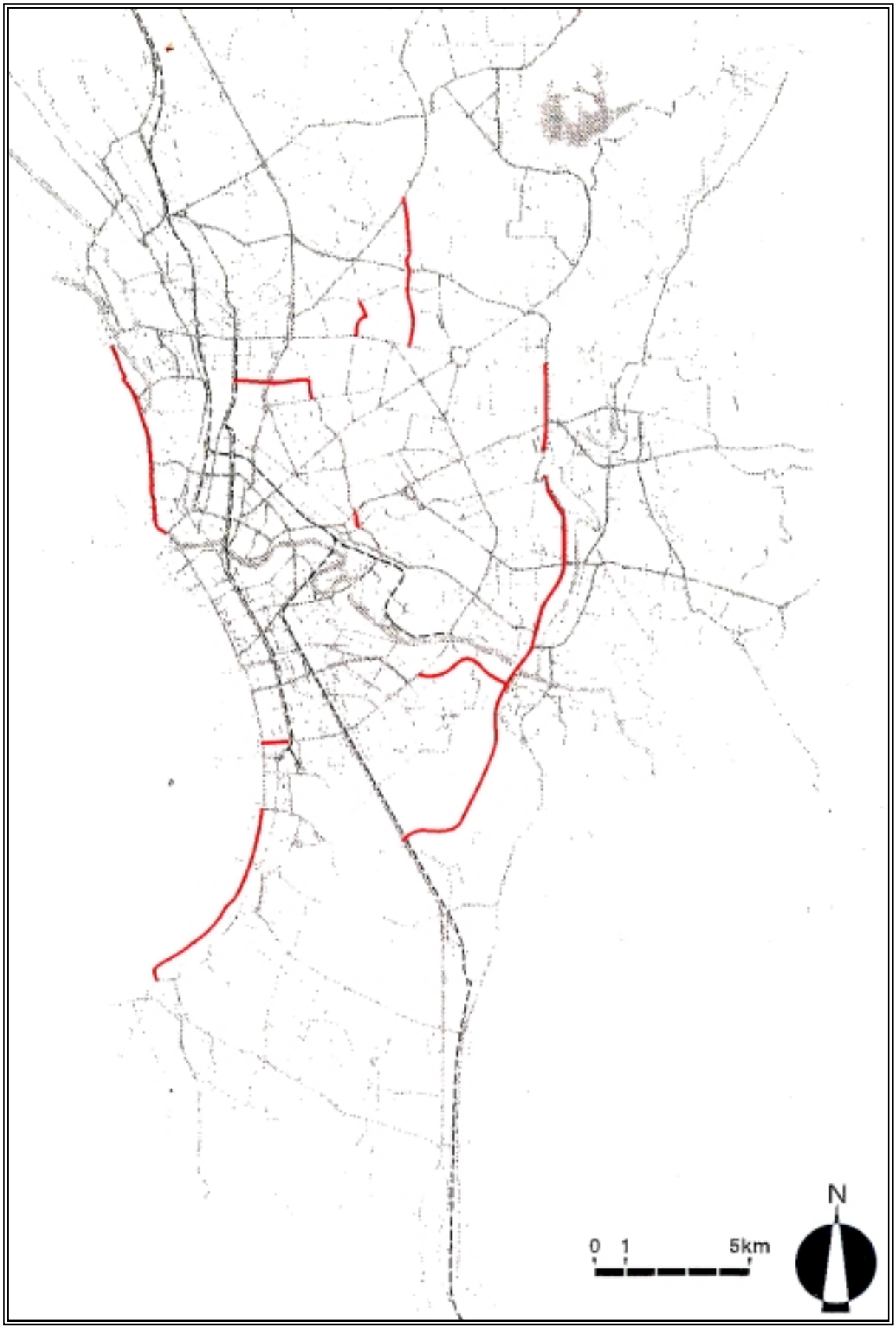


FIGURE 2.4
ROAD PROJECTS UNDER URPO-PMO AND BOT-PMO

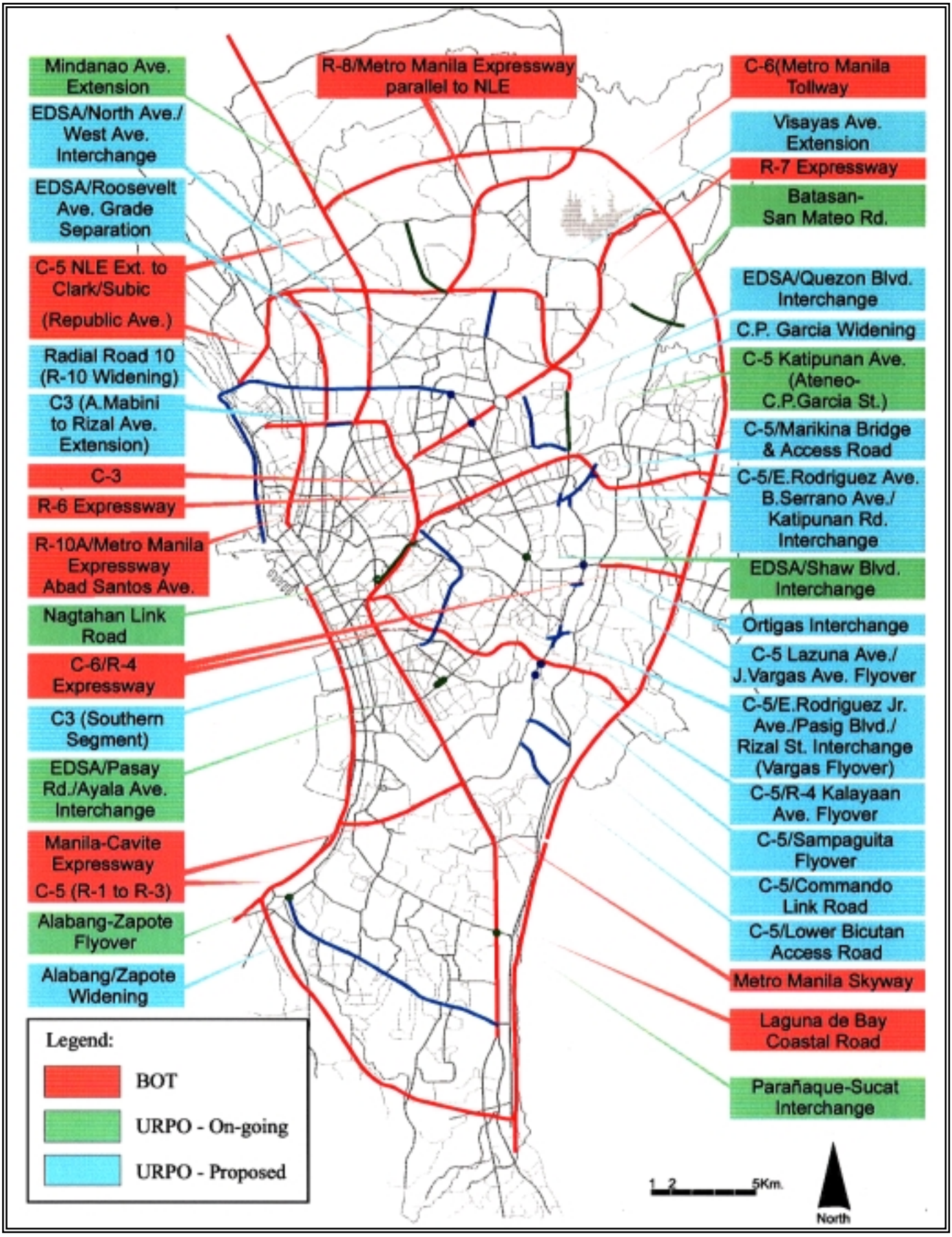


TABLE 2.1
LIST OF BOT PROJECTS AND ITS INVESTMENT SCALE

Symbol		Project Title	Status	Length (km)	Project Costs		
					Construction	ROW	Total
1.	C-6	Circumferential Road 6	Pre-FS	38.4	8,541	11,640	20,181
2.	LBCR	Laguna de Bay Coastal Road	Pre-FS	18.6	9,528	2,444	11,972
3.	C-5 / NLE	C-5 / NLE Ext. to Clark / Subic	IMP	181.2	8,304	3,078	11,382
4.	R-4 / R-5	Pasig Expressway	Pre-FS	12.6			18,461
5.	R-3	Metro Manila Skyway, Stage 1	IMP	9.3			7,557
6.	R-1	Manila-Cavite & C-5	IMP	22.1	5,575	900	6,475
7.	R-7	Metro Manila Expressway, Quezon Ave. / Commonwealth Ave.	Pre-FS	12.2	3,159	111	3,270
8.	R-6	Metro Manila Expressway, Santolan & Marcos Hi-way to Sumulong Hi-way	Pre-FS	12.0			5,501
9.	C-3	Circumferential Road 3	Pre-FS	19.0			8,002
10.	R-8	Metro Manila Expressway, parallel to NLE	Pre-FS	4.7			1,747
11.	R-10A	Metro Manila Expressway, Abad Santos Ave.	Pre-FS	4.0			2,108
12.	R-9	Metro Manila Expressway, A. Bonifacio Road	Pre-FS	3.8			1,700
Grand Total				**337.9**			**98,356**
				125.2			

Notes: 1) IMP denotes that the project is at implementation stage.
2) Pre-FS denote that a feasibility study of project is no completed yet.

3. PLANNING AND ENGINEERING

3.1 Road Inventory and Classification

3.1.1 Road Inventory Survey

The MMUTIS road inventory comprises 290 links in Metro Manila and 84 links outside Metro Manila, totaling 374 links. The road inventory survey was conducted to review and update the JUMSUT road inventory as well as to add new links. The survey items consist of the following:

1) Survey Code No.
2) Name of Road and Sections
3) Length by Sections
4) Road Width
5) Carriage-way Width
6) No. of Lane
7) Sidewalk Width, Left and Right
8) Median
9) Pavement Type and Conditions
10) Side Friction

The results of survey are summarized in the Road Inventory Survey May 1997 of MMUTIS working papers.

3.1.2 Road Classification

Fig. 3.1 shows the typical roads based on functional classification and Fig. 3.2 describes the features of each network configuration. Fig. 3.3 shows the locations of existing grade separation structures required in a short span of time.

The road inventory in Metro Manila combined with road classifications (administrative and functional) is summarized in Annex-I, on the assumption that the longest section could represent the cross sectional configuration in each link.

However, the road classifications (administrative and functional) are not officially confirmed but based on the Philippine Road Classification Study conducted by DPWH in 1993.

FIGURE 3.1
HIERARCHY OF MOVEMENT AND ROAD FACILITIES (2)

South Expressway

High Mobility

Urban Freeways, which is defined as an expressway with fully controlled access, are capable of carrying high traffic volume with high-speed and safety. To ensure high mobility, slow moving vehicles may not enter and use the freeways.

Roxas Boulevard

Primary Movement

The main movement of vehicles is interrupted, high-speed flow. To secure such function of through traveled carriageway, frontage roads may be provided on both sides in case of public road. Frontage road with wide outer separation can create a buffer zone to adjacent area.

Espana

Transition and Distribution

When approaching destinations from Primary Arterial, vehicles reduce speed acting as transition roadways.
Such intermediate facilities as designated a Secondary Arterial require appropriate spacing of intersections.

Ayala

Distribution and Collection

The vehicles enter moderate-speed arterial that brings them nearer to the vicinity of their destination neighborhoods.

Scout Limbaga

High Accessibility

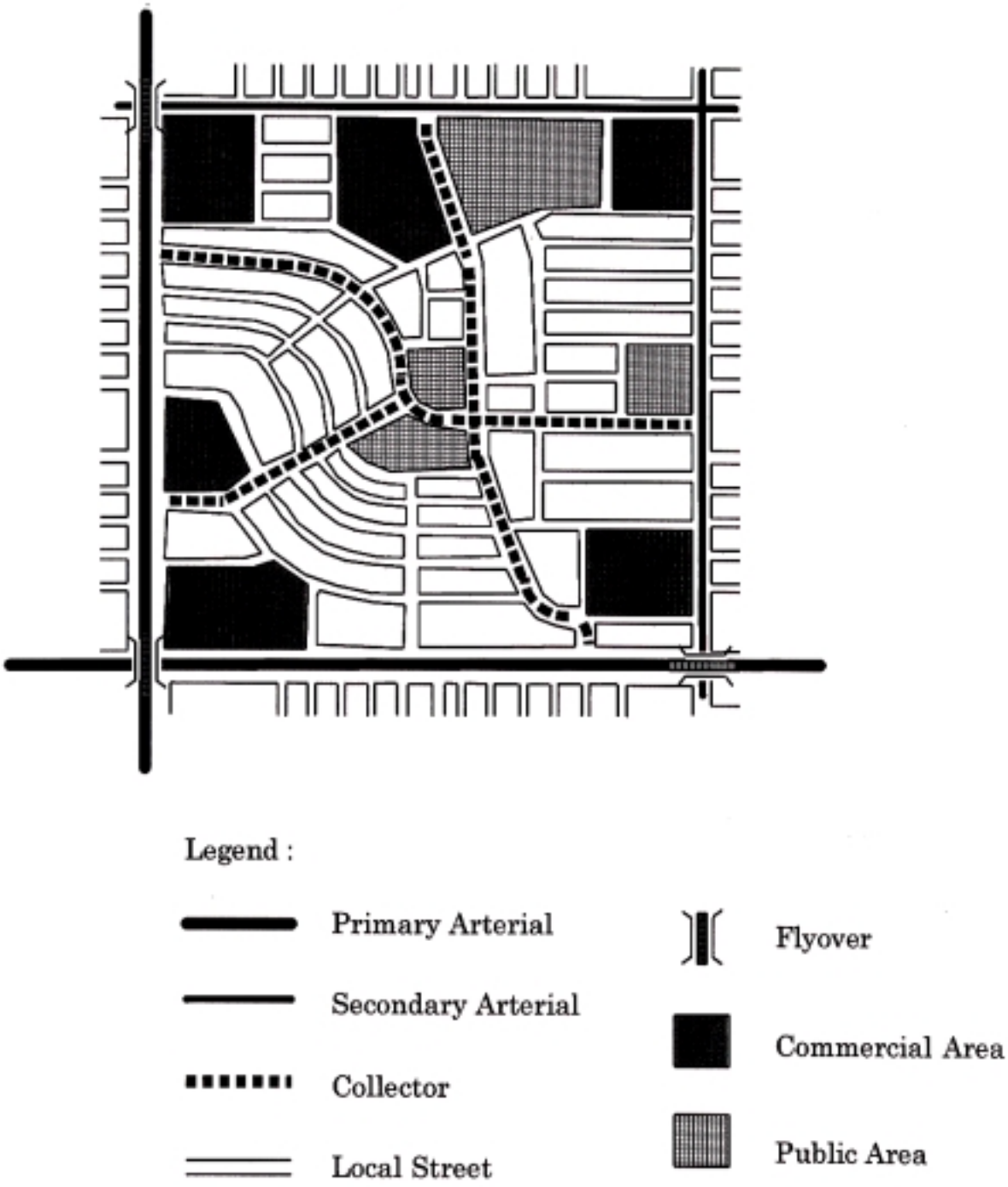
The vehicles finally enter local access roads that provide direct approaches to individual residences or other termination.
At their destinations the vehicles are parked at an appropriate terminal facility.

Ortigas Interchange

Grade Separation Structures

Ortigas Interchange is located at the intersecting point between EDSA and Ortigas Avenue that are both Primary Arterials.
High traffic volume and elimination of bottleneck can warrant such grade separation structures.

FIGURE 3.2
SCHEMATIC ROAD NETWORK IN URBAN AREAS



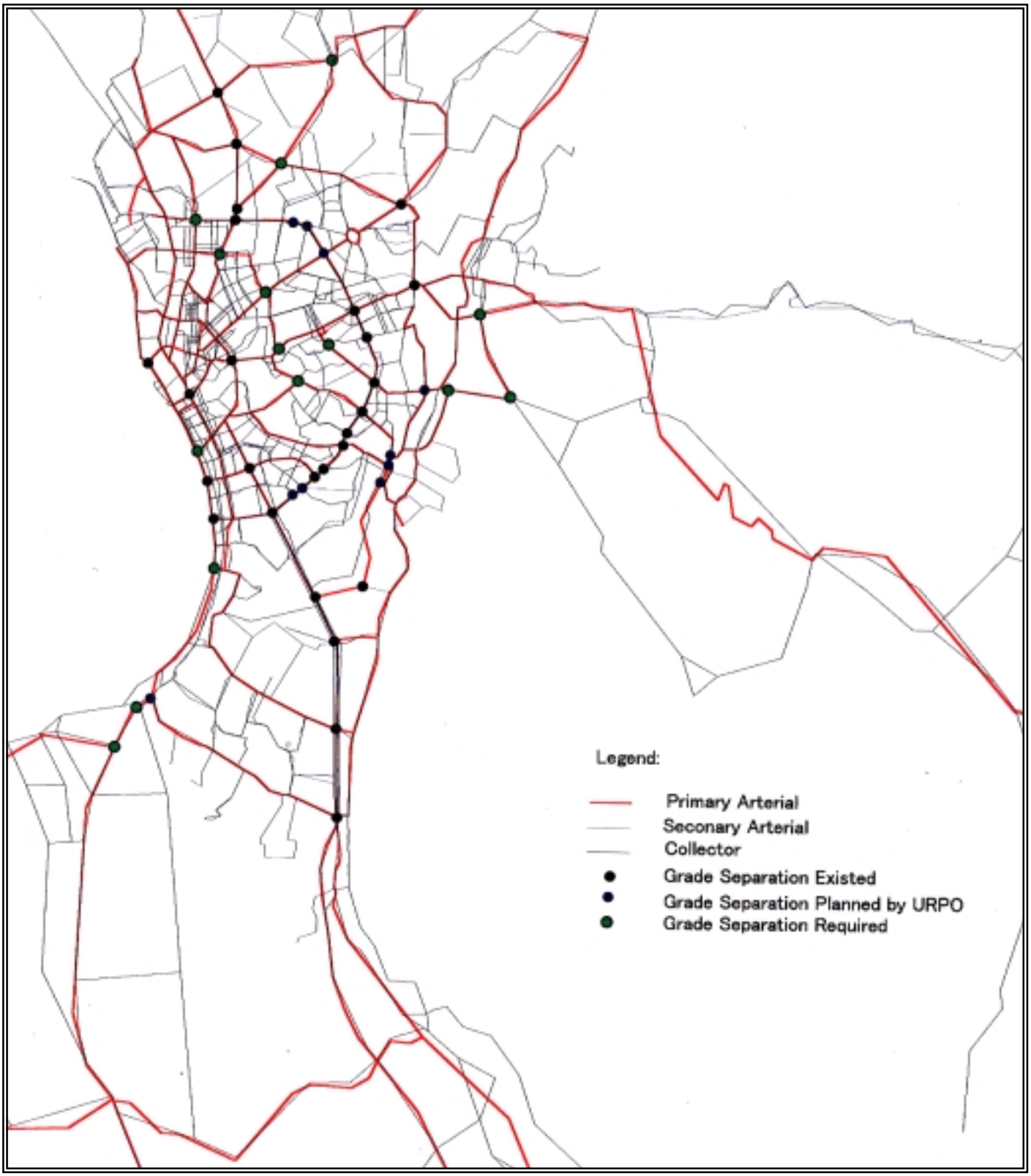
	Primary	Secondary	Collector	Local
Primary	GS-N	GS-D	RT-D	RT-N
Secondary		AI-N	AI-N	RT-D
Collector			AI-N	AI-D
Local				AI-N

Notes:

GS: Grade Separation
AI: At-Grade Intersection
RT: Right Turn Only

N: Necessary
D: Desirable

FIGURE 3.3
LOCATIONS OF GRADE SEPARATION STRUCTURES EXISTING AND REQUIRED



The administrative classification is related to jurisdiction and concerns the executing body to maintain road. The functional classification is the most fundamental basis of design criteria adopted and provides guideline for improvement.

3.2 Planning for Desirable Road Network

3.2.1 Improvement Level of Road Network

A road system serve passengers' trips and commodity transport and, at the same time, they provide spatial functions such as open space, space for public utilities and even space for disaster prevention. Roads, therefore, are an important and indispensable framework in the formulation of a desirable urban structure.

The following two indices should be taken into consideration in the formulation of a good road network:

1) Road Network Density (RND)

   This index, which is computed by a certain district area (ha) and accumulated length (m) of Primary Arterial, Secondary Arterial and Collector and usually expressed in unit of m/ha, indicates the level of mobility. The index is necessarily higher in a business and commercial area and lower in a residential area.

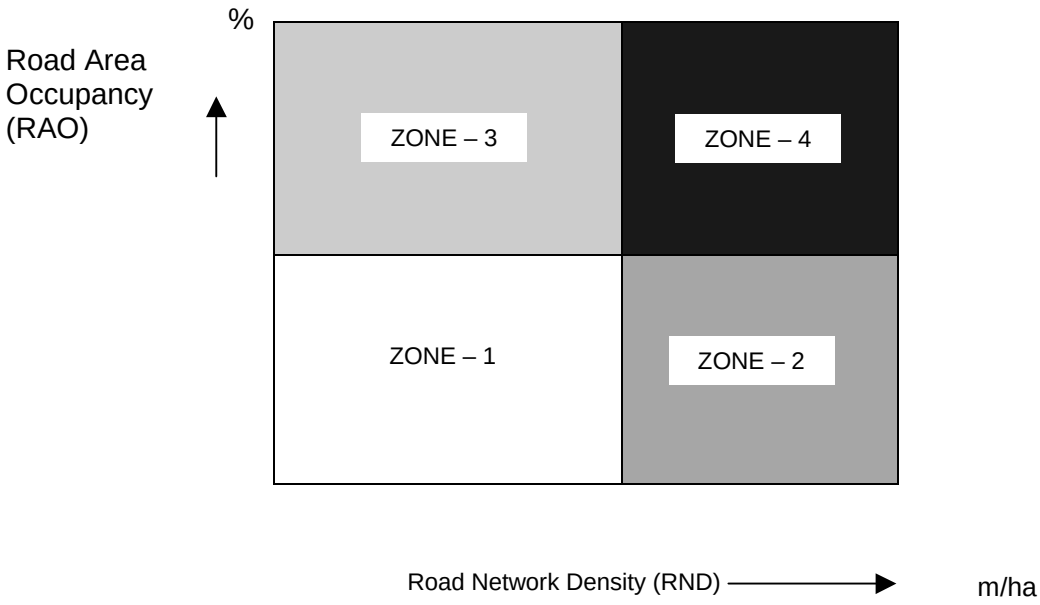
2) Road Area Occupancy (RAO)

   This index, which is calculated by a certain district area and accumulated area of roads and usually expressed in unit of %, indicates the level of accessibility and open space.

Figure 3.1 presents the salient features at each improvement level of road network using the RND and the RAO indices.

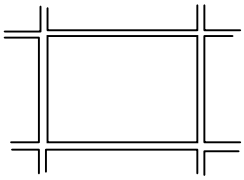
Metropolitan areas in the world have unique transportation systems and respond to different traffic demand by each mode, especially by road or by rail. Fig. 3.2 gives the comparison of improvement level in major cities in Japan and other foreign countries.

FIGURE 3.4
IMPROVEMENT LEVEL OF ROAD NETWORK



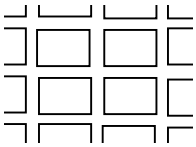
ZONE –1: Shortage of Road itself

Shortage of roads causes impeding mobility as well as scarce development due to low accessibility.
More road improvement is required.



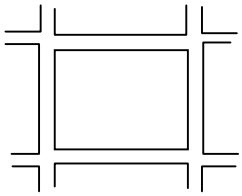
ZONE – 2: Shortage of Arteries

Good accessibility stimulates development to generate traffic, but mobility on arteries is hardly kept due to narrow road width.
Widening of roads are necessary.



ZONE – 3: Shortage of collectors

Ribbon development along arteries prevails and poor urban facilities remain behind.
Feeder system and traffic bottlenecks should Be improved



ZONE – 4: Well Balanced Road Network

Road network works as a system to provide mobility as well as accessibility. Accordingly, desirable urban structure with proper land use can be formed.

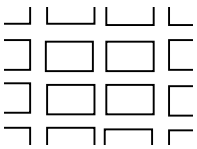
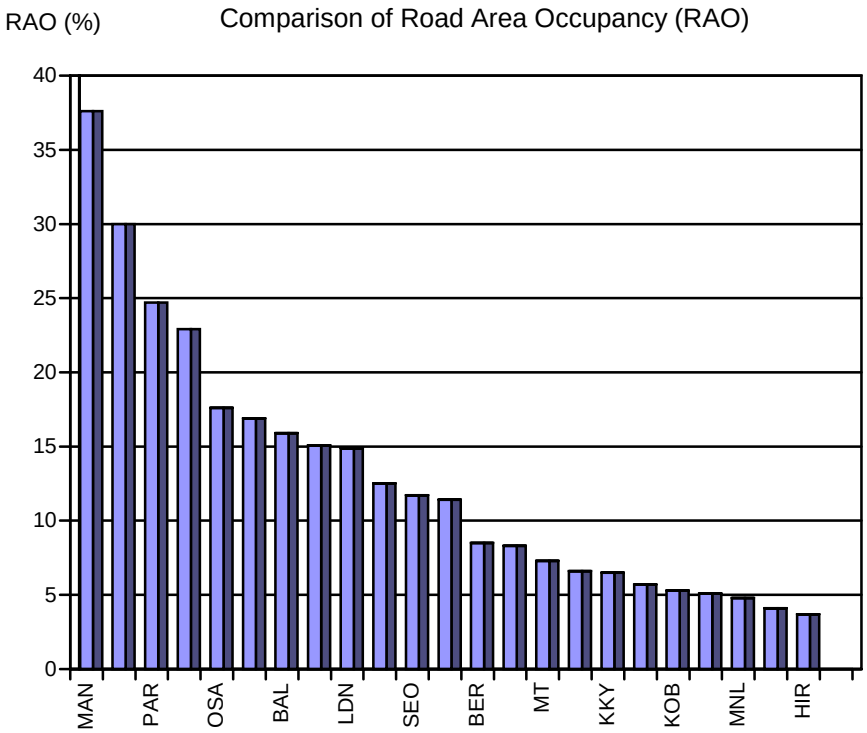
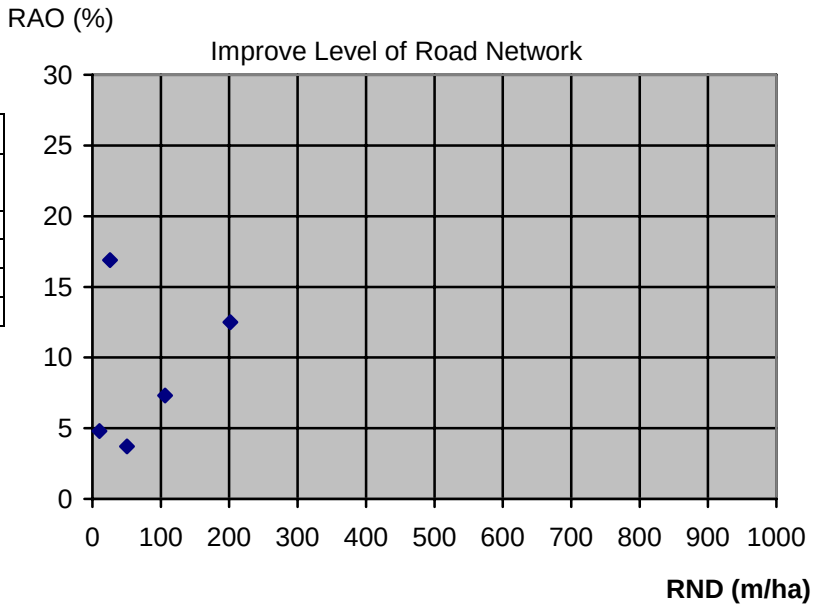


FIGURE 3.5
ROAD AREA OCCUPANCY (RAO) AND IMPROVEMENT LEVEL OF ROAD NETWORK

City Name	Abbr.	RAO (%)
Metropolitan Tokyo	MT	7.3
Tokyo within Wards	TW	15.1
Tokyo within Central 3 Wards	TW 3	22.9
Tokyo Outside Wards	TOW	5.1
Sapporo	SAP	5.7
Sendai	SEN	4.1
Chiba	CHI	6.6
Kawasaki	KAW	11.4
Yokohama	YOK	12.5
Nagoya	NAG	16.9
Kyoto	KYO	3.6
Osaka	OSA	17.6
Kobe	KOB	5.3
Hiroshima	HIR	3.7
Kita-Kyushuu	KKY	6.5
Fukuoka	FUK	8.3
New York	NY	30.0
Manhattan	MAN	37.6
Paris	PAR	24.7
London	LDN	14.9
Berlin	BER	8.5
Barselona	BAL	15.9
Seoul	SEO	11.7
Metro Manila	MNL	10.5



City Name	Abbr.	RAO (%)	RND (m/ha)
Metropolitan Tokyo	MT	7.3	106.4
Yokohama	YOK	12.5	201.8
Nagoya	NAG	16.9	25.6
Hiroshima	HIR	3.7	50.5
Manila	MNL	4.8	10.5



3.3 Improvement of Standards

3.3.1 Design Standards

There is no standard specification to cover geological, meteorological, hydrological, seismic features of the Philippines but modified foreign standards mostly derived from American AASHTO, German DIN or British BS, as far as project location is concerned have been adopted.

As a matter of fact, design standards in Japan were also made in a similar way. However, they have been modified/adjusted after updated research data have been obtained.

The standards have been improved to meet Filipino conditions but there still remain uncertainties in the method regarding its reliability and the range of application. Since natural and physical conditions in the Philippines are severe, design standards for pavement structure, substructure and drainage are considered insufficient or risky as compared with Japanese standards. The reason why such standards are used without any modification/adjustment is that research data obtained and analyzed in the Philippines are unreliable as basis for modification/adjustment.

It is necessary for DPWH to continue efforts to have its own design standards based local research data. Nevertheless, Japanese design standards may be referred to particularly in works where Philippine standards have technical shortcomings.

3.3.2 Standards Designs

Standard designs for road facilities such as asphalt pavement, concrete pavement, RC girders, PC girders, retaining walls, pipe and box culverts, other drainage structures etc., are in use and some are being reviewed. For example, standard design of concrete pavement is revised to install wire mesh even though it would increase the cost and decrease the speed of work. The use of wire mesh is effective in mitigating expansion of cracks and its gapes in case of fracture of pavement. Such an appropriate standard design may contribute to quality of works.

DPWH should also inform manufacturers of concrete projects on the new standard design so as to facilitate maintenance and rehabilitation of roads.

3.3.3 Roles of Bureau of Design (BOD)

BOD is responsible for design standards with its detailed criteria. It examines design works of roads carried out by either DPWH engineers or of foreign and local staff of consulting firms under the jurisdiction of DPWH.

Sometimes, design works encounter serious changes during project implementation. Although most of major changes are caused not by defects of design but by insufficient and erroneous surveys, it is a fact that technical shortcomings in BOD are also the reason especially for special structures.

Since natural and physical conditions in the Philippines are so severe that design standards could hardly meet satisfactory levels, DPWH should strengthen BOD technically, institutionally, and financially. It should have a strategic design unit equipped with CAD, computers, and well-trained staff to ensure the quality of works. Privatization or decentralization of road construction works should also push through.

4 ROAD CONSTRUCTION

4.1 Implementation Procedure

4.1.1 Public Road Development

1) Presidential Decree No. 1594

Presidential Decree No. 1594 entitled "Prescribing Policies, Guidelines, Rules and Regulations for Government Infrastructure Contracts," was promulgated in June 11, 1978 with the following stipulations:

Section 1	Policy Objectives
Section 2	Detailed Engineering
Section 3	Pre-qualification of Prospective Contractors
Section 4	Bidding
Section 5	Award and Contract
Section 6	Assignment and Subcontract
Section 7	Responsibility
Section 8	Adjustment of Contract Price
Section 9	Change Order and Extra Work Order
Section 10	Inspection and Construction of Contract Work
Section 11	Government's Right to Take Over Contract Work
Section 12	Implementing Rules and Regulations
Section 13	Reparability Clause
Section 14	Repealing Clause
Section 15	Effectively

The Implementing Rules and Regulations (IRR), which is mandated by Section 12 of PD 1594, has been published by Philippine Domestic Construction Board, Construction Industry Authority of the Philippines to implement the provisions of the PD No. 1594.

2) The Implementing Rules and Regulations (IRR)

The latest version of the IRR is prepared to amend the IRR as amended April 1992 and published by Philippine Domestic Construction Board in July, 1995. The latest IRR has following additional stipulations:

II. IB Instructions to Bidders
IB 10 Bid/Tender and Award
IB 10.10 Issuance of Notice to Proceed

III. CI Contract Implementation
CI 13 Accreditation of Testing Laboratory

IV. PE Evaluation of Contractor Performance
PE 1 Subject and Scope
PE 2 Evaluation Guideline
PE 3 Submission of Evaluation Results
PE 4 Utilization of Evaluation Results

The immediate purpose of amendment is to apply "Simplified Public Bidding" to severely damaged vital facilities as well as the approved Core Public Investment Program (CPIP) and flagship projects approved by the President. However, the amendment is envisioned to pursue alternative measures to expedite implementation of major infrastructure projects.

4.1.2 Toll Road Development by BOT

(1) Presidential Decree No. 1112

Presidential Decree No. 1112 as known "Toll Operation Decree", which is entitled "Authorizing the Establishment of Toll Facilities on Public Improvements, Creating a Board for the Regulation thereof and for Other Purposes", was promulgated in March 31, 1997.

PD NO.1112 created the Toll Regulatory Board that shall have, in addition to its general powers, the following powers and duties:

1) To enter into contract with the BOT concessionaire;
2) To determine and decide the kind, type and nature of public improvement as toll facilities;
3) To condemn private property for public us;
4) To issue, modify and promulgate from time to time the rates of toll;
5) To grant authority to operate a toll facility and to issue therefore the necessary "Toll Operation Certificate";
6) To promulgate rules and regulations governing the procedures for the grant of the Toll Operation Certificate; and
7) To issue the rules and regulations.

(2) Presidential Decree No. 1894

Presidential Decree No. 1894 as known "The PNCC Franchise Law II" is an Act amending certain sections of Presidential Decree No. 1113 as known "The CDCP (now PNCC) Franchise Law" to include the Metro Manila Expressways, which was entitled "Amending the Franchise of the Philippine National Construction Corporation (PNCC0 to Construct, Maintain and Operate Toll Facilities in the North and South Luzon Toll Expressways to Include the Metro Manila Expressway to Serve as an Additional Artery in the Transportation of Trade and Commerce in the Metro Manila Area", and was promulgated in December 22, 1984.

(3) Republic Act No. 7718

Republic Act No. 7718 as known "The BOT Law" is an Act amending certain sections of R.A. No. 6957, which was entitled "Act Authorizing the Financing, Construction, Operation and Maintenance of Infrastructure Projects by the Private Sector, and for Other Purposes", and was promulgated in July 26, 1993.
PD No. 6957 and No. 7718 amended that the Toll Regulatory Board is attached to the DPWH with the Secretary of DPWH as Chairman.

PD No. 7718 stipulates two procurement methods to implement BOT projects: unsolicited proposals and public bidding of projects. Unsolicited proposals for toll road projects are to be made by individuals, groups or corporations in the private sector and may be accepted by the TRB on a negotiated basis through due procedure.

4.1.3 Comparison of Implementation Procedure

Table 4.1 gives a comparison of implementation procedure for urban expressway for example. It is obvious that the implementation procedure for BOT project is more simple, but it is a fact that there are more players in each construction phase of BOT project to result in complicated relationships among players.

TABLE 4.1
COMPARISON OF IMPLEMENTATION PROCEDURE FOR URBAN EXPRESSWAY DEVELOPMENT

1	Implementing Method	Public Works	BOT Method	
2	Executing Body	DPWH	BOT Concessionaire	
3	Project Formation	Public Sector	Public Sector	Private Sector
4	Procurement Method	Public Bidding	Solicited	Unsolicited
			Public Bidding	Negotiation
5	Evaluation and Award	PBAC	TRB	
6	Type of Contract	Unit Price Contract	Lump Sum Contract	
7	Detailed Engineering	DPWH	BOT Concessionaire	
8	Basis of Implementation	IRR	Design – Built	
	1) Invitation to Bid	PBAC	NA	
	2) Pre-qualification of Contractors	PBAC	NA	
	3) Preparation of Bid Documents	DPWH	NA	
	4) Evaluation of Bid	PBAC	NA	
	5) Foreign Institution for Concurrence	DPWH	NA	
	6) Notice of Award	PBAC	NA	
	7) Signing of Contract	DPWH	NA	
	8) Approval of Contract	DPWH	NA	
	9) Issuance of Notice to Proceed	DPWH	NA	

Notes
BOT: Build-Operate-Transfer as well as Infrastructure Development by Private Sector Involvement as a General Term
DPWH: Department of Works and Highways
PBAC: Pre-qualification, Bid and Award Committee
TRB: Toll Regulatory Board

4.1.4 Issues on Implementation Procedure

4.1.4.1 Public Road Development

According to due procedure specified in the IRR, it takes only three (3) months from bid opening to the issuance of Notice to Proceed (NTP) even in case of 100 million project. It is possible to procure a responsible and bona fide contractor and commence construction works within six (6) months as APEC road projects have demonstrated.

However, several road projects in Metro Manila spent more than one (1) year to consummate due procedures from bid opening to NTP issuance. Furthermore, any justification could hardly be found to spend more than three (3) months from contract signing to NTP issuance.

4.1.4.2 Toll Road Development by BOT

Since land acquisition of road development is endorsed by the Government's prerogative, the TRB/DPWH should be responsible for its implementation, especially for consummating due procedure, no matter how much the TRB/DPWH shall appropriate to the required fund or no matter which the TRB/DPWH or BOT concessionaire shall bear the cost. In order to consummate the due procedure for land acquisition and property compensation, the TRB/DPWH will necessitate sufficient budget for working out as an executing agency to cooperate local government units, public corporations of utilities and even the Office of Solicitor General in case of filing cases to the court.

Accordingly, the allocation of such budget is apt to become short and it may cause significant delay of implementation at the beginning.

4.2 Quality Control

4.2.1 Design Phase

It is generally observed that road conditions in the Philippines are unsatisfactory and deteriorating. One of the major causes of such deterioration are severe climatic and natural conditions especially calamities. However, it is a fact that the low level of technical and managerial expertise has also aggravated the situation.

Since road construction projects generally are implemented for a long span of time through several phases, good preparatory works before construction is always crucial. The following technical shortcomings before commencement of construction works are often observed:

1) Insufficient and erroneous topographic survey
2) Inadequate selection of map scale
3) No intensive application of aerial photo and CAD
4) Inaccurate geological survey
5) Ignoring of axial weight survey in traffic survey

6) Ignoring of survey record keeping
7) Insufficient survey expenses and remuneration

The above-mentioned points are so fundamental that no appropriate construction work could be expected without their improvement. Though frequent changes are observed, it should be noted that insufficient and erroneous surveys may cause more serious than defects than design.

4.2.2 Pre-construction Phase

It seems to be easy for inexperienced, inept and under-financed contractors to obtain falsified or misleading documents certifying that financial backing, adequate equipment and competent personnel would be available for their use on a project. Hence, some contractors may pass the pre-qualifications process even though they do not have the competence, resources, and technical expertise to undertake the project. Sometimes, those who are technically and financially capable of doing the project may actually be disqualified in the pre-qualification stages due to political interference.

Pre-qualification data submitted by a contractor should be only for client's reference. More emphasis should be placed on the contractor's recent records showing satisfactory work and performance without significantly negative slippage. Towards this end, the Japanese government has developed a database on infrastructure projects and contractors and makes full use of it in the pre-qualification process. Through the database, contractors that have poor track records are weeded out in the pre-qualification process.

Modality and procedures for government contracts of civil works are based upon internationally accepted procedures and therefore fair and transparent. However, it is widely recognized that too much complicated procedures or excessive controls and regulation are the sources of irregularities. Rules and regulations that are aimed at preventing wrongdoing, if they are excessively stringent and complicated, may adversely affect the project or generate unofficial undertakings. The unreasonably long period of time involved in the bid opening, award of contract, and issuance of Notice to Proceed (NTP) sometimes are observed.

It is noted that low level of return as well as long negotiations discourage competent contractors to engage in a government contract. On the other hand, in case of APECD road projects there were only few cases of delay in the procurement process. Agreed time of completion was also observed.

4.2.3 Construction Phase

No matter how adequate the design works are made, no matter how qualified the contractors are, or no matter how strictly works are supervised and controlled, road construction works could not be executed satisfactorily without strong commitment to early completion. Immediate advantages in earlier completion are as follows:

1) earlier enjoyment of benefits expected from the project;
2) alleviates adverse effects suffered during construction (e.g. shorter traffic disturbance);
3) lessens vulnerability of the project to external interference;
4) price escalation is avoided; and
5) the project is lucrative for the contractor.

On the contrary, delay of works exposes the project to such risks as deterioration of quality and cost overrun.

A Department Order prescribes that a 10% slippage should warrant a warning from DPWH and a 15% slippage would warrant the termination of contract except in cases where the delay is caused by land acquisition problem. However, it has been observed that completion schedules are always extended several times.

4.2.4 Construction Capabilities

Civil engineering works especially for urban road development done in Metro Manila have been undertaken by Filipino contractors in joint venture with foreign contractors. Few projects require new technology that are not available in the Philippine because almost of all works pursue technical feasibility as well as high construction economy.

If sensitive environs or complicated circumstances should require special materials or procedures for the structures, Filipino contractors may enter into a joint venture with the foreign contractor who has expertise and experiences with new technology. As a matter of fact, a number of responsible works are completed on time in the private sector. On the other hand, some Filipino contractors, in an effort to get the project, submit an unreasonably low bid that often result in the non-completion of the project.

5 ROAD RIGHT-OF-WAY (ROW) ACQUISITION

5.1 Land Tenure System

The Torrens Title System prescribes a land tenure system wherein a land title held by a corporation or an individual is considered conclusive evidence of ownership against all third persons including the government. The following agencies are relevant to land registration:

1) Land Management Bureau (LMB), under Land Management Sector of DENR;
2) National Capital Region (NCR);
3) Housing and Land Use Regulatory Board (HLURB);
4) Land Registration Authority (LRA); and
5) Department of Agrarian Reform (DAR)

Either or both LRA and LMB can verify cadastral map or relocation survey plan as a safeguard against fraudulent transaction. LRA has the mandate to evaluate the survey documents and the applicant's qualification to own the land including approval of sub-division plans of titled properties.

LMB regulates the uses, development and disposition of land for real estate trade and business through the issuance of the following:

a) land use/zoning clearance
b) development permits
c) licenses to sell lots and units in all subdivisions and condominium project
d) enforcement of zoning regulation and related housing and land development laws

HLURB has devolved its functions of processing and approval of sub-division plans to local government units.

DAR issues clearance and certifications for conversion of agricultural lands into urban land use prior to approval of land development clearances and permits.

On the other hand, Department of Public Works and Highways (DPWH) is designated the executing agency to acquire land for road and waterway development.

5.2 ROW Acquisition Procedure

Land acquisition for road as well as railway requires long strips of land. Thus, the concerned agency is forced to take long negotiations with numbers of owners of lots and improvements. Therefore, ROW acquisition procedure necessitates the enforcement of government's prerogative. Table 5.1 summarizes the salient features by land acquisition method in general.

TABLE 5.1
SALIENT FEATURES BY LAND ACQUISITION METHOD

	Voluntary	Involuntary
Types	1) Negotiated Land Purchases 2) Lease Agreement 3) Joint Venture Agreement 4) Donation 5) Usufruct 6) Reclamation 7) Land Pooling/Readjustment	1) Expropriation 2) Forced Sales 3) Auction
Feature	Depending upon the willingness of Owners	Government's prerogative to exercise the Power of eminent domain
Issues	Availability of fund	Detested by owners because of its coercive Character usually giving no choice to Participate in the development or to Determine Just compensation

Furthermore, it is necessary to solve problems as squatter eviction, utilities relocation and so forth as shown in Fig. 5.1. It may be very difficult to change a plan that is being implemented and this results in wastes of time and money.

As the executing agency for ROW acquisition, DPWH is in charge to consummate the following procedures simultaneously;

1) Appropriation of Fund

   Cost estimates should be done at each stage for the purpose of inclusion in all capital outlay program. Accuracy of cost estimates depends upon the progress of works, and it should be based on a prevailing market price.

2) Survey and Documentation

   Topographic survey should be executed and to prepare parcellary plan as a part of or in parallel to detailed design. It is indispensable to provide completion of necessary documentation with basic data for land acquisition and property compensation.

3) Fulfillment of Tendering Process

   Prior to commencement of advertisement for bidding of road project, a least fifty (50) percent of the required ROW area must be secured and cleared of obstruction. However, if negotiation with affected owners fails and results into filing of appropriation proceedings, Writ of Possession must be secured after filing of case to the Court and depositing the compensation cost in the authorized banks (Land Bank of the Philippines or Development Bank of the Philippines).

The flow chart of ROW acquisition procedure is shown in Figure 5.2 and the definition of terms is given in Annex-II.

FIGURE 5.1
VARIOUS ACTIVITIES AND ITS WORK FLOW ASSOCIATED WITH LAND ACQUISITION PROGRAM

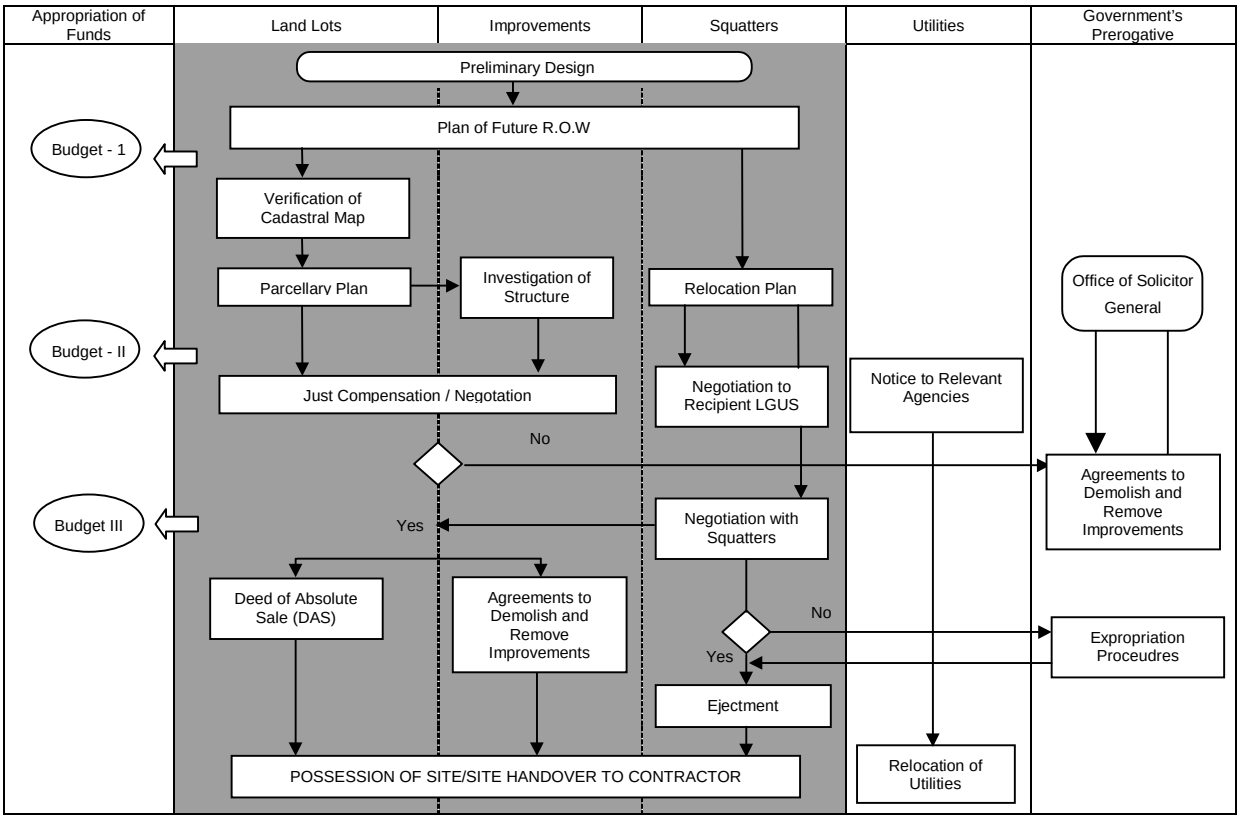
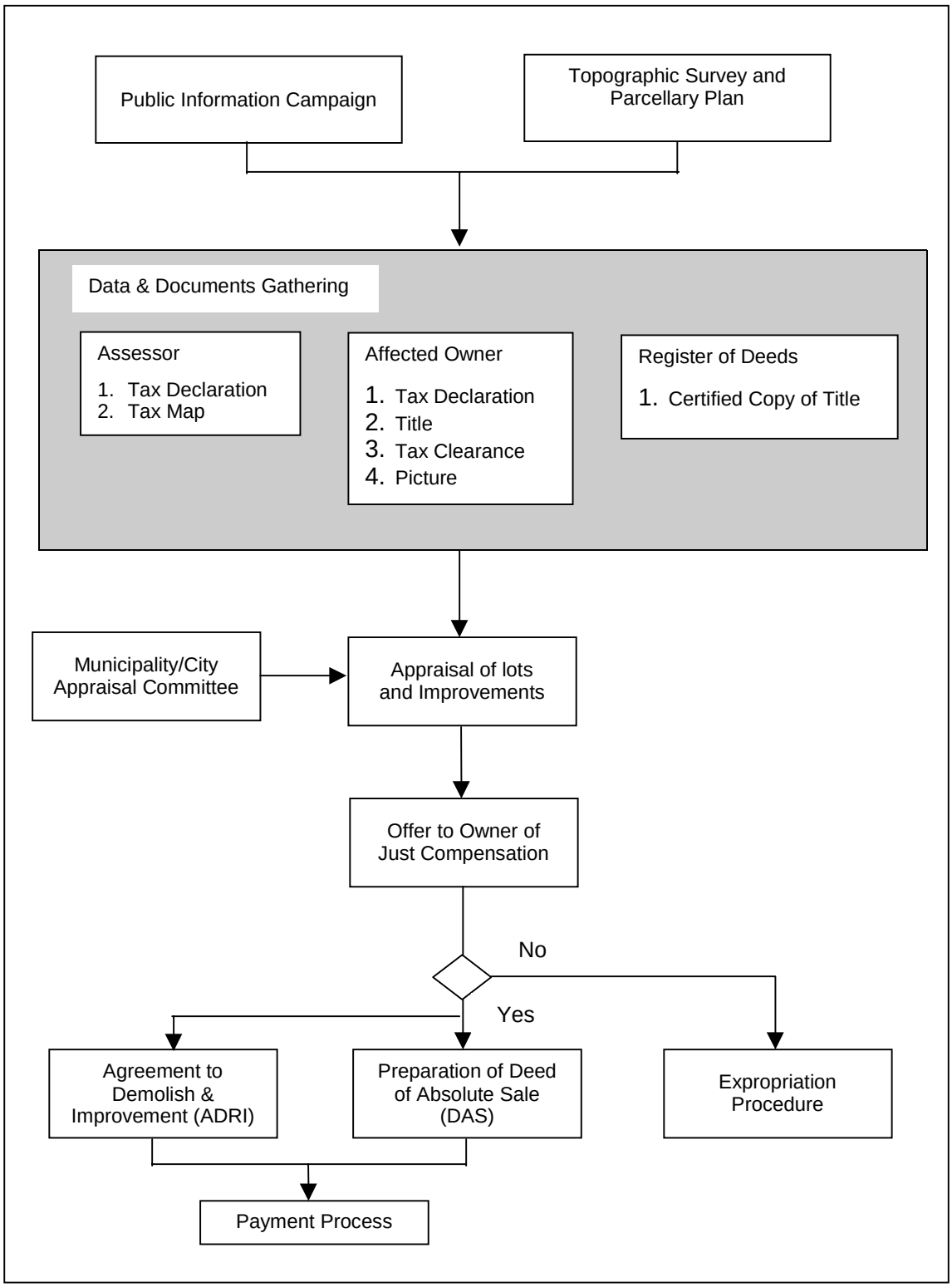


FIGURE 5.2
WORK FLOW FOR LAND ACQUISITION AND PROPERTY COMPENSATION



5.3 Trends in Current Land Acquisition Method

Land acquisition method for road development in Southeast Asia is changing. Though the government's prerogative still remains in force, the amount of compensation has become but flexible.

For example, DPWH sought to settle issues associated with land compensation in South Luzon Expressway Extension Project by hiring an independent appraiser to advise the DPWH on the true value of the affected properties.

Since 1993, a committee in Indonesia invites both government officials who need land and rightful landowners to deliberate and agree on the amount of compensation.

6 ROAD MAINTENANCE

6.1 Current Road Maintenance System

6.1.1 General

The road maintenance generally aimed at the following three aspects:

- Securing traffic safety;
- Smooth traffic flow; and
- User comfort.

However, it is also intended particularly to prolong the service life of roads as well as traffic management.

The road maintenance is classified functionally into two aspects;

1) Preventive Maintenance

   A preventive maintenance comprises periodic overlay, strengthening of surface, partial rehabilitation/reconstruction of existing pavement, improvement local alignment vertically and horizontally and so forth. The periodic maintenance in term of administrative viewpoint is under this category.

2) Regular Maintenance

   A regular maintenance generally consist of the following works:

   - Clearing of pavement
   - Mowing and maintenance of plantations
   - Clearing of ditches and culverts
   - Pavement repair such as patching
   - Repair of sealant and expansion joints of bridges and viaducts
   - Repaid of damaged paints on steel bridges and repainting as necessary
   - Repair and maintenance of traffic control devices, including traffic signs
   - Repair and maintenance of lighting
   - Repair of cut and fill slopes
   - Repair of damage to road facilities caused by traffic accidents

The routine maintenance in terms of administrative viewpoint is under this category.

Both preventive and regular maintenance works are presently carried out by either force account or contracting out. In principle, daily and routine works that are deemed necessary throughout the year are conducted by force account, and planned works are apt to be contracted out to the private sector.

The upper limit of contracting out is revised up to fifty (50) percent in 1997 to generate private sector involvement.

6.1.2 Administrative Responsibility

The DPWH is responsible for the maintenance of National roads and each local government unit concerned is responsible for the maintenance of public roads other than National roads as stipulated in the Local Government Code. Private roads and Toll roads developed through BOT are maintained individually by each owner and concessionaire, respectively.

6.1.3 Maintenance System of the DPWH

6.1.3.1 Maintenance Management Manual

Each regional office of the DPWH makes road maintenance program and carries out works in accordance with the Maintenance Management Manual prepared in 1993 by the DPWH under the 4th IBRD Highway Loan.

The manual was aimed at improving the following:

- uniforms levels of maintenance service throughout the Philippines;
- means to use labor, equipment and materials in manners appropriate to the Philippines;
- objective basis to plan and execute maintenance work program;
- comparisons of actual with planned work performance; and
- guidelines and procedures to effect corrective action.

The methodology of work management comprises five components such as planning, scheduling, directing, reporting and control procedures.

Planning serves to estimate annual work quantities, costs and resource requirements.

Scheduling functions in the short term to identify maintenance needs as well as to plan and assign work.

Directing is necessary to carry out work assignments to achieve acceptable work results.

Reporting serves to keep work records and to provide information in certain forms to enable to compare plan with actual progress.

Control Procedures facilitate to reveal significant deviations from plan and standard, and to review the guideline to improve performance. The manual was finalized to reflect the results gained from reviewing pilot projects.

6.1.3.2 Equivalent Maintenance Kilometer (EMK) System

The Bureau of Maintenance (BOM) of the DPWH is in charge of maintaining the National roads as well as apportioning the fund to each regional office based on the Equivalent Maintenance Kilometer (EMK) system.

Previously, the funds for road maintenance were allocated under RA No. 917 or the Philippine Highway Act enacted in 1953 under which the Highway Special Fund (HSF) was established to appropriate the proceeds from tax on motor fuel. However, the allocation of fund was so routine that neither actual physical condition of roads nor present performance could be reflected.

In 1972, the EMK system was mandated under Section 8, Article IV of Presidential Decree No. 17 (PD 17) to solve such problems.

The EMK system was developed to incorporate such road factors as traffic volume, pavement type and thickness, and roadway width by the following computation:

EMK=L x Fs x Fw

Where:

L = length of road in Kms
Fs = surface/traffic factor presented in Table 6.1
Fw = width factor presented in Table 6.2

TABLE 6.1
SURFACE AND TRAFFIC FACTORS (FS)

Traffic (AADT)	Pavement Type and Thickness							
	Sand and Gravel			Bituminous				Concrete
	Low	Medium	High	Low	Medium	High	Extra Strength	
	0 – 9 cm	10 – 20 cm	> 20 cm	1 – 3 cm	3 – 6 cm	6 – 10 cm	> 10 cm	20 cm
<25	0.35	0.40						
25 – 50	0.40	0.60						
50 – 75	0.50	0.90	0.85					
75 – 100		1.40	1.00					
100 – 150		1.90	1.45					
150 – 200		2.20	1.90					
200 – 300		2.40	2.10	1.10	1.00	0.70	0.50	0.50
300 – 400		2.50	2.30	1.10	1.00	0.70	0.50	0.50
400 – 600		2.60	2.50	1.55	1.25	0.85	0.60	0.60
600 – 1,000		2.80	2.90	2.10	1.55	0.95	0.70	0.80
1,000 – 1,500		3.10	3.50	2.50	2.00	1.20	0.80	0.85
1,500 – 2,000		3.10	3.50	2.60	2.20	1.65	0.90	0.90
2,000 – 3000				2.75	2.30	1.85	1.00	0.95
3,000 – 5,000					2.40	1.95	1.10	1.00
5,000 – 10,000					2.50	2.10	1.15	1.05
10,000 – 15,000					2.64	2.20	1.20	1.10
15,000 – 20,000						2.30	1.25	1.15
20,000 – 30,000						2.45	1.33	1.23
30,000 – 50,000						2.75	1.48	1.38
50,000 – 70,000						3.15	1.68	1.58
70,000 – 100,000						3.65	1.93	1.83
> 100,000						4.45	2.33	2.33

TABLE 6.2
WIDTH FACTOR (FW)

Width (m)	Type of Pavement	
	Bituminous or Concrete	Sand and Gravel
<5.00	1.00	0.80
5.00 – 7.50	1.00	1.00
7.50 – 10.00	1.15	1.20
10.00 – 12.50	1.30	1.40
12.50 – 15.00	1.45	1.60
15 .00 – 17.50	1.60	1.80
17.50 – 20.00	1.75	1.80
20.00 – 22.50	1.90	
22.50 – 25.00	2.05	
25.00 – 27.50	2.20	
27.50 – 30.00	2.35	
30.00 – 32.50	2.50	
32.50 – 35.00	2.65	
35.00 – 37.50	2.80	
37.50 – 40.00	2.95	
40.00 – 42.50	3.10	
42.50 – 45.00	3.25	
45.00 – 47.50	3.40	
47.50 – 50.00	3.55	
50.00<	3.70	

Annual inventory surveys of existing national roads and bridges are conducted by the DPWH to obtain data and information for computation.

PD 17 provides that the National Highway Maintenance Fund is determined on the basis of the sum of total EMK multiplied by the basic maintenance cost per kilometer of a standard equivalent maintenance kilometer at current prices. The fund shall be apportioned to all districts and cities of the Philippines accordingly. The National Highway Maintenance Fund is drawn from the General Fund of the Government pursuant to the General Appropriation Act that is being enacted into law by Congress and approved by the President

6.1.4 Maintenance Practice and Current Issues

1) Maintenance Practice

Road Maintenance is a major component of infrastructure maintenance undertaken by Bureau of Maintenance (BOM). About 68% of 1995 allocated budget for BOM are intended to maintain national roads of approximately 26,400 km.

The Government recently has given high priority on the proper maintenance of roads to preserve huge investments, to prolong its economic lives, to defer heavy outlays for rehabilitation and to minimize transport operating costs and public inconvenience. As a low-cost measure with high economic returns, rehabilitation and restoration are given higher priority over new construction.

Table 6.3 shows the trends of increase of basic cost per the EMK during 1986 to 1997. The increase of basic cost at both constant prices and current prices endorses the Government's policy.

TABLE 6.3
TRENDS OF INCREASE OF BASIC COST PER EMK

Fiscal Year	1986	1987	1988	1989	1990	1991
Basic Cost at current prices	14,745	14,745	17,104	17,104	20,500	20,500
Basic Cost at 1985 constant price	14,316	13,284	14,136	12,958	13,758	11,782

Fiscal Year	1992	1993	1994	1995	1996	1997
Basic Cost at current prices	28,049	31,517	33,500	62,463	63,351	66,835
Basic Cost at 1985 constant price	14,920	15,680	15,158	26356	24,650	24,572

FIGURE 6.1
BASIC COST PER EMK AT CURRENT PRICES

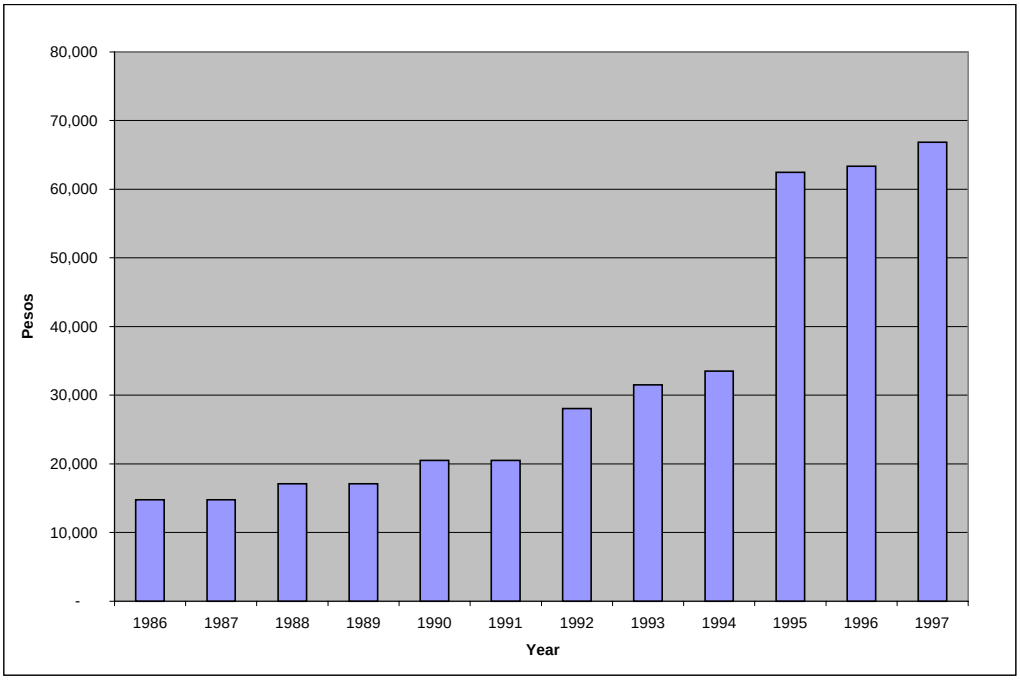
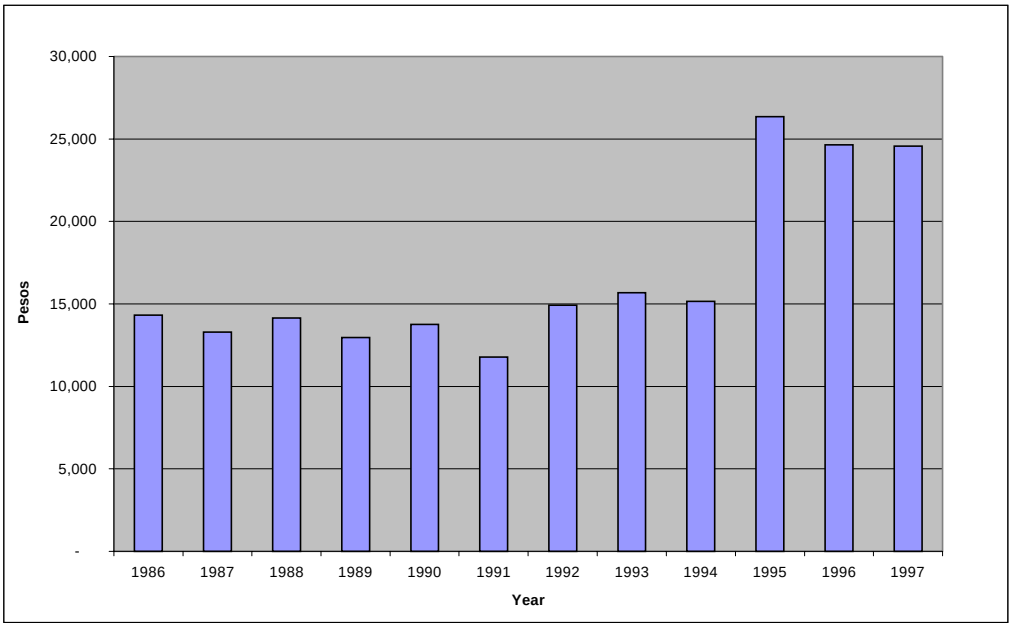


FIGURE 6.2
BASIC COST PER EMK AT 1985 CONSTANT PRICES



2) Maintenance Issues

One of the reasons why roads in Metro Manila are so seriously deteriorated may be the insufficient maintenance works after completion. The lack of funds results in incremental degradation caused by delay of implementation of rehabilitation works.

It is true that the basic cost per the EMK increase substantially and maintenance efforts are made more intensively, but arterial roads in Metro Manila suffer uninterrupted wear and tear or even damages by heavy vehicles such as trucks, trailers and buses as they continue to increase volume and axle load.

It is reasonable that maintenance costs should increase over time and road development increase in length. National roads in Metro Manila have extended its length from 675 km to 977 km during 1983-1993, that is 3.8% increase per annum on average. The MMUTIS has own road inventory in Metro Manila comprising 290 links and totaling 747.7 km in length.

Looking at maintenance requirement from the viewpoint that it should be necessary whatever administrative classification is designated to each link, current and future financial requirement to road network in Metro Manila can be estimated using the EMK method and the inventory. Table 6.2.2 shows the computation of financial requirement estimated by the MEK method using data and information compiled by the study team, providing that road length should grow 3.8% per annum and 9% escalation based on the average growth rate of GDP for these 10 years.

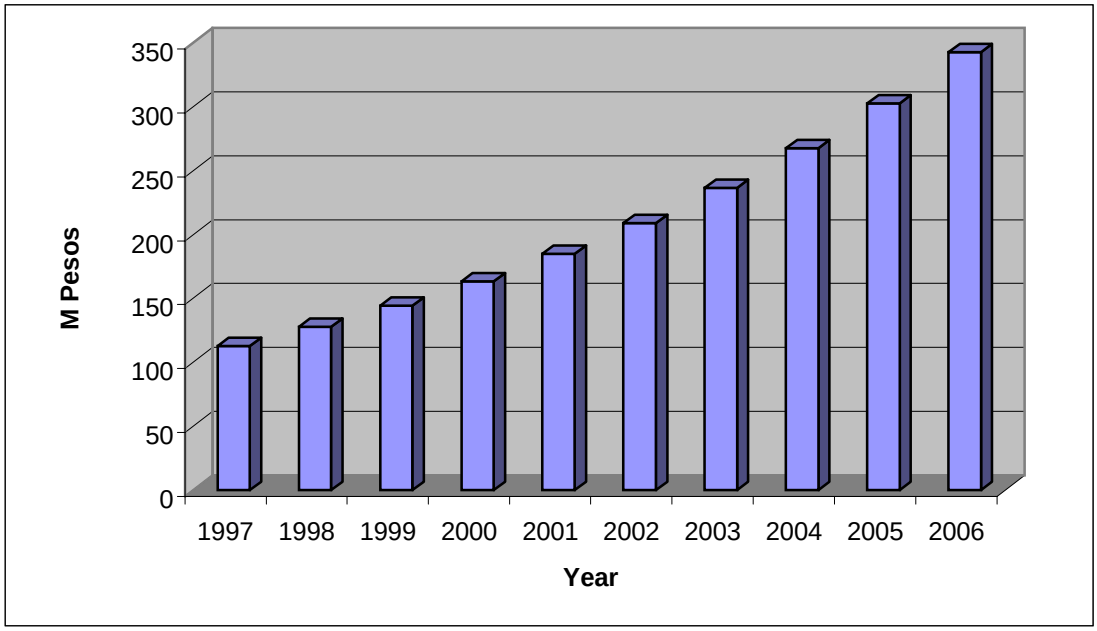
Accordingly, rapid and outstanding road development in Metro Manila may require more funds for road maintenance in the future.

Table 6.4
Estimated Annual Maintenance Cost by the EMK Method

Unit: Million Pesos

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Annual Maintenance Cost	112.7	127.5	144.3	163.3	184.7	209.0	236.5	267.5	302.7	342.5

FIGURE 6.3
ESTIMATED ANNUAL MAINTENANCE COST



7. IMPROVEMNET DIRECTIONS

7.1 Structural Reforms of Transport Sector

7.1.1 Necessity

Since investment in maintenance yields much higher return than building new facilities, there is definitely a pressing need to make greater capital investment for maintaining national roads as motorization enhances, road length increases and time elapses. The term "maintenance" includes rehabilitation and rebuilding of many roads that have deteriorated so badly. However, all road user charges and fuel taxes on road transport usage accrue to the General Fund of the government, and annual funding allocation to the road sector is approved by Congress, resulting in modest budget because road maintenance as well as road safety programs become second priority.

Such situation takes place in many countries of the world. Thus, the Word Bank and the DPWH jointly held the workshop on May 29 – 31, 1997 regarding "Institutional Development for the Maintenance of National Roads" to make full use of lessons learned from actual practices in other countries. It was concluded that such structural reforms as demonstrated in New Zealand or Australia might be indispensable in the Philippines to find innovative ways of improving national road maintenance program to cope with incremental financial requirement in future.

7.1.2 Concepts of Structural Reforms

The following concepts of structural reforms have been deliberated in New Zealand and Australia:

1) Government policy should be separated from regulatory and service delivery functions;
2) Central government's interest in the overall management of the transport sector should be focused on strategic policy development, taking multi-modal perspective;
3) The ownership and operation of transport system are carried out by the private sector on a commercial, competitive basis;
4) Safety regulation should be a joint operation/government responsibility; and
5) The costs of safety administration in each transport mode should be met by the relevant mode on a user-pays basis.

7.1.3 Structural Reforms of Transport Sector in the Philippines

The Government of the Philippines has a dominant role in transport. It has direct control of economic regulation, safety regulation, ownership and operation of several transport modes and provision of services to the transport industry.

The government is currently considering the merger of DOTC and DPWH. But unless a clear strategy is adopted, the proposed merger may not result in substantial reform.

A strategic structural reform in the Philippines should focus on the following technical aspects in order to downsize the government bureaucracies involved in transport and solve problems of excessive inefficiency:

1) Gradual downsizing of workforce;
2) Increasing privatization of functions; and
3) Larger commercialization of the road system

A strategic structural reform should be made in several phases to ensure its effectiveness as well as avoid conflict of interest among players.

7.2 Toll Road Development by BOT

7.2.1 General Considerations

The BOT scheme is deemed adaptable to toll road development as far as the designated roles and functions of infrastructure be kept.

The remarkable tendency in urban expressway development in Metro Manila is the recent emergence of BOT projects where the public sector seeks for private sector involvement financially and institutionally. The major roles of public sector are supposed to comprise planning, evaluation of proposals and road right-of-way acquisition, while the private sector may be given a certain period of concession to operate the toll road subject to its completion.

7.2.2 Issues to Implement BOT Projects

Since BOT projects have to be financially feasible, higher feasible sections would be implemented earlier but lower sections would remain undeveloped. If a concessionaire proposes a special condition of contract to these lower sections such as guaranteeing minimum traffic volume, periodic increase of toll rates and so forth, the public sector should conduct independent study to evaluate his proposal. Land acquisition problems still become financially serious and physically crucial even though a private sector undertakes the project by a design-built contract. The public sector should solve many matters in relation to road right-of-way acquisition.

A master plan and feasibility study such as the Metro Manila Urban Expressway Study (MMUES) conducted by JICA IN 1993 is very important to formulate BOT packages and to give implementation priorities. Accordingly, urban expressway network should be formed as a system.

The public sector should monitor and coordinate each project to reflect any modification and amendment that would take place during implementation of projects.

7.2.3 Technical Requirements

The following technical requirements should be carried out properly:

1) To strengthen the public sector institutionally to monitor on-going projects and to evaluate proposals.

2) To share recent data and information regarding BOT projects in Asia-Pacific region through a database.

3) To carry out independent topographic survey to produce parcellary plan in order to facilitate due procedure for road right-of-way acquisition.

7.3 Technical Requirements for Project Implementation

The following technical aspects are required to make road projects in Metro Manila more implementable.

7.3.1 Uninterrupted Implementation of Projects

One of the major factors that make road project implementation difficult is that its implementation phases are open to interference. Hence, an uninterrupted process of project implementation could lessen difficulties such as land acquisition problems and cost overruns. A slow process of documentation could expose the project to increased risks including rising land prices, escalation of construction costs, and additional administrative expenditures during delay or suspension. The loss of potential benefits resulting from project delay or suspension should also be taken into account as a major part of loss.

7.3.2 Propitious Preparatory Works

A good preparatory work as well as quality assurance of works at each implementation phase are crucial to smooth project implementation. A good preparatory work involves engineering, management and administration. The following difficulties should be addressed together with the implementation of road improvement projects.

1) Inadequate survey
2) Lax pre-qualification of contractors
3) Delay in Procurement Process

7.3.3 Intensive Utilization of Aerial Photos

Aerial photos are useful starting from preliminary design in a feasibility study to detailed design and certain activities in pre-construction phase. Controlled aerial photos and its aero-cartographic map should be accurate enough to be compatible with a topographic map produced by ground survey.

Topographic survey for the production of parcellary plan is sometimes hampered because of difficulties to get entry permit from landowners that oppose the project. It takes more time especially if the landowner concerned is in a foreign country. An aero-cartographic map based on aerial photos will be able to solve these kind of problem.

7.3.4 Upgrade of Pre-qualification System for Contractor and Consultant

To ensure smooth implementation, the contractors that will undertake the project should only be those that have done satisfactory works and performance without significant negative slippage.

The development of database such as the Construction Results Information System (CORINS) for contractors and the Technical Consulting Records Information Service (TECRIS) for consultants have been proven practical for such purpose in Japan. Such database system imposes obligation to both employer and contractor to provide data at the beginning and the end of project. These databases have been effective in weeding out unqualified firms. It will also promote fair and transparent modality and procedure for governmental contracts for civil works.

7.4 Recommendations for Urban Road Development in Metro Manila

1) Funds for Parcellary Plan Preparation Appropriated by ODA's Sector Loan

   To scope with present problems associated with ROW, it is very necessary that the preparation of parcellary plan should proceed individually prior to commencing its detailed design.

   The funds for parcellary plan preparation such as basic design, aerial photo taking, supplementary ground survey, accurate topography map production and so forth should be appropriated independently and not included in current project loans.

2) Ensuring Road Development Projects to Keep Quality of Work and Job Opportunity.

   In order to keep quality of works as well as job opportunity, it is important to ensure road development projects including intersection improvement. It is also necessary to secure qualified contractors through fair competition.

3) Strengthening Road Network in between C-5 and C-6

   Existing circumferential roads such as C-4 and C-5 are located west of the Marikina River, while intensive residential development continues to take place in the east. C-6 that is planned to pass through the east of the Marikina River would stimulate traffic demand across the Marikina River on existing three (3) radial arteries.

   To disperse concentrated traffic on existing radial roads and to link the east and the west at the same level as the north and the south, it is necessary to strengthen the road network in between C-5 and C-6 including construction of several bridges crossing the Marikina river.

ANNEX I

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (1)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieage-way	Lane No.	Right	Left		
1	Roxas Blvd.	NR	PRR	9.0	38.5	35.5	8	1.0	1.0	1.5	AS
2	Quirino Avenue	NR	PRR	9.0	12.0	12.0	4	0.0	0.0	0.0	AS
3	Taft Avenue	NR	PRR	8.4	20.5	13.0	4	3.0	4.5	0.0	PCC
4	South Super Highway (Toll Road)	PRR	PRR	26.5	32.0	30.0	6	0.0	0.0	2.0	PCC
4	South Super Highway (National Road)	NR	PRR	7.5	32.0	30.0	6	0.0	0.0	2.0	PCC
5	Buendia Avenue	NR	PRR	4.3	32.2	20.2	6	4.0	4.0	4.0	AS
6	Ayala Avenue	NR	SCR	1.8	43.4	26.4	8	6.0	7.0	4.0	AS
7	Shaw Boulevard	NR	PRR	5.9	19.9	16.8	4	1.2	1.9	0.0	AS
8	Ortigas Avenue	NR	PRR	9.2	31.2	24.7	6	2.0	2.0	2.5	PCC
9	C.M. Recto	NR	PRR	3.0	37.4	23.0	6	5.75	5.75	2.9	PCC
10	R. Magsaysay Boulevard	NR	PRR	1.7	28.8	24.0	6	2.0	2.0	0.8	AS
11	Aurora Boulevard	NR	PRR	7.6	15.8	12.0	4	1.8	2.0	0.0	AS
12	E. Rodriguez Sr.	NR	SCR	5.1	14.4	12.4	4	1.0	1.0	0.0	PCC
13	Lerma/ESPAÑA	NR	PRR	0.3	31.3	23.2	4	2.5	3.2	2.4	PCC
14	España	NR	PRR	2.0	38.4	24.8	8	5.8	5.8	1.95	PCC
15	Quzon Avenue	NR	PRR	4.6	36.0	25.0	8	2.0	2.0	6.95	AS
16	Marcos Avenue	NR	PRR	14.5	22.0	22.0	6	0.0	0.0	0.0	PCC
17	Quezon Boulevard	NR	PRR	0.4	23.0	18.0	4	2.0	2.0	1.0	PCC
18	Andalucia	NR	PRR	0.9	23.0	18.0	4	2.0	2.0	1.0	PCC
19	Laon Laan	NR	TCD	0.3	17.1	12.0	3	2.5	2.6	0.0	PCC
20	A. Bonifacio	NR	PRR	3.9	22.3	19.5	6	1.0	1.0	0.8	PCC
21	North Diversion Road	PR	PRR	5.8	30.6	30.6	6	0.0	0.0	0.0	PCC
22	Quirino Highway	NR	PRR	8.6	16.0	16.0	4	0.0	0.0	0.0	AS
23	Rizal Avenue	NR	PRR	5.9	24.8	20.0	6	1.8	2.0	1.0	PCC
24	J.A. Santos	NR	PRR	2.9	34.4	26.4	6	3.6	4.4	0.0	PCC
25	Reina Regente	NR	PRR	0.6	19.0	16.5	6	1.2	1.3	0.0	PCC
26	Dapitan	NR	TCD	0.5	20.3	18.3	3	1.0	1.0	0.0	PCC
27	McArthur Highway	NR	PRR	8.1	14.0	14.0	4	0.0	0.0	0.0	AS
28	Juan Luna	NR	PRR	7.2	14.7	11.3	2	2.1	1.3	0.0	PCC
29	Tayuman	NR	PRR	1.4	11.3	9.3	4	1.0	1.0	0.0	PCC
30	Gov. Forbes	NR	PRR	2.4	29.0	26.0	6	1.0	1.0	1.0	PCC
31	Pres. Quirino	NR	PRR	4.7	47.6	21.8	6	6.5	6.2	13.4	PCC
32	Samson Road	NR	PRR	1.3	18.5	15.0	4	1.5	2.0	0.0	PCC
33	EDSA	NR	PRR	23.4	34.4	32.0	12	0.0	0.0	2.4	PCC
34	Redemptorist	NR	TCD	0.3	18.5	14.0	4	2.1	2.4	0.0	PCC
35	Mexico Road	NR	TCD	0.8	18.8	13.0	4	2.8	3.0	0.0	PCC
36	Pedro Gil	NR	SCR	3.1	18.2	16.2	4	1.0	1.0	0.0	PCC
37	J.P. Rizal	NR	PRR	7.6	12.7	10.7	4	1.0	1.0	0.0	PCC

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (2)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
38	A. Mabini	NR	SCR	2.0	16.0	13.0	4	1.5	1.5	0.0	PCC
39	F.B. Harrison	NR	SCR	3.6	15.1	12.7	3	1.2	1.2	0.0	PCC
40	P. Burgos	NR	PRR	1.6	41.5	21.0	8	6.7	7.8	6.0	PCC
41	Ayala Boulevard	NR	PRR	0.8	25.0	23.0	6	1.0	1.0	0.0	PCC
42	P. Casl	NR	PRR	0.9	17.0	14.0	4	1.0	1.0	1.0	PCC
43	Legarda	NR	PRR	0.5	22.8	18.8	4	2.0	2.0	0.0	PCC
44	Aurora Boulevard	NR	PRR	0.9	27.0	18.0	6	4.5	4.5	0.0	PCC
45	Pedro Gil	NR	PRR	0.9	13.4	12.2	2	0.0	1.2	0.0	PCC
46	New Panaderos	NR	PRR	2.3	13.0	9.0	4	1.8	2.2	0.0	PCC
47	General Kalentong	NR	PRR	1.5	19.3	14.0	4	2.5	2.8	0.0	PCC
48	Real (Alabang - Zapote Road)	NR	PRR	10.0	14.0	14.0	4	0.0	0.0	0.0	PCC
49	National Road	NR	PRR	5.0	17.2	14.0	4	1.6	1.6	0.0	PCC
50	Dr. A. Santos Avenue	NR	PRR	8.6	25.1	21.6	6	1.0	1.0	1.5	PCC
51	Bagumbayan	NR	PRR	4.4	6.1	6.1	2	0.0	0.0	0.0	PCC
52	Pres. M. L. Quezon	NR	PRR	4.0	6.1	6.1	2	0.0	0.0	0.0	PCC
53	Upper Bicutan	NR	PRR	1.5	6.1	6.1	2	0.0	0.0	0.0	PCC
54	Almeda/J. Luna	NR	PRR	4.8	7.0	7.0	2	0.0	0.0	0.0	PCC
55	Dr. Sixto Antonio Avenue	NR	PRR	3.0	9.4	9.4	2	0.0	0.0	0.0	AS
56	A. Rodriguez Avenue	NR	PRR	2.7	7.0	7.0	4	0.0	0.0	0.0	PCC
57	A. Bonifacio	NR	PRR	6.6	17.0	12.0	4	2.0	2.0	0.0	PCC
58	Dr. J. P. Rizal	NR	PRR	4.3	7.0	7.0	2	0.0	0.0	0.0	PCC
59	Marcos Highway	NR	PRR	5.6	25.0	20.0	6	0.0	0.0	0.0	PCC
60	E. Rodriguez Jr. Avenue (C-5)	NR	PRR	6.2	13.2	10.0	8	0.0	0.0	0.0	AS
61	Katipunan Avenue	NR	SCR	2.5	11.0	8.0	2	1.5	1.5	1.5	AS
62	Katipunan Road	NR	PRR	4.6	18.5	16.6	6	0.0	0.0	0.0	PCC
63	Luzon Avenue	NR	PRR	5.1	6.1	6.1	2	0.0	0.0	0.0	PCC
64	Torres Bugallon	NR	PRR	4.2	7.0	7.0	2	0.0	0.0	0.0	PCC
65	Sta. Quiteria	NR	PRR	2.1	6.0	6.0	2	0.0	0.0	0.0	PCC
66	Tandang Sora	NR	PRR	5.6	10.2	10.2	2	0.0	0.0	0.0	PCC
67	Maysan Road	NR	PRR	3.2	6.5	6.5	2	0.0	0.0	0.0	PCC
68	General Luis	NR	PRR	5.4	6.5	6.5	2	0.0	0.0	0.0	PCC
69	Novaliches Ipo Road	NR	PRR	6.9	6.0	6.0	2	0.0	0.0	0.0	PCC
70	Regalado	NR	SCR	4.5	20.0	20.0	4	0.0	0.0	0.0	PCC
71	Litex Road	NR	SCR	5.9	10.0	10.0	2	0.0	0.0	0.0	PCC
72	M.H. Del Pilar	NR	PRR	1.3	6.2	6.2	2	0.0	0.0	0.0	PCC
73	Governor Santiago	NR	PRR	1.1	6.8	6.8	2	0.0	0.0	0.0	PCC
74	Congressional	NR	SCR	3.4	28.0	20.0	6	2.0	2.0	4.0	PCC
75	Mindanao Road	NR	SCR	2.6	26.6	20.0	6	1.3	1.3	4.0	PCC

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (3)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
76	Visayas Avenue	NR	SCR	2.4	23.0	20.0	4	0.0	0.0	3.0	PCC
77	Roosevelt Avenue	NR	SCR	3.0	18.9	15.5	4	1.5	1.9	0.0	PCC
78	General Araneta	NR	PRR	3.9	30.0	22.8	6	3.1	3.1	1.0	PCC
79	East Avenue	NR	SCR	1.8	29.3	26.6	6	1.0	1.0	0.7	PCC
80	North Avenue	NR	SCR	1.5	23.4	21.0	6	1.0	1.0	0.4	PCC
81	Timog Avenue	NR	SCR	2.0	23.0	18.0	4	2.3	2.7	0.0	AS
82	West Avenue	NR	SCR	2.1	20.0	15.0	4	2.5	2.5	0.0	PCC
83	Hornorio Lopez Boulevard	NR	TCD	4.1	14.0	14.0	4	0.0	0.0	0.0	PCC
84	10th Avenue	NR	TCD	1.8	15.0	13.0	4	1.0	1.0	0.0	PCC
85	Heroes Del 96	NR	TCD	0.7	7.0	7.0	2	0.0	0.0	0.0	PCC
86	8th Street	NR	TCD	0.9	7.0	7.0	2	0.0	0.0	0.0	PCC
87	7th Avenue	NR	TCD	1.1	7.0	7.0	2	0.0	0.0	0.0	PCC
88	4th Avenue	NR	TCD	0.8	6.0	6.0	2	0.0	0.0	0.0	PCC
89	Hermosa	NR	TCD	0.6	13.4	11.4	4	1.0	1.0	0.0	PCC
90	Pampanga	NR	TCD	0.3	12.0	12.0	4	0.0	0.0	0.0	PCC
91	Earnshaw	NR	TCD	0.6	11.0	11.0	4	0.0	0.0	0.0	PCC
92	Moriones	NR	TCD	1.2	27.5	22.0	6	1.5	2.0	2.0	PCC
93	C. Palanca	NR	SCR	0.9	17.0	13.0	4	2.0	2.0	0.0	AS
94	Aduana	NR	SCR	1.0	23.6	16.6	4	3.0	4.0	0.0	PCC
95	Arlegui	NR	TCD	0.6	11.0	9.0	2	1.0	1.0	0.0	PCC
96	Concepcion	NR	TCD	0.5	20.5	13.5	2	3.0	4.0	0.0	PCC
97	Romualdez	NR	TCD	1.1	11.5	9.0	3	1.0	1.5	0.0	PCC
98	San Marcelino	NR	TCD	2.0	12.0	10.0	3	1.0	1.0	0.0	AS
99	M. Y. Orosa	NR	TCD	0.0	19.8	15.0	4	1.8	2.0	1.0	PCC
100	T. M. Kalaw	NR	PRR	0.8	43.4	27.9	6	1.5	8.8	4.5	PCC
101	UN Avenue	NR	SCR	1.8	16.7	13.1	4	1.7	1.9	0.0	PCC
102	Padre Paura	NR	TCD	0.6	17.6	11.0	2	3.3	3.3	0.0	PCC
103	M. H. del Pilar	NR	TCD	1.8	9.1	7.1	2	1.0	1.0	0.0	PCC
104	Pres. Quirino Highway	NR	TCD	0.8	30.9	21.8	6	4.2	4.2	0.7	PCC
105	Paz. Guanzon	NR	SCR	0.8	16.2	12.0	4	2.0	2.2	0.0	AS
106	General Luna	NR	TCD	1.1	13.8	9.9	2	1.0	2.9	0.0	PCC
107	Singalong	NR	TCD	1.6	13.5	10.0	2	1.5	2.0	0.0	PCC
108	Leon Guinto	NR	TCD	2.2	18.9	16.9	4	1.0	1.0	0.0	AS
109	Zobel Roxas	NR	SCR	0.5	13.5	13.0	4	0.0	0.0	0.5	PCC
110	Vicente Cruz	NR	SCR	3.7	16.9	14.9	4	1.0	1.0	0.0	PCC
111	Kamagong	NR	SCR	0.9	12.2	7.8	2	2.3	2.3	0.0	PCC
112	Estrada	NR	TCD	0.9	10.4	8.0	2	1.2	1.2	0.0	AS
113	Bautista	NR	TCD	1.1	5.7	5.7	4	0.0	0.0	0.0	AS

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (4)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length		Carrieageway	Lane No.	Right	Left		
114	San Andres	NR	TCD	2.2	14.7	10.7	4	2.0	2.0	0.0	PCC
115	A. Francisco	NR	TCD	1.0	14.9	10.5	2	2.2	2.2	0.0	PCC
116	Pasig Line / Kalayaan	NR	TCD	3.2	9.5	7.5	4	1.0	1.0	0.0	PCC
117	Pasong Tamo	NR	SCR	2.2	19.8	19.87	4	0.0	0.0	0.0	PCC
118	Libertad	NR	SCR	3.1	18.5	15.8	4	0.0	0.0	0.0	AS
119	Paseo De Roxas	NR	TCD	1.1	23.7	20.7	6	1.5	1.5	0.0	AS
120	Makati Avenue	NR	SCR	2.1	27.0	18.0	8	2.9	2.9	3.0	AS
121	Reposo	NR	TCD	0.3	12.0	10.0	2	1.0	1.0	0.0	AS
122	Laura / Carreon	NR	SCR	1.9	13.3	11.0	2	0.8	0.8	0.0	PCC
123	D. Tuazon	NR	SCR	3.1	13.7	12.1	4	0.8	0.8	0.0	PCC
124	Mayon	NR	SCR	2.3	15.1	15.1	4	0.0	0.0	0.0	PCC
125	Blumentritt	NR	SCR	0.8	14.0	10.0	4	2.0	2.0	0.0	PCC
126	Retiro	NR	TCD	4.0	12.3	12.3	4	0.0	0.0	0.0	PCC
127	Del Monte	NR	SCR	3.6	19.7	15.2	4	1.8	1.8	0.0	PCC
128	Banaue	NR	SCR	3.7	15.0	13.0	4	1.0	1.0	0.0	PCC
129	Laon Laaan	NR	TCD	1.4	17.1	14.0	3	1.5	1.5	0.0	PCC
130	Dapitan	NR	TCD	1.5	10.5	8.5	3	1.0	1.0	0.0	PCC
131	M. Dela Fuente	NR	TCD	2.2	14.5	12.5	4	1.0	1.0	0.0	PCC
132	Vicente G. Cruz	NR	TCD	2.2	12.3	10.7	3	0.8	0.8	0.0	PCC
133	G. Tuazon	NR	SCR	2.2	9.0	9.0	2	0.0	0.0	0.0	PCC
134	Roces Avenue	NR	TCD	3.5	19.6	14.7	4	1.2	1.2	2.4	PCC
135	Tomas Morato	NR	SCR	1.2	22.0	12.0	4	5.0	5.0	0.0	AS
136	Kamuning	NR	TCD	1.4	13.6	9.1	2	2.2	2.2	0.0	PCC
137	New York	NR	TCD	0.5	7.0	7.0	2	0.0	0.0	0.0	AS
138	Hemady	NR	TCD	1.1	12.0	10.0	3	1.0	1.0	0.0	AS
139	Gilmore	NR	SCR	1.2	12.0	10.0	3	1.0	1.0	0.0	AS
140	Doña Rodriguez	NR	TCD	2.0	12.0	10.0	2	1.0	1.0	0.0	AS
141	Old Sta. Mesa	NR	SCR	1.0	14.2	11.1	2	1.3	1.8	0.0	AS
142	Blumentritt	NR	TCD	0.9	14.0	12.0	4	1.0	1.0	0.0	PCC
143	Wilson	NR	SCR	2.6	20.1	14.1	4	3.0	3.0	0.0	PCC
144	Valenzuela	NR	TCD	0.3	11.0	11.0	4	0.0	0.0	0.0	PCC
145	Santolan / Pinaglabanan	NR	SCR	3.5	14.0	14.0	4	0.0	0.0	0.0	PCC
146	P. Tuazon	NR	SCR	1.1	11.0	7.0	2	2.0	2.0	0.0	PCC
147	Boni Avenue	NR	SCR	3.4	19.8	15.1	4	1.8	1.9	1.0	PCC
148	M. Naval	NR	SCR	1.9	10.2	10.2	4	0.0	0.0	0.0	PCC
149	General Luna	NR	SCR	5.2	8.2	7.0	2	0.6	0.6	0.0	PCC
150	Panghulo	NR	SCR	1.5	7.0	7.0	2	0.0	0.0	0.0	PCC
151	Rodriguez	NR	PRR	0.1	7.0	7.0	2	0.0	0.0	0.0	PCC

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (5)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
152	M. H. Del Pilar	NR	SCR	4.5	7.0	7.0	2	0.0	0.0	0.0	PCC
153	Pasolo	NR	TCD	2.9	7.0	7.0	2	0.0	0.0	0.0	PCC
154	Governor Pascual	NR	SCR	3.9	9.2	8.0	2	0.6	0.6	0.0	PCC
155	Road I	NR	PRR	0.8	12.0	10.0	2	1.0	1.0	0.0	PCC
156	University	NR	SCR	0.4	36.0	28.0	8	1.0	1.0	6.0	PCC
157	Osmeña	NR	SCR	0.3	13.0	11.0	4	1.0	1.0	0.0	AS
158	Roxas	NR	SCR	0.5	13.8	10.6	4	1.6	1.6	0.0	AS
159	Kalyaan	NR	SCR	1.9	24.7	14.4	4	1.3	1.0	8.0	PCC
160	V. Luna	NR	TCD	0.9	17.6	13.8	4	1.9	1.9	0.0	PCC
161	Anonas	NR	TCD	0.1	20.1	16.1	4	2.0	2.0	0.0	PCC
162	Kamias	NR	SCR	1.4	17.6	11.8	4	3.0	3.0	0.0	PCC
163	New York	NR	TCD	2.8	14.0	12.0	2	1.0	1.0	0.0	PCC
164	P. Tuazon	NR	SCR	2.6	11.0	9.0	4	1.0	1.0	0.0	PCC
165	Santolan	NR	SCR	2.2	11.0	10.0	4	0.5	0.5	0.0	PCC
166	Bayan-Bayanan	NR	SCR	1.4	21.5	14.5	6	3.5	3.5	0.0	PCC
167	Katipunan	NR	TCD	1.1	8.0	6.0	2	1.0	1.0	0.0	PCC
168	C. Raymundo	NR	PRR	3.3	8.0	8.0	2	0.0	0.0	0.0	AS
169	Meralco Avenue	NR	SCR	1.6	28.9	19.2	4	3.1	3.1	3.5	PCC
170	Captain H. Javier	NR	TCD	0.8	18.3	14.0	4	2.3	2.3	0.0	PCC
171	Pioneer	NR	SCR	1.5	11.0	10.0	4	0.5	0.5	0.0	PCC
172	MCKinley	NR	SCR	3.1	16.5	13.6	4	1.6	1.6	0.0	AS
173	Aurora Boulevard	NR	SCR	1.2	25.6	20.4	6	2.0	2.0	1.5	AS
174	Airport Road	NR	SCR	6.1	16.8	14.8	6	1.0	1.0	0.0	PCC
175	Domestic	NR	PRR	1.1	11.9	10.9	4	0.0	0.0	1.0	AS
176	MIA Road	NR	PRR	1.0	32.0	27.0	8	1.0	1.0	3.0	PCC
177	Imelda Avenue	NR	SCR	3.5	18.0	18.0	8	0.0	0.0	0.0	AS
178	Naga Road	NR	SCR	4.4	12.0	10.0	2	1.0	1.0	0.0	PCC
179	Marcos Alvares	NR	SCR	2.4	12.0	10.0	2	10	1.0	0.0	PCC
180	Don manolo	NR	SCR	2.1	23.9	15.0	6	3.4	3.4	2.1	PCC
181	A. Aguirre	NR	SCR	4.9	17.0	15.0	4	1.0	1.0	0.0	PCC
182	Don Jesus	NR	SCR	1.7	17.5	14.0	4	1.0	1.0	1.5	PCC
183	Green Heights	NR	TCD	1.1	14.0	14.0	2	0.0	0.0	0.0	PCC
184	Doña Solidad	NR	SCR	2.2	16.5	12.5	4	2.0	2.0	0.0	AS
185	Armstrong	NR	SCR	4.2	19.2	19.2	2	0.0	0.0	0.0	PCC
186	Service Road (West Side)	NR	SCR	12.0	8.0	8.0	2	0.0	0.0	0.0	AS
187	Service Road (East Side)	NR	SCR	13.2	7.0	7.0	2	0.0	0.0	0.0	AS
188	MIA Road	NR	RCD	2.3	36.3	36.3	6	2.0	2.0	2.5	AS
189	T. Claudio	NR	TCD	0.4	8.8	8.8	2	1.0	1.0	0.0	AS

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (6)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
190	Leveriza	NR	TCD	1.8	13.0	9.0	3	2.0	2.0	0.0	AS
191	Park Avenue	NR	TCD	1.0	6.0	6.0	2	0.0	0.0	0.0	PCC
192	A. Luna	NR	TCD	0.7	7.3	7.3	2	0.0	0.0	0.0	PCC
193	Adriatico	NR	TCD	1.4	36.5	29.1	4	3.2	3.2	1.0	AS
194	Dominga	NR	TCD	1.0	6.4	6.4	2	0.0	0.0	0.0	PCC
195	P. Burgos	NR	TCD	0.7	6.4	6.4	2	0.0	0.0	0.0	PCC
196	Zamora	NR	TCD	1.0	6.4	6.4	2	0.0	0.0	0.0	PCC
197	Del Pan Bridge	NR	PRR	0.2	23.0	20.0	6	1.0	1.0	1.0	AS
198	Jones Bridge	NR	PRR	0.1	23.0	20.0	4	1.0	1.0	1.0	AS
199	MCArthur Bridge	NR	SCR	0.1	23.0	20.0	4	1.0	1.0	1.0	AS
200	Quezon Bridge	NR	PRR	0.1	23.4	20.0	6	1.3	1.3	0.8	AS
201	Ayala Bridge	NR	PRR	0.1	24.0	20.0	6	1.0	1.0	2.0	AS
202	Nagtahan Bridge	NR	PRR	0.2	24.5	20.0	6	1.0	1.0	2.5	AS
203	Aragon	NR	TECD	0.4	7.0	7.0	2	0.0	0.0	0.0	PCC
204	V. Fugoso	NR	TECD	0.2	14.4	14.4	4	0.0	0.0	0.0	PCC
205	Bambang	NR	TECD	0.9	10.2	10.2	4	0.0	0.0	0.0	PCC
206	Lope de Vega	NR	TECD	0.4	15.2	13.2	4	1.0	1.0	0.0	PCC
207	Antipolo	NR	TECD	1.3	13.1	13.1	4	0.0	0.0	0.0	PCC
208	F. Huertas	NR	SCR	2.4	15.3	13.3	4	1.0	1.0	0.0	PCC
209	Oroquieta	NR	TCD	1.0	16.3	14.0	4	1.0	1.3	0.0	PCC
210	Tomas Mapua	NR	TCD	2.6	11.3	11.3	4	0.0	0.0	0.0	PCC
211	Cavite	NR	TCD	0.6	12.0	12.0	4	0.0	0.0	0.0	PCC
212	Laguna	NR	TCD	0.4	16.5	14.0	4	1.5	1.0	0.0	PCC
213	Batangas	NR	TCD	0.3	16.5	16.5	4	0.0	0.0	0.0	PCC
214	Bugallon	NR	TCD	0.3	15.0	13.0	4	1.0	1.0	0.0	PCC
215	3rd Avenue	NR	TCD	0.3	6.0	6.0	2	0.0	0.0	0.0	PCC
216	5th Avenue	NR	PRR	0.3	7.0	7.0	2	0.0	0.0	0.0	PCC
217	6th Avenue	NR	TCD	1.0	6.0	6.0	2	0.0	0.0	0.0	PCC
218	A. Del Mundo	NR	TCD	1.0	6.0	6.0	2	0.0	0.0	0.0	PCC
219	P. Sevilla	NR	TCD	1.0	6.0	6.0	2	0.0	0.0	0.0	PCC
220	5th Street	NR	TCD	0.3	7.0	7.0	2	0.0	0.0	0.0	PCC
221	P. Guevarra	NR	TCD	1.4	12.0	12.0	4	1.0	1.0	0.0	PCC
222	R-10 (C.M Recto - Lapu-Lapu)	NR	PRR	6.5	20.0	20.0	6	0.0	0.0	0.0	PCC
223	Dagatdagatan	NR	SCR	3.4	15.0	15.0	6	3.0	3.0	2.5	PCC
224	C4 Extension	NR	PRR	1.8	20.0	20.0	6	1.0	1.0	2.5	AS
225	C3 (R-10 A. Bonifacio)	NR	PRR	5.4	20.0	20.0	6	2.0	2.0	2.5	PCC
226	C5 (South Super Highway-Pasig Blvd.)	NR	PRR	8.0	15.0	15.0	6	0.0	0.0	4.0	PCC
227	Ortigas Extension	NR	PRR	5.0	17.1	17.1	5	0.0	0.0	0.8	PCC
228	San Mateo / Batasan Road	NR	TCD	2.2	7.0	7.0	2	0.0	0.0		PCC

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (7)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
229	Tumana	NR	TCD	4.0	7.0	7.0	2	0.0	0.0		PCC
230	Manila - Cavite Coastal Road	NR	PRR	6.7	39.8	22.6	8	7.3	7.3	2.6	AS
231	Ordoñez Street	NR	TCD	1.2	12.4	12.4	2	0.0	0.0		PCC
232	Balagtas	NR	TCD	0.5	12.4	12.4	2	0.0	0.0		PCC
233	Fortune Avenue	NR	TCD	0.8	12.4	12.4	2	0.0	0.0		PCC
234	A. De Guzman	NR	TCD	2.2	14.4	12.4	2	1.0	1.0		PCC
235	Old Zabarte Road	NR	SCR	5.0	14.4	12.4	4	1.0	1.0	0.0	AS
236	Susano / Camarin Road	NR	SCR	4.3	12.0	10.0	2	1.0	1.0	0.0	PCC
237	Don Mariano Marcos Ave. Ext.	NR	PRR	3.1	29.0	20.0	8	1.5	1.5	6.0	PCC
238	Mindanao Ave. Ext.	NR	SCR	1.7	35.0	14.0	4	1.5	1.5	18.0	PCC
239	Lagro	NR	TCD	2.2	7.0	7.0	2	0.0	0.0	0.0	AS
240	Aguilar Ave. / Cawayway Avenue	NR	SCR	3.8	16.0	14.0	4	1.0	1.0		PCC
241	Imelda Ave. (Cainta)	NR	PRR	2.0	7.9	7.2	4	0.0	0.0	0.7	PCC
242	A. Tuazon	NR	PRR	1.6	17.4	15.0	4	1.2	1.2	0.0	PCC
243	Telaviv	NR	TCD	1.3	16.0	14.0	2	1.0	1.0	0.0	PCC
244	Sgt. Rivera	NR	TCD	0.8	23.0	20.0	6	1.0	1.0	1.0	PCC
245	Kalayaan	NR	TCD	3.2	20.0	18.0	4	1.0	1.0	0.0	PCC
246	President Avenue	NR	SCR	1.9	16.0	14.0	2	1.0	1.0	0.0	AS
247	Tropical Avenue	NR	SCR	2.1	18.0	15.0	2	1.5	1.5	0.0	PCC
248	Congressional	NR	SCR	1.2	25.4	23.0	6	1.2	1.2		PCC
249	Agham	NR	TCD	1.9	23.0	18.0	4	1.5	1.5	2.0	PCC
250	General Araneta	NR	PRR	0.6	20.0	12.0	6	3.0	3.0	2.0	PCC
251	Blumentritt	NR	SCR	1.6	14.0	12.0	3	1.0	1.0	0.0	PCC
252	Dimasalang	NR	PRR	1.1	18.4	15.0	4	1.0	1.0	1.4	PCC
253	Lapu Lapu	NR	SCR	1.7	15.0	15.0	4	0.0	0.0	0.0	PCC
254	Letre Rd./Rizal Avenue	NR	PRR	1.3	7.0	7.0	2	0.0	0.0	0.0	PCC
255	Sacrista	NR	SCR	0.6	7.0	7.0	2	0.0	0.0	0.0	PCC
256	Panorama	NR	TCD	0.7	10.0	7.0	2	1.5	1.5	0.0	PCC
257	Olive	NR	TRCD	0.6	9.0	7.0	2	1.0	1.0	0.0	PCC
258	Russet	NR	TCD	0.3	9.0	7.0	2	1.0	1.0	0.0	PCC
259	Rainbow	NR	TCD	0.7	9.4	7.0	2	1.2	1.2	0.0	PCC
260	E. Santos	NR	TCD	1.8	7.0	7.0	2	0.0	0.0	0.0	PCC
261	Rodriguez	NR	SCR	2.0	7.0	7.0	2	0.0	0.0	0.0	PCC
262	M. L. Quezon	NR	PRR	3.5	6.1	6.1	2	0.0	0.0	0.0	PCC
263	Araneta	NR	PRR	0.4	22.8	22.8	6	1.0	1.0	2.0	PCC
264	Dora J. Vargas Avenue	NR	SCR	2.4	23.5	15.0	6	3.0	3.0	2.5	PCC
265	San Miguel Avenue	NR	TCD	1.6	27.5	22.0	6	1.5	2.0	2.0	PCC
266	Fajardo	NR	TCD	2.8	7.0	7.0	2	0.0	0.0	0.0	PCC

ANNEX I

ROAD INVENTORY AND ROAD CLASSIFICATION IN METRO MANILA (8)

No.	ROAD NAME	CLASSIFICATION		Road				Sidewalk		Median	Pavement Type
		ADM.	FUNC.	Length	Road Width	Carrieageway	Lane No.	Right	Left		
267	S. H. Loyola	NR	TCD	2.0	12.0	10.0	2	1.0	1.0	0.0	AS
268	M. Earnshaw	NR	SCR	1.0	14.0	10.0	4	2.0	2.0	0.0	PCC
269	Nicanor Reyes	NR	TCD	0.4	23.0	14.0	6	1.0	1.0	1.0	PCC
270	9 de Pebrero	NR	TCD	1.8	15.0	23.0	4	1.0	1.0	0.0	PCC
271	Libertad	NR	TCD	1.2	7.0	15.0	2	0.0	0.0	0.0	PCC
272	C. P. Garcia	NR	SCR	2.5	11.0	7.0	2	1.5	1.5	0.0	PCC
273	Kalayaan	NR	TCD	1.2	7.0	11.0	2	0.0	0.0	0.0	PCC
274	South Super Highway (Toll Road)	PR	PRR	5.5	32.0	30.0	4	0.0	0.0	2.0	PCC
275	T. Montillano	NR	PRR	0.6	6.1	6.1	2	0.0	0.0	0.0	PCC
276	Tayabas	NR	TCD	0.8	14.0	12.0	4	1.0	1.0	0.0	PCC
277	Solis	NR	TCD	1.1	7.0	7.0	2	0.0	0.0	0.0	PCC
278	Tecson	NR	TCD	0.4	7.0	7.0	2	0.0	0.0	0.0	PCC
279	Scout Bardolaza	NR	TCD	0.6	7.0	7.0	2	0.0	0.0	0.0	PCC
280	Judge Jimenez	NR	TCD	0.5	7.0	7.0	2	0.0	0.0	0.0	PCC
281	Ermin Garcia Avenue	NR	TCD	2.9	7.0	7.0	2	0.0	0.0	0.0	PCC
282	Scout Chuatoco	NR	TCD	1.5	7.0	7.0	3	0.0	0.0	0.0	PCC
283	Maria Clara	NR	TCD	3.2	12.3	10.7	2	0.8	0.8	0.0	PCC
284	Fairlane	NR	TCD	0.8	7.0	7.0	2	0.0	0.0	0.0	PCC
285	Regalado Avenue	NR	SCR	0.7	7.0	7.0	2	0.0	0.0	0.0	PCC
286	Dahlia St.	NR	PRR	0.2	7.0	7.0	2	0.0	0.0	0.0	AS
287	Dagupan	NR	TCD	1.3	13.1	13.1	4	0.0	0.0	0.0	PC
288	Chicago	NR	TCD	1.6	7.0	7.0	2	0.0	0.0	0.0	PCC
289	Capulong	NR	PRR	1.4	11.3	9.3	4	1.0	1.0	0.0	PCC
290	South Avenue	NR	PRR	0.5	12.0	10.3	2	1.0	1.0	0.0	AS
Total				747.7							

Notes:

NR Means National Road

PR means Private Road

PRR means Primary Arterial

SCR means Secodary Arterial Road.

TCD means Collectors

ANNEX II

ANNEX II

Definition of Terms of Land Acquisition Procedure

1. Public Information Campaign – DPWH shall first hold consultations with local government officials and representatives of the Office of Media Affairs about the undertaking of the project to elicit support and assistance for an extensive public information campaign among local inhabitants that will be affected by the project. This information campaign is necessary to acquaint the public with the objectives and benefits to be derived from the project so that resistance to property acquisition could either be lessened or avoided.

2. Parcellary/Topographic Plan – It is a requirement that parcellary/topographic surveys be executed and prepared by a competent Geodetic Engineer. This must be immediately available at the implementing office as basis for just compensation of the rightful owners. The parcellary survey plan should have a survey number of the affected lots and indicates the relative position of these lots with respective to the road alignment. Topographic map shows the kind of structures or improvements that will be affected and indicates the extent of the damage to the property by the project.

3. a. Assessor

With the parcellary/topographic plan, a list of affected lots and improvements is made. A copy of this list is submitted to the Municipal/City Assessor concerned for the identification of lot owners of the Tax Map and Tax Declaration (Land and Improvement) on file in their respective office. The name and address of the owners, the lot/survey number with the corresponding Transfer Certificate of Title (TCT) number and the kind and type improvements constructed thereon are established and identified per indication on the Tax Declaration.

b. Affected Owner

After the identification of the owner (which is also done through actual field inspection), NOTICE is served to the affected owner informing him/her that the Department is implementing a road project that would affect his property/land. The notice also require him/her to submit pertinent documents such as Tax Declaration, TCT, Realty Tax Clearance and picture of the affected improvements. Failure on his/her part to comply with the needed requirements would mean their refusal to sell or share their property. In effect, DPWH would initiate expropriation proceedings.

c. Registered of Deeds

DPWH may send request to the Register of Deeds for a certified copy of TCT covering the affected lot.

4. Determination and Computation of Area of Improvements – Actual measurements of the affected improvement is undertaken to determine its cost based on the Tax Declaration.

ANNEX II

5. Municipal/City Appraisal Committee – DPWH requests Municipal/City Appraisal Committee to determine the fair and just compensation of the affected property (Land and Improvement). Accompanying documents include Parcellary survey plan, Tax Declaration, titles and estimated cost of improvements (to be submitted to the Appraisal Committee in cases where the owner does not agree to the market value determined by the Assessor for reconsideration).

6. Offer to Owner of Just Compensation – The ROW engineer will relay to the owner the amount to be paid for the affected property (Land / Improvement) based on the unit price approved by the Appraisal Committee.

7. Offer Denied – If offer of just compensation of the property is denied by the owner, the DPWH Office will request the Office of the Solicitor General (OSG) to file complaint for expropriation of the needed property. Pertinent papers/data for submission to the OSG include Name and Address of Owner, Tax Declaration, Title Parcellary Plan with technical description of the affected portion, and Appraisal Report.

8. Offer Accepted – In the event that the owner accepts the offer of just compensation, ROW – URPO will immediately prepare the Contract/Instrument to effect payment.

9. Agreement to Demolish and Remove Improvements (ADRI) – ADRI is an instrument or contract necessary to effect the demolition and removal of the improvements within the right-of-way of the project. Payment thereof is made in two (2) installments. First partial payment of 70% of the contract amount is made upon approval of the contract and the last installment is paid upon complete demolition and removal of the subject improvement from the right-of-way of the project. Accompanying papers/documents as part of the contract are: Certification of the Project Engineer that improvement is affected by the project, Tax Declaration, Tax Clearance of Property, Certification of Demolition by the Project Engineer, Comparative Analysis, Special Power of Attorney or Deed of Assignment.

10. Deed of Absolute Sale (DAS) – DAS is an instrument covering the sale of registered Real Estate property titled under the Torrens System and is free of any liens and encumbrances. Accompanying papers/documents as part of the contract are: Photocopy of Title duly certified by the ROW Engineer, Tax Declaration, Appraisal Report, Special Power of Attorney (If claimed through Attorney-in-Fact), Board Resolution (If owned by a Corporation/Company), Certification by the ROW Engineer that the subject lot is affected and the basis of payment, Planned Technical Description of the affected portion. Payment of the lot is made upon the registration of the sale in favor of the government.

ANNEX II

Note: Approval of ADRI is by the Project Manager regardless of amount of consideration.

Approval of DAS is dependent on the amount of consideration and delegated as follows:

Amount of Consideration	Approving Party
100,000.00 or less	Project Director
100,000.00 up to 500,000.00	Director (Legal)
500,000.00 up to 5,000,000.00	Undersecretary
More than 5,000,000.00	Secretary

Certificate for Availability of Funds for both ADRI and DAS has to be requested before approval by the party concerned and instruments should bear the signature of the Chief Accountant as one of the witnesses, signifying that the fund is available.