

Tricycles mainly serve the local roads, supplementing the motorized public transport services.

Although PNR is providing commuter services from Calamba to Manila, the number of users remains at a low level because of the following reasons:

- The rail track as well as the rolling stocks has deteriorated; therefore, train operation is not very reliable. In addition, due to the various obstructions such as the occupation by squatters, rapid commuter service cannot be expected.
- The train frequency is only 12 per day, resulting only to one train per 40 minutes even during peak hours. Among the 12 trains, 10 trains from Manila terminate at Alabang. One train consists of four coaches (the capacity of each coach is 130 to 150 passengers), therefore the transport capacity is not sufficiently high to meet the commuting demand.
- Rolling-stocks are also insufficient to increase the operation frequency. Due to the chronic operation deficit, no financial resources are available to increase them.

(2) Network System

(a) Bus network

Buses are exclusively operated by private companies with franchise system. The main bus routes in CALA region are shown in Figure 2.4.7, which is obtained from the terminal passenger surveys. The number of bus routes by major terminals is shown in Table 2.4.11.

Table 2.4.11 Bus Routes for CALA Region at Major Terminals, 2005

Bus Terminal	No. of Routes	Main Destinations
Baclaran	4	Cavite, Noveleta, Trece Martires, Dasmariñas
DMML (Baclaran)	5	Alfonso, Silang, Tagaytay
Saulog(Baclaran)	3	Indang, Mendez, Calatagan
Minibus terminal (Baclaran)	6	Naic, Noveleta, Tanza, Terejo
Lawton	18	Alabang, Dasmariñas, GMA, Carmona, Indang, Silang, Tagaytay, Batangas, Cavite
Ayala Center	6	Balibago, Biñan, Calamba, Sta. Cruz, Dasmariñas, GMA, Carmona, San Pedro/Pacita
Alabang (Metropolis)	3	Lemery, Calauag, Batangas
Alabang (De la Rosa)	2	Lucena, Batangas
Naic	1	Zapote
Cavite City	4	Baclaran, Naic, Tanza, Zapote
Trece Martires	2	Indang, Baclaran

Source: JICA Study Team

The bus routes cover most of the primary roads, mainly directing Metro Manila from various cities in the region. The main bus routes, where frequent bus services are provided, are those from Lawton to Cavite, Lawton to Batangas, from Baclaran to Alfonso, Baclaran to Trece Martires, etc. However, as for the area surrounded by the primary roads, bus services are not available. Such area is generally covered by jeepney services, but there are still remaining areas far from even the jeepney network. Those areas have to rely on other public transport modes such as tricycles.

Table 2.4.12 shows the cities with relatively high modal share of tricycles. Particularly, heavier reliance on tricycles is found in Trece Martires, Carmona and General Trias, accounting for more or less one third of all the transport modes. This may be partly reflecting the unavailability of bus services or desirable routes, as shown in Figure 2.4.8.

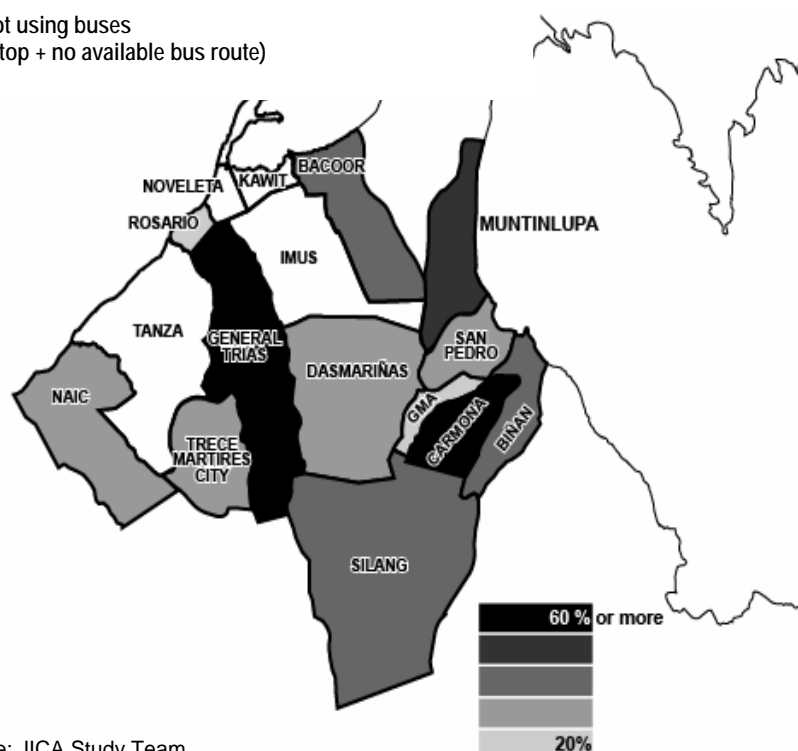
Table 2.4.12 Municipalities with High Modal Share of Tricycles

Municipality	Share of Tricycle (%)
Rosario	22
Kawit	22
Carmona	32
Biñan	22
Trece Martires	36
Naic	25
Gen. Trias	29

Source: JICA Study Team

Figure 2.4.8 Municipalities with High Percentage of “Unavailability of Buses”

Reasons for not using buses
(far from bus stop + no available bus route)



Source: JICA Study Team

(b) Jeepney network

Jeepney serves most of the primary and secondary roads in the CALA region as shown in Figure 2.4.7.

There are 142 jeepney routes in the study area as an inter-municipality route and the number of jeepney units in service is different by route ranging from only one to 749 units. The prominent routes, where a large number of jeepney units ply, are the one from Dasmariñas to Baclaran via Coastal Road and the one from GMA to Alabang via Carmona using the national road. Since the road network in CALA is not fully developed particularly for primary and secondary roads, there are some areas where even jeepney services are not provided.

Another problem is the manageability of jeepney services. Most of the jeepneys are owned or operated by individuals or small companies. This fact increases the difficulties in the management and enforcement of their operations.

(3) Traffic Volume

The existing public transport demand in terms of traffic volume at the survey stations is summarized in Table 2.4.13. The largest demand is found at the border of Metro Manila-Cavite on the Cavite-Manila Expressway which is observed at 15,472 vehicles (excluding tricycles) during the 24-hour survey period, which is estimated at about 242,000 person trips per day. Although jeepney and HOV taxi traffics are predominant in terms of vehicle trips, more than two thirds of passengers are transported by buses.

Other prominent stations are at Bacoor or Imus on the Aguinaldo Highway and at Muntinlupa on the Manila South Road, where approximately 16,000 to 17,000 vehicles per day were observed. All of the above stations are located at the major roads connecting CALA with Metro Manila in the North-South direction.

(4) Franchise System

The bus and jeepney services are operated under the franchise system, which has been expanded by accepting new applications unless a claim arises from other operators. The validity of the franchise is five years but can be extended until the age of 15 years for bus, 13 years for taxi and without age limit for jeepney.

The Land Transport Franchise and Regulatory Board (LTFRB) has not been accepting new franchise proposals since December 2003. One of the reasons is the oversupply of public transport services in certain routes. On the other hand, as reported by JICA's MMUTIS in 1999, a service problem, particularly overloading, is observed in the eastern and southern portions of Metro Manila. The current situation may be a little different depending on the routes.

Table 2.4.13 Public Transport Traffic Volume at Survey Stations

Station	Road Section	Traffic Volume (vehicles/24hrs.)					PCU /24hrs.	Person trips
		Jeepney	Mini-bus	Bus	Taxi	Total		
1	Manila-Cavite Expwy @ Longos / Boundary of Cavite and Metro Manila	5,770	570	3,866	5,266	15,472	17,241	241,944
2	Aguinaldo Hwy @ Bgy Real, Bacoor / (Between Tirona Hwy and Mambog Rd)	8,242	85	2,168	1,939	12,434	16,826	145,460
3	Aguinaldo Hwy @ Bgy Anabu 2, Imus / (North of Salawag-Salitran Rd)	8,360	58	2,184	709	11,311	16,995	133,267
4	Governor Drive @ Bgy San Francisco, Gen Trias / (Between Manggahan and Governor Drive @ Bgy	5,067	115	702	148	6,032	9,177	79,257
5	Paliparan, Dasmariñas / (Between Molino Rd and Gen	3,454	38	300	288	4,080	5,839	46,684
6	Amadeo - General Trias Rd @ Bgy Tapia, Gen Trias / (Between Manggahan and Gen Trias town proper)	210	34	41	20	305	449	2,688
7	Aguinaldo Hwy @ Bgy Zapote III, Bacoor / (Boundary of Las Piñas and Bacoor)	10,950	1,768	66	984	13,768	19,209	94,278
8	Tirona Highway (Hwy 25) @ Bgy Marulas, Kawit	1,150	2,993	406	311	4,860	7,028	74,590
9	Molino Rd @ Bgy Molino IV, Bacoor / (Boundary of Bacoor and Dasmariñas)	5,501	19	35	1,325	6,880	8,351	49,659
10	Daang Hari @ Bgy Molino IV, Bacoor / (Boundary of Cavite and Metro Manila)	85	20	12	411	528	182	670
11	Salitran - Salawag Rd @ Bgy Jose Abad Santos,	269	12	18	177	476	457	1,382
12	Don P Campos Ave / (Aguinaldo Hwy to Dasmariñas town proper)	2,258	8	941	107	3,314	5,280	36,355
13	Tanza - Trece Martires - Indang Rd @ Bgy Sanja	1,992	48	19	80	2,139	3,098	23,065
14	Noveleta - Tanza - Naic Rd @ Bgy Capipisa, Tanza / (Boundary of Naic and Tanza)	496	1,989	203	165	2,853	4,134	27,867
15	Governor Dr @ Bgy Cabuco, Trece Martires City / (Boundary of Tanza and Trece Martires City)	244	2	11	20	277	391	3,518
16	Aguinaldo Hwy @ Bgy Biga II, Silang / (Boundary of Dasmariñas and Silang)	3,383	27	866	106	4,382	6,846	65,105
17	Carmona National Rd @ Bgy Maduya, Carmona / (Boundary of Carmona and Biñan)	5,637	40	956	182	6,815	10,427	80,257
18	Manila South Road @ Bgy Tunasan, Muntinlupa / (Boundary of Laguna and	8,727	45	1,557	742	11,071	16,272	143,562
19	Sta Rosa - Tagaytay Rd @ Bgy Sto Domingo, Sta Rosa / (Boundary of Cavite and	716	39	166	83	1,004	1,465	19,724

Note: 1) The above figures are the total traffic volumes for both directions.
 2) Excluding tricycles
 3) Taxi is including HOV taxis.

Source: JICA Study Team

The Department of Transport and Communications (DOTC) has accomplished a passenger demand and supply surveys in the Public Transport Rationalization Program in 2004. Based on the survey results, there are imbalances in the number of bus units between the required number and the franchised number of buses: the former is bigger than the latter in some routes and less in others. In addition, there are considerable discrepancies between the authorized number of units and the actual units in operation, indicating that there are many additional vehicles illegally operated on the one hand and insufficient operation units on the other hand depending on the routes. LFTRB intends to adjust the number of units to be operated, which however, are expected to result to resistance particularly for the reduction of bus units.

Table 2.4.14 Difference between Supply and Requirement of Bus Services in Selected Routes, 2004

Routes	Bus Unit Observed	Passenger Demand	Bus Requirement
Dasmariñas – Lawton via Aguinaldo, Coastal Road	223	10,900	65
Indang – Baclaran via Aguinaldo, Coastal Road	166	10,700	89
Naic – Lawton via Aguinaldo, Coastal Road	76	13,800	82
Calamba – Alabang	210	15,300	109
Calamba – Lawton	135	8,400	60
Sta.Cruz – Lawton via Mayapa Exit	108	4,100	30

Source: Public Transport Rationalization Program (2004) (DOTC)

(5) Tariff System

The road-based public transport tariff is determined and authorized by LTFRB. The current tariff system as of June 2005 is shown below.

Table 2.4.15 Current Tariff System, 2005

	Bus	Aircon Bus	Jeepney
Minimum Tariff (*)	6.00	+20% of bus tariff at max.	5.50
Additional tariff per km	1.25		1.00

Note: Minimum Tariff: applied for the first 5km for buses and first 4km for jeepneys

Source: LTFRB

The tariff rate was raised in June 2004 from 4 pesos for the minimum charge and 0.87 pesos and 0.635 pesos for additional km for bus and jeepney, respectively, after a four year period of constant rate. According to LTFRB, these changes are corresponding to the increase in the operating cost, particularly the diesel price. When compared with the increase in diesel price during the last four years (27% increase), the tariff increase is much higher; about 45% and 61% increase for bus and jeepney respectively, in terms of average passenger trip length. According to LTFRB, the higher raise is an adjustment for the longer term since the fare had been politically controlled at a lower level in spite of cost increase. Corresponding to the rapid fuel price increase after the last tariff setting, particularly in the recent

year, the pressure to adjust the tariff has again surfaced, which is again expected to raise conflict with the public transport users.

The current tariff level was roughly examined from the financial viability by using the relationship between average speed, load factor and the viability developed by MMUTIS in 1996. The average speed and average occupancy obtained from the survey results on the major roads in CALA are shown in Table 2.4.16.

Table 2.4.16 Average Speed and Occupancy, 2005

	Speed (km/hr)		Occupancy (passengers)	
	Bus	Jeepney	Bus	Jeepney
Average	31.6	27.0	24.4	9.7

Source: JICA Study Team

Taking into account the inflation as well as the fuel price increase during the years from 1996 to 2005, and applying the average trip lengths of bus and jeepney passengers, 31km and 6.7km respectively in MMUTIS, the result indicates that under the current tariff rate, the bus service is a little profitable, while the jeepney operation is nearly at the break-even point. Due to the sharp increase in fuel cost since last year, the small amount of profit in public transport services may have been further squeezed.

(6) Current Problems

The current public transport problems are summarized as follows:

(a) Classification of bus and jeepney services

- Operators are not allowed to change fares nor adjust routes according to market demand because of franchise system.
- LTFRB is incapable of updating or adjusting the routes.

(b) Manageability

- There are so many independent operators, therefore, it is difficult for public organizations to control and manage each operating units.
- Many unauthorized operations cannot be controlled.
- The drivers usually do not care about the traffic flow, blocking each other to get passengers

(c) Traffic Congestion

- Due to the traffic congestion along the roads to Metro Manila, the steady operation is difficult, which causes the reduction in transport capacity
- Since the bus terminals are not properly provided at off-road, the existence of bus terminals is causing traffic congestion on major roads.

(d) Bus and Jeepney Network and Services

- Lack of public transport services in isolated area except for tricycle
- Poor accessibility to new growth centers (not responsive to demand changes in public transport)

- Many transfers required to make a trip
- Long waiting time because of insufficient transport capacity

(e) Facilities

- Poor waiting facilities at terminals and bus stops for passengers
- No parking spaces at terminals
- Insufficient facilities for waiting and loading/unloading of buses and jeepneys

2.4.4 Traffic Management

(1) Organization in Charge of Traffic Management

Several organizations are directly or indirectly involved in traffic management in the study area. Their roles are not clearly defined or delineated. In addition to the maintenance of road itself, the Department of Public Works and Highways (DPWH) is responsible for providing and maintaining traffic management facilities such as traffic signal, pavement markings, traffic signs, median island, etc. on the national highways in the area. As a matter of fact, however, some facilities, traffic signal and median barriers for example, are provided by provincial or municipality government. It seems that the process for introducing any traffic regulation such as one-way street or banning of left turn is not clearly defined.

The most prominent office related to traffic management in the study area is the Cavite Traffic Management Office. It engages in the daily operation of traffic management by deploying traffic aids at key intersections. They monitor traffic conditions and take action if necessary in cooperation with traffic police and other institutions.

Traffic police is inevitably an agency in charge of traffic management, in particular, for the traffic control at un-signalized intersection and enforcement of traffic rules.

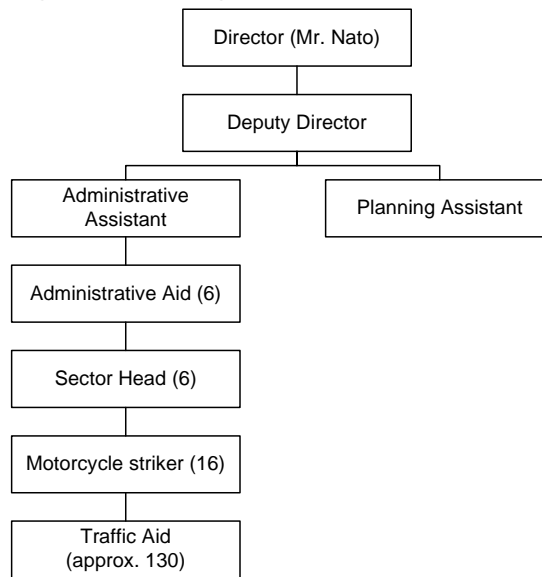
Cavite Traffic Management Office (CTMO)

CTMO is a department under the Provincial Government of Cavite and responsible for the traffic management in the province.

Organization

Organizational chart of CTMO is shown in Figure 2.4.9.

Figure 2.4.9 Organization Chart of CTMO



Budget

Budget of CTMO for the year 2002 – 2004 is summarized in the table below.

Table 2.4.17 Budget of CTMO, 2002 - 2004

	2002 (actual)	2003 (estimated)	2004 (estimated)
Personnel	7,104,500	16,227,000	16,227,000
Maintenance and other operating expenditure	0	1,098,000	1,311,000
Total	7,194,500	17,325,000	17,528,000

Source: CTMO, 2004.

As shown in the Table 2.4.17, the majority (93%) of the budget goes to personnel cost and the balance goes to the operation and maintenance expenses. There is no budget for new project or investment. Although personnel cost occupies a large portion of the budget, traffic aides only receive the minimum wage of ₱200 a day, according to CTMO staff.

Facilities

CTMO has 20 units of motorcycle. There are no other inspection or construction vehicles. A radio communication system is established for communication among traffic enforcers. A command desk is established in CTMO which is manned for 24 hours.

Traffic signals are installed only along Aguinaldo Highway. Maintenance of traffic signal is the responsibility of DPWH Region 4 as it is a national highway. Likewise, pavement marking and traffic sign on national highway is the responsibility of DPWH.

(2) Road Facility

Link

A brief description of the arterial roads in the study area is given below.

Aguinaldo Highway is a 4-lane undivided road. Sidewalk is provided only at the developed sections and unpaved shoulder is found at other sections.

Molino Road used to be a narrow 2-lane undivided road but is now being upgraded to 4-lane undivided road. Most of its sections do not have a sidewalk except in front of the newly developed shopping mall and other commercial areas.

Governor's Drive is a 4-lane undivided road without sidewalk except the section passing through the buildup area.

Other arterial roads in Cavite Province are mostly 2-lane undivided road without sidewalk. Some upgrading has been done, however, like the Soriano Highway in Tanza.

Intersection

Only few intersections have received some kind of intersection improvement work. Most of the intersections in the study area, in particular those in Cavite Province, is just a crossing of two roads and with no provision for traffic engineering considerations.

(3) Traffic Management Facilities

Traffic Signal

Signals in Cavite Province are summarized in Table 2.4.18.

Table 2.4.18 Traffic Signal in Cavite Province

No.	Location	Area	Status
1	Talaba Evangelista	Bacoor	Non operational
2	Aguinaldo Highway Molino Road	Bacoor	Non operational
3	Aguinaldo Highway Talaba	Bacoor	Non operational
4	Aguinaldo Highway Tirona Highway	Bacoor	Non operational
5	Aguinaldo Highway Nueno Ave	Imus	Non operational
6	Aguinaldo Highway Salitran	Dasmariñas	Operational
7	Aguinaldo Highway Guevarra	Dasmariñas	Operational
8	Aguinaldo Highway Police Station	Dasmariñas	Operational
9	Aguinaldo Highway Mangubat St.	Dasmariñas	Operational
10	Aguinaldo Highway Governor's Drive	Dasmariñas	Operational

Those non-operational signals were installed under Metro Manila Traffic Engineering and Management (TEAM) Project in early 1990's. But the maintenance of the signal has not been carried out properly until these signals

stopped operation. Intersection is controlled manually by the traffic enforcer or traffic aide.

Separately, a series of signal was installed at the intersections along Aguinaldo Highway in Dasmariñas. These are all operational as of September 2005. The signal installed at the intersection of Aguinaldo Highway and Governor's Drive adopts multiple lane signal configuration with long mast arm, in which signal lantern is installed over each lane. The configuration provides better visibility and separate control of movement is possible, although the cost is higher than simple configuration of single signal lantern.



Flashing signal

Flashing signal is installed at only one location along Aguinaldo Highway, in front of Meralco Dasmariñas.

Pedestrian overpass

Several pedestrian overpasses are found along Aguinaldo Highway. They are very effective to reduce the traffic accidents involving crossing pedestrian. At the same time, traffic management is easier if there is no pedestrian. Drawback of pedestrian bridge is that the stairs of the bridge is not convenient for people to climb. In particular, for those handicapped people, pedestrian overpass is very difficult to use. If pedestrian overpass is connected to the roadside building like the one in front of Walter Mart in Dasmariñas, more people would use it with less difficulty.

All pedestrian overpasses along Aguinaldo Highway are reasonably maintained except the one near Nueno Avenue, which is dirty and scattered with garbage. No cleaning work seems to have been done recently.



Pedestrian barrier

Pedestrian barrier is provided at some intersections like the one at Talaba – Evangelista (photo below) and Aguinaldo Highway – Tirona Highway. It is effective not only in preventing jaywalking near the intersection but also for reducing side friction resulting in inefficient and safer traffic operation. Due to narrow sidewalk, however, the pedestrian barrier is too restrictive for pedestrians at many locations.



Median island

Median island is provided only to the limited sections of Aguinaldo Highway. Some of them are of temporary type, which are not well maintained as shown in the photo. More Median island must be provided.



Traffic Sign

Traffic sign is virtually non-existent in the study area. There is no regulatory sign such as speed limit sign, no parking sign and full stop sign, and no warning sign such as pedestrian crossing.

No guide sign informing destination and distance exists even at key intersections. A number of small signs are found but they are too small and not visible.



Pavement Markings

Conditions of pavement marking depend on the location but pavement marking is faded away or not existing at most locations. Intersections such as Talaba – Real, Aguinaldo Highway – Governor’s Drive and Governor’s Drive – General Trias National Road have relatively good pavement.

Loading and Unloading Lane

Some shopping malls have sufficient length (see photo below) of loading and unloading lanes separate from the main road while others have no such facilities or too small and loading and unloading takes place on the road in front of the premises. A regulation must be established requiring separate loading and unloading lanes of adequate size for a development that is expected to attract and generate large number of trips.



(4) Traffic Operation

Link

Like other areas in the country, traffic operation on the road section in the study area is characterized by the jeepney. Jeepney is a kind of para-transit, which frequently stops at any location along its route to pick up or drop passengers resulting in the blockage of the vehicles behind. As a result, the throughput or capacity of a link is greatly reduced if jeepney is involved.

On the secondary or lower class roads, tricycle is a predominant mode of public transport.

New shopping centers are emerging along arterial roads, in particular, along Aguinaldo Highway like SM Bacoor, Puregold and Robinsons in Imus, Walter Mart in Dasmariñas and Robinsons at intersection with Governor’s Drive. Along some

commercial establishments have extra lane or service road in front of them, public transport and some of private vehicles stop at these location for loading and unloading causing congestion.



Signalized Intersection

There are only five (5) signalized intersections with a functioning signal. All of them are capable of time-of-day control but no vehicle detector is used. Observation at the site indicated that these signals operate reasonably well during off-peak hours. The level of operation during peak hours is not known. Improvement in operational efficiency would be possible if actuated control is introduced as the traffic demand varies greatly in a day at these intersections.

Unsignalized Intersection

Majority of intersections in the study area is unsignalized. Their size varies from a very minor intersection to the intersection of two arterial roads. In addition, half of the signals in Cavite are not operating so that intersections are effectively the same as those of unsignalized intersections. These intersections are either controlled manually or left to the judgment of drivers. In the latter case, there is no priority road designated by full stop sign or give way sign, and right-of-way is given on a first-come-first-served basis. Manual control is efficient for light traffic but not so efficient during peak because the total delay almost certainly becomes longer under manual control than automatic control.

If there is no control at intersection, the operation is not only very inefficient but also very dangerous.

Congestion/Bottleneck

There are three (3) types of congestion in the study area:

- Congestion caused by concentration of traffic exceeding capacity
- Congestion caused by high friction with road side activities
- Congestion caused by low and limited capacity of road

The first type of congestion is seen along the intersections of Aguinaldo Highway – Talaba and Coastal Road – Talaba during the morning peak hours when traffic demand heading for Manila is very high. Aguinaldo Highway – Talaba intersection is a T-shaped intersection where dominant movement is the left turn from Aguinaldo Highway to Talaba. The intersection capacity for the movement is lower than the capacity of Aguinaldo Highway so that congestion occurs along Aguinaldo Highway.

Coastal Road – Talaba used to be a T-shaped intersection with signal control. Later the left turn from Coastal Road toward Talaba north and through movement along Talaba was prohibited leaving only merging movements. At the same time, the signal was removed. Thus, the movement from Talaba south approach toward Coastal Road can be a continuous flow. It was observed that the capacity of the movement from Talaba south toward Coastal Road is determined by the capacity of turning section.



The second type is found at several locations along Aguinaldo Highway. New commercial development has been made along the road during the last decade. In particular, large shopping malls were constructed. These commercial establishments attract people who ride or alight in front of them creating congestion. Although additional lane is constructed at the road section fronting the shopping mall, the congestion still occurs.

The typical case of third type congestion is the congestion that occurs at the intersection along General Trias National Road in General Trias. The intersection is a crossing point of two narrow roads, both of which have a narrow sidewalk of about 1 meter wide. The dominant movement is between south and west legs of intersection so that turning movement is frequent. Although the traffic volume is small, queue develops along south and west approaches reaching more than 100 meters on south approach.

Sporadic congestion is seen along Aguinaldo Highway caused by left turning vehicle. Aguinaldo Highway is 4-lane undivided road and sidewalk is not constructed in most of the sections. Lane width is standard without margin and the shoulder is used for not only pedestrians but also various commercial activities. Therefore, there is little room for the following vehicles to maneuver if a vehicle stops on the inner lane for left turning. Banning of left turn is not practical as the span of crossing roads is very long and there is no alternate route.

(5) Traffic Management Issues

Lack of pedestrian facilities

The area fronting the arterial roads in the study area used to be suburban area where there were little commercial activities except at limited locations. The number of pedestrians was thus small at that time and traffic flow received little side friction. Situation has changed since then and many sections have become a build-up area with shops standing along the road resulting in high pedestrian movement. Road side activities such as parking maneuver, loading and unloading, sidewalk work shop, among others, impede smooth traffic flow, while pedestrians are suffering from narrow and uneven sidewalks with obstacles. At the road section where there is no sidewalk, pedestrians are exposed directly to high risk of accident.

Non-operating Signal

Half or five (5) signals out of the total of ten (10) signals in the study area are not operational as of September 2005. These signals were installed at the intersections where signal is warranted meaning unnecessary delay and safety risk due if they are not functional. Although manual control by traffic enforcer is adopted during peak hours, it is neither efficient nor consistent.

Loading and Unloading for Public Transport

Generally speaking, the share of public transport (bus and jeepney) is high on the arterial roads in the study area. For example, jeepney occupies 34% of vehicles on Aguinaldo Highway. Public transport stops frequently on the road reducing effective capacity of the road.

Poor Road and Road Facility Maintenance

DPWH is responsible for the maintenance of the national roads in the study area. The pavement of these roads is only in acceptable condition. The facilities such as pavement markings, median and traffic signs are, however, not well maintained.

2.5 Land Use

The land use of the study area has been well studied during the WB CALA Study in order that an urban development framework could be proposed. The study area was delineated into planning zones. Basically, the same planning zones are adopted in this study since the results of the assessments of previous studies regarding CALA's natural features (to determine the suitability for urban development) are good references. Moreover, with the availability of the latest NAMRIA GIS 2005 study output on the area, the information on land use was updated.

2.5.1 Land Resource

The natural features of land in CALA as shown in Figure 2.5.1 would dictate the eventual progression of development for the area. Land resource is broadly categorized into forestland and alienable/disposal land. Approximate land use classification in CALA (in terms of percentages to total land area) is broken down as shown in Table 2.5.1.

Table 2.5.1 General Land Use of CALA (%)

Land Use	Cavite	Laguna	CALA
Forest Lands	9	28	19.5
Alienable/Disposable			
Agricultural	74	49	60.0
Wetlands	1		0.5
Built-Up Areas	16	23	20.0

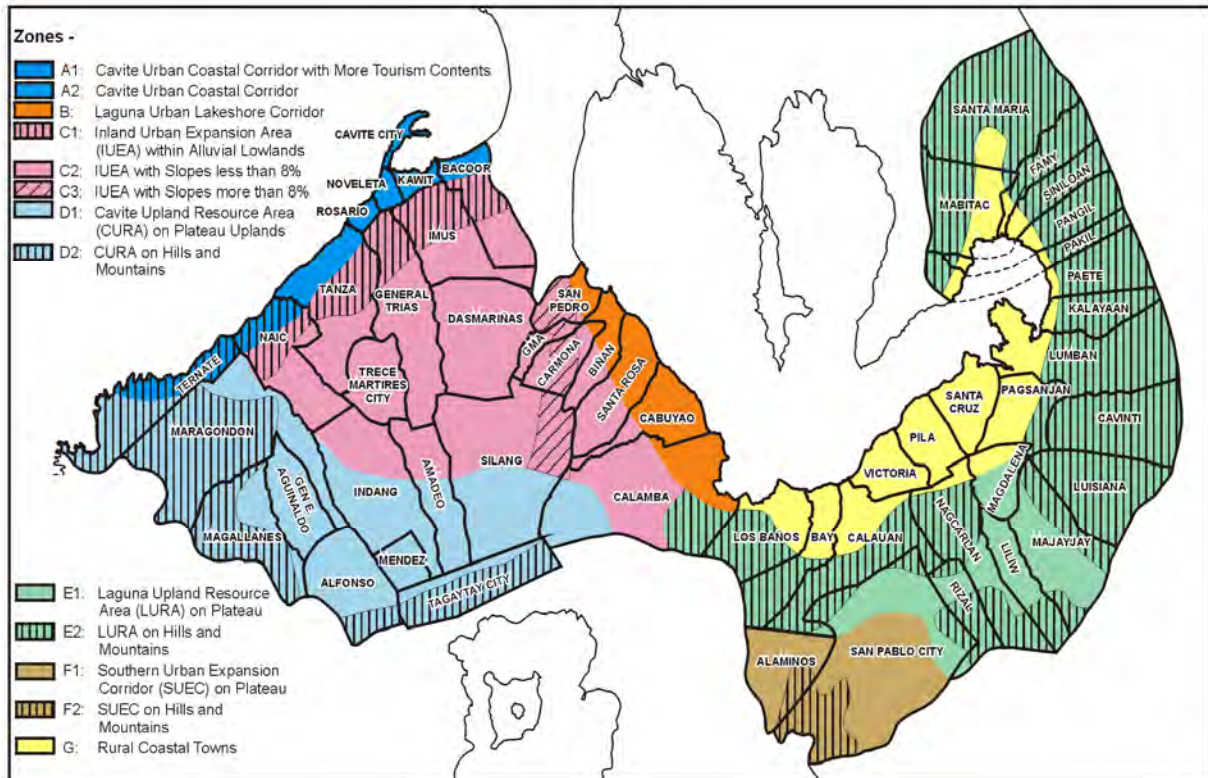
Source: CLUPs and PFFPs

Spatially, development can generally be described as follows:

- (a) High density generally low to middle income residential areas are concentrated along major highways (behind strip commercial development) and in portions closest to/most accessible to and from Metro Manila. Informal housing has continued to intensify, particularly in the old urban cores along PNR and river rights-of-way.
- (b) Strip commercial development occurs along major highways near town centers or *poblacions*. Major shopping centers have emerged along Aguinaldo Highway in Cavite as well as along or near the National Road in Laguna where population concentration is large.

- (c) Industrial areas are found in the Rosario-Imus Industrial Area, Dasmariñas-Carmona Industrial Area along Governor’s Drive in the south and Biñan-Calamba Industrial Area along the South Luzon Expressway and the National Road. This forms the industrial corridor from west Laguna to Central Cavite and down to Metro Batangas.

Figure 2.5.1 Natural Features of Land in CALA



Source: CLUPs and PFPs, 2001

- (d) Eco-tourism infrastructures such as resort subdivisions and leisure parks are found in Naic-Ternate, upland areas from Silang, Amadeo, Indang, Gen. Aguinaldo leading to Tagaytay and the Mt. Palay-palay and Mataas na Gulod National Park, including the plateau leading to Mt. Makiling, Mt. Banahaw-Cristobal and the other mountains, and the Seven Lakes of San Pablo City and resorts in Alaminos.
- (e) At least eight world class golf courses are found in Cavite, particularly in the southern areas, and one in Laguna.
- (f) Primary agricultural lands are abundant in planning zones shown Figure 2.5.1 such as A1, southern half of C2, C3, D1, E, F and G. Marginal agricultural areas can still be found in planning zones A, B and the northern half of C2.
- More than half of the agricultural lands in Laguna are planted to permanent crops, about a third to temporary crops, and the rest are either pasture lands or meadows or merely lying idle.
- (g) Fishponds are predominantly found along the coastal areas of Cavite and in the lakeshores of Laguna.

- (h) Secondary and primary forests in the hills and mountains of Cavite and Laguna (specifically the municipalities of Maragondon, Magallanes, and Ternate in Cavite and the mountainous areas of Laguna starting from parts of Calamba up till Los Baños in the study area) are environmentally critical areas.

2.5.2 Existing Land Use

For specifics, a detailed land use of the area was calculated using the NAMRIA GIS map of 2005 per municipality/city in the study area as presented in Table 2.5.2 and shown in Figure 2.5.2.

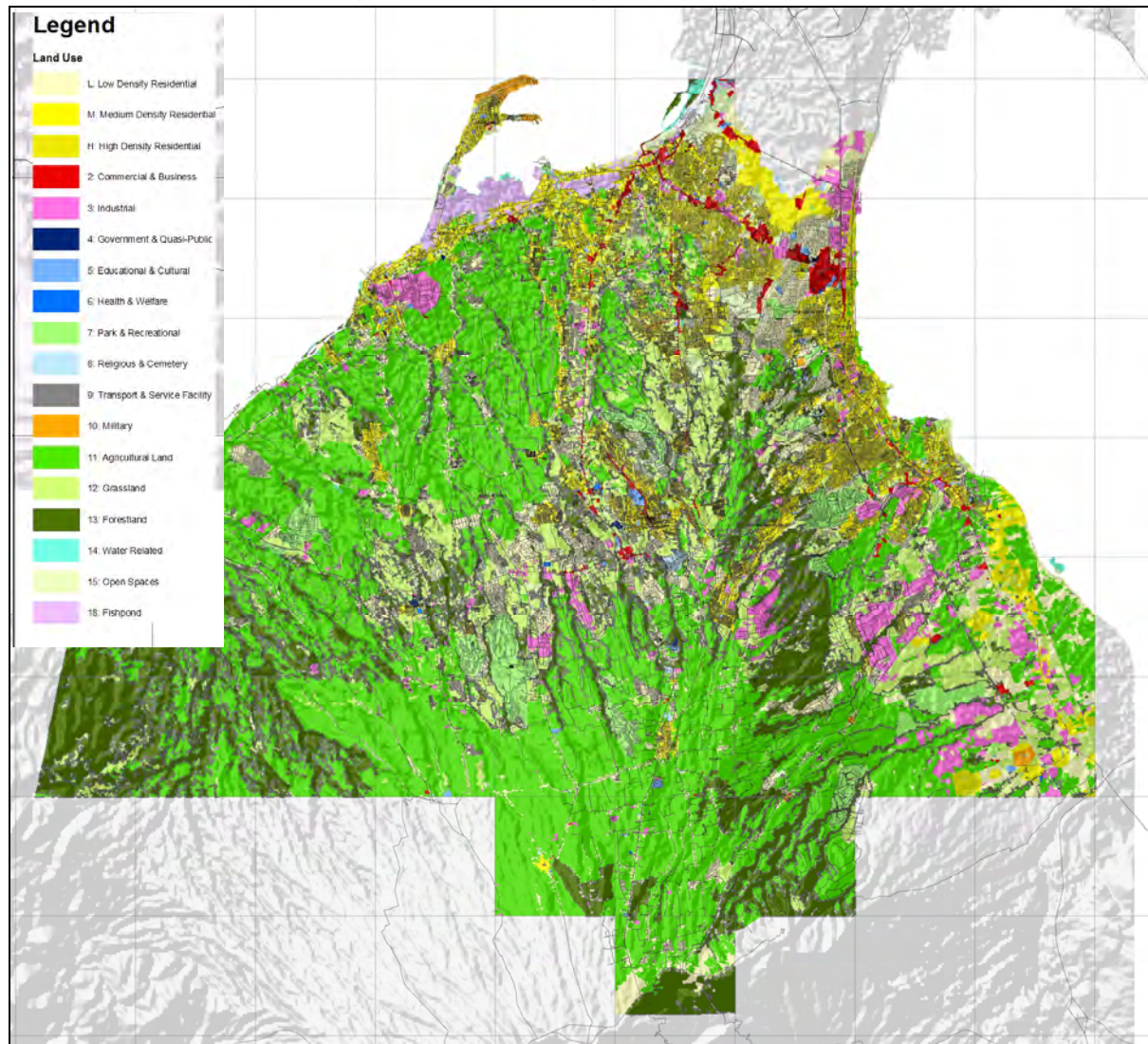
Table 2.5.2 Existing Land Use of the Study Area, 2005

(Area in Hectares)

Area	Low Density Residential	Medium Density Residential	High Density Residential	Commercial/ Business	Industrial	Government/ Quasi-Public	Educational/ Cultural	Health/Welfare	Park/ Recreational	Religious/ Cemetery
Bacoor	399.04	1,244.38	257.55	157.81	32.17	0.86	20.07	0.58	47.38	29.49
Imus	529.02	877.41	245.12	40.82	77.22	0.82	11.15	0.64	3.49	2.41
Cavite City	36.75	120.79	167.42	10.07	1.58	1.31	13.61	0.83	1.80	12.07
Kawit	37.01	186.33	61.12	12.55			0.60		0.72	6.48
Noveleta	73.88	153.66	11.71		0.57	4.33	1.47			3.54
Rosario	29.88	108.74	124.32	4.08	240.10	2.22	3.24		0.62	4.56
Gen. Trias	1,144.69	238.63	10.75	8.96	289.98	0.48	12.20	6.33	587.04	2.40
Tanza	590.43	324.49	121.67	6.82	59.87	3.29	9.34	-	212.52	6.04
Trece Martires City	545.13	59.04		8.69	73.10	13.77	4.31	5.27	184.58	0.72
Naic	405.10	159.05	63.57	-	62.44	1.04	-	3.55	165.14	4.91
Dasmarinas	1,392.89	542.08	548.78	156.48	216.72	28.39	83.07	8.86	412.45	98.58
Silang	1,000.85	119.77	157.54	16.93	258.82	0.13	37.88	1.89	262.80	31.35
San Pedro	259.04	545.17	529.95	9.28	97.52	0.30	13.05	2.27	81.03	9.72
G.M. Alvarez	41.12	283.34	105.74	1.11	29.41	0.10	3.61		60.20	1.97
Carmona	121.09	100.14	13.25	4.89	227.40	0.15	2.38		375.28	1.45
Binan	475.12	537.67	387.82	75.38	487.49	0.57	8.04	0.81	12.52	8.22
Muntinlupa	1,081.29	538.72	465.83	285.46	275.22	6.75	56.09	3.73	93.92	23.00
Las Pinas	207.47	1,233.60	554.35	253.60	197.82	-	26.98	1.68	1.46	1.72
Area	Transport/ Service Facility	Military	Agricultural Land	Grassland	Forestland	Water Related	Open Spaces	Fishpond	Total	
Bacoor	1.16	-	415.14	888.70	306.68	33.08	220.59	220.95	4,275.63	
Imus	-	-	2,812.48	1,099.99	715.32	5.12	23.61	8.80	6,453.42	
Cavite City	0.10	168.91		17.86	4.36	31.88	28.24	19.48	637.06	
Kawit			207.17	7.46	55.15	24.55		463.28	1,062.42	
Noveleta			114.87	20.76	13.56	7.70	2.60	174.71	583.36	
Rosario			81.81	38.28	35.08	8.09	10.10	15.26	706.38	
Gen. Trias	-	-	4,143.39	974.03	907.14	10.11	133.28	-	8,469.41	
Tanza	0.02	-	4,725.36	444.76	588.59	20.77	83.23	-	7,197.20	
Trece Martires City	0.24	-	1,498.50	1,072.81	986.63	0.58	60.65	-	4,514.02	
Naic	-	-	4,921.39	150.30	1,635.79	48.98	16.34	-	7,637.60	
Dasmarinas	2.41	-	1,788.20	2,276.23	2,189.30	0.56	356.86	-	10,101.86	
Silang	-	15.28	9,394.58	361.80	2,742.95	-	28.37	-	14,430.94	
San Pedro	3.11	0.01	49.82	219.72	366.23	5.02	22.14	-	2,213.38	
G.M. Alvarez			128.27	74.23	282.09				1,011.19	
Carmona		0.09	499.26	308.81	763.37				2,417.56	
Binan	13.65	-	786.33	822.17	217.10	11.24	7.71	-	3,851.84	
Muntinlupa	0.44	20.92	290.23	114.47	393.04	22.86	119.60	-	3,791.57	
Las Pinas	-	-	1.17	49.83	43.57	16.51	578.10	3.41	3,171.27	

Source: GIS Calculation of JICA Study Team based on NAMRIA Land Use Map, 2005

Figure 2.5.2 Existing Land Use, 2005



Source: NAMRIA, 2005

2.5.3 Status of Residential Areas

Development of residential areas in the study area has been done by private developers as well as by national government agencies concerned. The former is through subdivision development commonly observed in the study area as well as Metro Manila.

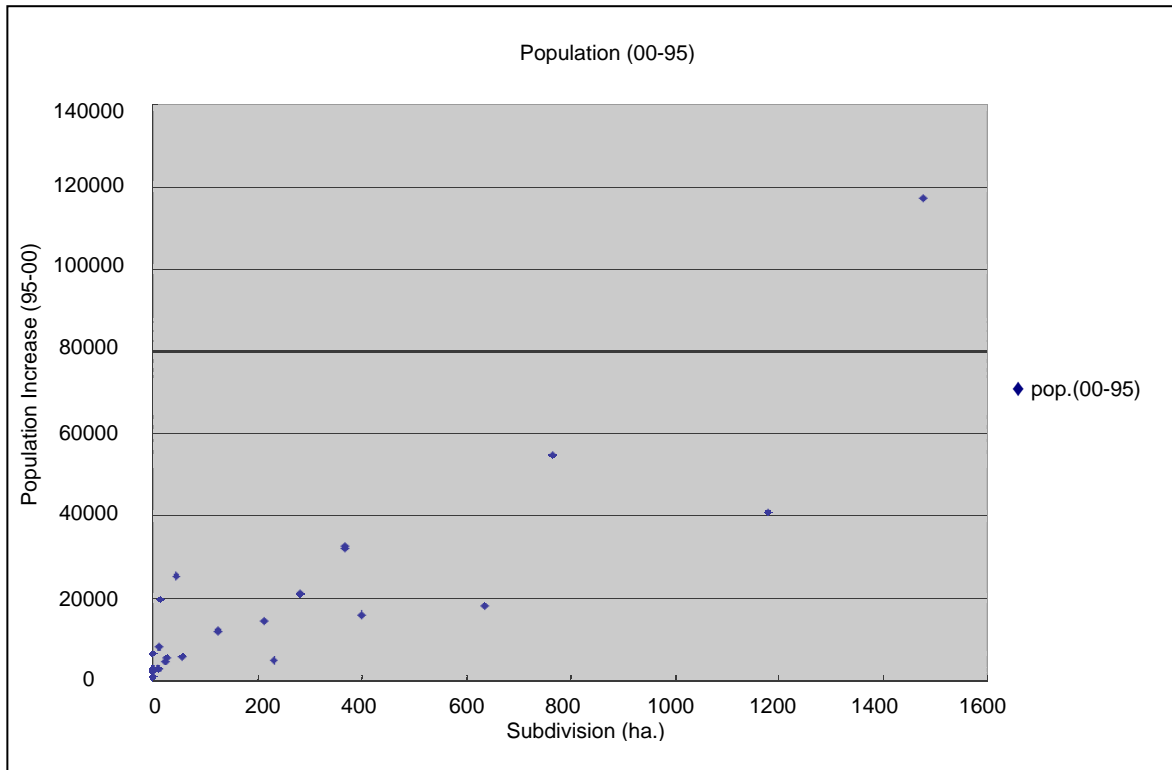
Subdivision Development

Due to the rapid increase of urban population of the study area, subdivision development seems to be in boom. As the income level of household is comparatively high in Cavite, it is evident that subdivision development in the area is generally for the upper middle income classes.

Demand and Supply

An average of 122,000 lots is developed every year, while the annual increase of population is around 90,000 only. Apparently, the provision of residential areas is far over the actual demand. Therefore, many lots developed remains vacant, even if the development follows the increase of local population. The expansion of urbanized areas is mostly done by subdivision developments.

Figure 2.5.3 Size of Subdivision Development and Increase of Population



Source: NSO and HLURB

Development Pattern

Based on available data for Cavite, an average area size of subdivision is 7.4 hectares. In terms of aerial size, it is not large. However, the number of lots is 998 per subdivision on the average due to the high density of development. An average lot size is only 100.6m² in gross, which suggests that townhouses are mixed in the development. Dasmariñas, in particular, has characteristically high-density developments. If population density of the municipality/city exceeds 2,000 persons/km², the average lot size of the subdivision will not exceed 200m².

Table 2.5.3 Characteristics of Subdivision Development (1998-2003)

	Number of Development	Area (ha.)	Ratio to Built up (%)	Ave. Size of Subdivision (ha.)	Ave. Size of Lot (gross sq.m.)
Cavite City	0				
Bacoor	169	766.6	16.5%	4.5ha	173.5 m ²
Kawit	17	58.4	46.4%	3.4ha	164.5 m ²
Noveleta	15	22.8	4.7%	1.5ha	176.2 m ²
Rosario	7	15.5	2.8%	2.2ha	96.3 m ²
Trece Martires City	41	282.5	8.3%	6.9ha	103.3 m ²
Carmona	6	123.6	5.0%	20.6ha	642.4 m ²
Dasmariñas	169	1475.9	26.0%	8.7ha	41.0 m ²
Gen. M. Alvarez	3	45.2	8.4%	15.1ha	171.8 m ²
Gen.Trias	75	1179.3	12.8%	15.7ha	167.4 m ²
Imus	159	636.1	8.3%	4.0ha	159.1 m ²
Tanza	58	368.6	4.8%	6.4ha	95.3 m ²
Tagaytay City	49	399.5	15.2%	8.2ha	914.7 m ²
Alfonso	14	231.8	74.5%	16.6ha	566.8 m ²
Amadeo	0				
Gen. Aguinaldo	0				
Indang	4	11.8	1.0%	3.0ha	130.5 m ²
Magallanes	0				
Maragondon	2	27.5	6.4%	13.4ha	144.0 m ²
Mendez	0				
Naic	11	213.7	16.3%	19.4ha	376.6 m ²
Silang	39	368.3	5.8%	9.4ha	376.6 m ²
Ternate	2	9.8	3.0%	4.9ha	655.7 m ²
CAVITE Total	840	6236.9	10.5%	7.4ha	100.6 m²

Data Source: Data for subdivision: Housing and Land Use Regulatory Board
 Data for built-up area: City/Municipal Comprehensive Land Use Plan & PPDC,2004

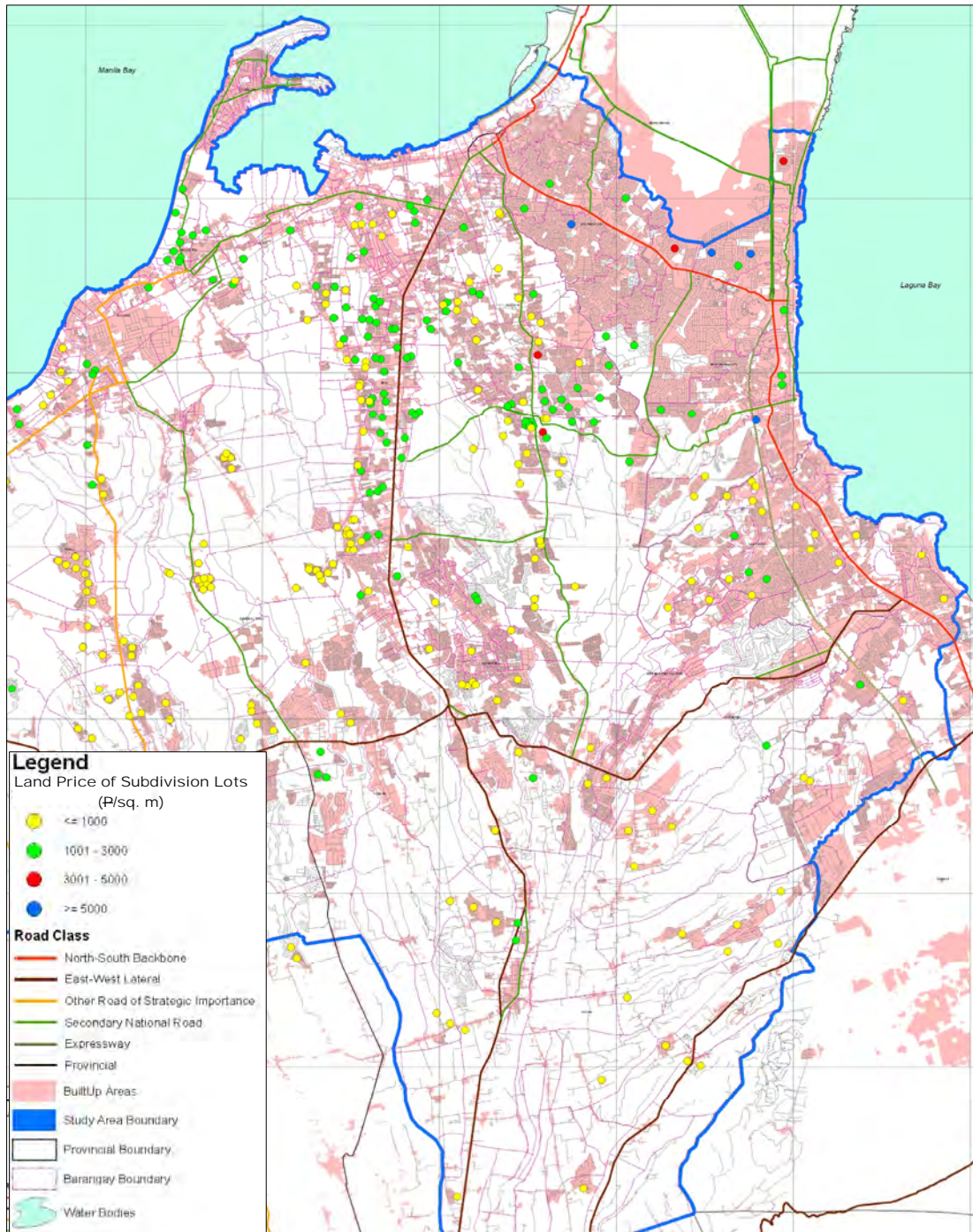
Note: Average size of lot = Area of subdivision / Number of Lots

Therefore public spaces are included into lot size. Generally speaking, 30% of total area is consumed for public purposes; lot as a private land is supposed to be 70% about 70 m² is occupied.

Land Prices of Subdivisions

A listing of subdivisions was collected from the Housing and Land Use Regulatory Board (HLURB), a government agency responsible for issuing permits to developers for the development of subdivisions in the country. As the repository of information pertaining to subdivisions, data on size, number of lots/house and lots, location and prices were gathered and plotted on a GIS map. A resultant map on land prices for subdivision lots in the study area is given in Figure 2.5.4.

Figure 2.5.4 Subdivisions and Land Prices, 2005



Source: Data from HLURB- 2005 plotted on NAMRIA GIS map.

3 EXISTING PLANS, POLICIES AND PROJECTS

3.1 Existing Plans

3.1.1 Medium-Term Philippine Development Plan (2004-2010)

The basic task of the Medium-Term Philippine Development Plan (MTPDP) 2004 - 2010 is to fight poverty by building prosperity for the greatest number of Filipino people through the opening up of economic opportunities, maintaining socio-political stability and promoting good stewardship, all to ensure better quality of life for all citizens. The country will focus on strategic measures and activities which will spur economic growth and create jobs.

The national governments' development thrust is guided by the 10-point agenda of President Arroyo's administration, as follows:

(1) **LIVELIHOOD** – ten million jobs shall have been created.

Three (3) million entrepreneurs shall have been supported; giving them loans and helping them become good managers, thereby establishing a deep foundation for a broad middle class. Two (2) million hectares of agribusiness land shall have been developed, making them productive and their products transported to the market efficiently.

(2) **EDUCATION**

Everyone of school age will be in school in an uncrowded classroom, in surroundings conducive to learning. Three (3) thousand school buildings a year shall have been built and a computer put in every high school.

(3) **FISCAL STRENGTH**

The budget shall have been balanced with the right revenues collected and spending on the right things insured.

(4) **DECENTRALIZED DEVELOPMENT**

The network of transport and digital infrastructure in which the Arroyo government embarked in 2002 shall have linked the entire country.

(5) **POWER SECTOR REFORMS AND WATER**

Power and water shall have been regularly provided to the entire country.

(6) **METRO MANILA DECONGESTION**

Metro Manila should have been decongested with economic activity growing and spreading to new centers of government, business and community in Luzon, in the Visayas and in Mindanao.

(7) SUBIC-CLARK ECONOMIC ZONES

The Subic-Clark corridor shall have become the most competitive international service and logistics center in the Southeast Asian Region.

(8) ELECTIONS

Election shall no longer raise a doubt about their integrity. The electoral process shall have been completely computerized.

(9) PEACE AND ORDER

Peace shall have come to Mindanao and all insurgency areas

(10) EDSA 1,2 & 3

The divisive issues generated by EDSA 1, 2 & 3 will have had a just closure.

The Philippine transport system relies heavily on the road network which handles about 90% of the country passenger movement and about 50% of freight movement. While arterial roads are extensive and serve priority production areas and population centers, roads that lead to many tourism destination and conflict-affected areas are inadequate. The administrative classification of roads is tabulated below:

Table 3.1.1 Situation of Road Infrastructure in the Country

Road Classification	Length (kms)	Percentage (%)	Responsible agency
National	30,160	15	DPWH
Provincial	27,080	13	Provincial Gov't
City/Municipal	22,860	11	LGUs
Barangay	122,000	61	DILG
Total	202,000	100	

Source: DPWH, 2005

Goals, Strategies and Action Plans

Transport infrastructure shall be provided in pursuit of the following:

- Providing easier access to markets at home and abroad to alleviate poverty in the countryside and isolated regions;
- Enhancing peace and order in conflict-affected regions through efficient transport and trade;
- Strengthening national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
- Facilitating the decongestion of Metro Manila via transport logistics system that would ensure efficient linkages between its business centers and nearby provinces; and

- Generating more transport infrastructure with minimal budget cover or liabilities. Private sector-initiated infrastructure should be deficit-neutral, with minimum government exposure in the project.

Projects to Decongest Metro Manila

The major transport projects to decongest Metro Manila are enumerated below:

- (1) North Luzon Expressway (NLE): The widening and improvement of NLE, 83 km, was completed in early 2005 by the Manila North Tollway Corporation (MNTC), a joint venture between PNCC as franchise holder and a consortium of private investors, under a Supplemental Toll Operation Agreement (STOA) issued by TRB. As a result, the level of service of NLE has significantly increased, with travel speed doubling from about 40 kph before the project completion to the current average of about 80 kph. The next phase of NLE, C-5 expressway from Katipunan in Quezon City to MacArthur Highway in Valenzuela, is programmed for implementation starting 2008 but likely to be hampered by ROW issues.
- (2) Manila – Cavite Toll Expressway (MCTE): The existing 6.3 km coastal road from Roxas Blvd to Zapote was initially built by DPWH in the late 1970s. It was upgraded into a tollway, which was opened to the public in 1998, by the Public Estates Authority (PEA) under a joint venture agreement (JVA) with Renong (Malaysia). No significant progress has been made since then, and Renong has been replaced by a local investor group Coastal Road Corporation. After two aborted financial closures, the concessionaire announced in September 2006 that it had secured financing from a consortium of local banks.
- (3) Metro Manila Skyway (MMS) Stage 2: Stage 1, from Pasay Road to Bicutan, 7 km, was completed in 1998 under a concession agreement granted to Citra Metro Manila Tollway Corporation (CMMTC), a joint venture between PNCC as franchise holder and Citra (Indonesia) as investor. Stage 2, from Bicutan to Alabang, has not been undertaken because of the financial difficulties experienced by the CMMTC in Stage 1 – i.e., high costs financed largely by foreign loans affected by the Asian economic crisis, regulated tolls which could not recover costs and low patronage on the skyway segment. DPWH intended to provide an initial P1-billion government funding for part of the substructure for Stage 2 in its 2005 budget, but this could not be implemented as CMMTC could not commit to finance and construct the rest of the civil works due to internal differences among its lenders and investors.
- (4) South Luzon Express Extension (SLEX): The project consists of the rehabilitation of the Alabang viaduct, the widening of the 27 km Alabang-Calamba section and the construction of the 8 km extension from Calamba to Sto. Tomas to link with STAR. This project was supposed to be undertaken by the South Luzon Tollway Corporation (SLTC), a joint venture (JV) company of PNCC (the franchise holder) and Hopewell as investor under a JV Agreement

(JVA) approved by the President in 1998. The project could not take off as Hopewell had not been able to raise the funds for the project. PNCC was poised to cancel the JVA at the same time that NDC stepped in to fund the retrofitting of the Alabang viaduct. These were aborted with the entry of MTD (Malaysia) in 2005 bought controlling interest in SLTC and became the JVA partner of PNCC. TRB approved the STOA on 3 February 2006 and construction is to start by 4th quarter of 2006.

- (5) Southern Tagalog Arterial Road (STAR) Phase II: Phase 1 of the project, a 4-lane 22 kilometers expressway from Sto. Tomas to Lipa City in Batangas Province, was earlier built by DPWH. Phase II is the 20-km extension of the expressway from Lipa City to Batangas City where an alternate port to the Manila international port is being developed. SIDC, the winner of the Build-Transfer-Operate (BTO) bidding in 1997, is to finance and construct Phase II and operate the entire 42-km expressway as a toll road. SIDC had not been able to secure funding for the project, prompting DPWH to issue a Notice of Default in October 2003 and a Notice of Termination in April 2005. To jumpstart the project, DPWH provided in its 2005 budget a P1-billion appropriation for an initial 2-lane highway without toll facilities, to improve the project's viability and bankability. As of report writing, SIDC had not been able to secure financing despite suspension of the Notice of Termination by DPWH on the conditions that SIDC (a) post a performance bond, (b) commit to make a 2-lane highway without toll facilities, passable by September 2006, and the complete tollway by end-2007 and (c) submit a firm financial plan for the project. SIDC started some works with claimed accomplishment at about 12% by end-January 2006.
- (6) Manila North Road (MNR) or McArthur Highway Capacity Improvement: This project was identified as one of the priorities for implementation in the JICA-assisted Master Plan Study for the Luzon Island Strategic Road Network Development Project (LISRNP) of DPWH. The project involves the widening from the present two lanes to four lanes of MNR from Bulacan to Tarlac to accommodate the increased traffic volume arising from the growth in the economy and the population, and to serve as a convenient alternate road for traffic that would divert from the improved NLE because of the increased toll rates thereon. DPWH has completed most of the critical sections of MNR in early 2006, and will complete the widening and improvement of the remaining sections in 2007.
- (7) Subic – Clark – Tarlac: Construction is in full swing as of September 2006, after about two years delay arising from bids in excess of government estimates. Belatedly, the Bases Conversion Development Authority (BCDA) is seeking a TOA from TRB.

3.1.2 DPWH Medium Term Public Investment Program: Region IV (2005-2010)

The 5-year highway development program using local funds for the Cavite – Laguna Provinces from year 2005 to 2010 amounts to about ₱1,970.453 Million. Out of this amount, about ₱1,821.153 Million could be considered located within the CALA study area. The program covers mainly improvements and widening of existing National roads and bridges under the jurisdiction of DPWH. Highway projects proposed for foreign financing includes the CALA East-West Road in the amount of ₱1.574 Billion and the CALA North-South Road with ₱4.079 Billion, both starting in year 2008.

Other highway projects under DPWH implementation not included in the MTDP but funded from CDF are the ongoing construction of Molino Blvd. and the Daang Hari Road extensions to Aguinaldo Highway and to San Pedro along the SLE.

Table 3.1.2 DPWH Medium Term Public Investment Program (2005-2010)

	CATEGORY	COST (Php Million)	IMPLEMENTATION SCHEDULE						
			2005	2006	2007	2008	2009	2010	Later Yrs
	Locally Funded								
1	Asphalt Overlay of Zapote - Cavite Road Zapote Section	3.0	=====						
2	Widening of Tirona Highway Bacoor Section	6.0		=====					
3	Asphalt Overlay of Zapote - Cavite Road Dulong Bayan Section	2.5	=====						
4	Asphalt Overlay of Binakayan Diversion Road	2.0	=====						
5	Improvement of Tirona Highway Kawit Section	9.0		=====					
6	Concreting of Kawit Diversion Road Sta. Isabel Kawit	5.0		=====					
7	Improvement of Noveleta - Naic Tagaytay Road Rosario Section	9.0		=====					
8	Widening of Noveleta - Rosario Diversion Road	7.5	=====						
9	Widening of Cavite - Batangas Road Bacoor Section	5.0	=====						
10	Improvement of Cavite - Batangas Road Aguinaldo Highway	10.0		=====					
11	Widening of Dasmariñas TMC - Naic Road Mangahan Section	3.5	=====						
12	Asphalt Overlay of Cavite - Batangas Road Imus Section	5.0	=====						
13	Improvement Cavite - Batangas Road Aguinaldo H-way	25.0		=====					
14	Asphalt Overlay of Cavite - Batangas Road Dasmariñas Section	6.0	=====						
15	Widening of Salawag - Paliparan Road	22.0		=====					
16	Widening of Dasmariñas Carmona Road Carmona Section	23.0	=====						
17	Widening of Dasmariñas TMC - Naic Road	25.0		=====					
18	Widening of TMC - Tanza Road TMC Section	10.0		=====					
19	Widening of TMC - Indang Road, TMC Section	10.0		=====					
20	Improvement of Manila South Road Sta. Rosa Section	15.0	=====						
21	Improvement of Sta. Rosa - Tagaytay Road Balibago Section	7.0	=====						
22	Improvement of Manila South Road	10.0		=====					
23	Improvement of Manila South Road Cabuyao Section	12.0	=====		=====				
24	Asphalt Overlay of Tanza - TMC Indang Road	27.5		=====					
25	Asphalt Overlay of Cavite - Batangas Road Silang Section	71.7		=====					
	FOREIGN ASSISTED								
1	CALA East - West Road	1754.0					=====	=====	=====
2	CALA North - South Road	4079.0							
	CDF PROJECTS								
1	Molino Boulevard		=====						
2	Widening of Molino Road		=====						
3	Cavite - Las Piñas - Laguna Road		=====						

3.1.3 Southern Tagalog Regional Development Plan

The NEDA Region 4 Office has also produced a planning document called the "Southern Tagalog Regional Development Plan (1999-2004)" which sets out five development goals, namely: (1) Increase economic growth; (2) Reduce poverty incidence and inter-provincial income disparity; (3) Promote economic and physical linkages; (4) Manage a sustainable environment; and (5) Promote effective governance.

The STRDP listed the following policies vis-à-vis the *first* goal of increasing economic growth:

- Expand implementing arrangement with the private sector in the provision of infrastructure, utilities and support services and
- Mobilize existing structures and develop new mechanisms in the institutionalization of coordination and implementation of programs and projects.

With regard to strategies to increase economic growth, the more relevant ones that STRDP mentioned are the following:

- Conduct advocacy programs at the local level to promote the compliance of developers to approved land use plans and zoning ordinances;
- Promote BOT projects and their other variants to accelerate economic infrastructure development and
- Carry-out solutions to address traffic problems through LGU coordination with DPWH, DOTC and PNP.

With regard to the *third* goal of strengthening economic and physical linkages, the STRDP lists the improvement of the quality of the existing transportation infrastructure to international standards as an objective. The more relevant corollary policies and strategies mentioned in the STRDP are the following:

Policies

- Prioritize the maintenance, rehabilitation and improvement of existing national roads to international standards¹.
- Develop and upgrade major seaports and the railway system in the CALABARZON sub-region and establish their linkages and interconnection.
- Construct more and improve the feeder road network in the depressed areas, under-exploited agricultural areas and economically-rich potential areas.
- Accord top priority to the physical development of areas devastated or affected by natural calamities.

¹ Better Roads Philippines, Draft Final Report, March 1999 revealed that current road maintenance nationwide averaged only less than one-third of that required under normal standards. This means that expenditures for road maintenance must go up by more than three times, to reach international standards.

- Accelerate planning, development and implementation of roads, seaports and water supply infrastructures. Targets shall be primarily pilot areas and sites of the following programs: industrial estates/ecozone; agrarian reform; SRA; tourism; and urban development.

Strategies

- Promote BOT scheme in the implementation of various infrastructure projects.
- Enhance the capability of LGUs in resource mobilization for the implementation of feeder road projects and other small-scale infrastructure projects.
- Rationalize the construction/improvement of multipurpose ports and municipal fishing ports to induce improved production and outputs.
- Improve and modernize inter-modal transport services to promote economic activities including tourism.
- Implement a national inter- and intra-urban transport system in the existing and emerging urban areas.
- Provide handling facilities to facilitate transfer of goods.

It should be noted that most of the transport policies and strategies indicated under Goal 3 of the STRDP are dependent on national agencies, and thus, outside the control of CALA LGUs.

3.1.4 Provincial Physical Framework Plans

(1) National and Regional Policies on Provincial Physical Framework Plans

There are numerous national and regional policies that guide the provinces of Cavite and Laguna in the preparation of their respective Physical Framework Plans. These are listed below as follows:

1. Letter of Instruction No. 1350: This directive from the Office of the President provides for the institutional framework for national physical planning. It mandates the inventory of land resources and its current utilization and subsequent adoption of national physical planning and supportive regional and sub-regional land and not to mandate the desired use of land resources except as may otherwise be prescribed by specific laws.
2. Executive Order No. 72: Provides for the preparation and implementation of the comprehensive land use plans of LGUs.
3. Republic Act No. 7160: This is otherwise known as the Local Code. Particular reference is made to section 20 empowering cities and municipalities to reclassify agricultural lands and section 114 providing for the integration of LGUs plans into regional plans.

4. Memorandum Circular No. 54: This circular prescribes the guidelines governing Section 20 of R.A. 7160 authorizing cities and municipalities to reclassify agricultural lands into non-agricultural lands.
5. Administrative Order No. 20: Lists the types of irrigated lands which are non-negotiable for land conversion.
6. Executive Order No. 124: This EO establishes priorities and procedures in evaluating development areas proposed for land conversion in Regional Agri-Industrial Centers, tourism development areas and site for socialized housing.
7. Republic Act No. 7279: The Urban Development and Housing Act mandates the LGUs to identify sites for socialized housing and their integration in the Comprehensive Land Use Plans and Zoning Ordinances of respective cities and municipalities.
8. Executive Order No. 71: This provides for the devolution by the Housing and Land Use Regulatory Board to cities and municipalities the approval of subdivision plans pursuant to the Local Government Code.
9. Republic Act 7586 (NIPAS Law): This law mandates the protection of strict nature reserve, national park, national monument, wildlife sanctuary, protected landscapes and seascapes, resource reserve, natural biotic areas, and other categories established by law, conventions and agreement.
10. National Physical Framework Plan: The plan embodies the country's land use policy agenda.
11. Southern Tagalog Regional Physical Framework Plan 1993-2023: The plan embodies a set of policies in achieving spatial pattern in the region.
12. Republic Act No. 8749 (The Philippine Clean Air Act of 1999): This law provides for a comprehensive air pollution control policy.
13. Republic Act No. 8435 (The Agriculture and Fisheries Modernization Act of 1997 complemented by the Department of Agriculture's Administrative Order No. 6 series of 1998): This is otherwise known as the AFMA. It prescribes urgent related measures to modernize the agriculture and fisheries sectors and provides for the protection of areas in the LGUs for agriculture and agro-industrial development.
14. Republic Act No. 9003 (The Ecological Solid Waste Management Act of 2000): This provides for ecological solid waste management programs.

(2) Policies for Transport Projects

There are aspects of the national transport strategy² with special significance to the transport planning for CALA. The more salient ones are as follows:

Roads. A more commercial approach to the management and financing of roads shall be pursued, with the "national government focusing on a select group of

² From the Draft Medium Term Philippine Development Plan, 1999-2004, NEDA.

national strategic roads". This implies that LGUs within the CALA area shall assume greater responsibility for road construction and maintenance.

"Practical ways should be found to support LGUs in developing the local roads network. Where the financial and technical capabilities of LGUs pose a constraint, the national government will institute an assistance program." This recognizes that local institutions have to gear up.

"Private resources shall be relied upon especially in the development of expressways along clogged road arteries." Its implication is that users will have to pay for the new facilities that will come into place, built by private investors rather than by government. In addition, the expansion of the tolled expressway system will progressively introduce road pricing across the urban area, creating 'quality' expressway travel for higher-income users and many commercial vehicles, while everyone else uses the existing less-congested road network.

Rail Transport. Rail transport is part of the solution to urban traffic congestion, but it comes at a huge investment. Hence, the policy implies that it will be developed only as a mode of last resort because of its capital intensity and subsidy requirements – as "a means for mass commuting particularly in congested urban regions."

"New rail projects shall be pursued if justified on the twin conditions of economic viability and risk sharing with private capital." For those projects that pass the economic test, public support may be considered but will be limited to the capital costs of the track infrastructure.

The implications to CALA is that opportunities for rail transport will be limited to external links (at least one terminus is outside the sub-region), and unlikely to be justified for intra-CALA only trips in the medium-term period.

Private Sector Participation. Private sector participation (PSP), or public-private partnerships (PPP) needs to be encouraged to solve funding and other problems associated with public sector management. The premise is that given reasonably competitive transport markets, the private sector will be efficient and responsive to changing patterns of demand – something that governments are ill equipped to do.

The success and sustainability of PSP in transportation requires the following:

- Government to set a consistent policy, and identify the projects it will support (the private sector cannot implement projects without a business framework).
- Government to prepare projects, design the PSP, and face up to the realities behind most projects:
 - Public funding: few transport infrastructure projects are financially viable, and most require substantial public support (an obligation which government must carefully weigh against public benefits);

- Risks: most private proponents want government to shoulder risk, and provide guarantees (another form of support);
 - Land is always needed and must be acquired (something only government can do);
 - Tariffs are generally high, to reduce the need for public funding (even if not revenue-maximizing) and cover costs, and they must be acceptable to government; and
 - The environmental consequences of new infrastructure must be acceptable.
- Concessions must be awarded transparently under international competitive bidding, if the full benefits of private sector involvement are to be secured.

The implication of the above to CALA is that PSP will be limited and may only become significant until and after the “bottleneck” issues are resolved at the national level.

(3) Preferred Development Strategy of Cavite

The preferred strategy of the Province of Cavite is stated in their Provincial Physical Framework Plan (PPFP) of 2005 to 2010. It is geared towards the Urban-Rural Integrated Development. As envisioned by the provincial government, the strengthening of urban-rural linkages ensures the establishment of effective linkage between urban and rural areas. These linkages are expected to improve rural income by encouraging the increase in production and promoting the enterprising culture of the rural communities for a strong and diverse business base which delivers a variety of good quality resource-based products.

The strategy calls for the promotion of the “seed to market” approach which integrates agricultural production with processing and marketing components. Crucial to this strategy is the improvement of infrastructure facilities particularly the farm-to-market roads, communication network and power. This economic linkage shall be further pursued by encouraging investments such as post harvest and other support facilities in production areas.

Agri-tourism and eco-tourism shall be integrated with rural development taking advantage of the rural living and landscape and capitalizing on the natural and indigenous characteristics of the countryside.

Industrial development shall continue as new investors will come in to locate in the designated industrial sites. The provincial government is also encouraging the establishment of industries that would promote linkage with agriculture. Small and medium enterprises are seen as the engines for growth.

It is further envisioned that urbanization level will increase by 2.63% over the 2000 urbanization level by 2010. In terms of employment, primary sector will be posted at 3.95% while in the secondary and tertiary sectors, the preferred strategy is

expected to have 96.05% share of employment by 2010. In terms of accessibility, the strategy will have an average of 31 minutes to travel from low to highly urbanized centers.

For land resource component, there is a need to convert 2,300 hectares prime land to accommodate population growth of 1.5 million by year 2010.

For infrastructure, there is a need to provide additional infrastructure and/or improve existing ones to cope with the demand of the growing population and increasing economic activities.

(4) Preferred Development Strategy of Laguna

The preferred strategy of Laguna is, likewise, stated in the PPF of Laguna. But without a recent PPF, reference is made to the planning period of 1993-2002. The preferred strategy of Laguna then is on the Agro-industrialization cum Tourism Development of the Province.

The province opted for the Agro-industrial strategy without neglecting its tourism industry which is one of the major earners in the provincial economy. The strategy is concentrated in developing the province's agri-industrial and resource-oriented tourism potentials. It aims to strengthen the complementarity of agriculture and industry by increasing agriculture production and increasing the capacity of processing agro-based resources and produced into processed industrial outputs. With this strategy, it was estimated that the total population of the province would reach 2.06 million in 2002 comprising of 1.65 million urban population and 0.413 million rural population. As to its impact on the provincial economic structure, manufacturing, agriculture, private services, and trade activities will dominate the economy and will contribute accordingly to the increase in the employment level. Moreover, it was envisioned that Calamba and San Pedro would develop to become a secondary metropolitan center and the towns of Biñan, Sta. Cruz, and Sta. Rosa will be converted to a small or medium-sized city.

3.2 Preferred Transport Policies and Strategies

Public transport is and will be a most important mode for the residents in the CALA region, particularly for poverty groups who are regarded as non car-owners. According to the resident interview survey in 2005, approximately 70% of the person trips are dependent on the public transport modes. Even though the vehicle ownership is anticipated to increase in the future, public transport system will continue to be the dominant mode at least in the coming two decades.

As a public transport development policy, the basic concept of the preceding studies will be adopted wherever it is possible. For instance, it is taken into account that the main stream of public transport connecting CALA area with the central area of Manila will be served by LRT and/or trunk route bus service.

However, the structure of the public transport system may be significantly affected by road network development conditions. Therefore, it should be discussed for the medium-long term and for the short-term, since current road network in CALA is far from sufficient condition to accommodate the projected population.

3.2.1 Short-term Policy

In the short-term, a significant development of infrastructure will not be expected. Therefore, the main issue will be to improve the current operation problems. DOTC's Land Transportation Office is responsible for ensuring that operators abide by the franchise system. However, illegal operations such as short cutting and irregular frequency are often reported. In order to monitor the operation system and establish a management plan, the actual operation should be investigated.

For mitigating the traffic congestion around the public transport terminals, various traffic management measures should be carried out. They will also contribute to the increase in the traffic safety for passengers.

3.2.2 Medium and Long Term Policies

(1) Future Demand and Services

Based on the future public transport demand for the year 2020 assigned to the proposed master plan road network, a large demand is found at the major roads such as SLEX, Cavite Expressway, Bacoor-Dasmariñas Road (formerly designated as a busway). These are the arterial roads connecting CALA region with Metro Manila. Particularly, the public transport demand of SLEX, including those from the side streets, is estimated to range from 33,000 to 77,000 pcu/day (280,000 to 650,000 passengers/day). As for Cavite Expressway, the demand will be approximately 60,000 pcu/day or 510,000 passengers/day. In the case of Bacoor-Dasmariñas Road, it is estimated at 22,000 to 35,000 pcu/day or 190,000 to 300,000 passengers/day.

In addition to the north-south roads, large public transport demand is also expected on E/W 1 (Daang Hari Extension) ranging from 24,000 to 40,000 pcu/day (200,000 to 340,000 passengers/day). This road is to be developed as an ordinary road therefore the traffic capacity per lane is expected to be comparatively lower than expressways.

These demands may be reaching at the maximum capacity level of road-based public transport. On the other hand, the public transport demands on the existing major roads such as Governor's Drive and Aguinaldo Highway are estimated to remain at 10,000 to 20,000 pcu/day level. For the other roads including national roads, the public transport demand is much less, mostly less than 10,000 pcu/day,

except for the roads in the southern part of Metro Manila such as Las Piñas and Muntinlupa.

For improving the service level of the public transport, therefore, the following measures should be considered.

(i) LRT Extension

In order to alleviate the traffic congestion in the north-south roads, the extension of LRT system up to Dasmariñas or Silang should be re-considered as an alternative plan. The LRT may be extended from Baclaran to Bacoor as the first step and then further extended to Imus and Dasmariñas or Silang. It is said that the minimum requirement of passenger demand for LRT is 15,000 passengers per hour per direction. Assuming the current peak hour ratio is 7.2%, the peak hour demand will be 18,000 passengers/hr for Cavite Expressway, which is exceeding the requirement for the viability. The public transport demand on the north-south roads such as Bacoor-Dasmariñas road and Cavite Expressway will be reduced by about 50,000 pcu/day as a diversion effect if the extension is realized. In addition, another modal shift from the private vehicle can be expected, which will contribute to the further mitigation of traffic congestion.

(ii) Re-arrangement of Bus Network System

The Mega Manila Bus Route Re-vitalization Study was undertaken by DOTC in collaboration with the National Center for Transportation Studies. The purpose of the study was to review the current franchise system by checking transport demand and supply and to examine the re-arrangement of bus network system, since it is pointed out that the current network system may not be corresponding to the recent changes such as the development of new subdivisions and the increased patronage of LRT/MRT. Although this study intended to revise the network system, it is rather a short-term arrangement under the current road network system.

Based on the future growth of passenger demand and the road network development, the road-based public transport network should be modified based on long-term arrangements.

In the long term, the newly developed roads should be effectively utilized so as to improve public transport services as a whole. For this purpose, services should be classified into arterial routes and other routes.

According to the traffic assignment result, the following corridors are arterial routes:

- a) West corridor along Cavite Expressway: Metro Manila (Baclaran) – Las Piñas – Bacoor – General Trias – Trece Martires – Indang
- b) Central corridor along Bacoor – Dasmariñas Road: Metro Manila (Baclaran) – Imus – Dasmariñas – (Tagaytay)

- c) East corridor along SLEX: Metro Manila (Lawton) – Muntinlupa – San Pedro – Biñan – Sta. Rosa – Calamba
- d) E-W corridor along Daang Hari Extension and SLEX: Rosario – General Trias – Dasmariñas – San Pedro – Calamba

As for these arterial routes, only buses should be operated for the purpose of increasing the transport capacity and providing better quality of services. Feeder bus services will be provided at the crossing roads so as to connect with these trunk routes. Jeepneys will be mainly served on the parallel roads, Aguinaldo Highway and Governors Drive, which will be used for intra-regional traffic.

(2) Designation of Bus Lanes

In order to secure higher transport capacity as well as traffic safety of passengers, a bus exclusive lane is designated on Bacoor-Dasmariñas Road which is designed as a 6-lane road. For the sake of passengers' convenience and safety, the outside lane of the carriageway should be used as a bus lane in both directions. Physical barrier for the bus lane will not be necessary so as to enable efficient use of the 6-lane road. At the early stage when the demand is not so high, the bus lane system will be limited for only the peak hours, say 7:00~9:00 a.m. and 16:30~18:30 p.m.

A daily patrol of traffic police will be required for eliminating roadside parking or other vehicle use of the lane and enacting the bus lane system.

For the other roads, the bus lane system will not be applied because at least three lanes may be required for one direction.

(3) Development of Terminals

In accordance with the newly developed road network, new multi-modal terminals should be developed at the intersections of trunk routes, which may become new transfer points for passengers.

The following three terminals are proposed to be developed. The North and Central Terminals are those proposed in the Feasibility Study of Cavite Busway Project by JICA, where the terminals are named as "North" and "South".

North Terminal

The North terminal is based on the assumption that the LRT extension will be implemented up to Bacoor as the first step. The terminal will be constructed in front of the LRT station so as to provide the seamless transport services among LRT and other road-based public transport modes as well as private vehicles.

Central Terminal

The central terminal will be developed at the south-west corner of the intersection of Bacoor, Dasmariñas Road and Governor Drive. The terminal is also a multi-modal terminal accommodating buses, jeepneys, taxis.

South Terminal

The South terminal will be developed at the adjacent area of the interchange between SLEX and R-1 Extension. By locating the terminal at the east side of the interchange, the accessibility from the national road will also increase. The terminal will be the transfer point among various public transport routes.

(4) Bus Stops

Bus stop facilities should be developed along the trunk routes stated above. Since the new roads, Daang Hari Extension and Bacoor–Dasmariñas Road are developed as high standard roads, access from crossing roads will be limited to main roads. At those intersections, bus bays of saw-tooth type will be installed for realizing smooth loading/unloading by minimizing the disturbances to the operation of other buses. The average interval of bus stops along these roads will be 2 to 3 km.

As for the Expressways, the bus stops or bus bays will be developed at the nearest points from intersections taking the passengers' convenience into account.

(5) Additional Measures

For meeting various passengers' demand, the following measures should be considered:

(i) Provision of express bus services along trunk routes

On the expressway, express buses should be operated for the purpose of providing faster services and increasing public transport capacity. Taking into account the demand nature of relatively long trip distance on the average, the interval of bus stops can be much longer than the services on an ordinary road.

(ii) Introduction of common ticketing system for facilitating bus transfer services

Based on the result of Person Trip Survey, more than 40% of the public transport users in CALA region are transfer passengers from the public transport modes. If

common ticketing system is introduced, the transfer among public transport becomes more convenient.

(iii) Traffic management and enforcement

For providing faster services, bus priority signal system should be developed particularly for the roads where high public transport demand is expected. In order to avoid a disorderly traffic, strict enforcement on illegal vehicles will be required.

(iv) Monitoring system

Monitoring the franchisee's performances in terms of abiding with the conditions of the franchise (Route, Frequency, Authorized vehicles, Punctuality etc.)

(v) Control of illegal or unauthorized operation

(vi) Monitoring vehicle occupancy

3.3 Ongoing, Committed and Proposed Transport Projects

3.3.1 Ongoing Transport Projects

Two (2) major road construction projects, the Daang Hari Road and Molino Road, are being constructed by DPWH at present.

(1) Daang Hari Road

The development of the Daang Hari Road, also known as the Las Piñas – Muntinlupa – Cavite – Laguna Link Road, was initiated by the private sector in close coordination with the concerned local government units traversed by the project. The initial segments starting from the Alabang-Zapote road up to Ayala Southvale area were developed by Fil-Estate and the Ayala Land Corporation. Its continuing link to Molino Road was constructed by DPWH into a 4-lane divided road facility with a RROW width of 30 meters.

The DPWH at present is constructing the extension of the Daang Hari Road up to Aguinaldo Highway. A two-lane road facility with total length of 5.0 kms, about 4.0 kms has already been completed with the remaining 1.0 km to eventually link Daang Hari with Aguinaldo Highway ongoing. DPWH is also pursuing the implementation of additional two (2) lanes for the 5.0 km extension to eventually upgrade the Daang Hari Road as a whole into a homogeneous four-lane road facility.

In addition, the DPWH is also undertaking the construction of a southward linkage of the Daang Hari Road via part of Muntinlupa and onwards to San Pedro, Laguna leading further to SLE. The DPWH – NCR is currently implementing the 2.5 km Daang Hari Jct. – Victoria Homes Muntinlupa Section into a four-lane facility. The full completion is expected before the end of the year.

(2) Molino Boulevard

Molino Boulevard is a combination of a new link road and that of the Molino Road, an old national secondary road linking Zapote and Paliparan in Gen. Mariano Alvarez at the junction of Governor's Drive in Cavite.

The new link of Molino Blvd. starts at Aguinaldo Highway in Zapote (beside St. Dominic Hospital) and runs parallel to Molino Road and terminates at Molino Road Junction near Jollibee. From hereon, it follows the existing old Molino Road up to Paliparan Jct. in Governors Drive in GMA. It has a total length of about 18.8 kms where the first 7.8 kms involves new construction into a divided four-lane road facility between Aguinaldo Highway and Molino Road, and the remaining 11.0 kms is the existing alignment of the Molino Road to Governors Drive. About 4.6 kms of the new link has been constructed and about 900 meters of the ongoing construction works are affected by ROW acquisition problem. For the Molino Road section of the Boulevard, most segments have already been widened into a four-lane facility except for some areas due to RROW problem. In addition, about 3.0 kms between Salitran Road and Governors Drive is currently undergoing construction but also encountering RROW problem. After completion, the Molino Boulevard will be a 4-lane road with a center median along the new constructed section.

3.3.2 Committed Projects

(1) MCTE Extension R-1 to Rosario, Cavite

Due to financial problems, there is high probability that the extension of the R-1 expressway to Rosario, Cavite to be undertaken by the original proponent of MCTE, the Manila Cavite Tollway Corporation (MCTC), will not be realized in the next five (5) years. For this reason, PEA is looking for a new investor to undertake the R-1 expressway extension initially to Kawit with a distance of 7.0 kms or 4.0 kms short to Rosario. Bidding should have been started by PEA early last year for completion of construction in 2007. The winning bidder will become the strategic partner of PEA in the operation of the R-1 expressway system.

(2) C-5 Expressway

The C-5 expressway is a component of the MCTE. The construction of this project was delayed due to RROW acquisition problem. The implementation is proposed to be undertaken after the completion of the R-1 expressway extension from Talaba to Kawit.

(3) MMS Extension, Stage 2

MMS, Stage 2 which is proposed for implementation by the private investor was found to be not financially viable. DPWH intended to provide an initial P1-billion in

its 2005 budget to construct the substructure (foundation and column) from Bicutan to Sucat with a distance of 3.2 kms for part of the substructure for Stage 2. The plan was DPWH will then turnover the completed substructure to the PNCC, which will construct the superstructure, and for the operation as a toll facility. The cost of DPWH civil works component (foundation and column) will not be recovered from toll collections but this was not implemented as the private investor, CMMTC, could not commit to finance and construct the rest of the substructure and superstructure as this did not appear to be financially viable.

(4) South Luzon Expressway (SLE) Extension to Sto. Tomas, Batangas and Alabang Viaduct

The identified critical sections of SLE are: 1) Alabang viaduct wherein trucks are not allowed to use due to structural problems and 2) the gap between SLE and the Southern Tagalog Arterial Road (STAR) between Calamba in Laguna and Sto. Tomas in Batangas. Upon the President's instruction, DPWH provided a P1.9-billion appropriation in its 2005 budget to fund the retrofitting of the Alabang viaduct and the construction, including the right-of-way, of an initial 2-lane Calamba-Sto. Tomas expressway. This was aborted with the entry of MTD (Malaysia) in 2005 which bought out Hopewell as JV partner of PNCC in SLTC. TRB approved the STOA on 3 February 2006. While financing arrangements are being finalized, SLTC is now reviewing the design, to be followed by construction over a 30 month period.

(5) Southern Tagalog Arterial Road (STAR), Phase II

Phase 1 of the STAR project covering the 22 km section from Sto. Tomas to Lipa City was built by DPWH into an expressway facility. DPWH conducted a bidding for the STAR, Phase 2 or its extension to Batangas City with a length of about 20 kms to cover initially the construction of a two (2) lane expressway and to operate the entire 42 km STAR project from Sto. Tomas to Batangas City. The Strategic Infrastructure Development Corporation (SIDC), a local company established by CITRA, won the bidding in 1997. Work for the STAR Phase II was suspended in 2000 due to the inability of the SIDC, the winning concessionaire, to secure funding for the project.

In order to complete the project, a Memorandum of Agreement (MOA) between DPWH, TRB and SIDC has been initiated and currently under preparation. Under the new agreement, the DPWH will construct the 20 km expressway extension into 2-lane highway from Lipa to Batangas City (excluding toll facilities). The bidding was conducted by DPWH in February 2005 and the start of construction is scheduled middle of this year for completion in one (1) year time. The DPWH funding is estimated at about P1.38 Billion. The SIDC, on the other hand, will upgrade the DPWH constructed 2 lane highway into tollway standards within one (1) year after the DPWH turn-over and for SIDC to widen it to four lane standard tollway after five years. The cost of the DPWH component will not be recovered from the toll rates.

The ongoing and committed projects are shown in Figure 3.3.1.

3.3.3 Proposed Transport Projects

The projects included in the Medium Term Philippine Development Plan (MTPDP) that have direct impacts in the CALA area are as follows:

(1) SLE Extension from Calamba to Lucena City in Quezon Province

The SLE extension involves the widening and upgrading of the existing expressway into six (6) lanes from Alabang to Calamba including the reconstruction of the Alabang viaduct and its extension to Lucena City into a four (4) lane expressway facility.

The original project proponent was a joint venture agreement between Hopewell Crown of Hongkong and PNCC, the franchisee of the SLE. After more than five (5) years of negotiation with TRB, the Hopewell Crown could not justify with TRB that their company is technically and financially capable/qualified to implement the project. For this reason, the PNCC entered into a Memorandum of Agreement (MOA) with NDC for the reconstruction of the Alabang viaduct and the construction of its extension between SLE and STAR expressway.

Relative to this, the PNCC at present is looking for a new joint venture partner for the upgrading of the expressway and its extension to Lucena City.

(2) North-South Road (CALABARZON Expressway)

The proponents of the MCTE are encountering financial problems for the extension of the R-1 expressway to Rosario, Cavite. The reason for this is that the construction of the R-1 expressway will be on a reclaimed land to be undertaken by other proponents where its cost will be recovered as part of the toll fees. To include the costs for the reclamation works for the expressway line has been assessed to be a not viable option for private sector implementation. There is, therefore, a high probability that the R-1 extension could not be implemented in the next 5-10 years.

As a continuing link to the proposed R1 expressway extension to Rosario, Cavite, the Hon. Governor Ayong Maliksi, through the Cavite Development Council, has proposed the expressway extension in a North-South orientation that will start at the junction of the proposed R1 expressway extension in Noveleta up to Tagaytay City, the alignment of which is located west of Aguinaldo highway in order to address the congestion problem of the said highway. The said proposed expressway is the so-called CALABARZON Expressway.

Since the proposed R1 Expressway could not be realized in the near future (5 to 10 years), another alignment for the CALABARZON Expressway has been conceptualized by following the eastern alignment parallel to Aguinaldo Highway or the so-called Busway alignment of the then CALA Master Plan Study.

To further pursue the project, the NDC and the province of Cavite has entered into a Memorandum of Agreement (MOA) to study the viability of a North-South Road as the CALABARZON Expressway. These two (2) north-south alternative alignments have been considered and are located east and west of Aguinaldo highway and are considered mutually exclusive projects. After a review, it was agreed that the alignment for the proposed CALABARZON expressway line will adopt the proposed alignment of the busway to be located east of Aguinaldo or between Molino Road and Aguinaldo Highway. The said alignment has advanced project preparation involving:

- a) a detailed alignment study established in close coordination with the concerned local government units traversed by the road during the CALA Master Plan Study;
- b) the affected land owners had been identified;
- c) environmental impact study is available;
- d) the ROW width of 40 meters is adequate for the development of the CALABARZON Expressway;
- e) a concept for the elevated structure connecting the busway with the R-1 expressway has been prepared;
- f) One Asia, a private company has offered to donate the RROW for the project; and
- g) an option to utilize the new link of Molino Boulevard.

To complete the study for the CALABARZON Expressway, the CALA Study Team has provided a traffic study taking into consideration the impacts of the delayed implementation of the R-1 Expressway extension.

The implementation of the North – South Road is included in the MTPIP of DPWH.

(3) East-West Road

MMUTIS, which prepared the road network plan for CALA, recommended the development of several East – West Road Links in the area that lead onwards to SLEX. The implementation plan of the East – West Road was subjected to a feasibility study by this present study, criteria used in the development of the East – West Roads are as follows:

- a) properly connected with the Noveleta – Naic – Tagaytay Road and the Manila South Road with entrance/exit points at the SLEX;
- b) adopt, as much as possible existing major roads in the area;
- c) minimize adverse social and environmental impacts of the projects;
- d) to function as a system with the proposed North – South Road; and
- e) the road connection with SLE should not be less than 3.0 kms, the minimum standard of TRB for urban expressway.

Based on the above criteria, the preliminary alignment of the East – West Road were identified:

East – West Road 1

- adopt the alignment of the wide and newly constructed Daang Hari Road;
- extension of Daang Hari Road to SLEX towards Susana Heights interchange and
- extension to Cavite to connect with the Binakayan bypass.

East – West Road 2

- alignment will be located south of Governors' Drive traversing less urbanized and developed areas;
- connection to SLEX will be in Biñan due to higher standard of the Biñan interchange;
- connection to Noveleta – Naic Tagaytay Road South of Rosario; and
- implementation strategy to include possible private sector participation.

(4) LRT 1 Extension to Cavite

The project starts from the southern terminal of the existing LRT 1 in Pasay then runs towards Roxas Blvd via Redemptorist Road. From Roxas Blvd/R1 Expressway, it will turn left following the Parañaque River to connect with the Benigno Aquino Blvd and the newly constructed bypass towards Quirino Avenue. The extension southward will be along the eastern side of the R1 expressway and ends in Zapote.

LRTA has received the amount of US\$4,787,675.63 from the National Government which it used to settle the substantial portion of its payment obligations to SNC-Lavalin International Inc. (SLII), the initial proponent of the project, under the Amended and Restated Settle Agreement (ARSA). The WB has indicated interest in the project. LRTA was expected to submit all the required documents to the NEDA-ICC for their approval by May 2006 with the objective of immediately launching the competitive tender for the project. The Project is to be implemented as a solicited transaction under the BOT Law and will have 2 major components: (1) Civil Works component (ROW, tracks and guideway) estimated at US\$400 million, which is proposed to be financed by the public sector and (2) Electro-Mechanical component (trains and signaling system) estimated at US\$400 million, which is proposed to be financed by the private sector. The financing strategy of combining ODA funds for the Civil Works component along with private sector capital for the Electro-Mechanical component would ensure affordable commuter fees.

(5) Traffic Management Along Major Corridors

To improve the flow of traffic along major corridors, low-cost measures involving traffic management should be implemented along Aguinaldo Highway and Governor's Drive. Traffic management program includes signalization of major intersections, provisions of loading/unloading bays, construction of sidewalks, and installation of necessary road signages, among others.

(6) Junction of Pala-Pala Proposed Senator Ramon Revilla Interchange Project

The project is located at Pala-pala junction of Aguinaldo Highway and Governors Drive, where the two (2) shopping malls, Robinsons and Shoemart, are situated. The initial proposal includes an underpass along Aguinaldo Highway and a left-turning fly-over ramp towards Governors Drive leading to SM Department Store. The Study is considering other structures such as fly-over along Aguinaldo Highway and other traffic management measures.

4 DEVELOPMENT TREND AND ALTERNATIVE DEVELOPMENT SCENARIOS

4.1 Development Trends

The current situation of the CALA regional growth discussed in Chapter 2 basically points to three predominant growth trends occurring in the study area, as follows:

- 1) Dependency on Metro Manila in terms of the metropolis' economic and social activities;
- 2) Urban center growth trend in CALA that is noticeable in areas adjoining the metropolis and along major roads of CALA and
- 3) Industrial development fast occurring in designated industrial zones with substantial economic impact in their vicinity.

These trends are considered to prevail and continue in CALA in the future and are not viewed as independent alternative trends as basis of the platform for designing the road network. Rather, they are occurring simultaneously in CALA. However, the impact of these trends to be imposed on road network will vary, depending on the situation of which one will take place more prevalently.

4.2 Alternative Development Scenarios

Overlooking at the past trend and current situation of CALA regional growth, we can find out some factors which have contributed to regional development of CALA, as follows:

- Large scale industrial estate development
- Relocation of industries from Metro Manila due to the 50 km radius ban
- Related sub-sectors growth (transport, trade, construction, service, etc.)
- Population influx from Metro Manila and affordable middle-income housing
- Population influx from countryside

In general, industrialization and urbanization has propelled the rapid regional growth of CALA.

Under rapid urbanization, the northern part of municipalities in the Analysis Area have been the main places to accommodate influx population from Metro Manila and they have grown to be existing urban centers such as Bacoor, Imus, San Pedro, Biñan, and Santa Rosa, among others. The family income level of those municipalities is close to that of NCR, especially the residents of Bacoor and Imus who are comparatively high income class people. It is presumed that life style and work style of the residents will be very similar to those of NCR. As it were, those municipalities are NCR conurbation area. They will probably continue to grow due to continuing urbanization even without official promotional development measures. Dasmariñas is adjacent to the above said NCR conurbation area. It has been rapidly developed in recent years because it has plenty of flat lands which are

easy to be converted to urban land use. The rapid urbanization and development trend will continue to take place in Dasmariñas in the future.

Looking at the southern part of the Analysis Area, such rapid urbanization trend has not taken place yet. The current land use is mainly agricultural and there remains some natural environment that may be conserved. From the viewpoint of intra-regional balance, new city centers should be developed in southern and middle part, without causing order-less urbanization. Although too extensive urbanization is not unfavorable to take place in such area, planned development is deemed as essential and more income generation opportunities should be created in the southern part of the study area.

In terms of industrialization, large scale industrial estate development and growth of transport, trade, real estate, and construction have created abundant job opportunities in the study area as compared with the other remote provinces. Industrial development has accommodated not only new labor force increase in industries but also in service sectors. More than 200,000 job opportunities have been created directly from large scale industrial estate development, which has indirectly contributed to increase of job opportunities in service sectors and constructions. In terms of the ratio of (employment at workplace/employment at residence), this study area is not so dependent to Metro Manila. The ratio as of Year 2000, is calculated to be around 0.9, based on the statistics data of Labor Force Survey. This independency has been formed partly because of topographical situation and shortage of mass transit. Topographically, the connection point between Metro Manila and the study area is very narrow and tight, bounded by the ocean and Lake Laguna, and there is not enough mass transit mode. In this context, it is deemed essential to prevent increase in commuting traffic between Metro Manila and the study area, and to strengthen independency from Metro Manila in the future.

The Provincial Physical Framework Plan of Cavite (Planning Period: 2005-2010) proposes the three alternative spatial strategies, as follows: 1) Multi Center Development; 2) Rural Industrialization and 3) Primary Industrial and Urban Growth. The Provincial Framework Plan of Laguna (Planning Period: 1993-2002, not updated yet as of May 2005) does not include spatial development strategy. However, it points out that manufacturing and trading were two major growth factors for the provincial economy, and the growth of the two aforementioned sub-sectors in association with construction, real estate and finance, will continue to lead the provincial economy.

With the assistance of the World Bank, NEDA conducted Cavite-Laguna Urban Development and Environmental Management Study to address the issue of rapid urbanization and regional growth currently taking place in the CALA area. The final report proposes mainly two scenarios for CALA regional growth: 1) Trend; 2) New urban center development to accommodate population influx and new economic activities.

As discussed above, the past regional development policies and plans are mainly reflected by growth pole theory. One of the options shall be based on growth pole. The other one shall be focused on industrialization.

Based on this present development scenario, the Study has developed the future socio-economic framework within the following three development scenarios:

- Following current trend
- Driven by new urban center network
- Driven by industrialization

The following are short description of these three scenarios:

Scenario 1: Trend (Metro Manila Dependency Development)

This scenario adopts the “let it go” policy. The current development trend will continue and the NCR conurbation area (the north of the study area), shall lead regional growth and development activities will tend to take place in existing urban centers such as Bacoor, Imus, San Pedro, Biñan, and Santa Rosa, among others. The less-developed southern area will remain as it is. The intra-regional disparity will increase.

Scenario 2: Urban Core Development

Based on the urban center network proposed in the WB CALA study, this Study placed more emphasis on urban center network hierarchy, which is expected to create a new regional structure for CALA. The highest hierarchy cores are Dasmariñas and Calamba, referred to as Secondary Metro in the WB study. In addition to the two growth poles, 8 primary urban centers, 17 primary urban centers B, 1 secondary urban center A, and 25 secondary urban centers B are proposed to grow in Cavite and Laguna. In view of balanced urban core development, it is assumed that the same class of urban hierarchy municipalities will grow to be the same size in terms of population. Various urban functions and services are expected to accommodate population as well as to create job opportunities. The new network and hierarchy of urban center shall emerge in the future.

Scenario 3: Industrialization-Driven Development

The role of the industry sector in CALA is to be the growth engine of the region. Specifically, the manufacturing sub-sector continues to be the most dynamic part of its economy. It will increase the job opportunities not only in terms of direct employments but also in various indirect employments. It will strengthen the sustainable growth mechanism of CALA. In view of CALA’s sound and regionally-balanced development of CALA, such industrialization should be located in the middle belt area and the southern area. It is therefore important that the less-developed mid- to southern areas will get on track of steady development.

With reference to regional growth poles of CALA, Dasmariñas and Calamba shall play the role of two main centers. The growth corridor, which encompasses from Calamba, Dasmariñas, General Trias, Trece Martires, Silang, to Cavite City, shall emerge as the leading growth corridor along the east-west direction. The CALA East-West Super Corridor shall function as “magnet” to induce world class companies. It will attract direct investment from foreign countries which will be determined by the multinational companies’ global supply-chain strategy on the basis of comparative advantage.

In accordance with the three scenarios, the future socio-economic framework for CALA region was envisioned. A set of key socio-economic indices such as population, employment, school environment, and car ownership are set forth in the next section of this chapter.

Figure 4.2.1 Scenario 1: Trend (Metro Manila Dependency Development)

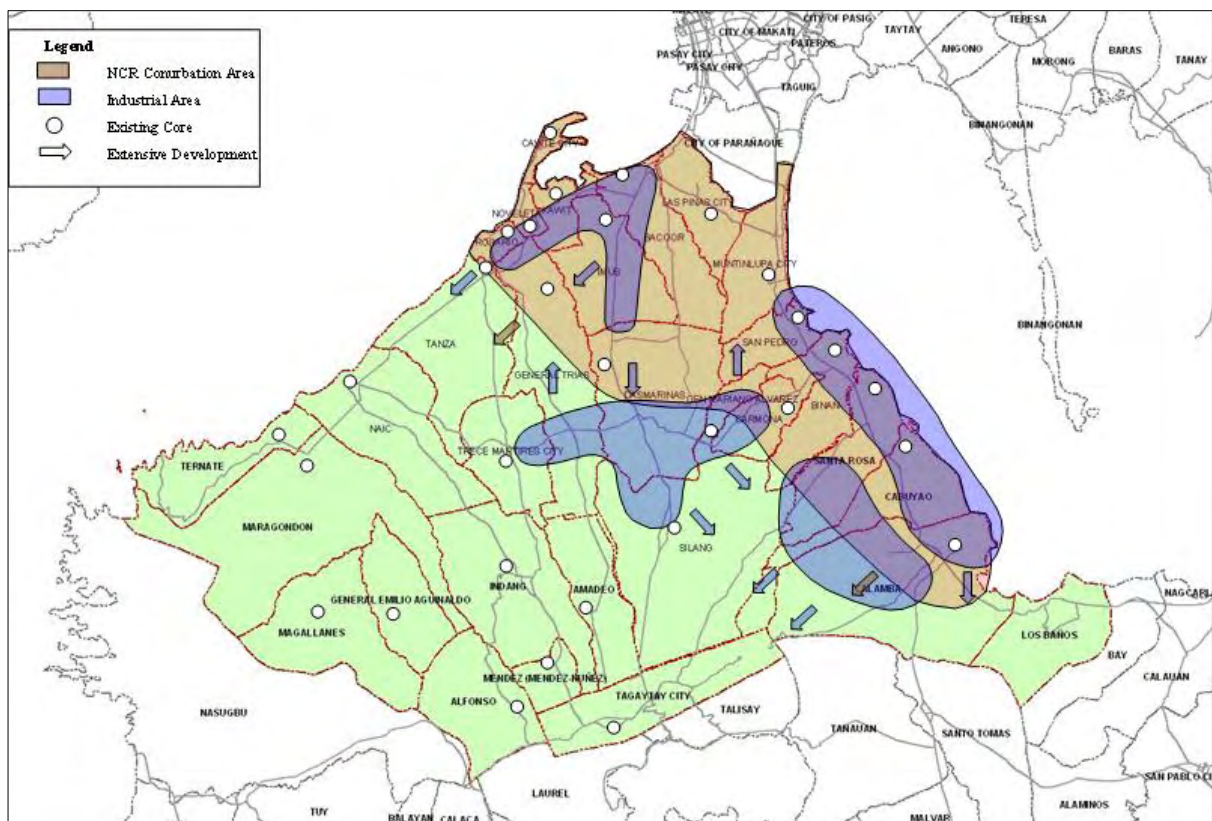


Figure 4.2.2 Scenario 2: Urban Core Development

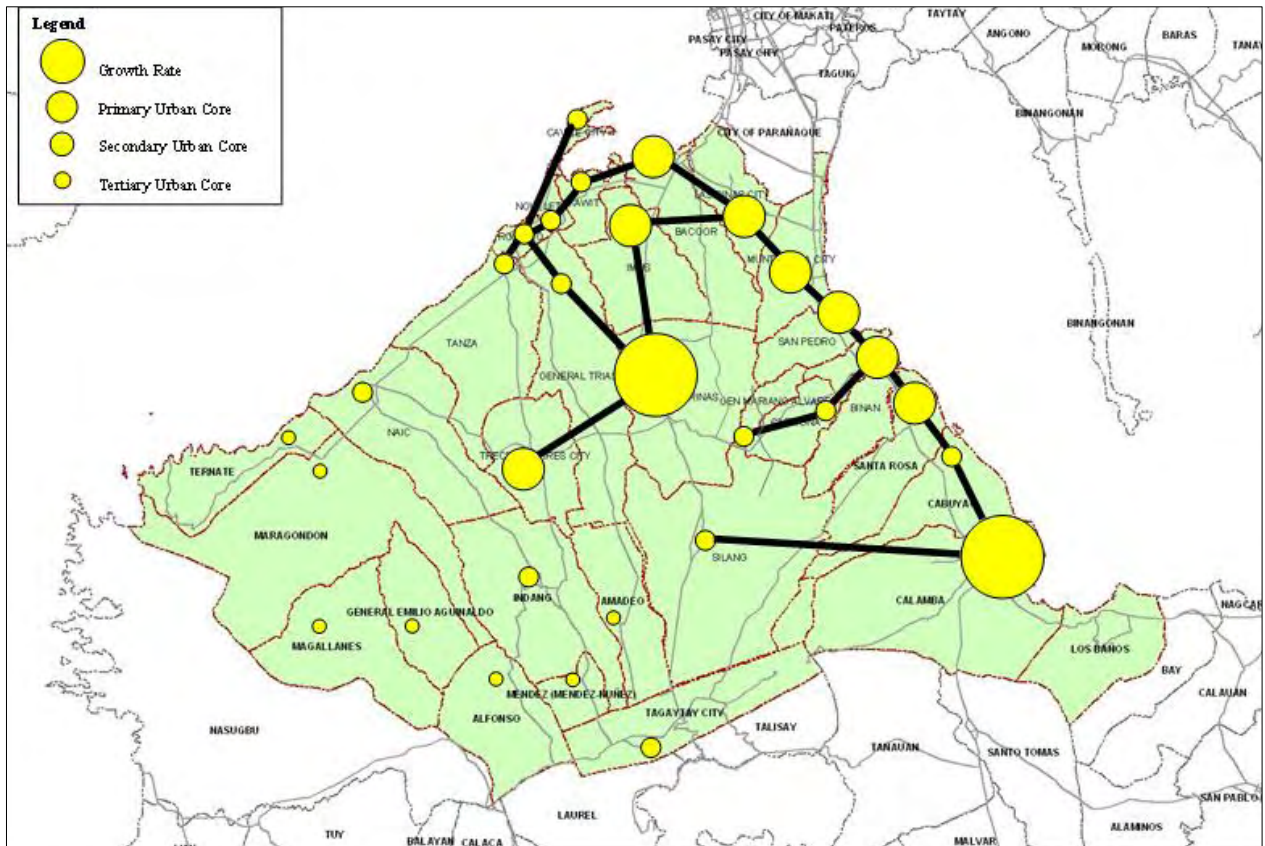
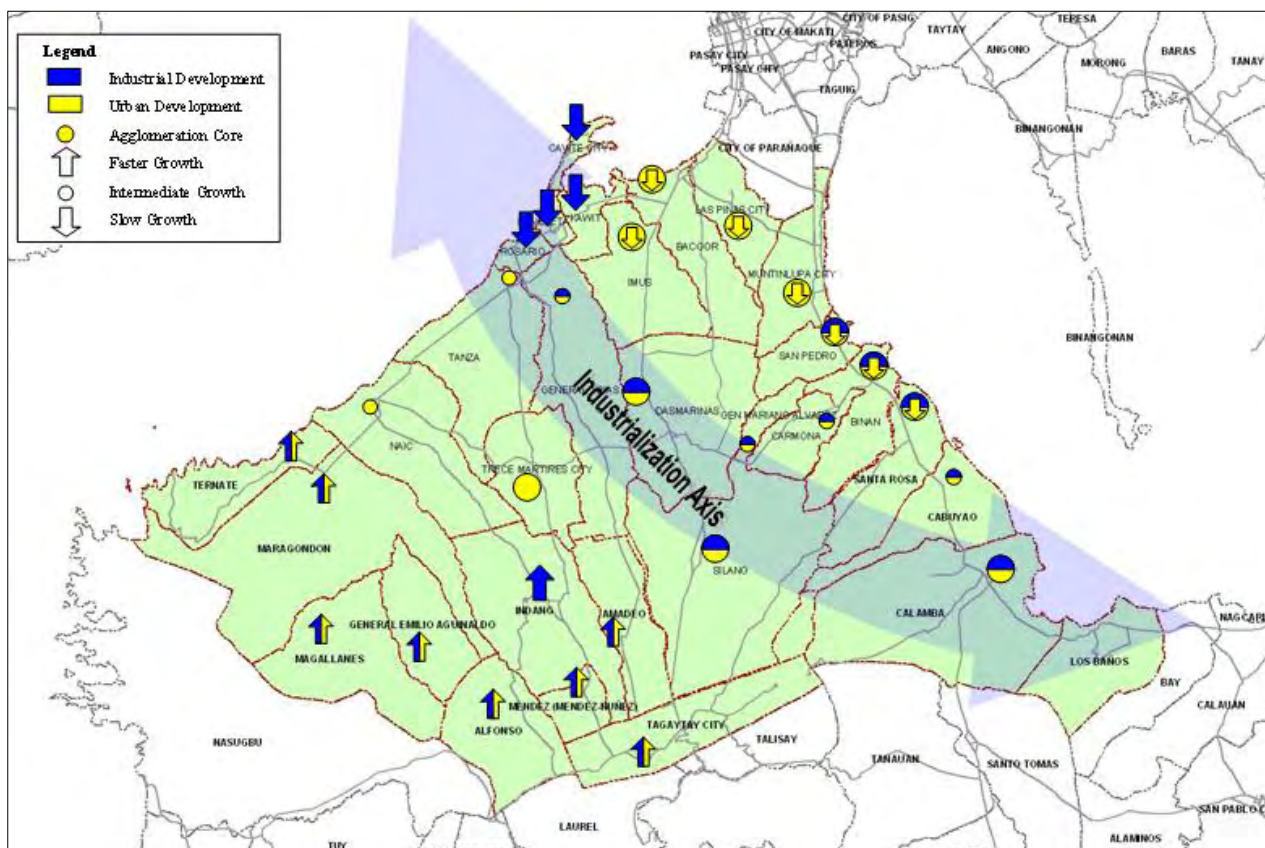


Figure 4.2.3 Scenario 3: Industrialization-Driven Development



4.3 Socio Economic Development Framework of Scenario 1, 2 and 3

Economic growth can be described by a number of indicators. In most cases, it is represented by population and per capita GDP because the multiplication of these two indicators is the GDP. However, per capita GDP is a function of various indicators such as industry structure and education levels. In order to describe economic situation of the study area, a set of indicators including population, employment, school enrolment, and car ownership are considered in this study.

4.3.1 Population

The population of NCR has rapidly increased. Looking into the breakdown by cities, however, there are trend changes and differences among cities. The centrally located cities in NCR, such as Makati City and Manila City, already peaked out in 1980s, and some cities changed into the trend of gradual decrease in 1990s. The population in the cities located in the northern and southern peripheral area of NCR continued a rapidly increasing trend (annually 7-8%, even more than 10%) during such decades. However, from the latter half of 1990s, such cities as Las Piñas and Muntinlupa have begun to peak out (annually 1-3%, even negative in some cities).

Cavite and Laguna have the most rapidly increasing population among the provinces in Southern Tagalog and seem to continue the trend (annual growth of more than 5%) for twenty to thirty years.

The population of the study area accounts for 4.11 million in 2000 and is estimated to be 5.0 million as of 2005. Based on past and current trend, the future population of the study area is projected differently in the three assumed scenarios, with a presumption that the total population is projected to increase by around 90% and exceed 9 million until 2030.

Case 1: Population will continue to grow rapidly at a similar speed and in a similar manner as before. The regional structure of Metro Manila dependency shall basically continue. Population projection is done on the basis of estimating habitable area in each zone as well as population density capacity in each zone.

Case 2: This is a case in which urban development activity shall take place to create a certain urban hierarchy in the CALA area. In this case, the proposed urban hierarchy by the WB is adopted. The two municipalities of Calamba and Dasmariñas shall grow as the two largest urban centers and reach the same population size in 2030. The six municipalities of Bacoor, Imus, Trece Martires City, Biñan, San Pedro, and Santa Rosa shall grow as primary urban cores and reach the same size in 2030. As the third class urban centers, fourteen municipalities of Cavite City, Carmona, General Trias, etc., shall grow.

Table 4.3.1 Future Urban Hierarchy (based on World Bank CALA Study)

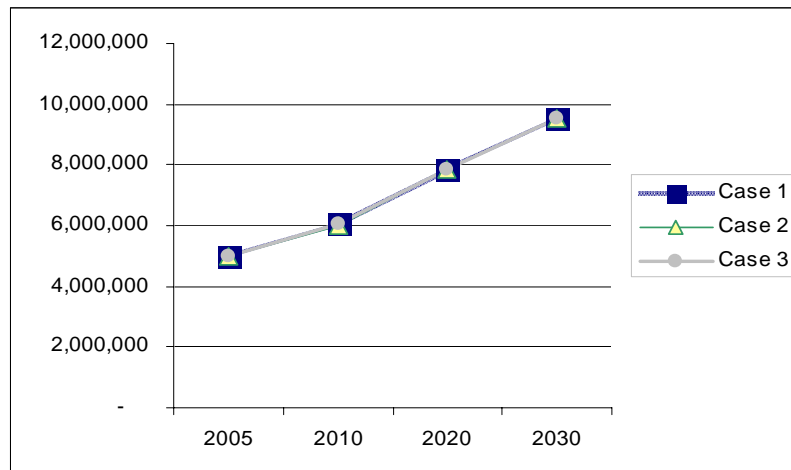
Hierarchy Classification	Municipalities
Growth Pole	Dasmariñas, Calamba
Primary Urban Core (6)	Bacoor, Imus, Trece Martires City, Biñan, San Pedro, Santa Rosa
Secondary Urban Core (14)	Carmona, Cavite City, General Trias, Indang, Kawit, Naic, Noveleta, Rosario, Silang, Tagaytay City, Tanza, GMA, Cabuyao, Los Baños
Tertiary Urban Core(7)	Alfonso, Amadeo, GEA, Magallanes, Maragondon, Mendez, Ternate

Case 3: This is a case in which industrial development shall be the main driving force for CALA regional development. Industrialization shall take place mainly in the mid-southern part of CALA. The zone which encompasses from Calamba, Canlubang, Silang, Dasmariñas, and Trece Martires City, etc. is named as the CALA East-West Super Corridor. This zone shall lead the regional growth of CALA. In comparison with the other cases, the growth speed of the northern area shall be slowed down. The growth of the southern and mid area, which includes Alfonso, Magallanes and Ternate, shall be comparatively faster. However, this area needs due consideration of environment and agriculture-related rural industrialization.

Table 4.3.2 Three Growth Type Classification in Case 3

	Name of Municipalities	Increase portion comparison
Slow growth (northern area)	Bacoor, Cavite City, Imus, Kawit, Noveleta, Rosario, Biñan, San Pedro, Santa Rosa	0.45 times in comparison with Case 1
Intermediate growth (mid area)	Carmona, Dasmariñas, General Trias, Naic, Silang, Tanza, Trece Martires City, GMA, Cabuyao, Calamba, Los Baños	1.2 times in comparison with Case1
Faster growth (southern area)	Alfonso, Amadeo, GEA, Indang, Magallanes, Maragondon, Mendez, Tagaytay City, Ternate	2.0 times in comparison with Case1

Figure 4.3.1 Case Comparison In terms of Population



Case Comparison in terms of population

	2005	2010	2020	2030
Case 1	5,011,900	6,037,443	7,852,822	9,534,475
Case 2	5,011,900	6,026,173	7,851,735	9,532,937
Case 3	5,011,900	6,033,646	7,859,069	9,531,557

Figure 4.3.2 Increase in Population (Case 1)

