

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

NO.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

**THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR
DEVELOPMENT OF REGIONAL GROWTH CENTERS
IN
THE REPUBLIC OF THE PHILIPPINES**

**FINAL REPORT
MAIN TEXT**

Volume-2

**PART C: METRO BACOLOD ROAD NETWORK
DEVELOPMENT PLAN**

October 2004

**KATAHIRA & ENGINEERS INTERNATIONAL
ALMEC CORPORATION**

SD
JR
04-33

EXCHANGE RATE

METRO ILOILO AND METRO BACOLOD

January 2004

1 US\$ = 55.36 Pesos

1 US\$ = 106.85 Yen

1 Pesos = 1.930 Yen

METRO CAGAYAN DE ORO

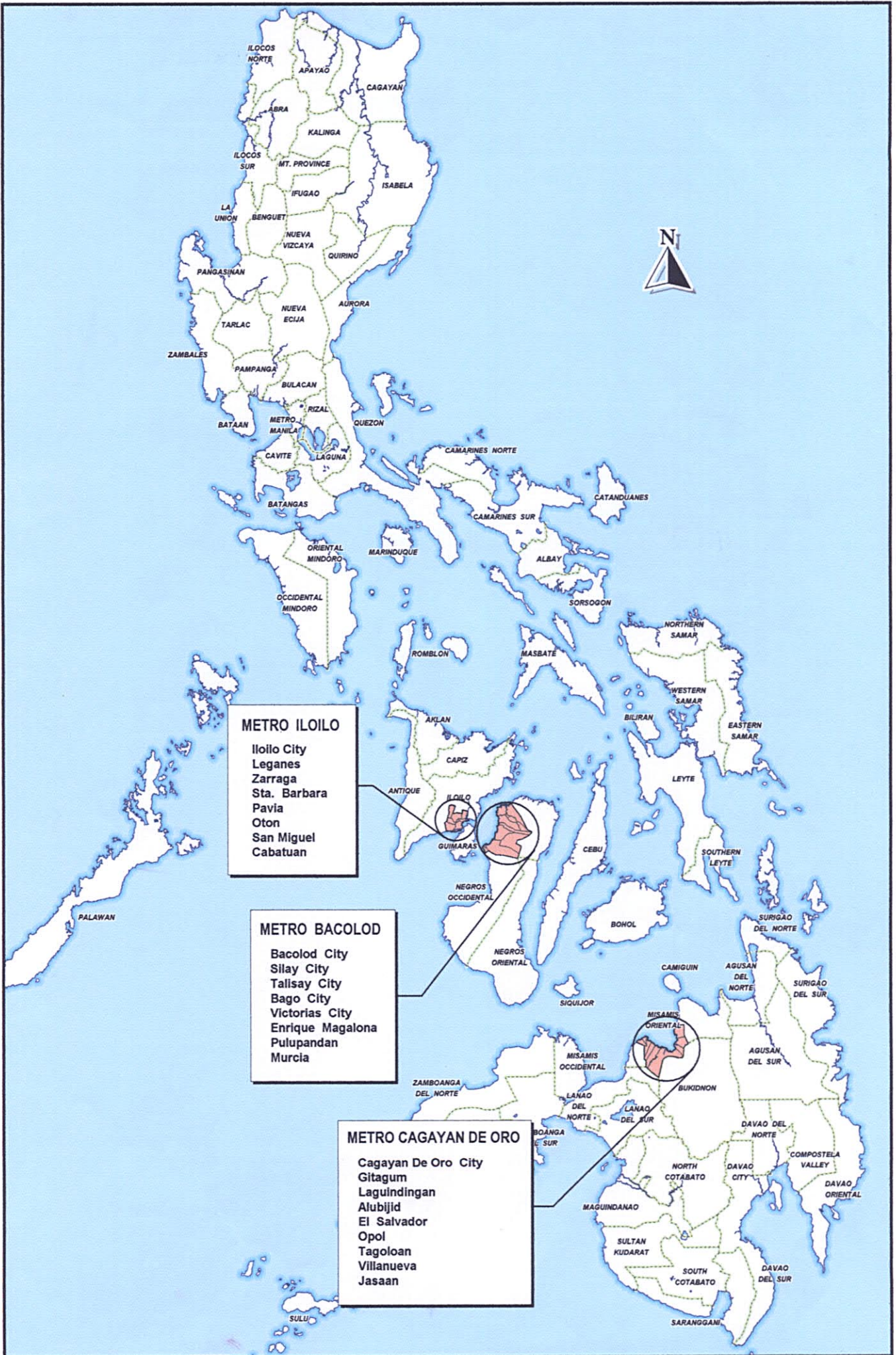
July 2004

1 US\$ = 56.04 Pesos

1 US\$ = 109.64 Yen

1 Pesos = 1.956 Yen

SOURCE: Central Bank of the Philippines



METRO ILOILO
 Iloilo City
 Leganes
 Zarraga
 Sta. Barbara
 Pavia
 Oton
 San Miguel
 Cabatuan

METRO BACOLOD
 Bacolod City
 Silay City
 Talisay City
 Bago City
 Victorias City
 Enrique Magalona
 Pulupandan
 Murcia

METRO CAGAYAN DE ORO
 Cagayan De Oro City
 Gitagum
 Lagulindangan
 Alubijid
 El Salvador
 Opol
 Tagoloan
 Villanueva
 Jasaan

LOCATION MAP OF THE STUDY AREA

TABLE OF CONTENTS

		<u>Page</u>
PART-C ROAD NETWORK DEVELOPMENT PLAN FOR METRO BACOLOD		
CHAPTER 1 PROFILE OF THE STUDY AREA		
1.1	Physical Profile	1
1.1.1	Topography	1
1.1.2	Geology	1
1.1.3	Meteorology	3
1.1.4	Natural Calamities	5
1.2	Socio-economic-Profile	6
1.2.1	Demographic Trend	6
1.2.2	Economy	9
1.2.3	Economic Activities by Sector	10
1.2.4	Vehicle Ownership	19
1.2.5	Income Level	22
1.3	Existing Land Use and Socio-economic Framework	24
1.3.1	Urban Structure	24
1.3.2	Existing Land Use	24
1.3.3	Socio-economic Framework	28
CHAPTER 2 RELEVANT TRANSPORT AND DEVELOPMENT PROJECTS		
2.1	New Bacolod Airport Development Project	33
CHAPTER 3 INTER-CITY TRANSPORT SYSTEM		
3.1	Road Transport	35
3.2	Air Transport	35
3.3	Sea Transport	35
CHAPTER 4 EXISTING TRAFFIC CONDITIONS		
4.1	Traffic Surveys Undertaken	39
4.2	Traffic Characteristics	43
4.2.1	Present OD Pattern	43
4.2.2	Traffic Volume on Roads	49
4.2.3	Airport and Port Related Traffic	57
4.2.4	Bus / Jeepney Terminals and Route	60
4.3	Traffic Management in Bacolod and Adjoining Areas	63
4.3.1	Existing Conditions	63
4.3.2	Traffic Control and Management Facilities	72
4.3.3	Parking Management	78
4.3.4	Traffic Management Organizations	78
4.3.5	Traffic Related Laws and Regulations	79
4.3.6	Traffic Regulation	80
4.3.7	Traffic Safety	81
4.3.8	Traffic Management Issues	83
4.3.9	Recommended Measures	84
CHAPTER 5 EXISTING ROAD NETWORK IN THE STUDY AREA		
5.1	Road Network Pattern and Administrative Road Classification	87
5.1.1	Road Network Pattern	87
5.1.2	Administrative Road Classification	90
5.2	Road Conditions	91
5.2.1	Number of Lanes and Road Cross-Sections	91
5.2.2	Pavement Conditions	91

	5.2.3	Bridge Conditions.....	96
	5.3	Level of Service of Existing Roads	98
CHAPTER 6		ROAD MAINTENANCE	
	6.1	National Road	101
	6.1.1	Maintenance Responsibility.....	101
	6.1.2	Maintenance Budget	101
	6.1.3	Maintenance Budget Allocation.....	102
	6.1.4	Maintenance Activity	103
	6.1.5	Maintenance Operation.....	103
	6.1.6	Organization.....	103
	6.2	Local Government Roads	106
	6.2.1	Maintenance Responsibility.....	106
	6.2.2	Maintenance Activity	107
	6.2.3	Maintenance Operation.....	107
	6.2.4	Maintenance Budget	107
	6.2.5	Organization and Staffing.....	108
	6.3	Maintenance Problems	109
	6.3.1	National Road	109
	6.3.2	Local Government Roads.....	110
CHAPTER 7		LOCAL GOVERNMENT SYSTEM IN THE PHILIPPINES	
	7.1	Local Government Units	111
	7.1.1	Levels of Government	111
	7.1.2	Income Classification	111
	7.2	The Local Government Code of 1991	112
	7.3	Relevant Agencies for the Development of Local Roads.....	112
	7.4	Local Government Fiscal Management	113
	7.4.1	Local Fiscal Administration.....	113
	7.4.2	Revenues and Expenditures	114
	7.4.3	Local Borrowing and Credit Financing	114
	7.5	Available Funding Mechanisms	116
	7.6	Capabilities of Metro Bacolod LGUs for Road Improvement	116
	7.6.1	Administrative Profile of LGUs in Metro Bacolod	116
	7.6.2	Assessment of Financial Capabilities.....	116
	7.6.3	Borrowing Capacities of LGUs	119
	7.7	Analysis of Technical Capabilities.....	119
	7.8	LGU Initiative for Road Network Development	119
CHAPTER 8		FUTURE LAND USE PLAN AND SOCIO-ECONOMIC FRAMEWORK	
	8.1	Future Urban Development Visions and Structure.....	121
	8.1.1	Possible Future Development Patterns.....	121
	8.1.2	Selection of Future Urban Development Pattern.....	123
	8.2	Future Land Use Plan.....	125
	8.2.1	Institutional System of Land Use Planning in the Philippines.....	125
	8.2.2	Land Use Plan for 2010.....	125
	8.2.3	Land se Plan for 2020	125
	8.3	Future Socio-economic Framework	128
	8.3.1	Population	128
	8.3.2	GRDP	130
	8.3.3	Employment	132
	8.3.4	Vehicle Ownership Projection	134

CHAPTER 9	TRAFFIC DEMAND FORECAST	
9.1	Demand Forecast Models	137
9.1.1	Traffic Generation / Attraction Models.....	137
9.1.2	Trip Distribution Model	137
9.1.3	Modal Split Model.....	138
9.2	Future Traffic Demand	139
9.2.1	Passenger Trip.....	139
9.2.2	Cargo Flow	141
9.2.3	Airport and Port Related Traffic.....	145
9.2.4	Vehicle Trip	147
CHAPTER 10	FUTURE ROAD NETWORK DEVELOPMENT PLAN	
10.1	Summary of Problems of Existing Road Network	149
10.2	Future Problems of Existing Road Network (Analysis of "Do Nothing" Case).....	150
10.3	Development Objectives and Strategies	153
10.3.1	Development Objectives	153
10.3.2	Development Strategies	153
10.4	Future Road Network Alternatives	155
10.4.1	Basic Road Network Planning Concept	155
10.4.2	Road Network Development Alternatives.....	156
10.5	Evaluation and Selection of Future Road Network	160
10.5.1	Traffic Assignment Results.....	160
10.5.2	Evaluation of Road Network Alternatives	160
10.6	Functional Road Classification and Standard Road Cross-Sections	165
10.6.1	Present Road Classification in the Philippines	165
10.6.2	Functional Classification of Roads in the Study Area.....	167
10.6.3	Proposed Design Criteria and Standard Road Cross-Section by Function.....	169
10.7	Road Projects and Cost Estimate	171
10.7.1	Road Projects.....	171
10.7.2	Cost Estimate.....	176
10.8	IEE of Road Projects.....	180
CHAPTER 11	ROAD NETWORK DEVELOPMENT MASTER PLAN	
11.1	Financial Framework.....	183
11.1.1	National Road	183
11.1.2	Investment Capacity of LGUs.....	187
11.2	Priority of Road Projects	189
11.2.1	Basic Policy and Prioritization Procedure.....	189
11.2.2	Prioritization Criteria	191
11.2.3	Priority Ranking of Road Projects	193
11.2.4	Specific Consideration in Implementation Sequence	193
11.2.5	Order of Implementation.....	196
11.3	Road Network Master Plan	197
11.4	Evaluation of Road Network Development of Master Plan	200
11.4.1	Improvement of Transport Efficiency by Master Plan.....	200
11.4.2	Economy Viability	206
11.4.3	Achievement of Road Network Development Objectives by the Master Plan....	206
11.5	Proposed Administrative Classification and Implementing Agency	208
11.6	Road Maintenance Plan.....	209
11.6.1	Estimated Road Maintenance Cost.....	209
11.6.2	Road Maintenance Plan	211
11.6.3	Requirement of Total Maintenance Expenditure	212

11.7	Traffic Management Plan.....	213
11.8	Measures to be Taken for Inside Area of Bacolod Circumferential.....	220
11.9	Selection of Road Projects for F/S.....	222
CHAPTER 12	FEASIBILITY STUDY OF NEW AIRPORT ACCESS ROAD	
12.1	Objectives of the Project.....	225
12.2	Physical Features of the Project Site.....	225
12.3	Engineering Surveys Conducted.....	225
12.4	Selection of Route Alignment.....	226
12.5	Traffic Forecast.....	228
12.6	Construction Phasing.....	230
12.7	Preliminary Design.....	230
12.7.1	Design Concepts and Criteria.....	230
12.7.2	Road and Intersection Design.....	237
12.7.3	Pavement Design.....	240
12.7.4	Structure Design.....	242
12.7.5	Drainage Design.....	247
12.8	Cost Estimates.....	253
12.8.1	Construction Cost.....	253
12.8.2	ROW Acquisition and Compensation Cost.....	258
12.8.3	Detailed Engineering and Construction Supervision Cost.....	259
12.8.4	Summary of Project Cost.....	259
12.8.5	Maintenance Cost for New Airport Access.....	260
12.9	Environmental Impact Assessment.....	261
12.9.1	General Characteristics of the Project Road.....	261
12.9.2	Social Acceptability.....	261
12.9.3	Data Gathering for Baseline Information.....	262
12.9.4	Description of Existing Environmental Condition.....	262
12.9.5	Perception Survey.....	270
12.9.6	Identified Impacts and Mitigation Measures.....	271
12.9.7	Environmental Management and Monitoring Plan.....	271
12.9.8	Resettlement Plan for Affected People.....	271
12.10	Social Impact Assessment and Resettlement Action Plan.....	276
12.10.1	Alternatives Studied.....	276
12.10.2	Barangays Affected by the Project.....	276
12.10.3	Community Consultation and Participation.....	276
12.10.4	Identified Impacts.....	279
12.10.5	Valuations of Losses.....	283
12.10.6	Resettlement Site.....	283
12.10.7	Income Restoration Program.....	283
12.10.8	Institutional Arrangements.....	286
12.10.9	Grievance Redress Measures.....	289
12.10.10	Monitoring and Evaluation.....	290
12.10.11	RAP Implementation.....	292
12.11	Project Evaluation.....	295
12.11.1	Economic Evaluation.....	295
12.11.2	Technical Evaluation.....	299
12.11.3	Other Impacts.....	299
12.11.4	Overall Evaluation.....	301
CHAPTER 13	FEASIBILITY STUDY OF SUGAR ROAD : NORTH SECTION	
13.1	Objectives of the Project.....	303
13.2	Physical Features of the Project Site.....	303
13.3	Engineering Surveys Undertaken.....	304
13.4	Selection of Route Alignment.....	305

13.5	Traffic Forecast.....	307
13.6	Construction Phasing.....	309
13.7	Preliminary Design.....	309
13.7.1	Design Concepts and Criteria	309
13.7.2	Road and Intersection Design.....	312
13.7.3	Pavement Design.....	315
13.7.4	Structure Design.....	318
13.7.5	Drainage Design.....	325
13.8	Cost Estimates.....	331
13.8.1	Construction Cost.....	331
13.8.2	ROW Acquisition and Compensation Cost.....	336
13.8.3	Detailed Engineering and Construction Supervision Cost.....	337
13.8.4	Summary of Project Cost	337
13.8.5	Maintenance Cost for Sugar Road	338
13.9	Environmental Impact Assessment.....	339
13.9.1	General Characteristics of the Project Road	339
13.9.2	Social Acceptability	339
13.9.3	Data Gathering for Baseline Information.....	340
13.9.4	Description of Existing Environmental Condition.....	340
13.9.5	Perception Survey.....	343
13.9.6	Identified Impacts and Mitigation Measures.....	345
13.9.7	Environmental Management and Monitoring Plan	345
13.9.8	Resettlement Plan for Affected People	345
13.10	Social Impact Assessment and Resettlement Action Plan.....	350
13.10.1	Alternatives Studied	350
13.10.2	Barangays Affected by Project.....	350
13.10.3	Community Consultation and Participation	350
13.10.4	Identified Impacts	352
13.10.5	Valuation of Losses.....	354
13.10.6	Resettlement Site.....	354
13.10.7	Income Restoration Program	355
13.10.8	Institutional Arrangements.....	355
13.10.9	Grievance Redress Measures.....	358
13.10.10	Monitoring and Evaluation.....	359
13.10.11	RAP Implementation	359
13.11	Project Evaluation	363
13.11.1	Economic Evaluation.....	363
13.11.2	Technical Evaluation	368
13.11.3	Other Impacts.....	368
13.11.4	Overall Evaluation	369
CHAPTER 14	RECOMMENDATIONS	
14.1	Implementation schedule of Projects Selected for F/S	371
14.2	Recommendations	372
14.3	Recommendation on Project Packaging.....	373

PART-C ROAD NETWORK DEVELOPMENT PLAN FOR METRO BACOLOD

LIST OF TABLES

	<u>Page</u>
CHAPTER 1 PROFILE OF THE STUDY AREA	
Table 1.1-1 Climatological Normals	4
Table 1.2-1 Population Growth Trend, 1990-2000	6
Table 1.2-2 Shares of Population to the Next Upper Level of Administration, 1990-2000	7
Table 1.2-3 Shares of Population of Cities / Municipalities in Metro Bacolod, 1990-2000	8
Table 1.2-4 Economic Growth of Region VI	9
Table 1.2-5 No. of Employed Persons by Sector, 2000	10
Table 1.2-6 Land Area Used for Primary Sector Production (Hectare)	11
Table 1.2-7 Rice Production in Metro Bacolod, 2000	12
Table 1.2-8 Comparison of Yield of Palay Between Bago City and Provincial Average	12
Table 1.2-9 Demand / Supply Balance of Rice, 2000.....	13
Table 1.2-10 Raw Sugar Production in Metro Bacolod	15
Table 1.2-11 Gross Tonnage of Cane Milled	16
Table 1.2-12 Number of Secondary Sector Establishments in Metro Bacolod.....	17
Table 1.2-13 Number of Tertiary Sector Establishments in Metro Bacolod.....	18
Table 1.2-14 Economic Activities of Licensed Establishments, 1998-2001	18
Table 1.2-15 Vehicle Ownership in Metro Bacolod, 2002	20
Table 1.3-1 Areas by Land Use Category (2000), Metro Bacolod.....	26
Table 1.3-2 Past Trend of Population Growth by Zone in Metro Bacolod	29
CHAPTER 4 EXISTING TRAFFIC CONDITIONS	
Table 4.1-1 Traffic Surveys	39
Table 4.1-2 Sampling Rate of Roadside & Terminal OD Survey.....	40
Table 4.2-1 Inbound / Outbound Traffic of Metro Bacolod and Bacolod City	43
Table 4.2-2 Trip Purpose of Passengers by Cordon Line of Metro Bacolod and Bacolod City ...	44
Table 4.2-3 Type of Commodity by Cordon Line Stations.....	47
Table 4.2-4 Traffic Volume & Vehicle Compositions on Major Road (AADT).....	49
Table 4.2-5 Vehicle Occupancy for Vehicle Type (Person / Vehicle)	53
Table 4.2-6 Average Loading Volume for Vehicle Type	53
Table 4.2-7 Passengers and Cargo Handled at Bacolod Airport.....	57
Table 4.2-8 Airport Related Traffic and Passenger Volume	58
Table 4.2-9 Ferry Port Related Traffic and Passenger Volume (Bacolod-Iloilo) Ferry Terminal)	60
Table 4.2-10 Cargo Port Related Traffic Volume Based on The Day of Traffic Counting Survey	60
Table 4.2-11 Condition of Bus / Jeepney Terminals.....	61
Table 4.3-1 Location with High Jeepney Share.....	67
Table 4.3-2 Location with High Tricycle Share	68
Table 4.3-3 Location with High Sugar Cane Trucks Share	68
Table 4.3-4 List of Congested Locations	69
Table 4.3-5 Traffic Signals in Bacolod City	72
Table 4.3-6 Local Regulation of Traffic Management.....	79
Table 4.3-7 Contents of Draft Ordinance of Comprehensive Traffic Regulation	80
Table 4.3-8 Location, Nature and Severity of Accident (January 2000).....	82

CHAPTER 5 EXISTING ROAD NETWORK IN THE STUDY AREA

Table 5.5-1	Road Length in Metro Bacolod.....	90
Table 5.2-1	Number of Lanes of Surveyed Roads.....	91
Table 5.2-2	Pavement Conditions by City / Municipality.....	95
Table 5.2-3	Pavement Conditions by Administrative Classification.....	95
Table 5.2-4	Bridge Conditions in Metro Bacolod.....	97
Table 5.3-1	Level of Service Criteria.....	98

CHAPTER 6 ROAD MAINTENANCE

Table 6.1-1	District Engineering Offices (DEO) in Metro Bacolod.....	101
Table 6.1-2	Maintenance Responsibility of DEO in Metro Bacolod.....	101
Table 6.1-3	Maintenance Budget of Allocation to DEO in Metro Bacolod.....	102
Table 6.1-4	Maintenance Activities.....	103
Table 6.1-5	Definition of MBA and MBC.....	103
Table 6.2-1	Provincial Engineer's Office for Road Maintenance.....	106
Table 6.2-2	Maintenance Responsibility of Provincial Roads in Metro Bacolod.....	106
Table 6.2-3	City and Municipal Engineer's Office for Road Maintenance.....	106
Table 6.2-4	Road Length and Bridges under Responsibility of CEO and MEO.....	107
Table 6.2-5	Maintenance Budget of Negros Occidental PEO.....	107
Table 6.2-6	Maintenance Budget of CEO and MEO in Metro Bacolod.....	108
Table 6.2-7	Summary of Staff and Organization.....	108
Table 6.3-1	Maintenance Status in DEO.....	109
Table 6.3-2	Maintenance Problems of PEO and CEO.....	110

CHAPTER 7 LOCAL GOVERNMENT SYSTEM IN THE PHILIPPINES

Table 7.1-1	Income Classification of Local Government Units, 2001.....	111
Table 7.6-1	Income Class and Administrative Coverage of LGUs in Metro Bacolod.....	116
Table 7.6-2	Revenue Profile of LGUs in Metro Bacolod Area, 2002.....	117
Table 7.6-3	Average Growth Rate of Income, 1998 to 2002.....	118
Table 7.6-4	Trend of LGUs' Fiscal Performance: 1998 to 2002.....	118
Table 7.6-5	Borrowing Capacities of Metro Bacolod LGUs, 2003.....	119

CHAPTER 8 FUTURE LAND USE PLAN AND SOCIO-ECONOMIC FRAMEWORK

Table 8.1-1	Evaluation of Three Urban Development Patterns.....	124
Table 8.3-1	Future Population Projection by City / Municipality.....	128
Table 8.3-2	GDP Projection (in 1985 Prices).....	130
Table 8.3-3	Projected GRDP of Region VI (in 1985 Prices).....	131
Table 8.3-4	Share of GRDP in Region VI to GDP.....	131
Table 8.3-5	GRDP of The Province of Negros Occidental (in 1985 Prices).....	132
Table 8.3-6	Future Vehicle Ownership in Metro Bacolod.....	134

CHAPTER 9 TRAFFIC DEMAND FORECAST

Table 9.1-1	Generation / Attraction Models.....	137
Table 9.1-2	Modal Share of Jeepneys to Total Public Transport Trips.....	138
Table 9.2-1	Passenger Trips Generation in Metro Bacolod.....	139
Table 9.2-2	Passenger Trips by Transport Mode.....	139
Table 9.2-3	Cargo Transport Demand Projection in Metro Bacolod Area.....	141
Table 9.2-4	Projection of Future Passengers, Cargo and Vehicle Traffic Movement at Bacolod Airport.....	145
Table 9.2-5	Projection of Passengers and Vehicle Traffic at Bacolod Ports.....	145
Table 9.2-6	Projection of Domestic Cargo and Foreign Cargo at Bacolod and Pulupandan Port.....	146
Table 9.2-7	Projection of Vehicle Traffic at Bacolod and Pulupandan Cargo Port.....	146
Table 9.2-8	Vehicle Trips in Metro Bacolod.....	147

List of Table & Figures Part-C (Metro Bacolod)

CHAPTER 10 FUTURE ROAD NETWORK DEVELOPMENT PLAN

Table 10.3-1	Road Network Development Objectives, Strategies, and Measures.....	154
Table 10.5-1	Evaluation of Road Network Alternatives: Metro Bacolod.....	164
Table 10.6-1	Administrative Classification	165
Table 10.6-2	Functional Classification of National Roads.....	166
Table 10.6-3	Functional Road Classification Criteria and Administrative Responsibility.....	167
Table 10.6-4	Recommended Road Classification and Cross-Section.....	169
Table 10.7-1	Road Projects for Metro Bacolod	172
Table 10.7-2	Unit Cost of Construction	177
Table 10.7-3	Construction Cost per Km	178
Table 10.7-4	Road and Bridge Construction Cost for Metro Bacolod Future Road Network Plan (Alternative-2)	179
Table 10.8-1	Summary Result of Project Screening for the Metro Bacolod Area	180
Table 10.8-2	Types of Environmental Impact Assessment (EIA).....	181

CHAPTER 11 ROAD NETWORK DEVELOPMENT MASTER PLAN

Table 11.1-1	GDP and Capital Outlay for Road Development.....	185
Table 11.1-2	Estimated Possible Investment Amount.....	186
Table 11.1-3	IRA and Borrowing Capacity	187
Table 11.1-4	Investment Capacity of LGU's.....	187
Table 11.2-1	Prioritization Factors and Indicators.....	191
Table 11.2-2	Points of Each Indicator	192
Table 11.2-3	Priority Scores for Each Indicator by Projects in Metro Bacolod	194
Table 11.2-4	Basic Data for Each Indicator by Project in Metro Bacolod.....	195
Table 11.2-5	Priority Order of the Road Projects	196
Table 11.3-1	Implementation Program for Metro Bacolod Future Road Network Plan	198
Table 11.4-1	Transport Efficiency by Master Plan	204
Table 11.4-2	Achievement of Road Network Development Objectives by Master Plan.....	207
Table 11.6-1	Unit Rate of Maintenance Activity	209
Table 11.6-2	Annual Routine and Minor Repair Cost.....	210
Table 11.6-3	Overlay Cost	210
Table 11.6-4	Maintenance Expenditure (1000 Peso).....	211
Table 11.6-5	Requirement of Total Maintenance Expenditure.....	212
Table 11.9-1	Assessment of Candidate Projects	223

CHAPTER 12 F/S OF NEW AIRPORT ACCESS ROAD

Table 12.4-1	Assessment of Alternative Alignments.....	226
Table 12.5-1	Estimated Traffic Volume and Volume / Capacity Ratio.....	229
Table 12.7-1	Highway Design Criteria Bacolod Airport Access Road	231
Table 12.7-2	Intersection Design Criteria.....	231
Table 12.7.3-1	Design Requirement (Airport)	240
Table 12.7.3-2	Traffic Loading (Bacolod Airport)	241
Table 12.7.4-1	River Discharge for Proposed Bridge Sites.....	243
Table 12.7.4-2	Proposed Bridge for New Airport Access Road	246
Table 12.7.5-1	Rainfall Intensity-Duration-Frequency Data	249
Table 12.7.5-2	Hydrological Analysis	250
Table 12.7.5-3	Hydraulic Analysis.....	251
Table 12.7.5-4	Flood Flow Analysis	252
Table 12.8-5	Construction Cost.....	253
Table 12.8-1	Market Price of Construction Materials in Bacolod.....	254
Table 12.8-2	Labor Cost.....	254
Table 12.8-3	Hourly (or Daily) Cost of Construction Equipment.....	255
Table 12.8-4	Unit Cost of Major Construction Item (1/2).....	256
Table 12.8-4	Unit Cost of Major Construction Item (2/2).....	257
Table 12.8-6	Unit Prices of Land Acquisition and Compensation	258
Table 12.8-7	Cost Estimate of Land Acquisition and Compensation Cost.....	258

Table 12.8-8	Engineering Service Cost (Million Peso).....	259
Table 12.8-9	Summary of Project Cost	259
Table 12.8-10	Maintenance Cost of Airport Access	260
Table 12.9-1	Action Taken by the Study Team to Ascertain Social Acceptability	261
Table 12.9-2	Summary of Climate Characteristics.....	262
Table 12.9-3	Results of Ambient Air Quality Measurements.....	263
Table 12.9-4	Results of Physical and Chemical Analysis of Water	263
Table 12.9-5	Noise Level Measurements.....	264
Table 12.9-6	Population and Population Growth Rate	266
Table 12.9-7	Distribution of Respondents by Barangay	270
Table 12.9-8	Summary Matrix of Impacts and Mitigation And Enhancement Measures (1/3)	272
Table 12.9-8	Summary Matrix of Impacts and Mitigation And Enhancement Measures (2/3)	273
Table 12.9-8	Summary Matrix of Impacts and Mitigation And Enhancement Measures (3/3)	274
Table 12.9-9	Environmental Management and Monitoring Matrix (Bacolod, NS-2)	275
Table 12.10-1	Summary of Workshops.....	277
Table 12.10-2	Summary of Meetings with Barangay Captains and Date of Issuance of Barangay Endorsement	278
Table 12.10-3	Summary of Barangay Consultation Meetings	279
Table 12.10-4	Summary of Impacts and Compensation Cost.....	280
Table 12.10-5	Socio-economic Survey of Form	282
Table 12.10-6	Sources of Unit Price for Valuation	283
Table 12.10-7	Summary of Relocation Sites.....	284
Table 12.10-8	RAP Update Surveys to be Undertaken.....	292
Table 12.11-1	Traffic Volume on New Airport Access Road	295
Table 12.11-2	Total Vehicle Kilometers in Metro Bacolod.....	295
Table 12.11-3	Total Vehicle Hours in Metro Bacolod.....	295
Table 12.11-4	Basic Vehicle Operating Cost (Excluding Tax).....	296
Table 12.11-5	Estimation of Benefits	297
Table 12.11-6	Economic Cost Estimate.....	297
Table 12.11-7	Economic Indications of Benefit Cost Analysis	297
Table 12.11-8	Benefit-Cost Stream of New Airport Access Road Construction Project.....	298
Table 12.11-9	Sensitivity Analysis Regarding Costs and Benefits of New Airport Road Construction Project	299
Table 12.11-10(1)	Traffic Volume With and Without R-4 Bypass Road Construction Project.....	300
Table 12.11-10(2)	Travel Speed With and Without R-4 Bypass Road Construction Project.....	300
Table 12.11-10(3)	Travel Time With and Without R-4 Bypass Road Construction Project.....	300
Table 12.11-10(4)	Transport Efficiency in Metro Bacolod With and Without New Airport Access Road	301

CHAPTER 13 F/S OF SUGAR ROAD : NORTH SECTION

Table 13.4-1	Assessment of Alternative Alignments.....	305
Table 13.5-1	Estimated Traffic Volume and Volume / Capacity Ratio.....	308
Table 13.7-1	Highway Design Criteria – Bacolod Sugar Road (North)	310
Table 13.7-2	Intersection Design Criteria.....	310
Table 13.7.3-1(1/2)	Design Requirement (Bacolod Sugar).....	315
Table 13.7.3-2(1/2)	Traffic Loading (Bacolod Sugar)	316
Table 13.7.3-1(2/2)	Design Requirement (Bacolod Sugar).....	317
Table 13.7.3-2(2/2)	Traffic Loading (Bacolod Sugar)	317
Table 13.7.4-1	River Hydraulics for Proposed Bridge Sites	319
Table 13.7.4-2	Bridge Section Dimensions	321
Table 13.7.4-3	Proposed Bridges for Sugar Road Alignment (North Side).....	324
Table 13.7.5-1	Hydrological Analysis.....	327

Table 13.7.5-2	Hydraulic Analysis.....	329
Table 13.8-5	Construction Cost.....	331
Table 13.8-1	Market Price of Construction Materials in Bacolod.....	332
Table 13.8-2	Labor Cost.....	332
Table 13.8-3	Hourly (or Daily) Cost of Construction Equipment.....	333
Table 13.8-4	Unit Cost of Major Construction Item (1/2).....	334
Table 13.8-4	Unit Cost of Major Construction Item (2/2).....	335
Table 13.8-6	Unit Prices of Land Acquisition and Compensation	336
Table 13.8-7	Estimated of Land Acquisition and Compensation Cost	336
Table 13.8-8	Engineering Service Cost (Million Peso).....	337
Table 13.8-9	Summary of Project Cost	337
Table 13.8-10	Maintenance Cost of Sugar Road	338
Table 13.9-1	Action Taken by the Study Team to Ascertain Social Acceptability	339
Table 13.9-2	Results of Ambient Air Quality Measurements.....	340
Table 13.9-3	Results of Physical and Chemical Analysis of Water	341
Table 13.9-4	Noise Level Measurements.....	341
Table 13.9-5	Distribution of Respondents by Barangay	344
Table 13.9-6	Summary Matrix of Impacts and Mitigation Enhancement Measures (1/3).....	346
Table 13.9-6	Summary Matrix of Impacts and Mitigation Enhancement Measures (2/3).....	347
Table 13.9-6	Summary Matrix of Impacts and Mitigation Enhancement Measures (3/3).....	348
Table 13.9-7	Environmental Management and Monitoring Matrix (Bacolod, NS-3)	349
Table 13.10-1	Summary of Meetings with Barangay Captains and Date of Issuance of Barangay Endorsement	351
Table 13.10-2	Summary of Barangay Consultation Meetings.....	352
Table 13.10-3	Summary of Impacts and Compensation Cost.....	353
Table 13.10-4	Updating Surveys to be Undertaken	359
Table 13.11-1	Traffic Volume on Sugar Road.....	363
Table 13.11-2	Total Vehicle Kilometers in Metro Bacolod With and Without Sugar Road Improvement Project.....	363
Table 13.11-3	Total Vehicle Hours in Metro Bacolod With and Without Sugar Road Improvement Project.....	363
Table 13.11-4	Basic Vehicle Operating Cost (Excluding Tax).....	364
Table 13.11-5	Estimation of Benefits	365
Table 13.11-6	Economic Cost Estimate	365
Table 13.11-8	Benefit-Cost Stream of Sugar Road Construction Project	366
Table 13.11-7	Economic Indications of Benefit Cost Analysis	367
Table 13.11-9	Sensitivity Analysis Regarding Cost and Benefits of Sugar Road Bacolod Construction Project.....	367
Table 13.11-10(1)	Traffic Volume With and Without Sugar Road Construction Project	368
Table 13.11-10(2)	Travel Speed With and Without Sugar Road Construction Project	368
Table 13.11-10(3)	Transport Efficiency in Metro Iloilo With and Without Sugar Road Construction Project.....	369

LIST OF FIGURES

	<u>Page</u>
CHAPTER 1 PROFILE OF THE STUDY AREA	
Figure 1.2-1 Changing Trend of AAGR from 1990/95 to 1995/00; National to Metro Bacolod Level	6
Figure 1.2-2 Population Growth of Metro Bacolod by City/Municipality, 1990-2000.....	8
Figure 1.2-3 Region VI's Growth Rates of GRDP by Sector, 1991-2001	9
Figure 1.2-4 Sugar Demand and Supply	15
Figure 1.2-5 Vehicle Registration in Province of Negros Occidental, 2002.....	19
Figure 1.2-6 Past Trend of Vehicle Registration in Province of Negros Occidental	19
Figure 1.2-7 Vehicle Ownership in Metro Bacolod	21
Figure 1.2-8 Family Income in Bacolod City and Province of Negros Occidental	22
Figure 1.2-9 Average Family Income Level by Zone	23
Figure 1.3-1 Existing Urban Structure of Metro Bacolod	25
Figure 1.3-2 Metro Bacolod Existing Land Use Map: 2002	27
Figure 1.3-3 Population Size and Density by Zone: 2000	30
Figure 1.3-4 Employment Size and Density by Zone: 2000	32
 CHAPTER 3 INTER-CITY TRANSPORT SYSTEM	
Figure 3.1-1 Major Inter-City Roads in Negros Island	36
Figure 3.2-1 Airports in Negros Island.....	37
Figure 3.3-1 Base and Terminal Port, Passenger Ferry and Ro-Ro Routes in Negros Island	38
 CHAPTER 4 EXISTING TRAFFIC CONDITIONS	
Figure 4.1-1 Traffic Survey Stations (Metro Bacolod).....	41
Figure 4.1-2 Travel Time Survey Route (Metro Bacolod).....	42
Figure 4.2-1 Traffic Volume by Cordon Line.....	43
Figure 4.2-2 Present Desire Line (Passenger)	45
Figure 4.2-3 Present Desire Line (Cargo)	45
Figure 4.2-4 Passenger Trip Generation & Attraction in Metro Bacolod.....	46
Figure 4.2-5 Cargo Generation & Attraction in Metro Bacolod	48
Figure 4.2-6 Estimated AADT on Major Roads in Bacolod City	50
Figure 4.2-7(1),(2) Hourly Traffic Volume Variation on Major Road (24h).....	51
Figure 4.2-8(1),(2) Hourly Traffic Volume Variation on Major Road in Bacolod City (12H)	52
Figure 4.2-9 Present Traffic Volume.....	55
Figure 4.2-10 Peak Travel Speed.....	56
Figure 4.2-11 Present Traffic Desired Line (Airport).....	58
Figure 4.2-12 Total Cargo Handled at Bacolod Port	59
Figure 4.2-13 Total Number of Passengers Embarkation / Disembarkation At Bacolod Port.....	59
Figure 4.2-14 Present Passenger Desired Line (Port).....	60
Figure 4.2-15 Jeepney Routes in The Bacolod City	62
Figure 4.3-1 Traffic Volume in City Center	65
Figure 4.3-2 Traffic Volume in Outer Central Area	66
Figure 4.3-3 Traffic Volume in Suburbs.....	67
Figure 4.3-4 Congested Location in Bacolod City	70
Figure 4.3-5 Parking Condition in Bacolod City.....	71
Figure 4.3-6 Map of Existing Traffic Signal Location	73
Figure 4.3-7 Wrong and Correct Phase Sequence	74
Figure 4.3-8 "No Left Turn" Signboard at Intersection.....	74
Figure 4.3-9 Left Turn Bay.....	76
Figure 4.3-9 Imaginary (Painted) Left Turn Bay	76

Figure 4.3-10	Jeepney Bay	77
Figure 4.3-11	Separate Jeepney Path and Pedestrian Overpass	77
Figure 4.3-12	Too Wide Intersection Without Clear Sign	78
Figure 4.3-13	Unfriendly Environment for Pedestrians.....	83
CHAPTER 5	EXISTING ROAD NETWORK IN THE STUDY AREA	
Figure 5.1-1	Existing Road Network by Administrative Classification	88
Figure 5.1-2	Metro Bacolod Present Road Network by Hierarchy.....	89
Figure 5.2-1	Number of Lanes in Metro Bacolod.....	92
Figure 5.2-2	Typical Cross Sections of Existing Roads in Urban Area (Bacolod City)	93
Figure 5.2-3	Pavement Condition in Metro Bacolod.....	94
Figure 5.2-4	Metro Bacolod Existing Bridge Location Map.....	97
Figure 5.2-5	Metro Bacolod Bridge Condition	96
Figure 5.3-1	Present Level of Service of Roads in Bacolod City.....	99
CHAPTER 6	ROAD MAINTENANCE	
Figure 6.1-1	Maintenance Budget Allocation (2000-2003)	102
Figure 6.1-2	Organization Chart of DPWH Region VI	104
Figure 6.1-3	Typical Organization Chart of DPWH Bacolod City Engineering Office.....	105
CHAPTER 7	LOCAL GOVERNMENT SYSTEM IN THE PHILIPPINES	
Figure 7.6-1	Revenue History of LGUs In Metro Bacolod	117
CHAPTER 8	FUTURE LAND USE PLAN AND SOCIO-ECONOMIC FRAMEWORK	
Figure 8.1-1	Future Urban Structure Alternatives of Metro Bacolod.....	122
Figure 8.2-1	Metro Bacolod Future Land Use: 2010	126
Figure 8.2-2	Metro Bacolod Future Land Use Map: 2022	127
Figure 8.3-1	Future Population by Zone.....	129
Figure 8.3-2	Future Trend of Provincial GRDP by Sector	132
Figure 8.3-3	Future No. of Employed Persons by Sector (Work Place Base), Metro Bacolod.....	133
Figure 8.3-4	Future Employment by Zone (Work Place Base).....	135
CHAPTER 9	MODELS DEMAND FORECAST	
Figure 9.2-1	Passenger Trip Growth by Zone	140
Figure 9.2-2	Passenger Desire Line.....	142
Figure 9.2-3	Cargo Transport Growth by Zone	143
Figure 9.2-4	Cargo Desire Line	144
Figure 9.2-5	Vehicle Trip Desired Line	148
CHAPTER 10	FUTURE ROAD NETWORK DEVELOPMENT PLAN	
Figure 10.2-1	Future Traffic Volume (Do Nothing) in 2022.....	151
Figure 10.2-2	Level of Service of Roads in Bacolod City: Do Nothing Case in 2022	152
Figure 10.4-1	Future Road Network: Alternative-1	157
Figure 10.4-2	Future Road Network: Alternative-2.....	158
Figure 10.4-3	Future Road Network: Alternative-3.....	159
Figure 10.5-1	Traffic Assignment in Metro Bacolod-2022 (Alternative-1).....	161
Figure 10.5-2	Traffic Assignment in Metro Bacolod-2022 (Alternative-2).....	162
Figure 10.5-3	Traffic Assignment in Metro Bacolod-2022 (Alternative-3).....	163
Figure 10.6-1	Road Classification by Function.....	168
Figure 10.6-2	Standard Cross Section	170
Figure 10.7-1	Metro Bacolod: Proposed Cross-Section for New Road and Widening	173
Figure 10.7-2	Metro Bacolod Applied Cross-Section to Future Road Network	174

List of Table & Figures Part-C (Metro Bacolod)

Figure 10.7-3	Metro Bacolod Proposed Roads Bridge Location Map	175
Figure 10.7-4	Procedure of Project Cost Estimate	176
CHAPTER 11 ROAD NETWORK DEVELOPMENT MASTER PLAN		
Figure 11.1-1	Procedure to Estimate Possible Investment Amount	183
Figure 11.2-1	Procedure for Prioritization of Road Project.....	190
Figure 11.3-1	Master Plan Road Network: Bacolod	199
Figure 11.4-1	Traffic Assignment to Short-Term Road Network Master Plan (2010)	201
Figure 11.4-2	Traffic Assignment to Medium-Term Road Network Master Plan (2016).....	202
Figure 11.4-3	Traffic Assignment to Long-Term Road Network Master Plan (2022).....	203
Figure 11.4-4	Transport Efficiency Improvement by Master Plan.....	205
Figure 11.7-1	Geometric Improvement Intersection	214
Figure 11.7-2	Traffic Signal Intersections.....	216
Figure 11.7-3	Road Section for Pavement Marking and Traffic Signs.....	219
Figure 11.8-1	Traffic Assignment in Metro Bacolod-2022 (Modal Shifting from Jeepney to Bus) ..	221
Figure 11.9-1	Selected Road Project for F/S.....	224
CHAPTER 12 F/S OF NEW AIRPORT ACCESS ROAD		
Figure 12.4-1	Airport Access Road Alternative Alignment.....	227
Figure 12.5-1	Number of Lanes Required	228
Figure 12.7-1	Typical Cross-Section-Bacolod New Airport Access Road	232
Figure 12.7-2	Selection of Type of Cross Drainage Structure	236
Figure 12.7-3	Bacolod Airport Access Road Horizontal Alignment	238
Figure 12.7-4	Intersection with Bacolod Circumferential Road (Type 1) STA. 0+171	239
Figure 12.7.4-1	Bridge Location Map	242
Figure 12.7.4-2	River Condition at Proposed Bridge Sites.....	244
Figure 12.7.4-3	Typical New Airport Road Bridge Section	245
Figure 12.7.5-1	New Airport Access Road (Catchments Area Map)	248
Figure 12.10-1	Location of Relocation Site	285
CHAPTER 13 F/S OF SUGAR ROAD : NORTH SECTION		
Figure 13.4-1	Bacolod Sugar Road Alternative Alignments	306
Figure 13.5-1	Number of Lanes Required	307
Figure 13.7-1	Typical Cross-Section-Bacolod Sugar Road (North).....	311
Figure 13.7-2	Bacolod Sugar Road (North) Horizontal Alignment.....	313
Figure 13.7-4	Intersection With Bacolod City-Murcia Road (Type K) STA. 0+000.....	314
Figure 13.7.4-1	Bridge Location Map	318
Figure 13.7.4-2	River Conditions at Bridge Locations	320
Figure 13.7.4-3	Typical Road and ridge Section for Urban Area.....	322
Figure 13.7.4-4	Typical Road and Bridge Section Outside Urban Area	322
Figure 13.7.5-1	Metro Bacolod Sugar Road North (Catchments Area Map).....	326
CHAPTER 14 RECOMMENDATIONS		
Figure 14.1-1	Implementation Schedule of Project Selected for F/S.....	371

ABBREVIATIONS

AADT	:	Annual Average Daily Traffic
AAGR	:	Annual Average Growth Rate
AASHTO	:	American Association of State Highway and Transportation Officials
AC	:	Asphalt Concrete
ADT	:	Average Daily Traffic
ATO	:	Air Transportation Office
B/C	:	Benefit / Cost Ratio
BCCR	:	Bacolod City Circumferential Road
BLGF	:	Bureau of Local Government Finance
BSP	:	Bangko Sentral ng Pilipinas
CBD	:	Central Business District
CC	:	Component City (CC)
CEO	:	City Engineering Office
CLUP	:	Comprehensive Land Use Plan
CPA	:	Cebu Pacific Air
DA	:	Department of Agriculture
DAR	:	Department of Agrarian Reform
DBM	:	Department of Budget and Maintenance
DBP	:	Development Bank of the Philippines
DENR	:	Department of Environment and Natural Resources
DEO	:	District Engineering Office
DILG	:	Department of Interior and Local Government
DOF	:	Department of Finance
DOTC	:	Department of Transportation and Communication
DPWH	:	Department of Public Works and Highways
DTI	:	Department of Trade and Industry
ECA	:	Environmentally Critical Area
ECC	:	Environmental Compliance Certificate
EIA	:	Environmental Impact Assessment
EIRC	:	Environmental Impact Assessment Review Committee
EIRR	:	Economic Internal Rate of Return
EIS	:	Environmental Impact Statement
EMK	:	Equivalent Maintenance Kilometer
FS	:	Feasibility Study
GDP	:	Gross Domestic Product
GFI	:	Government Financial Institutions
GNP	:	Gross National Product
GOJ	:	Government of Japan
GOP	:	Government of the Philippines
GRDP	:	Gross Regional Domestic Product
GVA	:	Gross Value Added
HCM	:	Highway Capacity Manual
HLURB	:	Housing and Land Use Regulatory Board
HUC	:	High Urbanized City
IC	:	Independent Component City
ICAO	:	International Civil Aviation Organization
ICC	:	Investment Coordinating Committee
IEE	:	Initial Environmental Examination
IRA	:	Internal Revenue Appropriation
IRF	:	Immediate Response Fund
JBIC	:	Japan Bank for International Cooperation
JICA	:	Japan International Cooperation Agency
LBP	:	Land Bank of the Philippines
LGUs	:	Local Government Units
LOGOFINDP	:	Local Government Finance and Development Project

LOS	:	Level of Service
LTO	:	Land Transport Office
MAO	:	Municipal Agricultural Office
MBA	:	Maintenance By Administration
MBC	:	Maintenance By Contract
MDF	:	Municipal Development Fund
MDFO	:	Municipal Development Fund Office
MEO	:	Municipal Engineer's Office
MIDC	:	Metro Iloilo Development Council
MPDO	:	Municipal Planning and Development Office
MVUC	:	Motor Vehicle Users Charges Act
NEDA	:	National Economic and Development Authority
NGA	:	National Government Agency
NIA	:	National Irrigation Administration
NRR	:	Net Reproduction Rate
NSDP	:	National Statistic Coordination Board
NSO	:	National Statistics Office
OD	:	Origin-Destination
PAFs	:	Project Affected Families
PAL	:	Philippine Airlines
PAPs	:	Project Affected Persons
PCC	:	Portland Cement Concrete
PCM	:	Project Cycle Management
PCU	:	Passenger Car unit
PDAF	:	Priority Development Assistance Fund
PEO	:	Provincial Engineer's Office
PGA	:	Proponent Government Agency
PHMMS	:	Philippine Highway Maintenance Management System
PMO	:	Project Management Office
PNB	:	Philippine National Bank
PPA	:	Philippine Port Authority
PUD	:	Planned Unit Development
RAIC	:	Regional Agro-Industrial Center
REO	:	Regional Engineering Office
ROW	:	Right-of-Way
TWG	:	Technical Working Group
UPV	:	University of the Philippines in the Visaya
WVCST	:	Western Visaya College of Science and Technology
WVSU	:	Western Visaya State University

CHAPTER 1

PROFILE OF THE STUDY AREA

1.1 PHYSICAL PROFILE

1.1.1 Topography

Topography in the study area is characterized by level plains from the coastline in the west to gently sloping terrains towards the mountainous areas in the east.

Bago City mainly consists of moderately sloping (1 to 3%) to rolling lands (18 to 30%) and very steep mountainous areas (> 50%). Of these, more than 50% have moderate slopes, and only around 6% of the total land area are mountainous. The study area is located within the 58.84% of the moderately sloping terrain.

The topography of Murcia is highly influenced by the presence of three mountains which form part and in boundary with the municipality. These are northern foot of Mt. Kanlaon, Mount Calindog, and Mount Mandalagan at its northeastern boundary. Slopes range from level to rolling on the west to steep and very steep on the south, southeast, and the northeast. The study area belongs to the level to rolling category.

Bacolod City is located on a level area, slightly sloping as it extends towards the sea. It has an altitude of 10 meters above sea level. Flood prone areas within the study area consist of Barangays Bata and Sum-ag.

The topography of Talisay City is described as generally flat, with moderately sloping and mountainous areas at Barangay katilingban and Cabatangan. The study area is located at the generally flat portions of the city.

Silay City has very broad flat areas, the city being located approximately one (1) meter above sea level. Its slope gradually increases towards the sitios Lantawan and Patag. The study area is within these flat terrains.

The Municipality of E.B. Magalona is also generally flat, particularly those barangays along the coastal areas and lowlands. The other barangays are located on hilly and mountainous portions. The study area is within the Poblacion, which is generally flat.

The Municipality of Victorias can be described as sloping and rolling, with steeply descending hills which gradually level off as it approaches a plateau at San Jose Estado. The study area is located in gently sloping terrains within Barangays VI and XX.

1.1.2 Geology

Volcanic and Seismology rocks make-up the cretaceous to holocene stratigraphic sequence in Negros Is. The volcanics are agglomerates, volcanic wacks; sedimentaries are siltstones, sandstones, shale and limestone.

The Basak Formation is the oldest rock in the area. The formation consists mostly of massive chloritized amygdaloidal basalt. Thin beds of metasediments (sandstone, siltstone and shales) and greenish volcanic wackes are intercalated with the volcanics in Calatan area are dark, fine grained, porphyritic andesite flows associated with metasediments.

Unconformity lying in the Basak is the Eocene Isio limestone. Next in the sequence is the upper Oligocene Escalante Formation (Yr. 1972). It consists of an upper limestone member (Trankalan Limestone) and a lower member, an alternative of shale, siltstone, marl, and sandstone.

A lower Miocene to Middle Miocene unit of alternating shales, conglomerate and sandstone with occasional coal seams and arenitic limestone was designated as the Macasilao Formation by Melendres and Barnes (1957). The unconformable relationship exists between the Escalante and the Macasilao.

Overlying the Macasilao is the Middle Miocene Paghumayan Formation with is subdivided into two members namely; the Lower Fuentes Green Tuff which is composed mainly of green tuff breccia and the Upper Paghumayan Clastics which is tuffaceous. The volcanic tuff breccia is intercalated with tuffaceous shale and limestone.

The Paghumayan Formation is overlain by the Upper Miocene Talave Formation which is composed of three (3) members namely; the Bairan Conglomerate, Tigbao Clastics and Talave Limestone.

A sequence of calcareous clastics with thin lenses of coal and conglomerates compose the Pantan-an Formation. This conformably overlies and intertongues with the Talave Formation.

Unconformably overlapping the older rocks is an upper Pliocene-Pleistocene limestone sequence called the Caliling limestone. Early workers (Corby et al, Sandoval, Caguiat and Yap) termed the limestone Carcar, as it is of the same type as the one in Cebu.

Yap named the basaltic and andesitic volcanic rocks which covered all the Formation, Sagay Volcanic, of Pleistocene to recent age. Pyroclastics in Kabelohan River and Casoy creek unconformably overlying the Tabu clastics series were reported. Pyroclastic rocks on the southeastern part of Cabanbanan area, Cauayan, Negros Occ. and the upper reaches of Kabiluhan River and Casoy creek are probably the same as the Tuyom Pyroclastics.

The Quaternary volcanics are represented by volcanic plugs, lavas and pyroclastic rocks with associated sediment in the vicinity of Kanlaon Volcano, the Sulfataric Mandalagan (Silay) volcano and Cuernos de Negros (Mag-aso).

Alluvial deposits comprise the rest of the Quaternary Stratigraphy in Negros Island.

1.1.3 Meteorology

1) Climate Type

The nearest synoptic meteorological station in the study area is located in Dumaguete City, Negros Oriental. Based on the Modified Corona's Classification, the climate in the project area belongs to Type I, which is characterized by two (2) pronounced seasons, the wet and the dry. As illustrated in the Climatological Normals presented in **Table 1.1-1**, the project area experiences a relatively dry period from January to May. Wet months on the other hand are from June to December.

2) Rainfall

The rainy season in the area is usually experienced from June to December. The amount of annual rainfall recorded is close to **1200.6 mm**, which is relatively low. The highest amount of precipitation of approximately **168.5 mm** was recorded in October. As well, this month has the most number of rainy days with **16**. The onset of dry season is felt in January and continues up to April. March registered the minimum amount of rainfall of **41.6 mm**.

3) Temperature

From a cool temperature of **26.8°C** in January, it could swing to a warm **28.8°C** during the month of May. The average annual mean temperature is **27.8°C**. From December to February, the maximum humidity of **82%** is felt in project area. A low of **65%** on the other hand is experienced in May. The warm months are from March to June.

4) Air Streams

The principal air stream that significantly affects the study area is the Northeast Wind, which predominates throughout the year. The Northern Monsoon prevails during the dry season, while the Southwest Monsoon is experienced during the rainy season. The North Pacific Trades is the southern portion of the North Pacific anti-cyclone. Having passed over a vast expanse of the North Pacific Ocean, this air stream is classified as a maritime tropical air mass. This air stream, which is extremely warm, is generally dominant over the entire Philippines in April and early May. It commonly arrives in the country from an easterly direction but may come from any direction from northeast to southeast.

TABLE 1.1-1 CLIMATOLOGICAL NORMALS

STATION : 642 – DUMAGUETE CITY, NEGROS ORIENTAL
 LATITUDE : 09° 18' N
 LONGITUDE : 123° 18' E
 ELEVATION : 8.0 m
 PERIOD : 1971-2000

MONTH	RAINFALL		TEMPERATURE °C					VAPOR PRES. MBS.	REL. HUM. %	MSLP MBS.	WIND		CLOUD AMT. (OKTA)	NO. DAYS w/	
	AMT. (mm)	No. Of RD	MAX (°C)	MIN. (°C)	MEAN (°C)	DRY BULB (°C)	WET BULB (°C)				DEW PT. (°C)	DIR (16-pts)		SPEED (mps)	THUNDR STORM
JAN.	80.2	12	29.1	24.5	26.8	26.6	24.2	23.3	28.5	1010.8	NE	3	6	1	2
FEB.	54.5	9	29.3	24.3	26.8	26.7	24.3	23.4	28.7	1011.8	NE	2	6	1	1
MAR.	41.6	7	30.1	24.7	27.4	27.4	24.6	23.6	29.0	1011.0	NE	2	5	1	3
APR.	48.6	6	31.2	25.4	28.3	28.3	25.2	24.1	29.9	1009.8	NE	2	4	4	7
MAY	70.5	8	32.0	25.5	28.8	28.8	25.6	24.5	30.6	1009.0	NE	2	5	11	21
JUNE	122.5	14	31.7	24.9	28.3	28.2	25.3	24.3	30.2	1008.7	NE	2	6	12	23
JULY	116.3	14	31.6	24.4	28.0	27.8	25.0	24.0	29.7	1008.5	NE	1	6	10	19
AUG.	110.1	13	31.9	24.3	28.1	27.9	25.1	24.1	29.9	1008.6	NE	2	6	9	18
SEPT	141.5	15	31.7	24.3	28.0	27.8	25.0	24.0	29.7	1008.9	NE	1	6	11	20
OCT.	168.5	16	31.2	24.6	27.9	27.6	25.0	24.1	29.9	1008.9	NE	2	6	13	23
NOV.	142.6	15	30.7	24.8	27.8	27.6	25.0	24.1	29.9	1009.1	NE	2	6	9	20
DEC.	103.6	15	29.9	24.8	27.3	27.1	24.7	23.8	29.4	1010.0	NE	2	6	3	10
ANNUAL	1200.6	144	30.9	24.7	27.8	27.7	24.9	24.0	29.6	1009.5	NE	2	6	85	167

SOURCE: CDS/CAB/PAGASA

1.1.4 Natural Calamities

In terms of natural calamities, the most significant and frequently experienced in the Study Area is flooding. In Metro Bacolod, flood prone areas consist mostly of the low-lying, coastal areas of Bago Ciy, Bacolod City, Silay City, and Talisay City. In Silay City, the relatively flat terrain plus the presence of three rivers and tributaries traversing the city causes flooding during heavy rains. In Talisay, flood prones areas were reported to be located in the vicinities of Minulu-an River and Catabla River, and in Barangay Concepcion.

1.2 SOCIO-ECONOMIC PROFILE

1.2.1 Demographic Trend

Population growth trend of the Metro Bacolod from 1990 to 2000 is shown in Table 1.2-1, comparing with those of the Philippines, Region VI and Province of Negros Occidental. The annual average growth rates (AAGRs) of the Region VI and Province of Negros Occidental are considerably lower than the national average through 1990s. It means that people are still out-migrating from the Region and Province to the advanced areas like Metro Manila, Cebu and foreign countries, because the national average growth rate can be considered as the natural rate of increase based on the births and deaths. During the period of 1995-2000, the Metro Bacolod registered a lower rate of 0.91% compared to 2.01% during the previous period. Silay City marked a population decrease. Except Talisay City, AAGRs of all cities/municipalities are lower than the regional average of 1.56%.

TABLE 1.2-1 POPULATION GROWTH TREND, 1990-2000

Administration	Census Population			Annual Average Growth Rate (%)	
	1990	1995	2000	1990-95	1995-00
	(May 1)	(Sep 1)	(May 1)		
Philippines	60,703,216	68,616,536	76,498,735	2.32	2.36
Region VI	5,393,333	5,776,938	6,208,733	1.30	1.56
Province of Negros Occidental	1,892,728	2,031,841	2,136,647	1.34	1.08
Metro Bacolod	844,071	938,596	979,105	2.01	0.91
Bacolod City	364,180	402,345	429,076	1.89	1.39
Talisay City	63,260	68,401	79,146	1.48	3.18
Silay City	101,031	122,748	107,722	3.72	-2.76
Enrique B. Magalona	48,866	54,421	54,490	2.04	0.03
Victorias City	69,892	78,283	81,743	2.15	0.93
Murcia	50,996	55,128	59,358	1.47	1.60
Bago City	122,863	132,338	141,721	1.40	1.48
Pulupandan	22,983	24,932	25,849	1.54	0.78

Source: National Statistics Office (NSO)

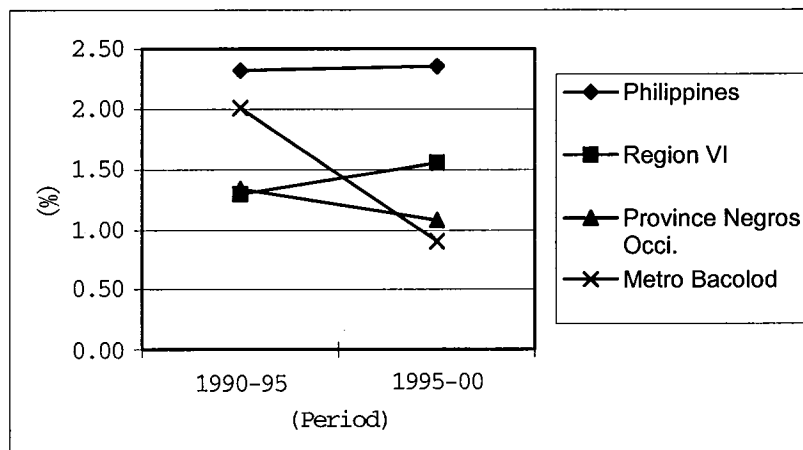


FIGURE 1.2-1 CHANGING TREND OF AAGR FROM 1990/95 TO 1995/00, NATIONAL TO METRO BACOLOD LEVEL

According to the medium assumption of the "1995 Census-Based National and Regional Population Projections" (NSO, 1999), the national population was expected to increase at an annual average rate of 2.24% during the period of 1995-2000. The population projection was based on the assumption that the net reproduction rate (NRR) would reach 1 in 2020 at a moderate pace of fertility decline. The 2000 Population Census, however, showed that the national level AAGR from 1995 to 2000 was 2.36%, a little higher than 2.32 % recorded during the previous quinquennium. It means that the fertility decline has not been proceeding at the expected pace. (See Figure 1.2-1).

On the other hand, the out-migration from the Region VI continued and resulted in a decrease of its share of population to the country from 8.9% in 1990 to 8.1% in 2000. Population of the Province of Negros Occidental occupied 35.2% of that of the regional total. However, the share fell to 34.4% in 2000 due to the above-mentioned slow population increase of the Metro Bacolod. (See Table 1.2-2).

The population of Metro Bacolod increased from 938.6 thousand in 1995 to 979.1 thousand in 2000, but its share to the Province fell from 46.2% in 1995 to 45.8% in 2000. (See Figure 1.2-2).

TABLE 1.2-2 SHARES OF POPULATION TO THE NEXT UPPER LEVEL OF ADMINISTRATION, 1990-2000

Administration	1990	1995	2000
Region / Nation	8.9%	8.4%	8.1%
Province / Region	35.1%	35.2%	34.4%
Metro / Province	44.6%	46.2%	45.8%

Source: NSO

In the Metro Bacolod, Bacolod City, the provincial capital, has a population of 429.1 thousand and occupies 43.8% of the metropolitan total in 2000. However, its population AAGR from 1995 to 2000 was only 1.39%. 1995-2000 AAGRs of the neighboring LGUs, Talisay City, Murcia and Bago City are 3.18%, 1.60% and 1.48%, respectively, higher than that of Bacolod City. These LGUs increased their population shares in Metro Bacolod. (See Table 1.2-3)

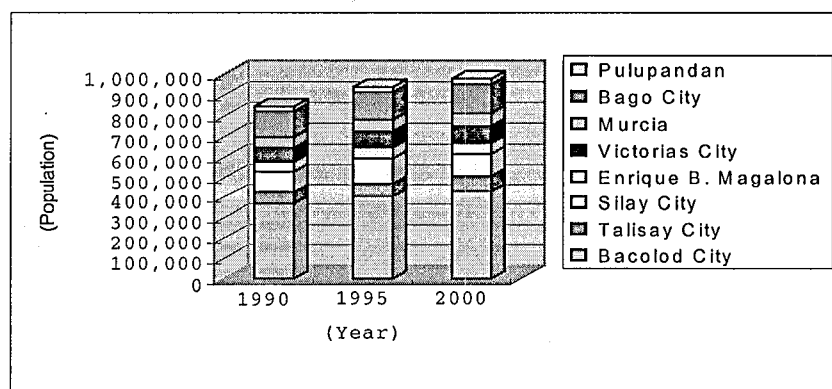


FIGURE 1.2-2 POPULATION GROWTH OF METRO BACOLOD BY CITY/MUNICIPALITY, 1990-2000

**TABLE 1.2-3 SHARES OF POPULATION OF CITIES / MUNICIPALITIES
IN METRO BACOLOD, 1990-2000**

LGU	1990	1995	2000
Bacolod City	43.1%	42.9%	43.8%
Talisay City	7.5%	7.3%	8.1%
Silay City	12.0%	13.1%	11.0%
Enrique B. Magalona	5.8%	5.8%	5.6%
Victorias City	8.35	8.3%	8.3%
Murcia	6.0%	5.9%	6.1%
Bago City	14.6%	14.1%	14.5%
Pulupandan	2.7%	2.7%	2.6%

Source: NSO

1.2.2 Economy

1) Regional Economic Growth

Metro Bacolod belongs to the Region VI, and its economy affects greatly the Region's economic growth. The Gross Regional Domestic Product (GRDP) of Region VI occupies around 7% of GDP, and grew with fluctuation at an annual average rate of 2.91% from 1990 to 2001, which was almost equal to the rate of GDP growth of the Philippines during the same period. The GRDP growth rate of Region VI was higher than the national average during the first half of 1990s, but because lower after 1995. (See Table 1.2-4)

The annual average growth rate (AAGR) of the primary sector (agriculture and fishing) of the Region from 1990 to 2001 was 1.89%, almost the same as the nation. This is due to a comparatively high rate of 2.24% during the period 1990-95. After 1995 the sector experienced a two-year continuous negative growth in 1997 and 1998, which caused lower average growth rate of 1.63% during the period 1995-2000 and the low growth still continues after 2000. The secondary sector (mining, manufacturing, utilities and construction) has registered higher growth rates than the national average through the period, although the pace slowed down after 2000. The tertiary sector (commerce and services) continues to grow at high rates, though it was a little lower than the national average. These facts show that the Regional economic growth has been pulled by the secondary and tertiary sectors. Especially, the secondary sector of the Region has enlarged its percentage share to the nation from 4.7% in 1990 to 5.2% in 2001. (See Figure 1.2-3)

TABLE 1.2-4 ECONOMIC GROWTH OF REGION VI

	Sector	GRDP/GDP at 1985 Prices (million pesos)				Annual Average Growth Rate (%)			
		1990	1995	2000	2001	1990-95	1995-00	2000-01	1990-01
GRDP of Region VI	Primary	16,718	18,672	20,248	20,552	2.24	1.63	1.50	1.89
	Secondary	11,892	13,675	17,303	17,616	2.83	4.82	1.81	3.64
	Tertiary	22,137	25,250	30,145	31,389	2.67	3.61	4.13	3.23
	Total	50,747	57,597	67,696	69,557	2.56	3.28	2.75	2.91
GDP	Primary	160,734	172,848	190,691	197,737	1.46	1.98	3.69	1.90
	Secondary	255,548	283,858	332,258	336,697	2.12	3.20	1.34	2.54
	Tertiary	304,408	345,518	435,462	454,824	2.57	4.74	4.45	3.72
	Total	720,690	802,224	958,411	989,258	2.17	3.62	3.22	2.92
% Share of Region VI's GRDP to GDP	Primary	10.4%	10.8%	10.6%	10.4%				
	Secondary	4.7%	4.8%	5.2%	5.2%				
	Tertiary	7.3%	7.3%	6.9%	6.9%				
	Total	7.0%	7.2%	7.1%	7.0%				

Source: NSO

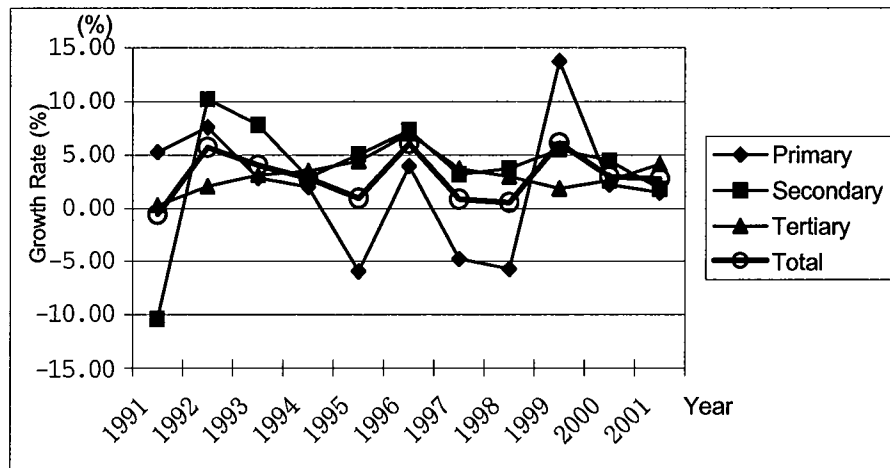


FIGURE 1.2-3 REGION VI'S GROWTH RATES OF GRDP BY SECTOR, 1991-2001

(1) Position of Metro Bacolod in the Province and Region VI

GRDP or Gross Value Added (GVA) by sector is not estimated officially at the provincial or city/municipal levels. However, the employment by sector in Metro Bacolod demonstrates an aspect of its economic position in the province and the Region. Table 1.2-5 shows the number of employed persons by sector (workplace base) in 2000 for Metro Bacolod, the province and the Region VI.

TABLE 1.2-5 NUMBER OF EMPLOYED PERSONS BY SECTOR, 2000

Administration	Unit	Primary	Secondary	Tertiary	Total
Region VI	Number	1,087,866	288,474	977,371	2,353,711
	Percentage	46.2%	12.3%	41.5%	100.0%
Province of Negros Occidental	Number	362,529	126,285	425,786	914,600
	Percentage	39.6%	13.8%	46.6%	100.0%
Metro Bacolod	Number	86,237	56,218	191,529	333,985
	Percentage	25.8%	16.8%	57.3%	100.0%
% Share of Province to Region		33.3%	43.8%	43.6%	38.9%
% Share of Metro Bacolod to Province		23.8%	44.5%	45.0%	36.5%

Source: Study Team Estimates based on the 2000 Census (NSO)

Employment in the primary sector occupies the largest share of 46.2% in the Region VI. In the Province of Negros Occidental, the largest one is in the tertiary sector but that in the primary sector still occupies 39.6%. In the Metro Bacolod, employment in the primary sector occupies only 25.8%, while that in the tertiary sector is predominant at 57.3%. The percentage shares of the Metro Bacolod to the Province for the primary, secondary and tertiary sectors are 23.8%, 44.5% and 45.0%, respectively. The Metro Bacolod occupies nearly half of the non-agricultural activities in the Province. This means that the economic position of the Metro Bacolod in the province and the Region is more important in the non-primary sectors despite keeping a considerable role in the primary sector.

A comparison of Table 1.2-4 and 1.2-5 gives values of labor productivity by sector in the Region VI in 2000. The values of the primary, secondary and tertiary sectors are 18,613 pesos/person, 59,981 pesos/person and 30,843 pesos/person, respectively. Labor productivity of the secondary sector is the highest, about 3.2 times of that of the primary sector and 1.9 times of that of the tertiary sector. Labor productivity of the tertiary sector is around 1.7 times of that of the primary sector. The fact that the percentages of employment in the secondary and tertiary sectors with higher labor productivity are large in the Metro Bacolod indicates a considerably higher GRDP per capita of Metro Bacolod, if calculated, than the regional and provincial averages.

1.2.3 Economic Activities by Sector

1) Primary Sector

Although weight of the primary sector is comparatively lower in the Metro Bacolod than in the province as a whole, land area used for agricultural production, including fishponds, occupies 77% of the total land area of the Metro Bacolod. The main crop is sugarcane and rice. According to Table 1.2-6, the area of sugarcane field is about 78,500 ha and that of rice field is about 18,500 ha, respectively. The both in all occupy more than 80% of the total cropland of 118,500 ha.

TABLE 1.2-6 LAND AREA USED FOR PRIMARY SECTOR PRODUCTION (Hectare)

LGU	Cropland						Fishpond	Total Agri. Land	Year
	Rice			Sugar-Cane	Other Crops	Total			
	Irrigated	Rain-fed	Total						
Bacolod City	447	400	847	7,726	569	9,142	173	9,315	1999
Talisay City	276	272	548	8,032	4,767	13,347	89	13,436	1994
Silay City	286	539	825	14,380	2,041	17,246	620	17,866	1995
E. Magalona	846	610	1,456	6,724	347	8,527	2,217	10,744	1997
Victorias City	398	372	770	8,145	1,545	10,460	185	10,645	1995
Murcia	1,193	832	2,025	12,464	9,295	23,784		23,784	2000
Bago City	10,349	1,431	11,780	20,285	2,483	34,548	222	34,770	2000
Pulupandan	154	71	225	824	453	1,502	385	1,887	2000
Total	13,949	4,527	18,476	78,580	21,500	118,556	3,891	122,447	

Source: Study Team Estimates based on LGUs' documents for Comprehensive Land Use Plan (CLUP)

Rice production, however, concentrates in Bago City, where rice fields of 11,780 ha (63.8% of the metropolitan total) are existent and nearly 90% of them are irrigated. The irrigated areas are served by the canal system of the National Irrigation Administration. In the other cities/municipalities, the area of rice fields is small and the percentage of irrigated areas is low.

In the irrigated areas, the farmers practice two-cropping pattern growing rice the whole year round, while those in the rain fed-areas plant rice alternately with other crops such as mungo. However, in the case that the irrigation water is not sufficiently supplied for the second cropping, the farmers are forced to plant other crops instead of rice.

Table 1.2-7 shows the rice production in the Metro Bacolod by city/municipality, as well as a comparison with that of the Province of Negros Occidental. In 2000, when the Province of Negros Occidental registered the peak rice production of 371,013 tons, the Metro Bacolod produced 107,355 tons in all, which occupies 29% of the provincial total. Bago City produced 70,955 tons, equivalent to 66.1% of the metropolitan total.

TABLE 1.2-7 RICE PRODUCTION IN METRO BACOLOD, 2000

Cities/Municipalities	Area Harvested (ha)	Production (ton)	Yield (ton/ha)
Bacolod City	3,015	7,975	2.65
Talisay City	343	864	2.52
Silay City	502	1,457	2.90
E. Magalona	942	3,288	3.49
Victorias City	1,111	3,840	3.46
Murcia	4,270	14,987	3.51
Bago City	20,962	70,955	3.38
Pulupandan	1,020	3,989	3.91
Metro Bacolod Total	32,165	107,355	3.34
% to the Province	29.5	28.9	
Province of Negros Occidental	109,132	371,013	3.40

Source: Data from the District III Agricultural Office and Bago City

The yearly area harvested and yield fluctuate depending on the natural disasters such as droughts and typhoons. In 2000 the rice fields in Metro Bacolod appears to be used effectively. Although Bago City is almost fully irrigated, the yield is not so high compared with those of the other LGUs, and a little lower than the provincial average. Table 1.2-8 shows the comparison result of yields of palay (unyield rice) between Bago City and the provincial average. Irrigated rice fields of Bago City were fully utilized for two-cropping pattern and the yield was a little higher than the provincial average. But the yield of rain-fed rice fields was only 2.05 tons/ha, a very low level in comparison with the provincial average of 3.29 tons/ha.

TABLE 1.2-8 COMPARISON OF YIELD OF PALAY BETWEEN BAGO CITY AND PROVINCIAL AVERAGE

Administrator	Harvesting System	Area Harvested (ha)	Production (ton)	Yield (ton/ha)
Bago City	Irrigated	19,554.10	68,072.22	3.48
	1st Crop	10,349.00	34,565.66	3.34
	2nd Crop	9,205.10	33,506.56	3.64
	Rain-fed	1,407.45	2,882.64	2.05
	Lowland	805.85	1,950.16	2.42
	Upland	601.60	932.48	1.55
	Total	20,961.55	70,954.86	3.39
Province of Negros Occidental	Irrigated	79,798	274,422	3.44
	Rain-fed	29,334	96,591	3.29
	Total	109,132	371,013	3.40

Source: Bago City and Province of Negros Occidental

The Province of Negros Occidental is known as a rice-importing province as many of agricultural lands are used for sugarcane planting. Table 1.2-9 shows a calculation result of demand/supply balance of rice for the Province of Negros Occidental and the Metro Bacolod. The province as a whole has a deficit of 124 thousand tons and the Metro Bacolod a deficit of 65 thousand tons. Assumptions on the percentage of feeds/wastage, milling recovery and especially on per capita requirement for rice are not unchangeable, but the situation will become harder in future due to the decrease of rice field, especially rain-fed one, by reclassification to other uses in the process of urbanization.

TABLE 1.2-9 DEMAND/SUPPLY BALANCE OF RICE, 2000

Item	Unit	Province of Negros Occi.	Metro Bacolod
Supply	Area harvested (ha) ¹⁾	109,132	32,165
	Palay production (ton) ¹⁾	371,013	107,355
	Reserve for seeds (ton) ²⁾	22,918	6,755
	Feeds/wastages (ton) ³⁾	24,116	6,978
	Food consumption (ton)	323,979	93,622
	Milled rice (ton) ⁴⁾	194,388	56,173
Demand	Population ⁵⁾	2,570,361	980,616
	Per capita requirement (kg/year) ⁶⁾	124	124
	Required rice (ton) ⁷⁾	318,725	121,596
Balance	Surplus rice (ton)	-124,337	-65,423

Note:

1) For Province: Data from Province of Negros Occidental

For Metro Bacolod: Data from District III Agricultural Office and Bago City

2) 210 kg/ha

3) 6.5 % of production

4) Milling recovery 60 %

5) Estimated midyear population based on the 2000 Census population as of May 1

6) Food requirement for "cereals and cereal products" shown in HLURB guideline

7) Rice is assumed to meet the total food requirement for cereals and cereal products

Sugarcanes are planted all over the Metro Bacolod. Harvested sugarcanes are transported to the milling centers for the production of raw sugar and related products. There are four milling centers operating in the Metro Bacolod. Their locations are Victorias City, Silay City, Talisay City and Bago City. They have their respective territories for sugar plantation called "Mill District", for the exclusive collection of sugarcanes. At present, however, the mill district is collapsing practically, due to the competition among the mill companies. Strong companies collect sugarcanes from farmers outside their mill districts presenting attractive trade conditions. Accordingly, heavy trucks heavily loaded with sugarcanes run on the NS-1 (Bacolod Coastal Road) from hacienda (sugarcane plantation) to milling centers northwards and southwards.

Production of sugarcanes depends on the yearly natural conditions and it is not easy to grasp the real volume. According to the Victorias City's documents for CLUP, the yield is estimated at 75 tons/ha. On the other hand, the final crop estimate by SRA for 200-2001 shows that the yield by mill district varies from the lowest of 13.84 tons/ha to the highest of 72.00 tons/ha and the average is 53.71 tons/ha. Applying this average yield to the total area of sugarcane fields of 78,580

ha shown in the above Table 1.2-6, the total sugarcane production in the Metro Bacolod is estimated at 4.2 million tons. This amount almost corresponds with the gross tonnage sugarcane milled in this area, as described in the following section.

The other main crops planted in the area are corn, banana, coffee, vegetable, cassava, mango and coconut.

Livestock and poultry have its share in the metropolitan economy. The livestock products are mainly sold to the local market.

Fishing, especially aquaculture, is an important industry in Metro Bacolod. All cities/municipalities except Murcia have fishponds. As for species cultured, milkfish occupies an overwhelming majority. The average fishpond's productivity is 500-800 kg/ha/yr. The unit price is P60/kg-P80/kg.

Assuming that the average productivity is 650 kg/ha/yr and the unit price is P70/kg, the total sales value is estimated at 177 million pesos. Comparing it with the rice production value of 904 million pesos (applying a revised 2000 palay price of 8.42 pesos/kg to palay production of 107,355 tons), the economic size of fishing industry in Metro Bacolod is about 1/5 of rice production.

2) Secondary Sector

Economy of the Metro Bacolod depends on the performance of the sugar industry. The sugar industry is supporting economically the sugarcane farmers, its employees, directly related industries and various commercial/service industries within the Metro Bacolod.

Sugar production is the most prominent industry in the Province of Negros Occidental. The province has produced almost half of the national total raw sugar production as shown in Table 1.2-10.

In Metro Bacolod, there are currently four sugarcane milling centers in operation occupying around 45% of the provincial production. Among above, Victorias Milling Company is the largest center in the Philippines.

TABLE 1.2-10 RAW SUGAR PRODUCTION IN METRO BACOLOD

in metric tons

Sugar mill	96/97	97/98	98/99	99/00	00/01	01/02	02/03 ¹⁾
Aidsisa (Sunnix)	49,700	31,184	27,568	30,025	0	0	0
Bacolod-Murcia (Noa's Ark)	7,341	0	0	0	0	0	0
First Farmers	64,118	64,155	46,762	48,835	64,163	63,703	63,813
Hawaian Philippines	91,404	85,739	78,824	85,380	92,371	90,703	81,156
Ma-ao	23,709	18,352	6,258	n.a.	8,096	3,144	802
Victorias	147,754	157,261	177,690	180,498	233,369	253,660	193,916
Sub-total (Study Area)	384,026	356,691	337,102	344,738	397,999	411,210	339,687
Negros Occidental	860,617	842,066	768,576	760,843	864,685	857,881	824,227
Philippines	1,828,609	1,802,744	1,624,322	1,619,523	1,805,203	1,898,501	1,707,411
% of Negros Oc.to Philippines	47%	47%	47%	47%	48%	45%	48%
% of Study A.to Negros Occidenta	45%	42%	44%	45%	46%	48%	41%

Note 1): as of March 23, 2003

Source: Planning & International Sugar Affairs Office

Figure 1.2-4 shows the raw sugar supply and demand in the Philippines. It is found that most of the production has been consumed domestically and the exporting volume has been more or less only 10% of the total production, though some fluctuation in total production can be observed. Domestic demand is still growing at 3% per annum, while world sugar consumption is also increasing at 1 to 2% per annum. It implies that domestic production will be increased to meet the demand growth in the future if the current taxation policy for the imported sugar is maintained. In spite of the declining tendency in the cropping area of sugarcane field, sugarcane production can be expanded by improving the soil conditions, introducing high yield varieties, and developing irrigation system.

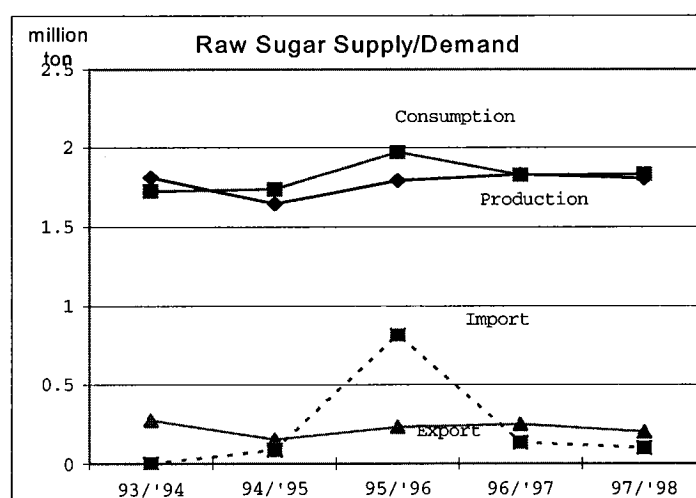


FIGURE 1.2-4 SUGAR DEMAND AND SUPPLY

On the other hand, it is pointed out in several studies that the sugar production cost in the Philippines is much higher than the neighboring sugar producing countries such as Australia, Thailand etc. This is due to the low productivity throughout the process from sugarcane production to the final refinery, which is explained by various reasons: inferior varieties of sugarcanes, inadequacy of

On the other hand, it is pointed out in several studies that the sugar production cost in the Philippines is much higher than the neighboring sugar producing countries such as Australia, Thailand etc. This is due to the low productivity throughout the process from sugarcane production to the final refinery, which is explained by various reasons: inferior varieties of sugarcanes, inadequacy of transport facilities, insufficient modernization of milling machineries, etc. According to a milling company, the production cost will be reduced step by step up to fully competitive level to other sugar exporting countries by the year 2010.

Table 1.2-11 shows the gross tonnage of sugarcane milled in the Study Area. Total volume was about 4.4 million tons in 2001/2002 excluding the tonnage milled in Ma-ao.

Sugar marketing system has started with the transport of the sugarcane from the plantation to the sugar mill for processing into raw sugar. The milling company usually has a mill district near the own milling center. Because of the harsh competition among milling companies for inadequate supply of sugarcane, some companies such as Bacolod-Murcia, have stopped their operation. On the other hand, some are collecting more sugarcane supply by offering more attractive conditions to the farmers, such as an increase in the yield, trucking assistance, advance payments or other incentives.

TABLE 1.2-11 GROSS TONNAGE OF CANE MILLED

Sugar mill	metric tons					
	'96/'97	'97/'98	'98/'99	'99/'00	00/'01	01/'02
Aidsisa (Sunnix)	669,471	414,958	452,651	471,221	-	-
Bacolod-Murcia (Noa's Ark)	141,171	-	-	-	-	-
First Farmers	811,512	783,124	656,917	616,193	757,101	770,704
Hawaiian Philippines	1,134,449	1,060,430	1,120,442	1,061,523	1,115,085	1,026,098
Ma-ao	318,777	290,899	107,004	n.a.	144,111	n.a.
Victorias	1,890,625	1,674,925	2,211,331	2,061,508	2,565,437	2,630,290
Sub-total (Study Area)	4,966,005	4,224,336	4,548,345	4,210,445	4,581,734	4,427,092
Negros Occidental	10,841,950	10,198,352	10,725,600	9,453,593	10,303,310	10,396,643
Philippines	21,901,189	20,506,256	21,776,862	19,591,467	21,170,945	21,159,795
% of Negros Oc..to Philippines	50%	50%	49%	48%	49%	49%
% of Study A.to Negros Occidenta	46%	41%	42%	45%	44%	43%

Source: Planning & International Sugar Affairs Office

As shown in Table 1.2-12, the registered establishments of the secondary sector concentrate in Bacolod City. According to the City's data, as far as export-oriented firms are concerned, 9 firms engaged in food processing, 8 in garment making, 19 in gifts and house decors and the other are engaged in furniture, souvenir items, ceramic, and fashion jewelry and accessories among others.

**TABLE 1.2-12 NUMBER OF SECONDARY SECTOR ESTABLISHMENTS
IN METRO BACOLOD**

LGU	Mining	Manufacturing	Construction	Utilities	Total	Year
Bacolod City	-	386	-	-	386	1998
Talisay	-	14	-	-	14	1993
Silay City	-	-	-	-		No data
E. B. Magalona	-	9	-	-	9	1997
Victorias	-	45	-	-	45	1995
Murcia	-	8	-	-	8	2000
Bago City	-	73	6	-	79	2001
Pulupandan	-	47	1	-	48	1999
Total	0	582	7	0	589	

Source: Documents of Cities/municipalities for CLUP

Outside Bacolod City, most of the establishments shown in the table are small-scale cottage industries such as bakeries, hollow blocks making, printing press, tailoring, dried fish making and so on.

3) Tertiary Sector

Table 1.2-13 shows the number of tertiary sector establishments registered in Metro Bacolod. More than 70% of them are concentrated in Bacolod City.

As the City is the financing center of the Province of Negros Occidental, there were 45 banks, 37 financing companies and 23 pawnshops in 1998. These banks and financial companies provide capitalization for both individuals and corporations. According to the record of the City Treasurer's Office, the total investments of the business community amounted to 10,942.8 million pesos in 1998 (for licensed 12,781 establishments including 386 manufacturing businesses), and reached 20,299.5 million pesos for the total of 14,739 establishments in 2001.

Table 1.2-14 shows the economic activities of licensed commerce and service establishments (including manufacturing ones) from 1998 to 2001. 2,000-3,000 new businesses have been established every year in the City. The number of employed persons was 48,636 in 2001. Gross sales amounted to 20,223.3 million pesos in 2000. Based on the gross sales, the estimated revenue of the City at the year-end of 2001 was 90.9 million pesos.

TABLE 1.2-13 NUMBER OF TERTIARY SECTOR ESTABLISHMENTS IN METRO BACOLOD

	Commerce	Financing	Services	Transport	Total	Year
Bacolod City	6,358	467	5,570		12,395	1998
Talisay	488	3	23		514	1993
Silay City					2,034	1996
E. B. Magalona		59	4		63	1997
Victorias		6			863	1995
Murcia	280				280	2000
Bago City	459	14	132	3	608	2001
Pulupandan	479	3	34	166	682	1999
Total	8,064	552	5,763	169	17,439	

Source: Documents of City/municipalities for CLUP

TABLE 1.2-14 ECONOMIC ACTIVITIES OF LICENSED ESTABLISHMENTS, 1998-2001

Year	Number of Establishments (year-end)	Newly Licensed Establishments	Number of Employed Persons	Gross Sales (Previous Year) (million pesos)	Estimated Yearly Tax Due (million pesos)
1998	12,781	2,571	41,324	16,264.3	55.5
1999	11,517	2,123	42,636	15,708.2	61.7
2000	13,352	3,106	40,879	15,423.5	64.9
2001	14,739	2,028	48,636	20,223.3	90.9

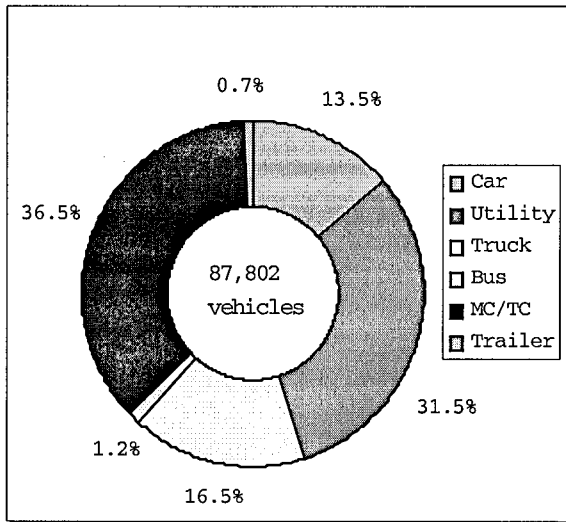
Source: Bacolod Trends 2002

For other municipalities in Metro Bacolod, trade and service activities are of limited scale. Every municipality has at least one public market in its central urban district called "poblacion". Generally it is a building of 5,000 to 10,000 square meters divided into the dry and wet areas according to the commodities. It is open every day for the residents of the municipality. In addition, during market days, one or more days a week, inhabitants of surrounding rural barangays (sometimes in the adjacent municipalities) bring their farm products to the market place, and in return buy their farm and household needs from the different commercial establishments inside and around it.

The most popular commercial establishment is sari-sari store. It is a small retail shop of around 10 square meters operated by 1-2 persons servicing barangay residents a variety of commodities. Generally one sari-sari store services 10-20 households or 50-100 persons at the barangay level. It means that a barangay with a population of 1,000 has 10-20 sari-sari stores.

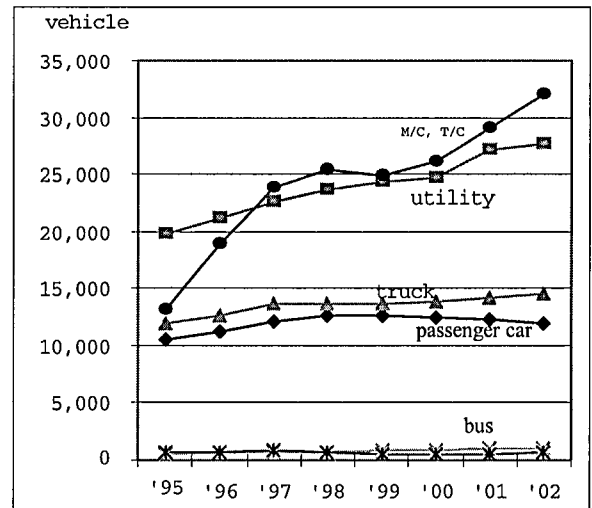
1.2.4 Vehicle Ownership

There are five district offices of Land Transport Office (LTO) for vehicle registration in the Province of Negros Occidental: Bacolod City, Silay City, Himmaylan, Cadis City and San Carlos City. The total number of car registration in the province in 2002 was 87,802 vehicles, of which about 63%, 55,723 vehicles were four-wheel types. Motorcycles and tricycles occupy 36.5%. The majority of them and utilities seem to be used for public transport as tricycles and jeepneys. The growth rates of motorcycles and tricycles have been very high, 13.6% per annum during the recent seven years from 1995 to 2002.



Source: Land Transport Office

FIGURE 1.2-5
VEHICLE REGISTRATION IN PROVINCE OF NEGROS OCCIDENTAL, 2002



Source: Land Transport Office

FIGURE 1.2-6
PAST TREND OF VEHICLE REGISTRATION IN PROVINCE OF NEGROS OCCIDENTAL

Since the vehicle registration has not been compiled by the owner's residence but by district office basis, the number of vehicles by municipality or barangay is not available from the record published by LTO.

However, some vehicle ownership data by barangay can be obtained from the "Barangay Accessibility Survey" conducted during the years from 2001 to 2002, within the framework of the Integrated Rural Accessibility Planning Information System. The system was developed by the Department of Interior and Local Government (DILG), in collaboration with the Government of the Netherlands. As the Survey was made only for selected municipalities in the Metro Bacolod, an estimation formula was established by using the Survey results in order to estimate the vehicle ownership by barangay in the Study Area.

The vehicle ownership for four-wheel vehicles is estimated by using the following formula:

$$N = K \times \alpha \times I^\beta$$

Where N: Number of persons per vehicle by barangay base

K: Constant (=530265)

α : Adjustment factor: 1.370 for the annual income more than P200,000.
 0.935 for the annual income range P100,000 – P200,000
 0.805 for the annual income less than P100,000

I: Family income per year by barangai base

β : -1.78873

R: Correlation coefficient: 0.68

As a result, the vehicle ownership in 2002 is estimated as shown in Figure 1.2-7 and is summarized by city/municipality as shown in Table 1.2-15. The vehicle ownership in Bacolod city is estimated as 67.5 vehicle per 1000 persons, whereas that for the other cities/municipalities in the Metro Bacolod ranges from 5.9 to 15.5 vehicles per 1000 persons.

TABLE 1.2-15 VEHICLE OWNERSHIP IN METRO BACOLOD, 2002

City/Municipality	Number of Vehicles	Vehicle Ownership (Vehicles/1000 persons)
Bacolod City	28,975	67.5
Silay City	1,013	9.4
Talisay City	892	11.3
Bago City	834	5.9
Victorias City	1,263	15.5
Enrique Magalona	328	6.0
Pulupandan	240	9.3
Murcia	598	10.1
Total	34,143	34.9

Note: Excluding vehicles for hire and motorcycles/tricycles

Source: Barangay Accessibility Survey 2002, Study Team

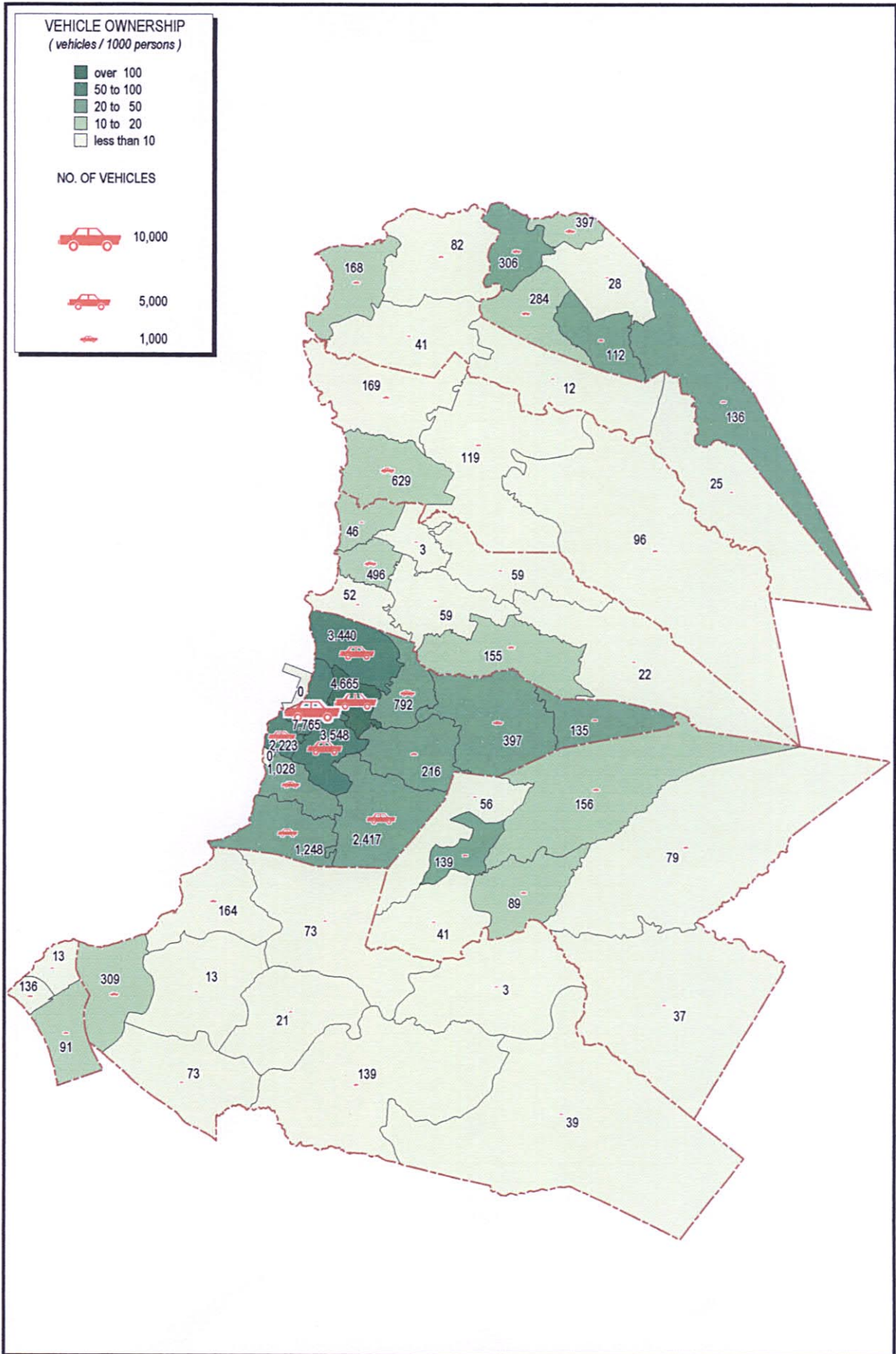
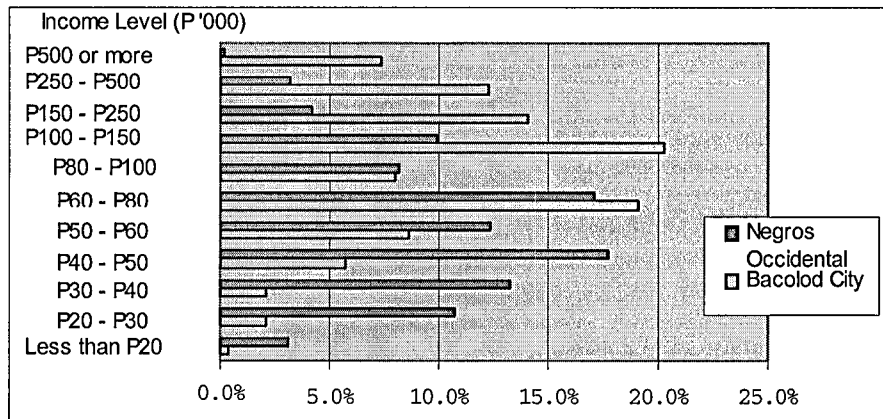


FIGURE 1.2-7 VEHICLE OWNERSHIP IN METRO BACOLOD

1.2.5 Income Level

The family income distributions in Bacolod City and Province of Negros Occidental (excluding Bacolod City) are illustrated in Figure 1.2-8, based on the Family Income and Expenditure Survey in 2000.

The average annual family incomes in Bacolod City and Province of Negros Occidental are P 177,500 and P 73,900, respectively. The average income of the City is nearly double the national average of P144,000, while that of the province is about half of the national average.



Source: Family Income and Expenditure Survey 2000

FIGURE 1.2-8 FAMILY INCOME IN BACOLOD CITY AND PROVINCE OF NEGROS OCCIDENTAL

It is difficult to break down the above survey results further to the city/municipality or barangay level because of the sampling variations of the survey. Hence, the average income by municipality or barangay is estimated by using the relationship between the family income and the floor area of housing unit the family occupies, of which distribution pattern is obtainable at the barangay level from the 2000 Census of Population and Housing. The family income and the floor area of housing unit are highly correlated as follows:

$$\text{Bacolod City: } I = 3.154A + 13.6 \quad (R = 0.999)$$

$$\text{Province of Negros Occidental: } I = 2.562A - 7.37 \quad (R = 0.962)$$

Where I: Average Family Income (P '000 per year)

A: Average Housing Floor Area (m²)

R: Correlation Coefficient

Using the above relationship between the family income and floor area of occupied housing unit, the average income levels are estimated by traffic zone. The results are shown in Figure 1.2-9.

In general, the CBD area of Bacolod City is at the highest income level, while the peripheral zones of Metro Bacolod, particularly rural areas are relatively at the lower level.

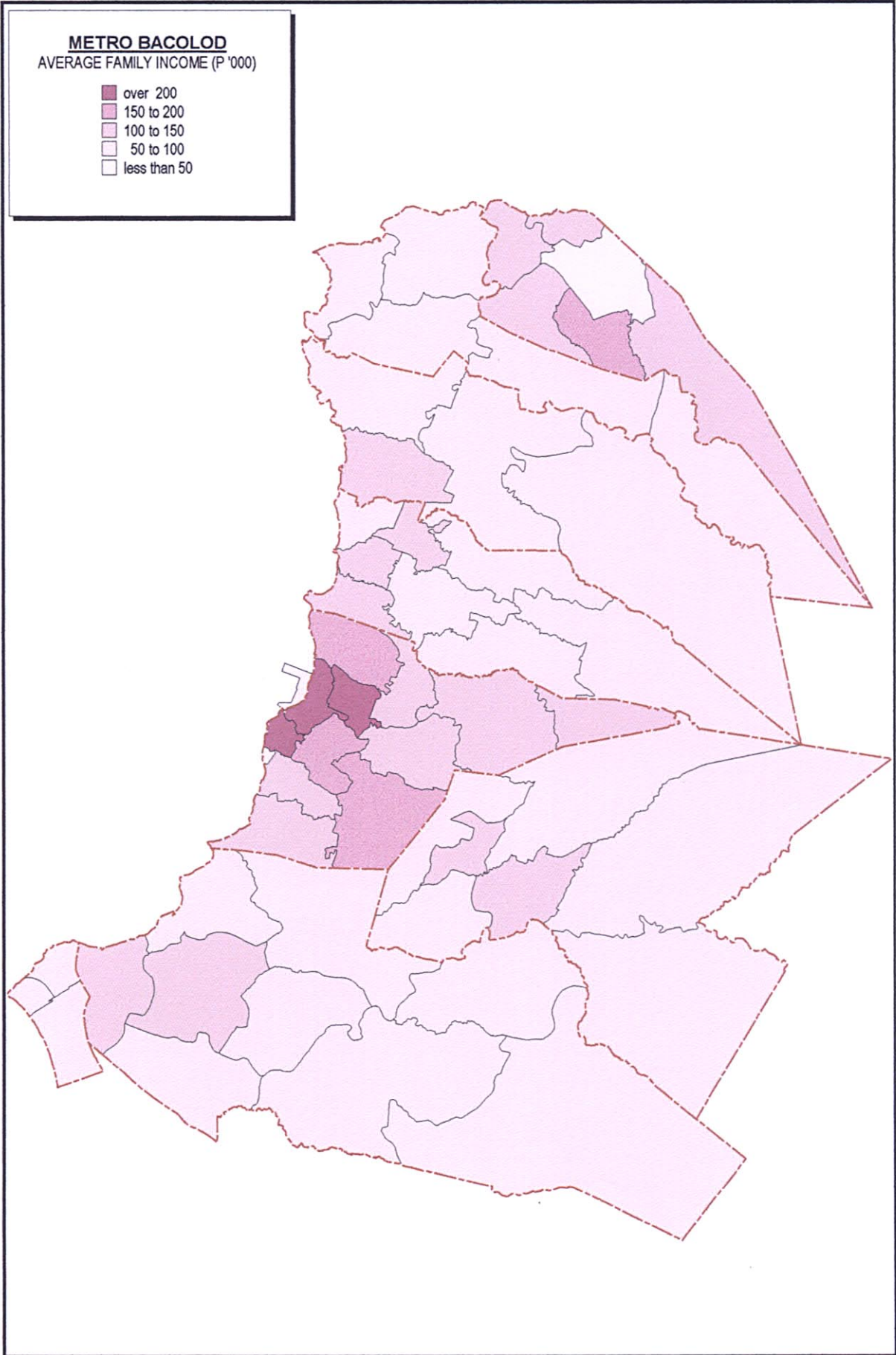


FIGURE 1.2-9 AVERAGE FAMILY INCOME LEVEL BY ZONE

1.3 EXISTING LAND USE AND SOCIO-ECONOMIC FRAMEWORK

1.3.1 Urban Structure

As shown in Figure 1.3-1, the existing physical urban structure of Metro Bacolod is a rosary-type connected by Bacolod Coastal Road, with a branch line of Bacolod-Murcia-San Carlos City Road which connects the urban area of Murcia with Bacolod City. The poblacion of Bacolod City with an area of 623 ha is playing a role of not only metropolitan but also provincial center of tertiary sector activities. From there to the north, North Section of Bacolod Coastal Road runs through Talisay City, Silay City, E. B. Magalona and Victorias City to Province of Negros Oriental. To the south, South Section of Bacolod Coastal Road connects Bago City and Pulpandan. To the east, there are two national roads. One is Bacolod-Murcia-San Carlos City Road and the other is Bacolod-Granada Road which connects Barangays of Granada and Alangilan of Bacolod City. Another important road is Bacolod City Circumferential Road which runs through the suburban area of the City.

In addition, the Bacolod Port connects Provinces of Iloilo and Guimaras in Region VI and other regions including Manila. The Bacolod airport is located in the Barangay of Ingcang adjacent to the poblacion connecting Manila and Cebu.

This urban structure concentrated at the Central Business District (CBD) of Bacolod City causes traffic congestion on Bacolod Coastal Road and on streets within the central part of the City.

1.3.2 Existing Land Use

The existing land use is shown in Figure 1.3-2. Green-colored areas (agricultural use) are widely extended over the Metro Bacolod. According to the area measurement on the map, the Metro Bacolod covers an area of 153,071 ha of which 115,625 ha is used for agriculture, 24,521 ha for forest and 2,984 ha for fishponds. An aggregated area of these uses or rural land use, amounts to 143,130 ha which occupies 93.5% of the total area.

Urban land uses amount to 9,941 ha equivalent to 6.5% of the total area. Among them residential use covers an area of 8,593 ha 86.4% of the total urban area. Commercial areas amount to 358 ha in all, most of them are located in Bacolod City. Other urban land uses are 430 ha of institutional, 407 ha of industrial and 153 ha of parks/open space.

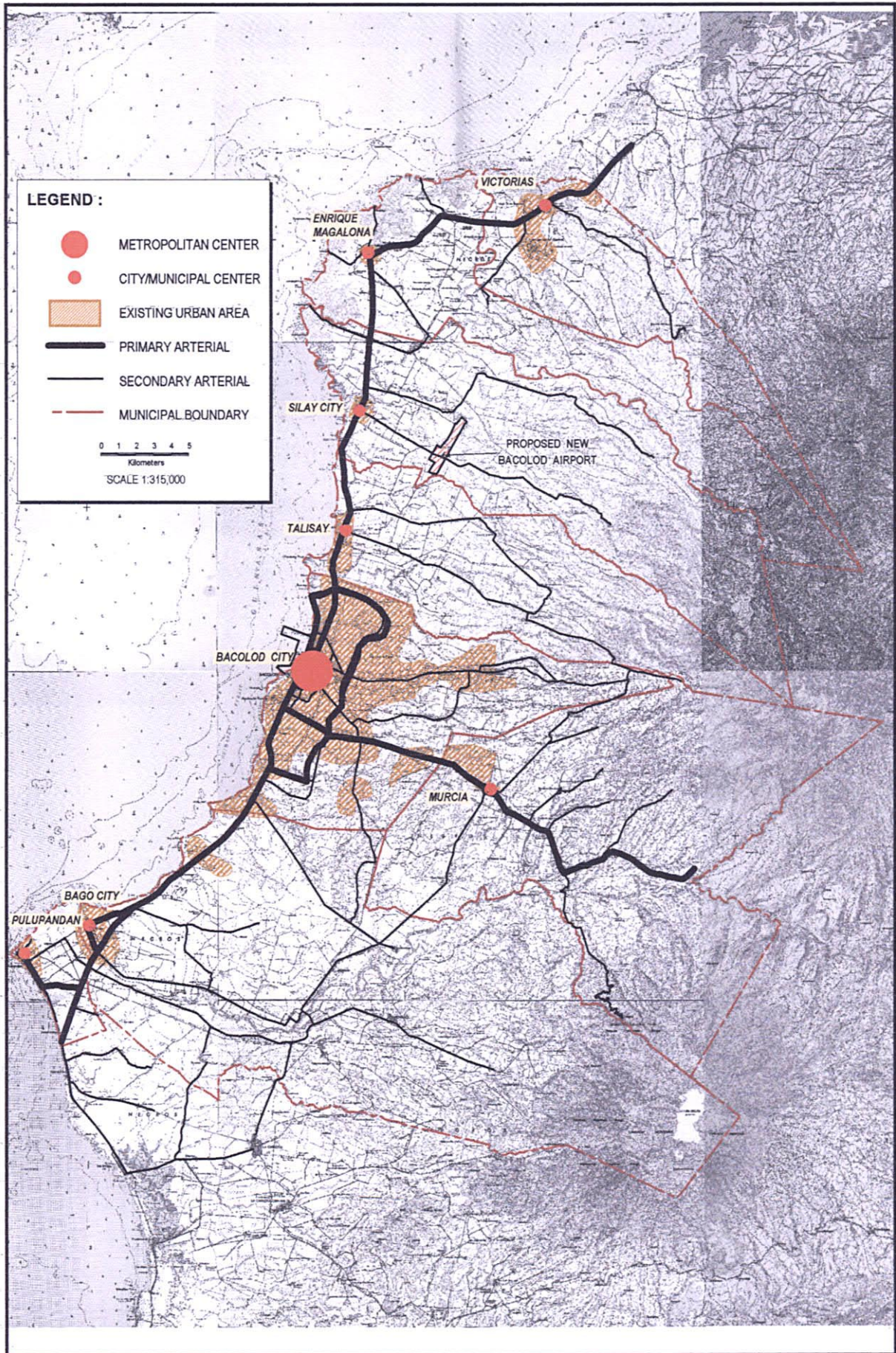


FIGURE 1.3-1 EXISTING URBAN STRUCTURE OF METRO BACOLOD

**TABLE 1.3-1 AREAS BY LAND USE CATEGORY (2000), METRO
BACOLOD**

Land Use Category	Area (ha)	Percentage
Rural Land Use		
Agriculture	115,625	75.5
Forest	24,521	16.0
Fishpond	2,984	2.0
Total	143,130	93.5
Urban Land Use		
Residential	8,593	5.6
Commercial	358	0.2
Industrial	407	0.3
Institutional	430	0.3
Park/Open Space	153	0.1
Total	9,941	6.5
Grand Total	153,071	100.0

Source: Study Team Measurements on the Map

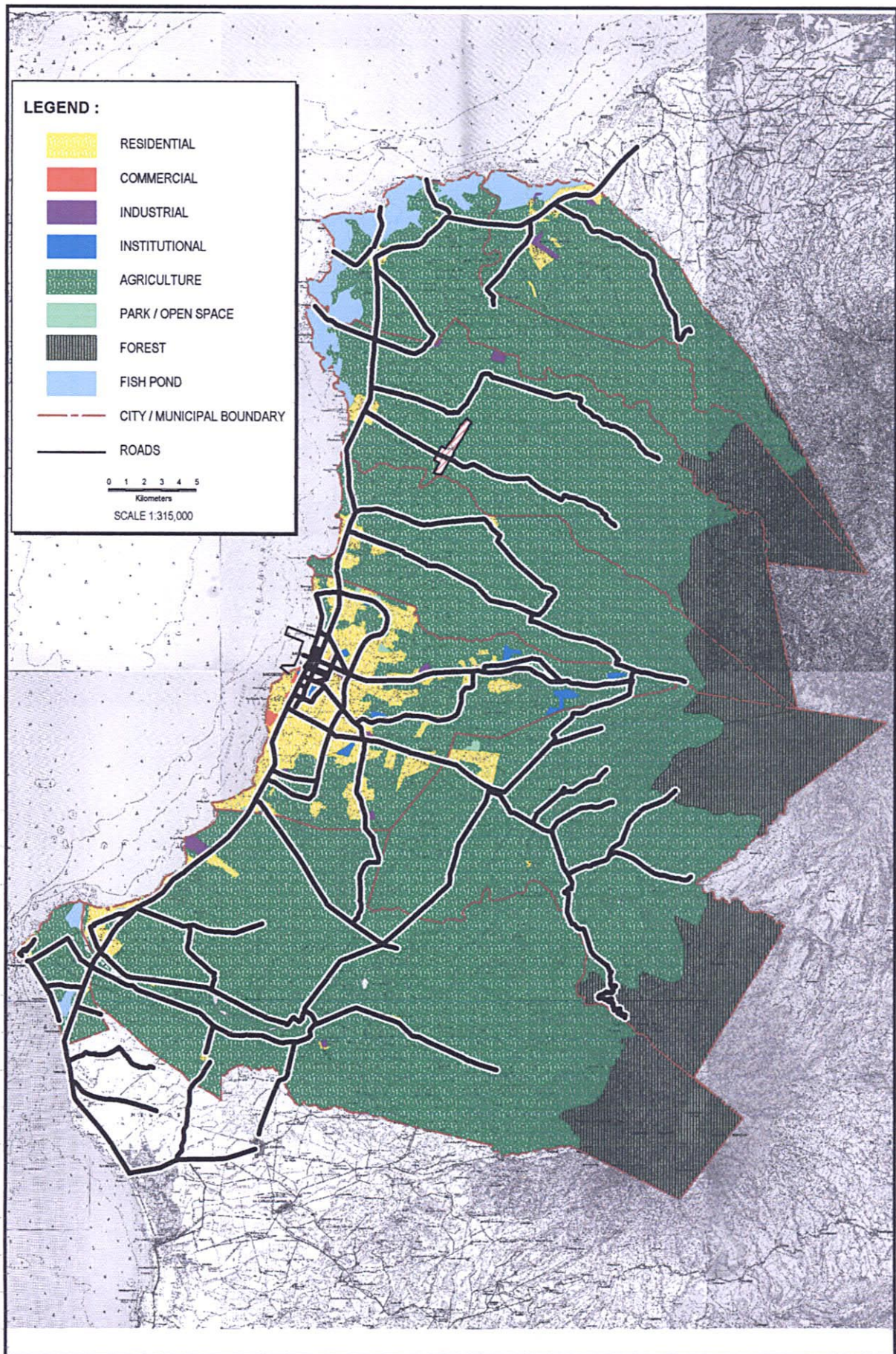


FIGURE 1.3-2 METRO BACOLOD EXISTING LAND USE MAP : 2002

1.3.3 Socio-economic Framework

The followings are a description about the present population and employment distribution in Metro Bacolod. As socio-economic indicators for the analysis of the present situation of traffic and for the future projections of traffic demand in Metro Bacolod, population and employment by economic sector were selected and tabulated by traffic zone. Traffic zones are demarcated aggregating several barangays from the viewpoint of transport planning

1) Population

Population by barangay is available for 1990, 1995 and 2000 from the Population Censuses carried out in respective years. Table 1.3-2 shows the population growth trend by traffic zone.

In Silay City, all zones registered decrease of population from 1995 to 2000. The causes of population decrease are said to be flood and shut of a milling center.

In Bacolod City, Zones 2001 (Poblacion), 2002 (Bacolod City 2: Singcang) and 2004 (Bacolod City 4: Montevista and Villamonte) have shown population decrease. These zones are CBD and its vicinities. In Zone 2001, a change of land use from residential to commercial or other uses is in progress and population continued to decrease. Population density of the zone 2001 is the highest in Metro Bacolod, with 142.8 persons/ha. Zones with a recent great population increase are 2008 (Bacolod City 8: Felisa, Handumanan and Mansilingan, +13,011 during the period 1995-2000), 2005 (Bacolod City 5: Alijis and Taculing, +6,042), 2006 (Bacolod City 6: Tangub, +4,564) and 2009 (Bacolod City 9: Vista Alegre, +3,297). These zones are located to the southeast of the CBD. Many subdivision developments are completed or ongoing in the areas.

In the other LGUs, only Talisay City registered a total population increase of more than ten thousand during the period 1995-2000. Population increased in all zones within this city. In Zone 2101 (Talisay City 1: a part of Poblacion), population continued to increase through 1990s. Population density of the zone was rising and reached 49.4 persons/ha in 2000. In Zone 2102 (Talisay City 2: a part of Poblacion) located between Zone 2101 and Bacolod City, subdivision developments for upper classes are in progress. But its population density is still at a low level of 6.7 persons/ha.

The total population increase of Bago City was 9,383, next to the Talisay City, during the same period. Zone 2601 (Bago City 1: Poblacion and its vicinity) experienced a continuous population increase through 1990s. Population density was 14.3 persons/ha in 2000. In Zone 2604 (Bago City 4: Calumangan and Taloc), located between Zone 2601 and Bacolod City, population increased 3,583 persons with an average annual increase rate of 4.15% during the period 1990-95, but in the next quinquennium (1995-2000) the population increase has dulled.

Population size and density by zone is shown in Figure 1.3-3.

TABLE 1.3-2 PAST TREND OF POPULATION GROWTH BY ZONE IN METRO BACOLOD

Zone Code	Zone Name	Land Area (ha)	Population			Annual Average Growth Rate (%)		Pop. Density (pns/ha)
			1990 (May 1)	1995 (Sep 1)	2000 (May 1)	1990-95	1995-00	
								2000
2001	Bacolod City 1 (Pob.)	623	100,041	98,151	88,983	-0.36	-2.08	142.8
2002	Bacolod City 2	343	26,749	30,546	29,019	2.52	-1.09	84.6
2003	Bacolod City 3	1,426	53,150	63,492	65,805	3.39	0.77	46.1
2004	Bacolod City 4	641	40,021	39,642	38,728	-0.18	-0.50	60.4
2005	Bacolod City 5	987	34,924	43,625	49,667	4.26	2.82	50.3
2006	Bacolod City 6	872	18,091	21,398	25,962	3.20	4.23	29.8
2007	Bacolod City 7	1,564	24,103	28,396	30,060	3.12	1.23	19.2
2008	Bacolod City 8	2,509	30,525	38,392	51,403	4.39	6.45	20.5
2009	Bacolod City 9	1,676	3,192	5,079	8,376	9.10	11.32	5.0
2010	Bacolod City 10	1,018	11,975	15,719	18,691	5.23	3.78	18.4
2011	Bacolod City 11	2,997	12,897	13,682	16,555	1.11	4.17	5.5
2012	Bacolod City 12	1,384	3,954	4,223	5,827	1.24	7.14	4.2
2013	Reclamation Area 1		4,558	0	0			
2014	Reclamation Area 2		0	0	0			
2015	Bacolod Airport	44	0	0	0			0.0
	Bacolod City Total	16,084	364,180	402,345	429,076	1.89	1.39	26.7
2101	Talisay City 1	682	25,501	29,231	33,680	2.59	3.08	49.4
2102	Talisay City 2	953	5,117	5,209	6,349	0.33	4.33	6.7
2103	Talisay City 3	740	3,432	3,596	4,211	0.88	3.44	5.7
2104	Talisay City 4	791	2,663	2,792	3,570	0.89	5.41	4.5
2105	Talisay City 5	1,942	5,433	6,221	7,042	2.57	2.69	3.6
2106	Talisay City 6	2,260	7,274	8,204	8,752	2.28	1.40	3.9
2107	Talisay City 7	2,493	7,435	6,814	8,406	-1.62	4.60	3.4
2108	Talisay City 8	4,951	6,405	6,334	7,136	-0.21	2.59	1.4
	Talisay City Total	14,812	63,260	68,401	79,146	1.48	3.18	5.3
2201	Silay City 1	1,937	36,004	46,224	43,713	4.80	-1.19	22.6
2202	Silay City 2	2,902	27,486	32,345	27,916	3.10	-3.11	9.6
2203	Silay City 3	5,104	19,298	23,647	19,079	3.88	-4.50	3.7
2204	Silay City 4	11,539	18,243	20,532	17,014	2.24	-3.95	1.5
	Silay City Total	21,482	101,031	122,748	107,722	3.72	-2.76	5.0
2301	E. B. Magalona 1	1,517	13,926	15,807	15,995	2.40	0.25	10.5
2302	E. B. Magalona 2	2,827	14,067	15,517	16,178	1.86	0.90	5.7
2303	E. B. Magalona 3	2,695	8,485	9,165	9,001	1.46	-0.39	3.3
2304	E. B. Magalona 4	3,224	8,108	9,300	9,002	2.61	-0.70	2.8
2305	E. B. Magalona 5	4,959	4,280	4,632	4,314	1.49	-1.51	0.9
	E. B. Magalona Total	15,222	48,866	54,421	54,490	2.04	0.03	3.6
2401	Victorias City 1	587	25,984	29,769	29,888	2.58	0.09	50.9
2402	Victorias City 2	1,161	10,701	11,992	12,933	2.16	1.63	11.1
2403	Victorias City 3	1,532	19,781	20,140	20,640	0.34	0.53	13.5
2404	Victorias City 4	1,896	5,240	7,268	8,296	6.33	2.88	4.4
2405	Victorias City 5	1,246	3,626	3,782	3,846	0.79	0.36	3.1
2406	Victorias City 6	4,445	4,560	5,332	6,140	2.98	3.07	1.4
	Victorias City Total	10,867	69,892	78,283	81,743	2.15	0.93	7.5
2501	Murcia 1	852	6,738	6,982	6,427	0.67	-1.76	7.5
2502	Murcia 2	2,088	6,233	6,583	6,870	1.03	0.92	3.3
2503	Murcia 3	2,150	4,726	4,820	5,629	0.37	3.38	2.6
2504	Murcia 4	1,912	4,588	4,842	5,209	1.02	1.58	2.7
2505	Murcia 5	5,697	11,243	11,859	11,629	1.01	-0.42	2.0
2506	Murcia 6	9,925	11,621	12,479	14,207	1.34	2.82	1.4
2507	Murcia 7	8,043	5,847	7,563	9,387	4.94	4.74	1.2
	Murcia Total	30,667	50,996	55,128	59,358	1.47	1.60	1.9
2601	Bago City 1	1,880	21,849	23,893	26,957	1.69	2.62	14.3
2602	Bago City 2	2,891	11,182	11,819	11,400	1.04	-0.77	3.9
2603	Bago City 3	3,275	9,533	9,723	10,332	0.37	1.31	3.2
2604	Bago City 4	2,247	14,796	18,379	19,270	4.15	1.02	8.6
2605	Bago City 5	4,835	12,550	14,724	15,184	3.04	0.66	3.1
2606	Bago City 6	2,970	8,709	9,432	9,312	1.51	-0.27	3.1
2607	Bago City 7	7,103	25,143	23,310	26,880	-1.41	3.10	3.8
2608	Bago City 8	4,185	7,304	7,131	7,359	-0.45	0.68	1.8
2609	Bago City 9	12,434	11,797	13,927	15,027	3.16	1.64	1.2
	Bago City Total	41,820	122,863	132,338	141,721	1.40	1.48	3.4
2701	Pulupandan 1	322	14,305	15,407	15,644	1.40	0.33	48.6
2702	Pulupandan 2	543	1,701	1,833	1,827	1.41	-0.07	3.4
2703	Pulupandan 3	1,252	6,977	7,692	8,378	1.85	1.85	6.7
	Pulupandan Total	2,117	22,983	24,932	25,849	1.54	0.78	12.2
	Metro Bacolod Total	153,071	844,071	938,596	979,105	2.01	0.91	6.4

Source: Population Censuses, 1990, 1995 and 2000 (NSO)

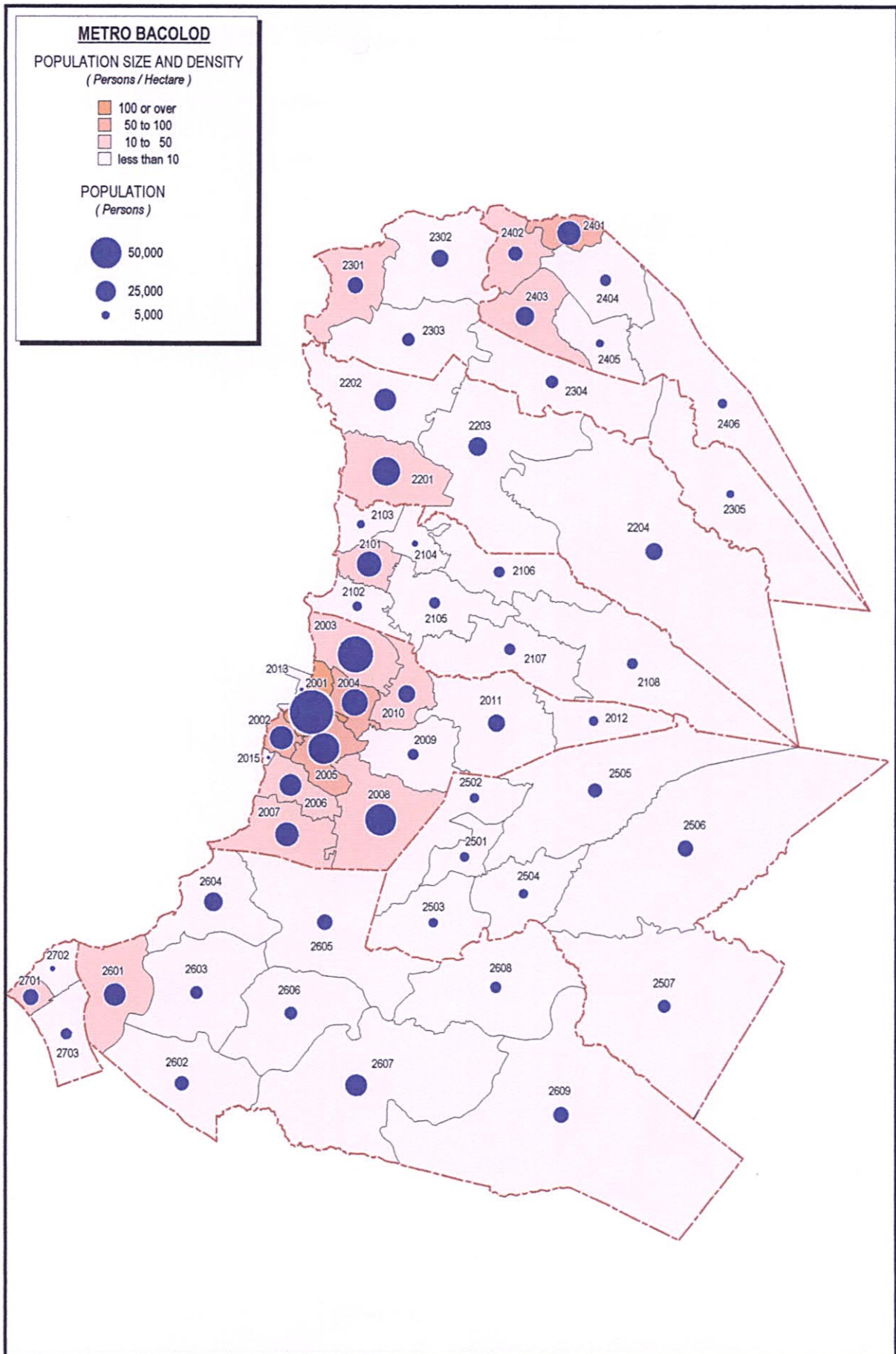


FIGURE 1.3-3 POPULATION SIZE AND DENSITY BY ZONE : 2000

2) Employment

Employment distribution is expressed as the number of employed persons by economic sector by zone on the workplace base. However, these data are neither available from the population censuses, nor from the labor force surveys. The 1995 Population Census gives information about the number of employed persons by sector by bagangay on the residence base. On the other hand, the 2000 census carried out the workplace base employment survey at the city/municipality level by 10% sampling. Using these data, the Study Team estimated the employment distribution for the Metro Bacolod in 2000.

The results are shown in Figure 1.3-4. Employment is concentrated in Bacolod City, especially Zone 2001 (Poblacion) with an employment density of 76.1 persons/ha. Also in other zones such as 2003, 2005, 2002, 2004, 2008 and 2006, there are considerable volumes of the tertiary and secondary sectors employment. Bacolod City is highly urbanized, but about 10,000 persons are engaged in the primary sector.

Other cities/municipalities of Metro Bacolod are basically of agriculture-based economy. Except the built-up area called poblacion and its vicinity, most zones are rural and employment in the primary sector is dominant. In these zones, however, some secondary and tertiary sector employment is existent providing the residents with daily services at the barangay level such as bakeries, sari-sari stores and educational and social institutions.

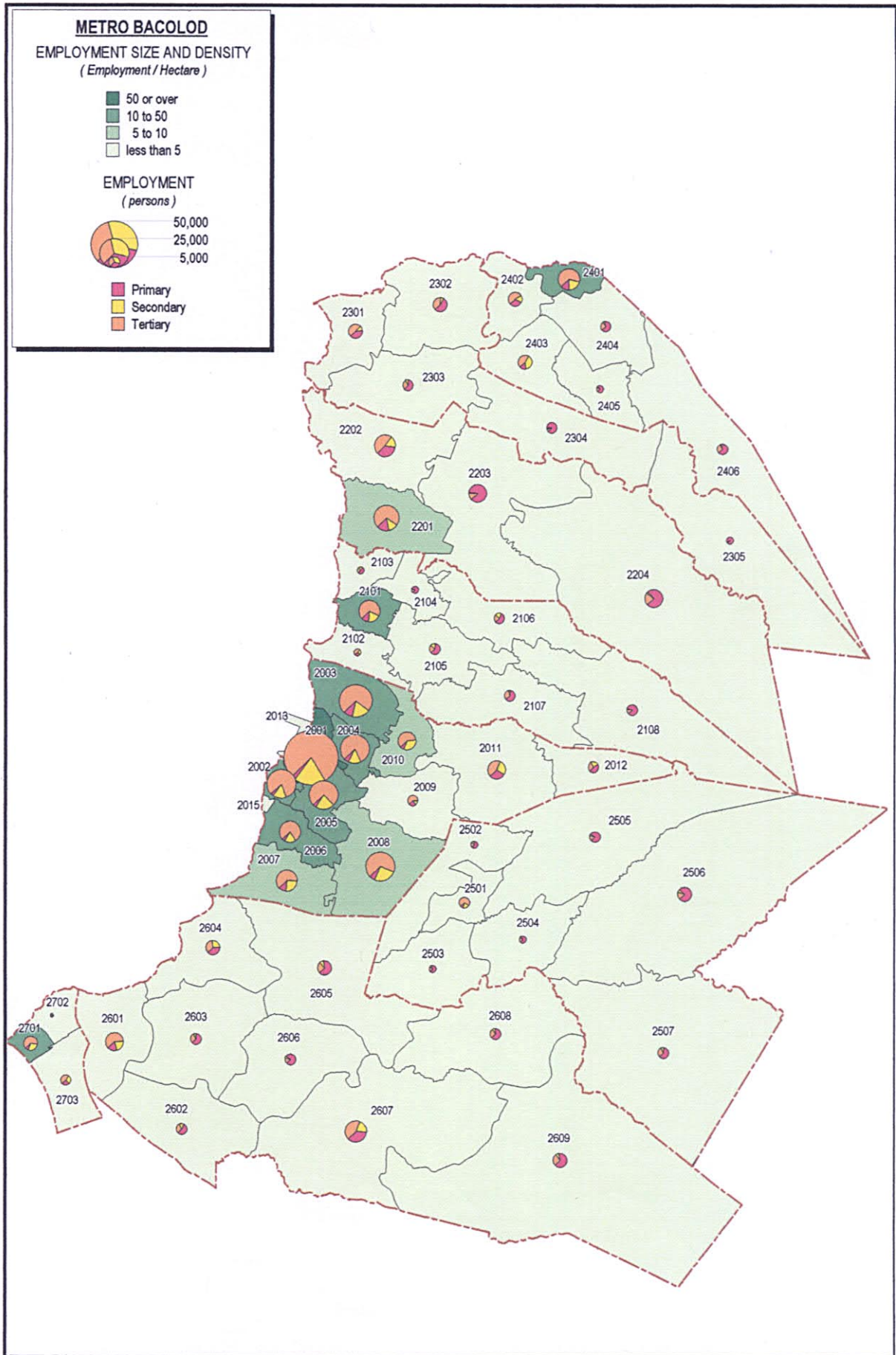


FIGURE 1.3-4 EMPLOYMENT SIZE AND DENSITY BY ZONE : 2000

CHAPTER 2

RELEVANT TRANSPORT AND DEVELOPMENT PROJECTS

2.1 NEW BACOLOD AIRPORT DEVELOPMENT PROJECT

1) Background

Although air transport accounts for a relatively small proportion of total domestic transportation volume in the Philippines, its share is increasing steadily. It is recognized that air transportation is one of the factors that area conducive to economic development, because of its relative speed, reliability and comfort. Airplanes are expected to play an increasingly important role carrying passengers and freight in this nation of more than 7,000 islands, as the economy grows and incomes rise. The Philippine government has announced its intention to develop in each of the country's 13 regions at least one airport that meets international standards set by International Civil Aviation Organization (ICAO). The government has begun updating airports, starting with those serving the greatest number of domestic travelers.

The Bacolod and Tacloban Airports are important trunkline airports located in the central region of Visayas. The two airports rank 5th and 8th respectively in terms of number of passengers served (540,000 and 300,000 respectively in 1997). Passenger and freight traffic volumes grew at an annual rate of 10.7% and 4.7% from 1992 to 1997 at Bacolod at Airport and 16.1% and 13.2% at Tacloban Airport. Similar growth is projected in the coming years.

This Project involves the construction and expansion of new airport facilities at both airports to meet growing demand for passenger and freight transport and to raise the safety of air transport services. It will contribute to the sustainable socioeconomic development of islands of Negros and Leyte and the surrounding regions.

The proceeds of the loan will be used for engineering and construction work for runways, passenger terminal, etc., for the procurement of safety devices, materials and other equipment, and consulting services (environmental and management, bidding support, etc.)

2) Study

There were two studies for preparation of the project.

- (i) JICA, The Study on Selected Airports Master planning Project, March 1997, and
- (ii) JICA, The Detailed Design Study of The Selected Airport (Trunk line) Development Project, April 1999

3) Financial Source

Japan Bank for International Cooperation (JBIC)

4) Implementation Schedule

Department of Transportation and Communications (DOTC)

5) The Project Components

The Project is composed as follows.

(i) Civil Work:	Runaway strip	150 each side
	Runaway	2,000m x 45m
	Taxiway	670m x 23m
	Passenger loading apron	219m x 48m
(ii) Building Work:	Passenger terminal	6,180m ²
	Control tower & Operations buildings	1,000m ²
	Cargo terminal buildings	1,660m ²
	Passenger boarding bridge	3 No.
(iii) Air Navigation System		1 Lot
(iv) Aviation Fuel Supply System		1 Lot
Equipment Procurement		1 Lot

6) Implementation Program

Bidding	2003
Construction (42 months)	2004 to 2007
Commencement of operation	2008

CHAPTER 3

INTER-CITY TRANSPORT SYSTEM

3.1 ROAD TRANSPORT

Metro Bacolod is located in the north-west coast of Negros Island. Distribution of urban centers and major inter-city roads in the Island are shown in Figure 3.1-1. There are three major inter-city roads as follows:

- Bacolod Coastal Road : North Section
- Bacolod Coastal Road : South Section
- Bacood City – San Carlos City Road

3.2 AIR TRANSPORT

There are two trunkline airport in the Island at Bacolod City and at Dumaguete City. Bacolod Airport is connected by air services with Manila and Cebu.

3.3 SEA TRANSPORT

There are one base port, three terminal ports and two passenger ports int eh Isladn. West coast ports provide transport linkage with Iloilo City, whereas east coast ports with Cebu Island.

At Bacolod City, passenger ferry terminals and ro-ro terminals a re providing transport services going to / from Iloilo City. Pulupandan passenger terminal also provides transport services to / from Iloilo City.

In Bacolod City, there are other private ports for cargo transportation.

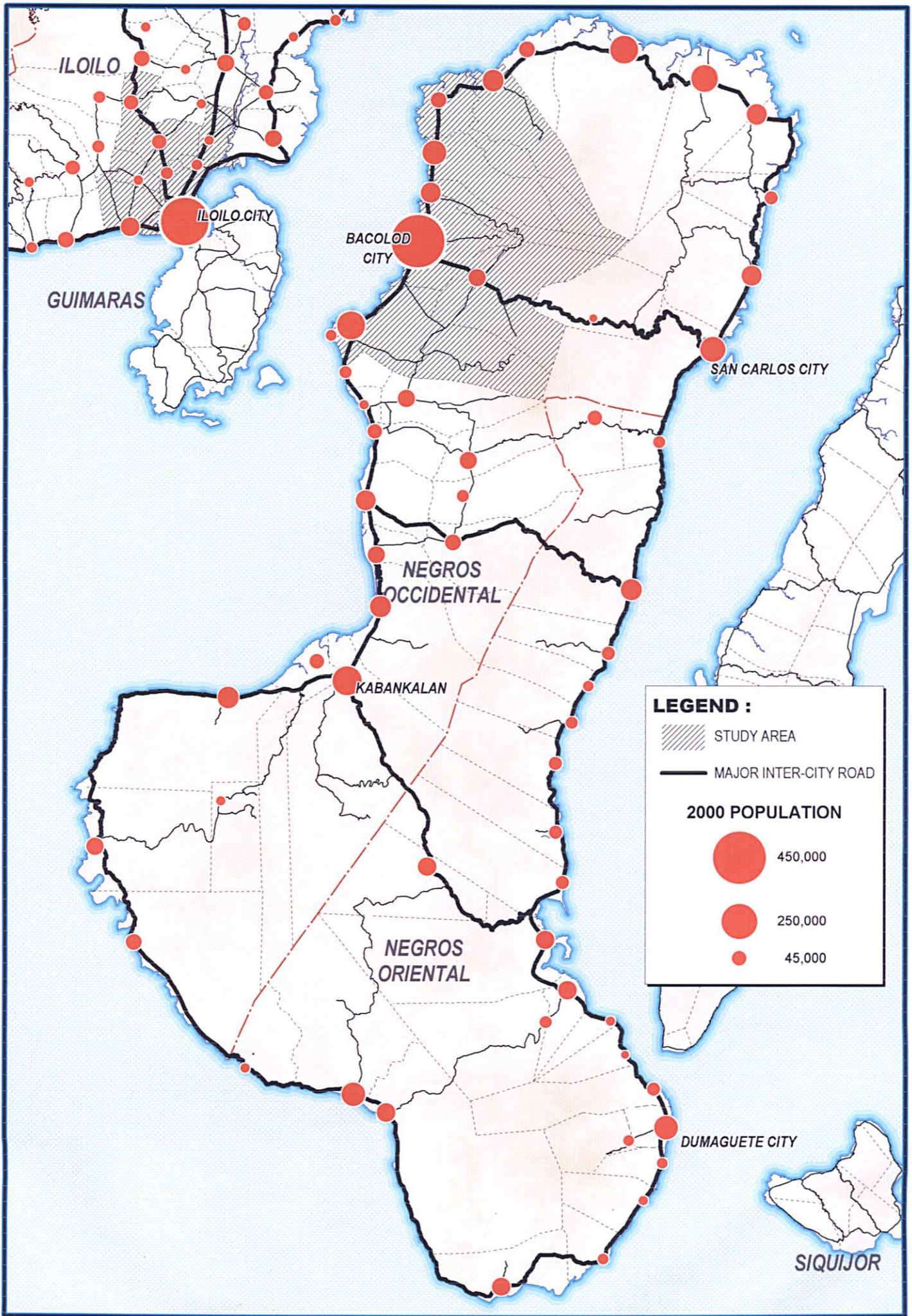


FIGURE 3.1-1 MAJOR INTER-CITY ROADS IN NEGROS ISLAND

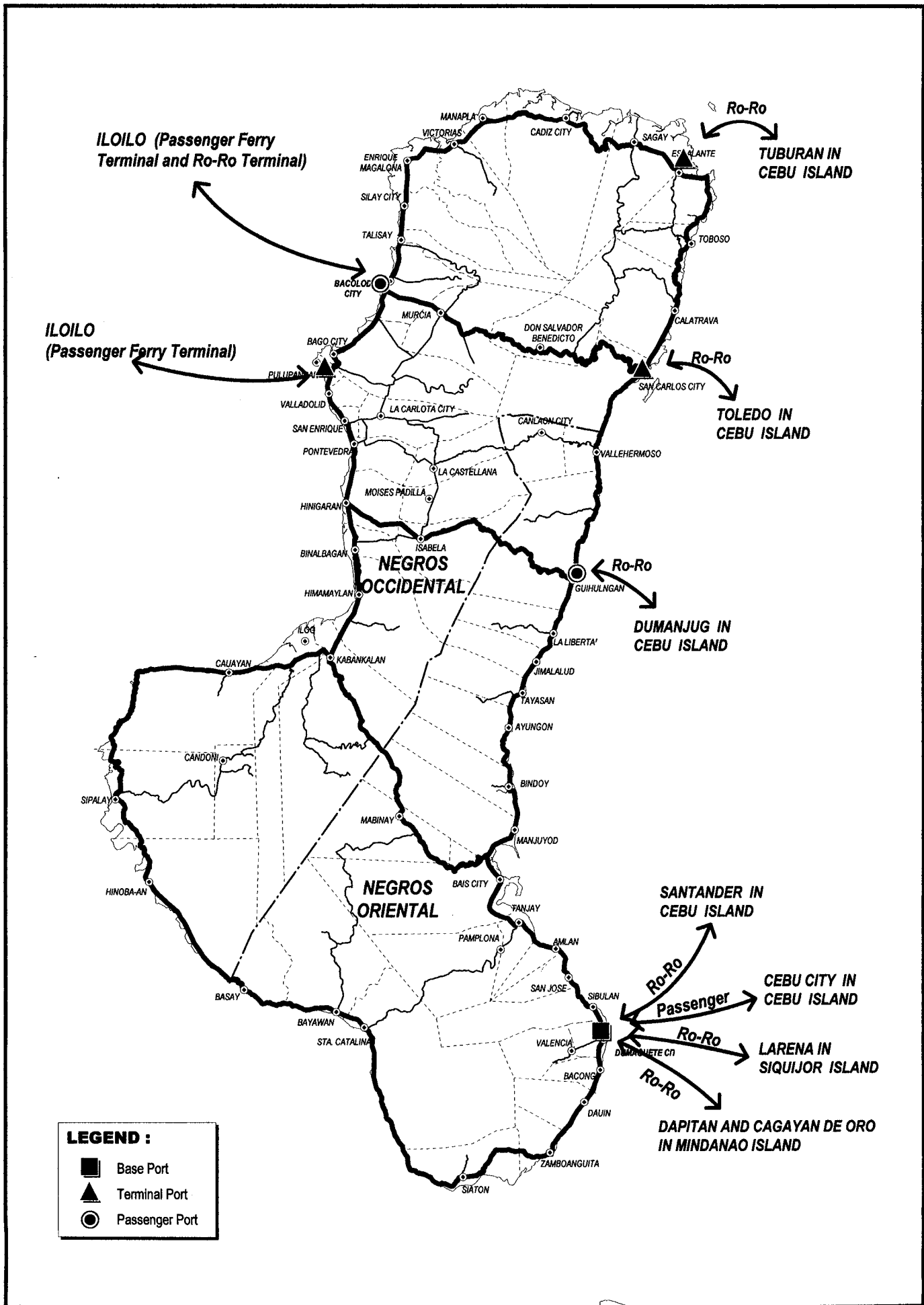


FIGURE 3.3-1 BASE AND TERMINAL PORT, PASSENGER FERRY AND RO-RO ROUTES IN NEGROS ISLAND