8.4 Economic and Financial Analysis

8.4.1 Economic Analysis

In order to evaluate effectiveness of the project from the standpoint of the national economy, comparative analysis of economic cost and benefit both in the cases of implementation of this project (with the Project) and un-implementation (Without the Project) is carried out.

(1) Estimate of Project Benefits

1) Expected Project Benefits

In general, the benefits of urban rail transit projects vary from direct transport benefits to indirect environmental, social and economic benefits. These benefits are widely distributed among beneficiaries, not only passengers, but also other transport users and the local economy and society as well. Taking into account the project scale, the proposed station plazas will change traffic movement a little bit. The expected benefits of the project are briefly explained below.

- Railway Passengers

  Railway passengers will have shorter transfer time through the station plaza.

- Diverted Railway Passengers

  Diverted railway passengers will have less travel time and VOC decreases compared with the previous mode.

- Non-transport Sector

  Expected benefits from the project can be more extensive for the non-transport sector. These will include appreciation of land values to reflect urban reform and more effective development, provision of various job opportunities not only during the construction phase but also during operation, improvement of urban environment and enhancement of traffic safety. It should be noted that environmental degradation, such as air, water and noise pollution, might occur in some areas during the construction period. However, these negative effects could be minimized with necessary preventive measures.

  These expected benefits are summarized in Table 8.4.1.

Table 8.4.1 Expected Benefits of the Station Plaza Projects by Beneficiary

Benefit Type	Railway Passengers Using Station Plaza	Non-transport Activity/Society
Travel time saving	vv	-
Improved reliability	vv	-
Enhanced traffic safety	v	
Reduced air pollution and noise	v	v
Increased land value	-	vv
Job opportunities	-	vv

Note: vv - significant positive effects
v - expected positive effects

2) Estimation Method

The economic evaluation is done by comparing the benefits and costs of a project, both expressed in terms of economic prices over the project life. However, the economic consequences of such urban transit project are extensive, complicated and difficult to quantify.

In this study, the estimate of the benefits is limited to passenger time saving of the project and the reduction on operating costs of the diverted passengers in the project. The magnitude of the benefits on public road transport can be measured in terms of vehicle-kilometers with or without the project. On the other hand, the magnitude of the railway passenger time saving can be estimated by comparing railway travel speed with vehicle travel speed.

3) Value of Time (VOT) and Vehicle Operation Cost (VOC)

① VOT for Railway Passengers

The value of time by type of passengers as of 1996 was calculated by the DPWH based on the income approach, i.e. annual income divided by annual working hours, as follows:

Driver, otherwise and passenger	P 20.98/hour
Jeepney passenger	11.75
Bus passenger	14.14

* The wage of drivers and assistants (for truck drivers) is included in the VOC.

The VOTs are assumed to increase in real terms at 5.9%, 2.8% and 2.1% annually for the period of 1996-2000, 2000-2010 and 2010-2020, respectively, considering the economic framework of the region.

The VOT for railway passengers is estimated at ₱17.56/hour as of 1996 by the following considerations:

- The railway provided better service in terms of speed, punctuality and comfort more than that of bus and jeepney. Its VOT must be higher than that of buses.

- Most railway passengers were diverted from buses and jeepneys. The VOT must be considerably lower than that for car driver/owner.

The VOT for railway passengers during its operation period is determined accordingly as follows:

Year	VOT (₱/Hour)
(1996)	(17.56)
2000	22.1
2005	25.4
2010	29.1
2015	32.0
2020	35.1

② VOT and VOC for Public Road Transport

Table 8.4.2 summarizes the VOT and VOC for jeepney and bus. Exclusive tax is used in the economic evaluation of the project from the standpoint of national economy. For railway passengers ₱ 0.287/person-kilo is adopted.

Table 8.4.2 VOC and VOT for Public Road Transport, 1996

Type	Tax	Running Cost (₱/km)	Fixed Cost (₱/hour)	VOT (₱/vehicle-hour)
Jeepney	Excluding tax	1.670	56.520	58.26
	Including tax	2.130	60.240	63.96
Bus	Excluding tax	6.110	81.300	220.50
	Including tax	7.990	93.360	244.50

Source: DPWH, 1996
Note: Surface = paved, condition = fair

4) Estimation Results

The study ascertained some effect of the project on public road transport**.** The effect is to promote diversion of passengers from buses only and thus reduce their operations.

The results of the estimation for time saving benefit for railway passengers is summarized in Table 8.4.3, while the benefits of time saving and vehicle operating cost reductions are summarized in Table 8.4.4.

Table 8.4.3 Time Saving Benefit for Railways Passengers, Year 2015 at Monumento Station

Item	With	Without
• No. of Railway Passengers ('000/year)[A]	92,876	78,876
• Ave. transfer time (minutes)[B]	3	6
• Value of time (₱/hour)[C]	32.3	32.3
• Time value (million ₱/year)*	150	255
• Time Saving Benefit (million ₱/year)	105	-

* [A x B/60 x C/1000]
Average transfer time is 6.0 minutes from MMUTIS Passenger Interview Survey at LRT stations.

Table 8.4.4 Benefits of Vehicle Operating Cost Reduction for Public Road Transport, Year 2015, at Monumento Station

Item	2015
Bus (without case)	
• Diverted passengers ('000/year)[A]	7,000
• Passenger-hour ('000/year)[B]	2,940
• Vehicle-km ('000/year)[C]	1,178
• Vehicle-hour ('000/year)[D]	59
• VOC and VOT (million ₱/year)	112
Jeepney (without case)	
• Diverted passengers ('000/year)[A]	7,000
• Passenger-hour ('000/year)[B]	6,533
• Vehicle-km ('000/year)[C]	5153
• Vehicle-hour ('000/year)[D]	573
• VOC and VOT (million ₱/year)	272
Rail (with case)	
• Diverted passengers ('000/year)[A]	14,000
• Passenger-hour ('000/year)[B]	4,523
• VOC and VOT (million ₱/year)	180
Vehicle Operating Cost Reduction (million ₱/year)	397

(2) Estimate of Project Costs

In general, project costs can be expressed in two units, i.e. financial cost and economic cost. Financial costs are equivalent to investment costs while economic costs are costs that are adjusted based on the existing conditions of the economy where domestic taxes are excluded in the procurement of local products and special value is added in the procurement of foreign products (Fig. 8.4.1).

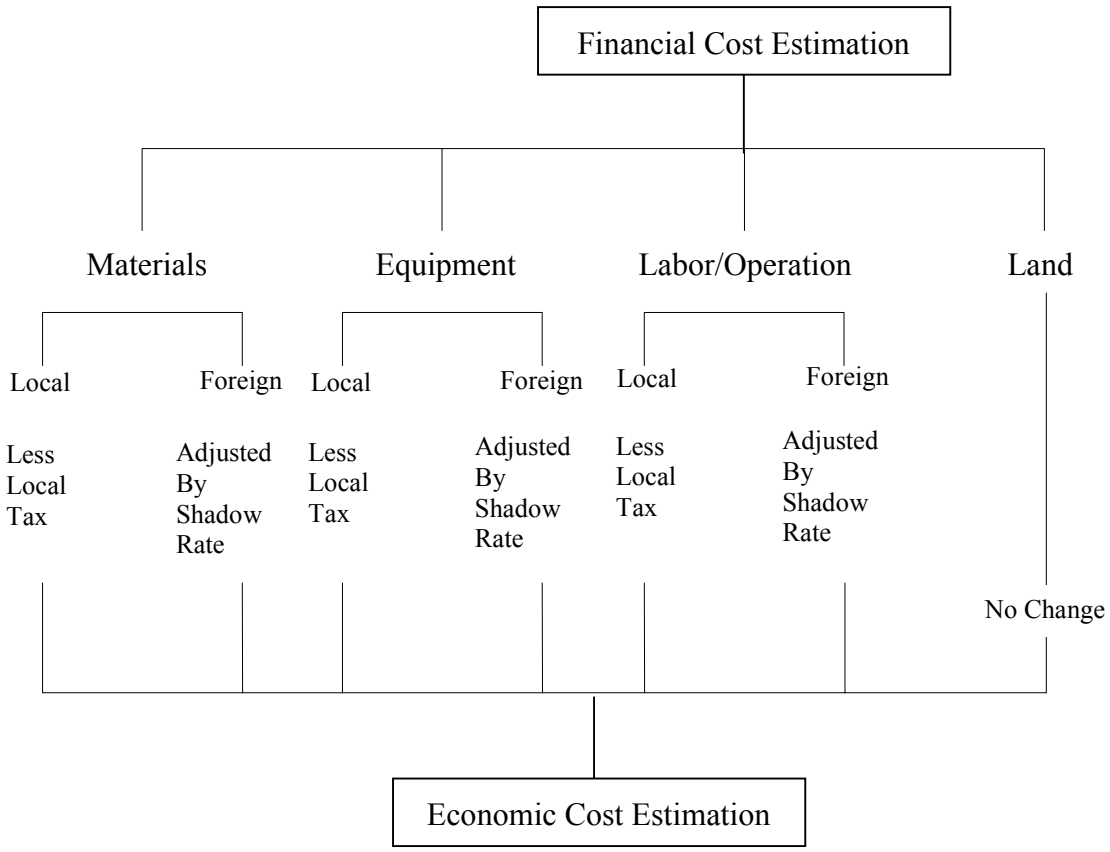

Fig. 8.4.1 Comparison Between Financial Cost and Economic Cost

As a practice in the Philippines, shadow pricing is used on financial costs (Foreign Cost (FC) x 1.2 and Local Cost (LC) x 0.8) to estimate economic cost except for land acquisition/compensation. The economic cost of the project is summarized in Table 8.4.5.

Prerequisite for the evaluation is considered as follows:

Exchange rate

P1=Japanese Yen 2.28 as of October, 2000

Economic price

Price subtracting tax is regarded as transfer item from the standpoint of the national economy, from the market price as of October 2000 (economic price) is used in this study. The price is fixed for the period of analysis.

Reinvestment

The same amount of initial investment of depreciable assets is reinvested in the year following the expiration of its useful life.

Residual value

The un-amortized portion of depreciable assets, as residual value, will be counted as negative investments.

Inflation

Inflation is not considered in the analysis. For its virtually impossible to forecast the inflation rate for the 30-years period.

Table 8.4.5 Capital Cost Investment Schedule at Monumento Station

(Million~~₱~~)

Item	Year				
	2001	2002	2003	2004	2005
Building	-	-	21.88	-	-
Truck	-	-	-	-	-
Platform	-	-	0.32	-	-
Shelter	-	-	0.45	-	-
Elevator	-	-	-	442.11	-
Escalator	-	-	-	105.60	-
Ticket Vending Machine	-	-	-	70.74	-
Automatic Gate Fare Machine	-	-	-	17.89	-
Engineering & Consulting	32.00	21.33	-	-	-
Total (Station Facilities)	32.00	21.33	22.65	636.34	-
Land Acquisition	-	338.40	-	-	-
Pedestrian Deck	-	-	-	76.69	76.69
Access Road	-	-	12.00	-	-
Pavement	-	-	5.44	-	-
Environmental Zone	-	-	-	6.12	-
Shelter	-	-	-	0.38	-
Lighting	-	-	-	-	0.42
Engineering & Consulting	30.42	20.28	-	-	-
Total (Station Plaza)	30.42	380.01	17.44	83.19	77.11
Total	4.1%	29.7%	3.1%	56.3%	6.0%
1279.16	62.41	381.74	40.09	719.53	77.11

Table 8.4.6 Capital Cost Investment Schedule
at Magallanes Station

(Million~~₱~~)

Item	Year				
	2001	2002	2003	2004	2005
Building	-	-	21.88	-	-
Truck	-	-	-	14.16	-
Platform	-	-	0.39	-	-
Shelter	-	-	-	-	-
Elevator	-	-	-	31.58	-
Escalator	-	-	-	91.20	-
Ticket Vending Machine	-	-	-	94.32	-
Automatic Gate Fare Machine	-	-	-	23.16	-
Engineering & Consulting	13.68	9.12	-	-	-
Total (Station Facilities)	13.68	9.12	22.27	254.41	-
Land Acquisition	-	82.65	-	-	-
Pedestrian Deck	-	-	-	46.02	46.02
Access Road	-	-	16.86	-	-
Pavement	-	-	7.95	-	-
Environmental Zone	-	-	-	8.45	-
Shelter	-	-	-	0.54	-
Lighting	-	-	-	-	0.03
Engineering & Consulting	12.69	8.46	-	-	-
Total (Station Plaza)	12.69	91.11	24.82	55.01	46.05
Total	5.0%	18.9%	8.9%	58.5%	8.7%
529.15	26.37	100.23	47.08	309.42	46.05

(3) Benefit and Cost Analysis

The results of the benefit and cost analysis for the project are shown in Tables 8.4.7 and 8.8. The calculated EIRRs are 14.4% and 31.0% for Monumento and Magallanes respectively. Monumento Station Plaza project including station facilities improvement is not economically feasible, with an EIRR below the threshold set by NEDA (15%) because of the expensive land acquisition and elevator facility. However, considering the fact of sensitivity analysis (Table 8.4.8), implementation of the proposed Monumento Station Plaza project is feasible under the condition of private sector's participation and the Magallanes project is feasible economically and can be justified for implementation.

Table 8.4.7 Economic Evaluation of the Project (for 30 years) at Monumento Station

(Million₱)

Year	Capital Cost	O&M Cost	Time Saving for Passengers	VOC Reduction	Net Benefit
2001	62.41				-62.41
2002	380.01				-380.01
2003	40.49				-40.49
2004	719.53				-719.53
2005	77.11				-77.11
2006		38.03	54.50	116.62	133.09
2007		38.03	58.83	125.28	146.08
2008		38.03	63.50	134.62	160.09
2009		38.03	68.54	144.65	175.17
2010		38.03	73.99	155.45	191.41
2011		38.03	79.32	166.11	207.40
2012		38.03	85.03	177.51	224.52
2013		38.03	91.16	189.71	242.84
2014		38.03	97.73	202.76	262.45
2015		38.03	104.77	216.71	283.45
2016		38.03	112.32	231.64	305.92
2017		38.03	120.41	247.61	329.98
2018		38.03	129.08	264.69	355.74
2019		38.03	138.38	282.96	383.31
2020		38.03	148.35	302.51	412.84
2021		38.03	159.04	323.43	444.45
2022		38.03	170.50	345.81	478.29
2023		38.03	182.79	369.77	514.52
2024		38.03	195.96	395.39	553.32
2025		38.03	200.07	402.68	564.72
2026		38.03	204.27	410.12	576.36
2027		38.03	208.56	417.72	588.25
2028		38.03	212.94	425.47	600.39
2029		38.03	217.41	433.39	612.78
2030	-38.63	38.03	221.98	441.48	664.06

EIRR =14.4%

Table 8.4.8 Economic Evaluation of the Project (for 30 years) at Magallanes Station

(Million~~₱~~)

Year	Capital Cost	O&M Cost	Time Saving for Passengers	VOC Reduction	Net Benefit
2001	26.37				-26.37
2002	100.23				-100.23
2003	47.08				-47.08
2004	309.42				-309.42
2005	46.05				-46.05
2006		17.03	31.58	175.78	190.33
2007		17.03	34.08	190.52	207.58
2008		17.03	36.79	206.47	226.23
2009		17.03	39.71	223.73	246.41
2010		17.03	42.86	242.40	268.24
2011		17.03	45.95	260.58	289.50
2012		17.03	49.26	280.10	312.34
2013		17.03	52.81	301.07	336.85
2014		17.03	56.62	323.59	363.18
2015		17.03	60.70	347.77	391.44
2016		17.03	65.07	373.74	421.78
2017		17.03	69.76	401.62	454.35
2018		17.03	74.78	431.57	489.32
2019		17.03	80.17	463.72	526.86
2020		17.03	85.95	498.24	567.16
2021		17.03	96.98	513.16	593.11
2022		17.03	101.82	544.91	629.69
2023		17.03	106.96	578.83	668.76
2024		17.03	112.42	615.10	710.50
2025		17.03	118.23	653.88	755.09
2026		17.03	124.42	695.34	802.73
2027		17.03	130.99	739.69	853.66
2028		17.03	137.99	787.13	908.10
2029		17.03	140.89	805.12	928.98
2030	-52.80	17.03	143.85	823.48	1003.11

EIRR = 31.0%

Table 8.4.9 Sensitivity Analysis

		Cost					
		Monumento			Magallanes		
		-20%	same	+20%	-20%	same	+20%
Demand	-20%	14.4%	12.0%	10.1%	31.0%	26.9%	24.0%
	Same	17.0%	14.4%	12.4%	35.5%	31.0%	27.7%
	+20%	19.3%	16.5%	14.4%	39.5%	34.6%	31.0%

Table 8.4.10 Useful Life and Maintenance Rate

Item	Useful Life (Year)	Maintenance Rate (%, p.a.)	Remarks
Building	50	3.1	
Platform	50	3.1	
Track	60	3.1	Rail: Foreign portion
Automatic Gate Fare Machine	15	5.0	Foreign portion
Elevator	15	5.0	Foreign portion
Escalator	15	5.0	Foreign portion
Automatic Ticket Vending Machine	10	5.0	Foreign portion
Shelter	10	5.0	
Pedestrian Deck	50	3.1	
Street Light	10	3.1	
Environmental Zone	10	3.1	
Access Road	-	3.1	
Pavement	-	3.1	

8.4.2 Financial Analysis

(1) Objective and Method of Financial Analysis

1) Objective

The objective of the financial analysis is to analyze and evaluate the profitability of the project and the cash flow as the result of the implementation of the project.

2) Method of Financial Analysis

The Financial Internal Rate of Return (FIRR) is calculated as an index for evaluating the profitability of the project. The FIRR is the discount rate which would make aggregate total of the net present value of cash flow for each year of the project life become zero. It is expressed by the following equation.

$$0 = \sum_{i=1}^{n} Ai/(1+FIRR)^{i-1}$$

where n : project life
Ai : cash flow

Cash flow is obtained by the following equation:

Cash flow = Operating revenue – Operating cost + Depreciation cost – Investment cost

Net cash flow is obtained by the following equation:

Net cash flow = Cash flow + Financed amount – (Loan repayment + Interest payment)

Several fund raising plans are assumed and net cash flow for each year of the project life is calculated. Net cash flow is analyzed and evaluated the debt repayment ability and the soundness of the fund raising plan.

Sensitivity analysis are conducted in the case of cost overrun and reduction, and revenue reduction and increase.

3) Premises for Calculation

Market price

The prices of the materials, equipment, commodities and man-power to be used in this project are as of October, 2000 and determined as follows:

When locally procured
Market price is adopted.

When imported
CIF price plus custom duty(30%)

Foreign exchange rate, inflation
As to these, the same premises as in the economic analysis are assumed.

Project life, etc
As to the project life, reinvestment, useful life, maintenance rate and residual value, the premises are the same as in the economic analysis.

Depreciation method
The straight-line depreciation method is applied.

(2) Project for Analysis

Case (A) Financial Analysis of development of Monument station and the station plaza.

Case (B) Financial Analysis of development of Magallanes (LRT Line 3 and PNR/MCX) station and the station plaza.

(3) Fund Raising Plan

Terms and conditions of each financing source

	Interest Rate (%,p.a)	Term (Years)	Grace (Years)	Repayment
Domestic Peso				
Borrowing	15	15	3	Annual Installment
(Local currency portion)				
JBIC	1	40	10	Semi-Annual Installment
(Government to Government Borrowing)				
(Foreign currency portion)				

(4) Investment Cost

The total estimated investment cost is as follows.

(Unit: 1000 Peso)

	Monument		Magallanes	
Station		611,057		260,733
	(Local currency	52,388)	(Local currency	33,498)
	(Foreign currency	558,669)	(Foreign currency	227,235)
Station plaza		580,882		242,296
	(Local currency	494,751)	(Local currency	194,045)
	(Foreign currency	86,131)	(Foreign currency	48,251)
Total		1,191,939		503,029
	(Local currency	547,139)	(Local currency	227,543)
	(Foreign currency	644,800)	(Foreign currency	275,486)

Comparatively big investment items are as follows.

(Unit: 1000Peso)

	Monument	Magallanes	Difference
Building	24,313	24,313	0
Truck	0	12,000	-12,000
Elevator	368,421	26,316	+342,105
Escalator	88,000	76,000	+12,000

Ticket Vending Machine	58,947	78,597	-19,650
Automatic Gate Fare Machine	14,912	19,298	-4,386
Engineering & Consulting	55,551	23,750	+31,801
Station plaza			
Land	338,400	82,650	+255,750
Pedestrian Deck	159,776	95,866	+63,910
Access Road	15,000	21,080	-6,080
Pavement	6,800	9,940	-3,140
Environmental Zone	7,290	10,062	-2,772
Engineering & Consulting	52,808	22,027	+30,781

(5) Operating Expense

The operating expense is calculated based on maintenance cost and depreciation cost.

1) Maintenance cost

It is calculated applying the maintenance rate given in 8.4.1to the increased assets in the project.

2) Depreciation cost

As to the depreciation cost, the straight line depreciation method is applied, useful life being assumed as the same as in economic analysis.

There is no new investment in the case (A) and the case (B) from 2006, total maintenance cost and depreciation cost are unchanged until the end of the project life.

(Unit: 1000 Peso)

Case (A)	
Maintenance cost per year	33,195
Depreciation cost per year	41,869
Total	75,064
Case (B)	
Maintenance cost per year	15,429
Depreciation cost per year	19,653
Total	35,082

(6) Revenue

Operating revenue is calculated by applying unit fare to the diverted traffic volume.

Fare levels are shown below.

LRT 1	1.41 Peso / passenger-km
LRT 3	1.41 Peso / passenger-km
PNR	1.05 Peso/ passenger-km

(7) Operating Profit

The operating profit is shown below.

(Unit: 1000 Peso)

Case (A)

	2006	2015	2030
Operating revenue	105,615	163,842	254,178
Operating expense	75,064	75,064	75,064
Operating profit	30,551	88,778	179,114

Case (B)

	2006	2015	2030
Operating revenue	136,438	211,662	307,246
Operating expense	35,082	35,082	35,082
Operating profit	101,356	176,580	272,164

(8) Net Cash Flow and Cumulative Net Cash Flow

(Unit: 1000 Peso)

Case (A)

	2006	2015	2029
Net cash flow	-25,380	26,052	185,491
Cumulative net cash flow	-25,380	-180,343	1,681,420

Case (B)

	2006	2015	2029
Net cash flow	66,383	136,486	272,457
Cumulative net cash flow	66,383	2,146,601	5,379,952

In the case of Case (A), net cash flow becomes positive from 2014 and the cumulative deficit turns positive in 2020.

In the case of Case (B), net cash flow becomes positive from the first year after the construction period.

(9) Cash Flow

Both cash flows of Case (A) and Case (B) become positive from the first year after the construction period except 2019 of Case (A). In the Case (A), big amount is re-invested in 2019.

(10) FIRR and Evaluation

	FIRR
Case (A)	7.02%
Case (B)	28.64%

The reason why FIRR of Case (B) is high level, is that investment cost is small as mentioned in (5) investment cost and revenue gets from LRT 3 and PNR. As to the land in the station plaza, it is owned by government and there is no need to pay money.

On the other hand, FIRR of Case (A) is low level comparatively, because investment cost is so big, especially land acquisition and escalators.

If the construction of Case (A) and (B) starts at same time and FIRR calculates totally, FIRR becomes 15.26%.

WACC (Weighted Average Cost of Capital)

Monument (Total investment cost)

Local currency	547,139	× 15% =	82,071
Foreign currency	644,800	× 1% =	6,448
Total	1,191,939		88,519

88,519 ÷ 1,191,939 = 7.43%

Magallanes (Total investment cost)

Local currency	227,543	× 15% =	34,131
Foreign currency	275,486	× 1% =	2,755
Total	503,029		36,886

36,886 ÷ 503,029 = 7.33%

FIRR of Case (A) is almost same percentage as WACC of Case(A)
FIRR of Case (B) > WACC

(11) Sensitivity Analysis

Table 8.4.10

(Unit: FIRR)

		Cost					
		Monument Case (A)			Magallanes Case(B)		
		-20%	Unchanged	＋20%	-20%	Unchanged	＋20%
Revenue	-20%	7.02%	4.70%	2.88%	28.64%	24.54%	21.37%
	Unchanged	9.47%	7.02% (Base Case)	5.11%	33.02%	28.64% (Base Case)	25.27%
	＋20%	11.59%	9.01%	7.02%	36.81%	32.20%	28.64%

8.5 Environmental Consideration and Scenic Views

8.5.1 Objectives of the Study

This Study intends to review and examine the proposed selected stations and plazas in terms of environmental consideration and scenic view on the basis of the formulation of a Master Plan Study and Preliminary Feasibility Study for the integration of the railway transport system in Metro Manila and implementation of a preliminary design study on Monumento and Magallanes areas as selected nodal stations.

In relation to these selected Monumento and Magallanes stations and their plazas, environmental impacts mainly on social environment are expected when implemented. The study team has therefore conducted an Initial Environmental Examination (IEE), in order to examine potential positive and negative environmental impact assessment (EIA) and social impact assessment (SIA) for the further detailed design study stage.

(1) Study Area and Study Method

The survey was carried out around the Monumento and Magellanes stations, as there are potential impacts not only within the project area itself but also in the areas surrounding it. Impacts for the short, medium, and long-term range including the construction period

were considered. Social condition survey included items on relocation of houses, land prices, vicinity population, scenic conditions and related items.

The study has been carried out in line with the Environmental Guidelines for the Infrastructure Projects-IV Railway prepared by JICA together with consideration of the environmental laws and rules roles in the Philippines and the Philippine Environmental Impact Statement (EIS) System. The work is based on site visits to the project locations and related areas, results of meetings and discussions with representatives of related sectors, and review of documents, regulation and data concerning the project.

8.5.2 Description of the Present Environment of the Study Area

(1) Social Environment

Site reconnaissance survey was carried out to obtain the general information on social conditions and land use of the area for possible sites from viewpoints of social and environmental issues related to land acquisition of possible project sites.

1) General socio-economic conditions of Monumento area

The Monumento area is situated near the junction of the two major roads of EDSA and Rizal Avenue at the Central Business District (CBD) in Caloocan City. In addition, the Monumento area tends to be recognized as the North Gateway of the National Capital Region (NCR) in the urban development strategy. Land use in most of the area is composed of commercial, and mixed use of commercial and residential along Rizal Avenue. Existence of a bus transportation terminal area also characterizes the area. Residential use is allocated at the inland area off the main road margins and some small industrial uses are scattered within these residential use areas.

Population-wise, 21,000 people inhabit 11 barangays that are located adjacent to the Monumento area. Since Monumento is a terminal station of LRT Line-1 and approximately 153,000 passengers use the railway daily, the volume of buses and jeepneys around the area reaches over 7,000 a day, excluding those of other motor vehicles. As a result, traffic condition is always congested due to daily transition activities of the citizens. Furthermore, the narrow and irregularly-formed sidewalk of Rizal Avenue poses difficulty of smooth pedestrian flows towards the station access. Fig. 8.5.1 shows the project area at Monumento and urban built-up area.

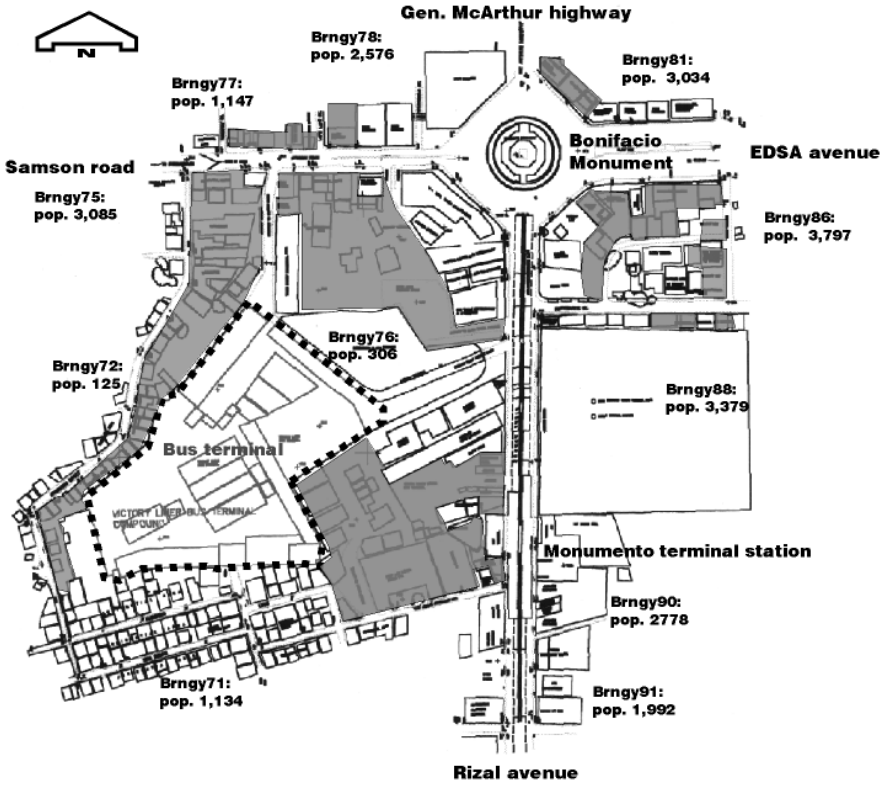

Fig.8.5.1 Project Area at Monumento and Urban Built-up Area

Existing environmental condition and scenic views at the Monumento area

The existing conditions of the project area are shown by scenic views depicted through sketches drawn at representative locations.

View to the Monument of the circle through Rizal Avenue: continuous viaduct structure of the LRT line-1 occupies clear vista line (Fig. 8.5.2). Station stairway to the platform: Large numbers of passengers on the stairway being controlled for entry to the LRT platform (Fig.8.5.3).

Fig.8.5.2 View to the Monument at Rizal Ave.

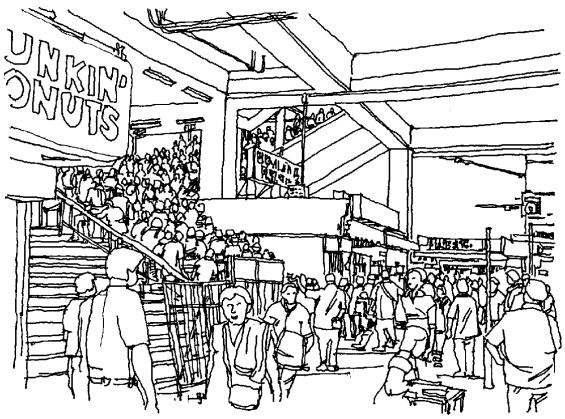

Fig.8.5.3 Crowd at the Access to the Station

Streetscape toward the station on Rizal Avenue: Narrow, irregular and several changes of sidewalk levels make it difficulty for pedestrians to walk (Fig.8.5.4). Jeepney depot along the corridor beside a shopping mall: Jeepneys waiting along the corridor to fill up to capacity before they depart rolling stock of LRT can be observed on the railway viaduct (Fig.8.5.5).

Fig.8.5.4 Streetscape to the Station on Rizal Ave.

Fig. 8.5.5 Jeepney Depot at the Corridor

Jeepney terminal in front of the shopping center: A wide sheltered space provides a comfortable waiting area to board a jeepney (Fig.8.5.6). Streetscape toward the station on the west side of Rizal Avenue: Makeshift shops almost totally occupy the sidewalk and pedestrians even walk on the carriageway (Fig.8.5.7).

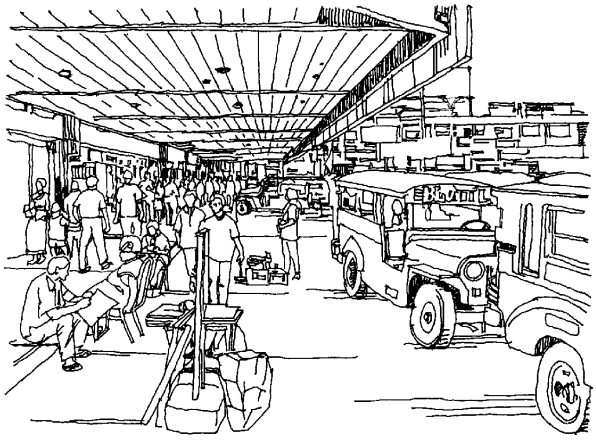

Fig. 8.5.6 Jeepney Terminal at the Circle

Fig.8.5.7 Streetscape to the Station, Rizal Ave.

Bus terminal of Victory Liner: Medium- to long-distance bus transportation is available near the railway station; the departure and arrival gateway of buses is also shown (Fig.8.5.8). National historical asset: Bonificio Monument at the Circle of EDSA Rizal Avenue (Fig.8.5.9).

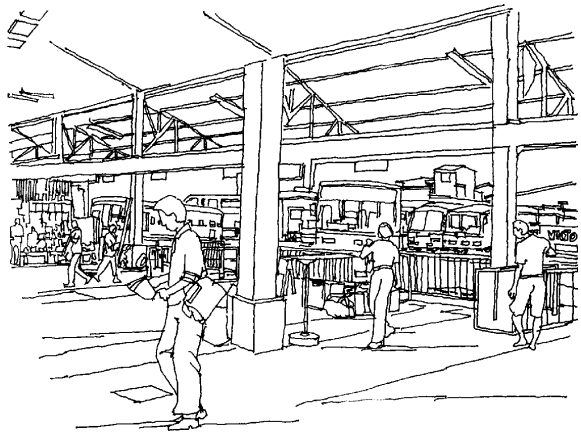

Fig.8.5.8 Bus Terminal of Victory Liner

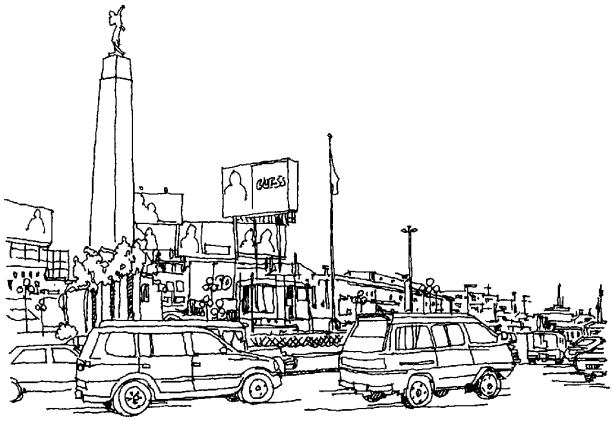

Fig.8.5.9 Bonifacio Monument at the Circle

2) General socio-economic conditions of Magallanes area

Magallanes area is situated at the urban traffic trunk spines where cross sections meet with EDSA , Chino Roces Avenue, Pres. Sergio Osmena highway and LRT line-3, as well as the PNR line in the southern part of Makati City. This location is intended to be a nodal core of the railway transfer.

Land use of the vicinity is composed of commercial, industrial and mixed use of all three. Vacant open spaces are found under the viaducts of the highway and its ramps. LRT line-3 occupies quite a large area in total. Residential use is allocated inland off the traffic roads and railways. In this vicinity commercial and industrial use areas are even large in their scale, occupying the subdivision blocks.

Population-wise in the Magallanes area, there are four villages found with a combined population of 43,188 people. Today, Magallanes station of LRT line-3 is being used by approximately 16,000 passengers while PNR's EDSA station accounted for only 1,000 passengers a day. Informal settlements along the PNR waysides and at spaces under the highway viaducts are the specific character of this area. Fig. 8.5.10 shows the project area at Magallanes and urban built-up area.

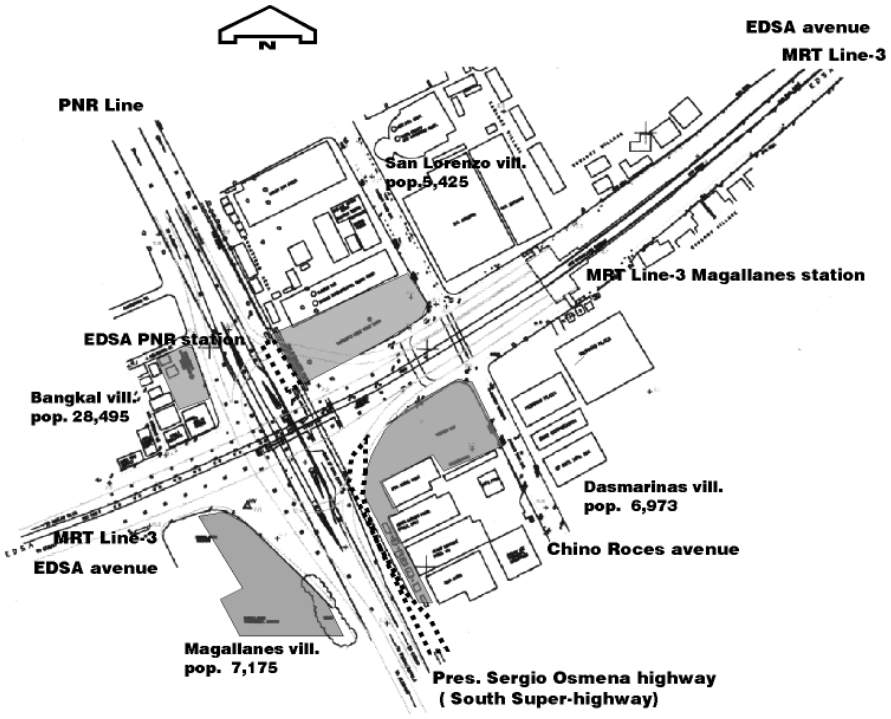

Fig.8.5.10 Project Area at Magallanes and Urban Built-up Area

Existing environmental condition and scenic views at the Monumento area

The existing conditions of the project area are shown by scenic views depicted through sketches drawn at representative locations.

LRT line-3, Magallanes station: Work on the access stairway and elevator is underway (Fig.8.5.11). Overview of the PNR station at EDSA: Station and wayside facilities have deteriorated and few passengers use it daily (Fig. 8.5.12).

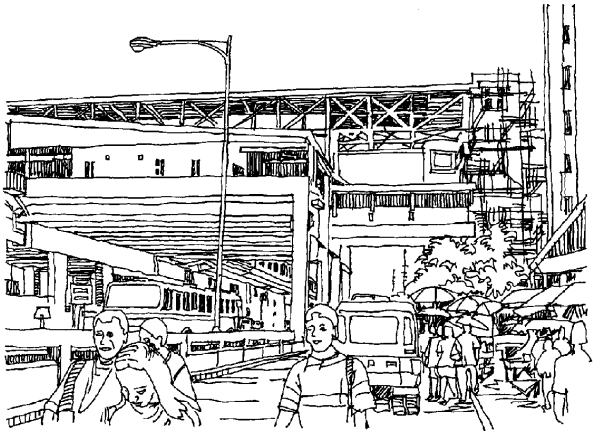

Fig.8.5.11 LRT Line-3, Magallenes Station

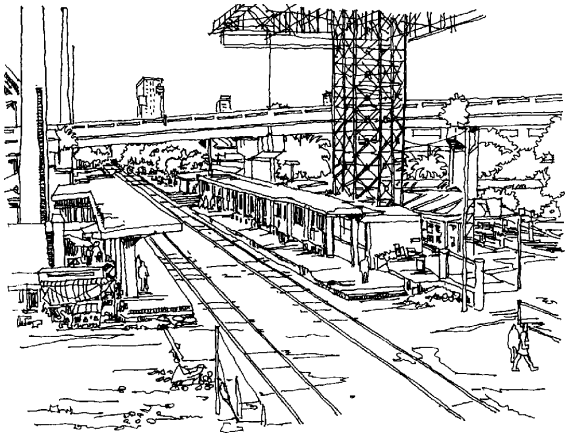

Fig.8.5.12 View of the EDSA Station of PNR

Spaces underneath the highway viaduct adjacent to the PNR wayside: The open vacant spaces are used at random by pedestrians to access their secondary transport modes (Fig.8.5.13). Jeepney depot at a space under the viaduct of LRT line-3: A number of jeepneys are seen parked in this area for checkups on vehicle condition, and their departure times are adjusted accordingly (Fig. 8.5.14).

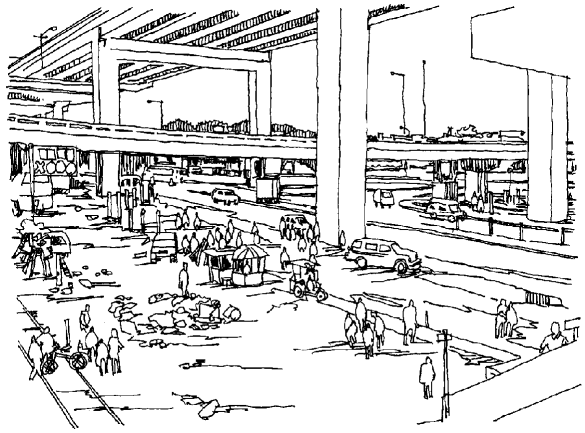

Fig.8.5.13 Spaces Under the Highway

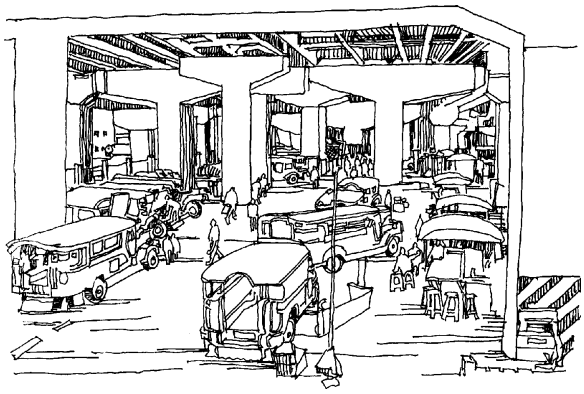

Fig.8.5.14 Jeepney Depot Under the Viaduct

Overview of the street at EDSA side pass: Makeshift shops are fully occupying the sidewalk spaces of the road (Fig.8.5.15). Informal settlements near under the viaduct of the highway ramp way Many informal settlements are gathered at the back side of the EDSA station of PNR (Fig.8.5.16).

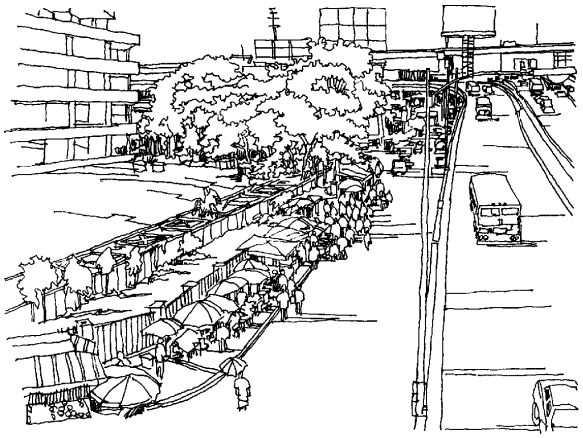

Fig.8.5.15 View of the Street Side of EDSA

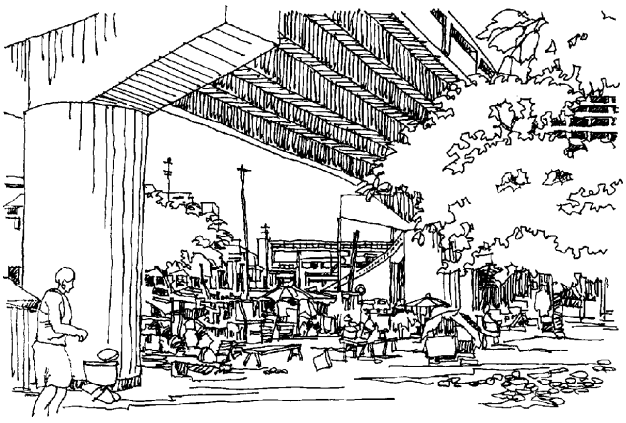

Fig.8.5.16 Informal Settlements

Congested street intersection at Chino Roces Avenue and EDSA side pass:
Due to the narrow viaduct pass under MRT line-3, traffic jams are always occurred with critical bottleneck section. Insufficient sidewalk width coupled with the encroachment of makeshift shops add to traffic congestion in the vicinity (Fig.8.5.17) Informal settlements are observed along the PNR waysides and some places under the viaduct of the highway ramps (Fig.8.5.18).

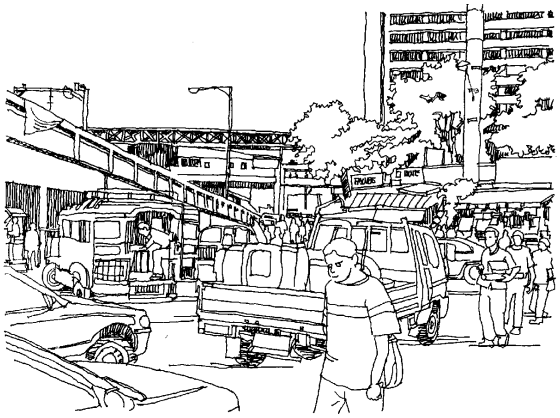

Fig.8.5.17 Congested street Intersection

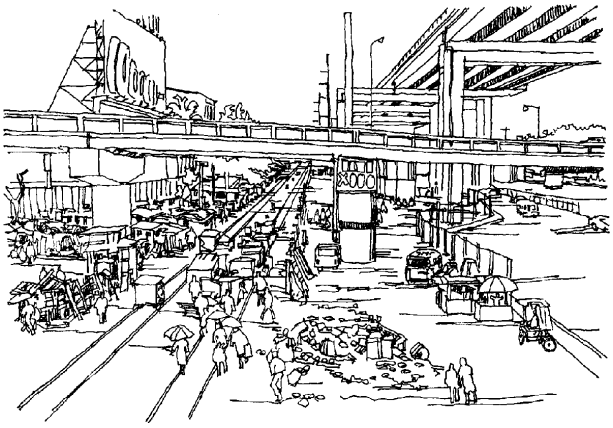

Fig.8.5.18 Informal Settlements Along PNR

(2) Natural Environment and Pollution

Since the respective project areas of Monumento and Magallanes are situated in the urban built-up area of Metro Manila, which has long since been developed for several decades now, and has very limited natural environmental element remaining. As a natural environmental element, the terrain of each area is characterized by low-lying flat lands with governing discharge problem of surface water. In addition, a pounding phenomenon on the roads whenever it rains has been observed in the area.

In terms of natural vegetation, almost none can be found because the built-up area has left no space for wild plants to grow. Only gardened and landscaped spaces could have some trees and flowering shrubs grown in partial privately-owned spaces.

With regard to pollution, since these project areas are identified as two of the most traffic congested nodal areas, their environmental conditions are measured in terms of motor vehicle emission gases and noise levels originating from traffic volume.

8.5.3 General Outlines of the Philippine Environmental Impact Statement (EIS) System

(1) Background

The 1987 Philippine constitution laid down the basic framework for the policy on the environment. To implement this policy, an Executive Order issued designated the Department of Environment and Natural Resources (DENR). Its Environmental Management Bureau (EMB) is specifically tasked "to recommend rules and regulations for environmental impact assessments and provide technical assistance for their implementation and monitoring."

(2) The Philippine Environmental Impact Statement (EIS) System

The Philippine Environmental Policy (PD 1151) is the first policy issuance on Environmental Impact Statement (EIS) system in the Philippines. Effective since 1977, it requires that all agencies and instrumentalities of the national government, including government owned and controlled corporations, private corporations, firms and entities to prepare an environmental impact system (EIS) for every action, project or undertaking which significantly affects the quality of the environment. The EIS system was formally established in 1987. Reiterating the policy statement, it declared environmentally-critical projects and project within environmentally-critical areas as projects which require the submission of the EIS. Also the policy statement identifies the lead agency for the implementation of the EIS system and provided sanctions for its violation.

8.5.4 Initial Environmental Examination

For the selected objective Monumento and Magallanes stations and their plazas, initial environmental examination (IEE) has been conducted and summarized in tabular form in the following sub-chapters.

(1) Project Description

A general outline of the Project Description of the Study is shown below.

Table.8.5.2 Project Description

Items	Contents
Name of the Project	The Study on the Standardization for Integrated Railway Network of Metro Manila (SIRNMM)
Background	Problem of the transport sector is one of the most serious problems in Metro Manila. Recently the transport problem has gotten more serious due to i) outstanding population concentration to Metro Manila. ii) expansion of urbanized area, iii)advance of motorization by income and population increase, iv) insufficient road network, and v) lack of integrated transport policy.
Objectives	The integration of the rail transport system in Metro Manila and implementation of station and its plaza as for nodal station.
Location	LRT-line 3 Magallanes and PNR-EDSA station area in Makati city LRT-line1 Monumento station area in Caloocan city
Implementation organization	Department of Transportation and Communications (DOTC)
Benefiting population	Users around Monumento station and along waysides of LRT-line1, PNR-EDSA station and MRT-line 3. Approx. 250,000 to 300,000 persons.
Details of plan	
Context of work	Innovation of the station and development of station plaza with an area of 1.3 ha. Fulfillment of station equipment, transportation terminal such as for bus, jeepney, taxi, and etc. and plaza spaces for transition function.
Classification of Power / Character / Form	Power: Electric
Length of railway	Existing railway length: (One of the objectives of the project is equipment fulfillment for station and plaza development)
Station / Station facility	Existing LRT-line1 Magallanes, PNR-EDSA station and LRT-line 3 Monumento station. Equipment fulfillment for the station
Attached facilities	Plaza's functional facilities: Pedestrian decks, shelters at bus, jeepneys and taxi bays
Demand	Passenger : persons /year, Approx. 930,000,000 to 1,200,000,00 persons/year in 2015.
Other specific matters	

(Note) Survey is conducted within information obtainable from existing documents.

(2) Site Description

A general outline of the Site Description for Monumento and Magallanes areas is shown in the following tables-Table 8.5.3. and Table 8.5.4.

Table 8.5.3 Site Description (Monumento Area)

Items	Contents
Name of the Project	The Study on the Standardization for Integrated Railway Networkof Metro Manila (SIRNMM)
Background	Refer to the background description given on the 4 projects, the integration of the rail transport system in Metro Manila and implementation of the existing station innovation and developmentof its station plaza.
Objectives	The integration of the rail transport system in Metro Manila and implementation of Monumento station innovation and development of its station plaza.
Location	LRT-line1 Monumento station area in Caloocan city, Metro Manila
Implementation organization	Department of Transportation and Communications (DOTC)
Benefiting population	Number of users around Monumento station and along the way of LRT-line 3. Approximately 250,000 persons.
Details of plan	
Context of work	Innovation of the station and development of station plaza of 1.3 ha area. Fulfillment of station equipment, transportation terminal such as for bus, jeepney, taxi, and etc. and plaza spaces for transition function.
Classification of Power / Character / Form	Power: Electric,
Length of railway	Existing railway length: (One of the project objectives is equipment fulfillment for station and plaza development)
Station / Station facility	Existing LRT-line1 Monumento station: Equipment fulfillment for the station
Attached facilities	Plaza's functional facilities: Pedestrian decks, shelters at bus, jeepneys and taxi bays
Demand	Passenger : persons /year, Approx. 930,000,000 persons/year in 2015.
Other specific matters	

(Note) Survey is conducted within information obtainable from existing documents.

Table 8.5.4 Site Description of Magallanes Area

Items	Contents
Name of the Project	The Study on the Standardization for Integrated Railway Network of Metro Manila (SIRNMM)
Background	Refer to the background description given on the 4 projects, the integration of the rail transport system in Metro Manila and implementation of the existing station innovation and development of its station plaza.
Objectives	The integration of the rail transport system in Metro Manila and implementation of Monumento station innovation and development of its station plaza.
Location	LRT-line 3 Magallanes and PNR-EDSA station area in Makati city, Metro Manila
Implementation organization	Department of Transportation and Communications (DOTC)
Benefiting population	Number of users around Monumento station and along the way of LRT-line 3 Magallanes and PNR-EDSA station. Approximately 300,000 persons.
Details of plan	
Context of work	Innovation of the station and development of its plaza with an area of 1.3 ha. Fulfillment of station equipment, transportation terminal such as for bus, jeepney, taxi, and etc. and plaza spaces for transition function.
Classification of Power / Character / Form	Power: Electric
Length of railway	Existing railway length: (One of the project objectives is equipment fulfillment for station and plaza development)
Station / Station facility	Existing LRT-line3 Magallanes and PNR-EDSA station: Equipment fulfillment for the station
Attached facilities	Plaza's functional facilities: Pedestrian decks, shelters at bus, jeepneys and taxi bays
Demand	Passenger : persons /year, Approx. 116,000,000 persons/year in 2015.
Other specific matters	

(Note) Survey is conducted within information obtainable from existing documents.

(3) Screening of the Project

On the basis of the project description each objective project area has been checked through information gathered and discussion with DOTC and officials of related government agencies concerned with the Screening of the Projects. The results are summarized in Table 8.5.5. and Table 8.5.6.

Table 8.5.5 Screening of the Project at Monumento Area

Items of environment		Contents	Evaluation
1. Social Environment			
1	Transfer of dwellers	Transfer upon acquisition of lands (dwelling right, transfer of land ownership)	**Yes** No Unknown
2	Economic activities	Loss of means of production e.g. lands: Change of economic structures	Yes **No** Unknown
3	Transportation and Living facilities	Effects to present traffic jam, traffic accident to schools, hospitals, etc.	Yes **No** Unknown
4	Breakup of Communities	Breakup of local communities with traffic barrier	Yes **No** Unknown
5	Ruins, cultural assets	Loss and /or deterioration of temples, shrines and hidden cultural assets	**Yes** No Unknown
6	Water, Fishing and Forest rights	Disturbances to water, fishing and forest utilization rights	Yes **No** Unknown
7	Health	Deterioration of health environment due to garbage, outbreak of noxious insects, etc.	Yes **No** Unknown
8	Refuse	Generation of construction refuse, extra soil and refuse in general	**Yes** No Unknown
9	Natural disaster (Risk)	Increasing danger of land collapse, landslide and other accidents	Yes **No** Unknown
2. Natural environment			
10	Topography, geography	Change of valuable topographic and geographic natures with digging and /or filling of soil	Yes **No** Unknown
11	Soil erosion	Loss of top soil with rainfall as the results of land opening and cutting of forest trees	Yes **No** Unknown
12	Underground water	Drying up of underground water as the result of digging and following drainage	Yes **No** Unknown
13	Situation of lakes and rivers	Change of water flow and river bed with reclamation and inflow of drainage water	Yes **No** Unknown
14	Coast, Sea	Coast erosion and soil accumulation with reclamation and change of current	Yes **No** Unknown
15	Animals and plants	Obstruction of multiplication and extinction of species with the change of living conditions	Yes **No** Unknown
16	Climate	Change of temperature and wind with large scale land opening and construction	Yes **No** Unknown
17	Scenery	Change of topography with land opening and disturbance in harmony with construction	Yes **No** Unknown
3. Public Hazard			
18	Air pollution	Pollution with exhaust gas and noxious gas of vehicles and factories	Yes **No** Unknown
19	Water contamination	Water contamination with inflow of eroded soil and factory wastewater	Yes **No** Unknown
20	Soil contamination	Contamination with dust, agricultural pesticides, chemicals and asphalt etc.	Yes **No** Unknown
21	Noise, vibration	Occurrence of noise and vibration caused by vehicles etc.	**Yes** No Unknown
22	Sinking of land altitude	Sinking of land surface caused by changing of land formation and lowering ground water table	Yes **No** Unknown
23	Offensive odor	Occurrence of exhaust gas and ill smelling substances	Yes **No** Unknown
General evaluation:		Is this a project that requires implementation of or EIA?	**Yes**

Table 8.5.6 Screening of the Project (Magallanes Area)

Items of environment		Contents	Evaluation
1. Social Environment			
1	Transfer of dwellers	Transfer upon acquisition of lands (dwelling right, transfer of land ownership)	**Yes** No Unknown
2	Economic activities	Loss of means of production e.g. lands: Change of economic structures	Yes **No** Unknown
3	Transportation and Living facilities	Effects to present traffic jam, traffic accident to schools, hospitals, etc.	Yes **No** Unknown
4	Breakup of Communities	Breakup of local communities with traffic barrier	Yes **No** Unknown
5	Ruins, cultural assets	Loss and /or deterioration of temples, shrines and hidden cultural assets	Yes **No** Unknown
6	Water, Fishing and Forest rights	Disturbances to water, fishing and forest utilization rights	Yes **No** Unknown
7	Health	Deterioration of health environment due to garbage, outbreak of noxious insects, etc.	Yes **No** Unknown
8	Refuse	Generation of construction refuse, extra soil and refuse in general	**Yes** No Unknown
9	Natural disaster (Risk)	Increasing danger of land collapse, landslide and other accidents	Yes **No** Unknown
2. Natural environment			
10	Topography, geography	Change of valuable topographic and geographic natures with digging and /or filling of soil	Yes **No** Unknown
11	Soil erosion	Loss of top soil with rainfall as the results of land opening and cutting of forest trees	Yes **No** Unknown
12	Underground water	Drying up of underground water as the result of digging and following drainage	Yes **No** Unknown
13	Situation of lakes and rivers	Change of water flow and river bed with reclamation and inflow of drainage water	Yes **No** Unknown
14	Coast, Sea	Coast erosion and soil accumulation with reclamation and change of current	Yes **No** Unknown
15	Animals and plants	Obstruction of multiplication and extinction of species with the change of living conditions	Yes **No** Unknown
16	Climate	Change of temperature and wind with large scale land opening and construction	Yes **No** Unknown
17	Scenery	Change of topography with land opening and disturbance in the harmony with construction	Yes **No** Unknown
3. Public Hazard			
18	Air pollution	Pollution with exhaust gas and noxious gas of vehicles and factories	Yes **No** Unknown
19	Water contamination	Water contamination with inflow of eroded soil and factory wastewater	Yes **No** Unknown
20	Soil contamination	Contamination with dust, agricultural pesticides, chemicals and asphalt etc.	Yes **No** Unknown
21	Noise, vibration	Occurrence of noise and vibration caused by vehicles etc.	**Yes** No Unknown
22	Sinking of land altitude	Sinking of land surface caused by changing of land formation and lowering ground water table	Yes **No** Unknown
23	Offensive odor	Occurrence of exhaust gas and ill smelling substances	Yes **No** Unknown
General evaluation:		Is this a project that requires implementation of or EIA?	**Yes**

(4) Scoping of the Project

According to the result of the Screening of the Project of each objective project area, a public hearing has been held and discussions have been made with DOTC and officials of related government agencies concerned with the Scoping of the Projects. The results are summarized in Table 8.5.7. and Table 8.5.8.

Table 8.5.7 Scoping of the Project (Monumento Area)

Items of environment		Evaluation	Authority
1. Social Environment			
1	Transfer of dwellers	A	There are 14 units of residential houses and their families for removal.
2	Economic activities	C	Economy will be greatly vitalized with the station and station square development.
3	Transportation and living facilities	C	Existing congested transportation condition and system as well as pedestrian flow will be much conveniently enhanced.
4	Breakup of communities	C	No specific community breakup may occur.
5	Ruins, cultural assets	A	Bonifacio Monument situates at the circle.
6	Water, fishing and forest rights	C	There is no water body and forest, so that there is no effect on these items.
7	Health	C	No deterioration on health and sanitation, but vicinity environment will become more hygienic in status.
8	Refuse	B	Construction wastes may be generated, but this is a temporary situation during construction period.
9	Natural disaster (Risk)	C	There will be no occurrence of land collapse and landslide.
2. Natural environment			
10	Topography, geography	C	There will be no large scale artificial topographic changes.
11	Soil erosion	C	There is flat land within the urban core area, and no occurrence of soil erosion.
12	Underground water	C	No effect on under ground water.
13	Situation of lakes and rivers	C	There is no lake and river on or near the project area.
14	Coast, Sea	C	There is no coast and sea on or near the project area.
15	Animals and plants	C	There are no habitats of precious fauna and flora within the project area.
16	Climate	C	There will be no work that may induce climatic changes.
17	Scenery	C	The project, which will be situated in the urban core area, may enhance the urban scenery with architectural harmony.
3. Public Hazard			
18	Air pollution	C	There will be no air pollution since the size of the transportation will not be increased drastically.
19	Water contamination	C	There will not be work that may bring water pollution
20	Soil contamination	C	There will be no enhancement of soil erosion with the work, no occurrence of noxious substances.
21	Noise, vibration	B	During construction period, noise may occur but this will be temporary. There will be no increase of noise and vibration after the work.
22	Sinking of land altitude	C	No use of underground water.
23	Offensive odor	C	No offensive odor will generate.

Note: Classification of evaluation:
A: The subject E.I is unquestionably induced by the Project
B: The subject E.I is likely to be induced by the Project
C: There is no possibility of the subject E.I being induced by the Project (It is not a target of EIA)

Table 8.5.8 Scoping of the Project (Magallanes Area)

Items of environment		Evaluation	Authority
1. Social Environment			
1	Transfer of dwellers	A	There are 70 units of houses of informal settlers and they will have to be removed.
2	Economic activities	C	Economy will be greatly vitalized with the station and station square development.
3	Transportation and Living facilities	C	Existing congested transportation condition and system as well as pedestrian flow will be much conveniently enhanced.
4	Breakup of communities	C	No specific community breakup may occur.
5	Ruins, cultural assets	C	No specific effects.
6	Water, fishing and Forest right	C	There is no water body and forest, so that there is no effect on these items.
7	Health	C	No deterioration on health and sanitation, but vicinity environment will become more hygienic in status.
8	Refuse	B	Construction wastes may be generated, but this is a temporary situation during construction period.
9	Natural disaster (Risk)	C	There will be no occurrence of land collapse and landslide.
2. Natural environment			
10	Topography, geography	C	There will be no large scale artificial topographic changes.
11	Soil erosion	C	There is flat land within the urban core area, and no occurrence of soil erosion.
12	Underground water	C	No effect on underground water.
13	Situation of lakes and rivers	C	There is no lake and river on or near the project area.
14	Coast, Sea	C	There is no coast and sea on or near the project area.
15	Animals and plants	C	There are no habitats of precious fauna and flora within the project area.
16	Climate	C	There will be no work that may induce climatic changes.
17	Scenery	C	The project, which will be situated in the urban core area, may enhance the urban scenery with architectural harmony.
3. Public Hazard			
18	Air pollution	C	There will be no air pollution since the size of the transportation will not be increased drastically.
19	Water contamination	C	There will not be work that may bring water pollution
20	Soil contamination	C	There will be no enhancement of soil erosion with the work, no occurrence of noxious substances.
21	Noise, vibration	B	Temporary noise occurs during construction period, but no increase of noises and vibration after the work.
22	Sinking of land altitude	C	No use of underground water.
23	Offensive odor	C	No offensive odor will generate.

Note: The classification of evaluation
A: The subject E.I is unquestionably induced by the Project
B: The subject E.I is likely to be induced by the Project
C: There is no possibility of the subject E.I being induced by the Project (It isn't made the target of EIA)

(5) Positive Environmental Impact of the Project

The positive environmental impacts of the overall components of the Monumento and Magallanes projects are assumed as follows.

1) Alleviation of urban transportation and traffic congestion problems;
2) Enhancement of passenger transfer at the station by making it more convenient and smoother;
3) Securement of pedestrians through sufficient walking spaces for transferring from one transportation mode to another;
4) Generation of time and energy saving effects for the diverse daily activities of citizens;
5) Upgrade of townscape and business opportunities;
6) Generation of new economic activities and land potentials; and
7) Contribution to reduction of motor vehicle emission and noise levels.

(6) Existing Valuable Historical Asset

Andres A. Bonifacio Monument

The first encounter between Andres Bonifacio and his revolutionary group, Katipunan, with Spanish soldiers was on August 3, 1896. To commemorate this historic event, the Bonifacio Monument was established on the circle of EDSA and Rizal Ave. intersection in 1935. This site is registered as National Historical Site by the National Historical Commission.

The monument site has been preserved, and restrictions with regard to height of building structures have been imposed on the direct surrounding area of the circle; currently, 7-story high would be a maximum with any scenic disturbances. However, the volume of motor vehicles passing on the rotary, the towering billboards, and the congested use of side walk area produce lots of busy scenic disturbances toward the monument.

(7) Land Acquisition and Relocation as Social Issues

1) Monumento area

The station plaza development would require an area of approximately 1.3 ha, while the station surroundings has some potential for low story buildings (1 to 2 story) with non-permanent structures. Currently, the area is mostly of residential use, small warehouses and vacant spaces. In the case of the project formulation, land

acquisition and relocation of settlers have to be considered with sufficient prices and compensation agreed upon between the project development body and land owners, settlers and so on.

2) Magallanes area

There are a number of informal settlements along the PNR waysides, including the EDSA station surroundings. The areas under the viaducts of South Superhighway and its ramp ways and also of LRT line-3 are reserved as right-of-way, the same goes for the waysides of PNR. These spaces are public domain.

For formulation of the station front development, these areas are supposed to be most suitable and easiest for land acquisition process in general. However, a serious and potential explosive issue of the informal settlements and settlers exists, and it must be addressed before the project can be implemented. Current situation of the informal settlements within this area would be counted at approximately 70 family units and the inhabitants would be assumed at about 350. Meanwhile these families stand to be displaced from their homes. To be able to address this issue adequately can lead to a social, financial, and public relations success for the project proponents.

8.5.5 General Outline Relocation Cost of the Project

According to the area requirement of the proposed station plaza development, the affected land areas and building structures, such as houses and facilities, would be acquired, and those acquisition and compensation costs could be estimated in both Monumento and Magallanes areas. The station plaza development plan and alternatives shall be referred to the previous section of the same chapter. Details of the cost estimation shall be referred to the Tables in the Appendix.

(1) Monumento Area

Alternative plan F: (Recommendable Plan)

Total land acquisition area	:	12,830 m^2	Land acquisition cost	:	407,568,000 Pesos
Total building area	:	5,260 m^2	Compensation cost	:	37,710,000 Pesos

Alternative plan E:

Total land acquisition area	:	12,570 m^2	Land acquisition cost	:	338,400,000 Pesos
Total building area	:	3,620 m^2	Compensation cost	:	35,540,000 Pesos

(2) Magallanes Area

Concentrated plaza space plan:

Total land acquisition area	:	365 m^2	Land acquisition cost	:	387,675,000 Pesos
Informal settlers' lands, houses and soft cost., etc.	:	70 Units	Compensation cost	:	7,770,000 Pesos

Dispersed space plaza plan:

Total land acquisition area	:	625 m^2	Land acquisition cost	:	74,880,000 Pesos
Informal settlers' lands, houses and soft cost., etc.	:	70 Units	Compensation cost	:	7,770,000 Pesos

For informal settlers, compensation cost component includes the following categories, with the details shown in the Appendix.

Soft cost involves cost for such items as Land development and house structure: 60m^2 / family for land and 60m^2 /family for structure, and cost of house (Balik Probinsya). Also included is soft cost for Local Government Units, National Housing Authority and livelihood fund.

8.5.6 Scenic Views and Landscape

Introduction of landscape elements and townscape establishment would play a role of qualitative up-grading of existing environment of disorderly and chaotic condition. And consideration of establishing a neat and amicable station plazas as distinctive urban spaces would be expected. For the plaza space establishment it shall be considered following design components with clear planning criteria, as explained below.

(1) Paving, the most fundamental component of the plaza space and design requirement, is as follows in general.

1) Paving space:

For a solid paving surface, concrete block materials can be recommendable.

2) Paving color:

A subdued grayish-white color concrete block would be suitable to create an amicable space for people to stay and possibly linger while in transition from one transportation mode to another.

3) Paving texture of the materials:

The paving surface will be slightly coarse to allow pedestrians to safely walk on it even when it gets wet.

4) Paving pattern:

Paving pattern of the surface will encourage and serve as guide for pedestrians, so that some simple graphic pattern related to human activity such as grid system would be applied.

(2) Introduction of Natural Elements

1) Trees, flowering plants and greenfly turfs will give psychological appreciation, stability and amenity to people, encouraging them to approach and use the station plaza, even when these areas become congested. Their natural elements could present a more comfortable condition of space to people.

2) Water element also gives some psychological stability and a calming atmosphere to such plaza where large numbers of people are expected to gather and use its facilities.

(3) Street Furniture and Lightings

1) Station plaza would require enough shelters at proper locations where waiting transportation vehicles and transit passengers can comfortably stay. Some benches and information signages, space demarcation facility and convenience facilities for safety and easy usage of the spaces would be required.

2) Lighting is a fundamental measure for evening to night use of the plaza, with enough brightness to maintain total spaces under a congested situation or for safety and security purposes.

8.5.7 Further Study Guideline for Environmental Impact Assessment and Landscape

For the further study of environmental impact assessment (EIA), clear examinations should be conducted on potential positive and negative factors of EIA and social impact assessment (SIA) for further feasibility study and detailed design study stage.

Environmental impacts of the negative side of the social environment components at Monumento area would be inevitable, such as:

(1) Land acquisition and compensation for landowners, residents and business activity;

(2) Conservation of the Bonifacio Monument; and

(3) Temporary traffic congestion and noise occurrence during the implementation period

It is inevitable that negative environmental impacts pertaining to the social environment components at Magallanes area will arise, such as:

(1) Resettlement of and compensation for informal settlers and other social cares;

(2) Land acquisition and compensation for landowners, and business activity in some critically-affected area; and

(3) Temporary traffic congestion and noise occurrence during the implementation period.

Further EIA study of the project, in relation with informal settlers, the government agencies concerned, the EIA study procedure, and the roles of other related organizations are provided in the Appendix.