CHAPTER 11

POSSIBLE CAPITAL INVESTMENT FOR THE STUDY AREA

11.1 PAST CAPITAL INVESTMENT

Past capital investment for the road sector is shown in **Table 11.1-1**.

DPWH-National

- Quite high growth rate for the road sector investment was recorded from 2005 to 2009 at 40.7% per annum.
- Allocation to Region X, Region XII and Road Project within ARMM

Region X ---------- 1.8% - 6.1% of National Road Budget

Region XII ---------- 0.7% - 4.3% of National Road Budget

Road Projects within ARMM ---------- 1.3% - 3.6% of National Road Budget

DPWH-ARMM

- Allocation to infrastructure has been constant and no increase was made from 2006 to 2008.
- Allocation to a road sector from infrastructure budget is decreasing.
- Allocation of infrastructure budget to a road sector of mainland provinces ranged from 36% to 38%.

TABLE 11.1-1 PAST INVESTMENT FOR ROAD SECTOR

Unit: Million Pesos

				2005	2006	2007	2008	2009	Average Annual Growth Rate (%)			Remarks
									05-09	06-09	06-08	
DPWH-National (Note-1)	TOTAL			19,193 (100%)	24,884 (100%)	31,127 (100%)	45,962 (100%)	75,428 (100%)	40.7%	44.7%	35.9%	
	Region X			829 (4.3%)	701 (2.8%)	569 (1.8%)	1,879 (4.1%)	4,622 (6.1%)	53.7%	87.5%	63.7%	
	Region XII			235 (1.2%)	183 (0.7%)	1,238 (4.0%)	1,995 (4.3%)	2,207 (2.9%)	75.0%	129%	230%	
	Projects within ARMM (National Road)			-	328 (1.3%)	568 (1.8%)	1,653 (3.6%)	1,179 (1.6%)	-	-	124%	Basically for Foreign-assisted Projects within ARMM
Infrastructure and Road Budget from GAA Allocation to ARMM Government (Note-2)	Infrastructure			-	650 (100.0%)	650 (100.0%)	650 (100.0%)	-	-	-	0%	
	Allocation to Road Sector	Mainland	National Road	-	0	12	0	-	-	-	-	
			Local Road	-	246	237	232	-	-	-	-	
			Total	-	246 (38%)	249 (38%)	232 (36%)	-	-	-	-2.9%	
		Island Provinces	National Road	-	23	10	0	-	-	-	-	
			Local Road	-	167	198	143	-	-	-	-	
			Total	-	190 (29%)	208 (32%)	143 (22%)	-	-	-	-13.2%	
		Total	National Road	-	23	22	0	-	-	-	-	
			Local Road	-	413	435	375	-	-	-	-	
			Total	-	436 (67%)	457 (70%)	375 (58%)	-	-	-	-7.3%	

Source: Note-1 : Planning Service, DPWH-National
Note-2 : DPWH-ARMM

11.2 ESTIMATE OF POSSIBLE INVESTMENT FOR THE STUDY AREA

Based on the past trend of capital investment, capital investment for the Study Area was estimated on the following assumptions;

DPWH-National

- DPWH-National's capital investment for the road sector will increase 5% to 10% per annum.
- Allocation of DPWH-National's road budget to Region XII and ARMM through DPWH-National

  Region X ---------- 5.1%
  Region XII ---------- 4.5%
  Road Projects within ARMM ---------- 1.5%

DPWH-ARMM

- Infrastructure budget will increase 5% to 10% per annum.
- Allocation from infrastructure budget to a road sector will be as follows;

  Mainland Provinces ---------- 38%
  Island Provinces ---------- 32%

Based on the above assumptions, possible investment was estimated as shown in **Table 11.2-1**.

Adopting conservative assumptions, i.e. DPWH-National's budget will increase at 5% per annum, and ARMM's infrastructure budget will increase at 5% per annum , possible investment for a road sector for the Study Area will be as shown in **Table 11.2-2**.

TABLE 11.2-1 ESTIMATE OF POSSIBLE INVESTMENT TO THE STUDY AREA BY DPWH-NATIONAL

(Unit: Million PhP)

Year	DPWH-National Budget				Allocation to Region X		Allocation to Region XII		Allocation to ARMM thru DPWH-National	
	Case-1		Case-2		*5% of Budget*		*4.5% of Budget*		*1.5% of Budget*	
	5% per annum	5 years Total	10% per annum	5 years Total	Case-1	Case-2	Case-1	Case-2	Case-1	Case-2
2009	75,428		75,428							
2010	75,500		75,500							
2011	79,300		83,100							
2012	83,200		91,400							
2013	87,400	438,100	100,500	507,100	21,900	25,300	19,700	22,800	6,600	7,600
2014	91,800		110,500							
2015	96,400		121,600							
2016	101,200		133,800							
2017	106,200		147,100							
2018	111,500	559,000	161,800	816,500	27,900	40,800	25,200	36,700	8,300	12,200
2019	117,100		178,000							
2020	123,000		195,800							
2021	129,100		215,400							
2022	135,600		237,000							
2023	142,400	713,500	260,600	1,315,100	35,600	65,700	32,100	59,200	10,700	19,700
2024	149,500		286,700							
2025	156,900		315,400							

Source: Consultant's Estimate

TABLE 11.2-2 ESTIMATED POSSIBLE INVESTMENT FOR ROAD SECTOR

(Unit: Million PhP)

		2011-2015	2016-2020	2021-2025
DPWH-National	Region X	21,900	27,900	35,600
	Region XII	19,700	25,200	32,100
	Projects for ARMM	6,600	8,300	10,700
ARMM Government	Mainland Provinces	1,433	1,829	2,334

CHAPTER 12

ROAD NETWORK DEVELOPMENT SCENARIO

12.1 ROAD NETWORK DEVELOPMENT ISSUES

Road network development issues were identified as follows;

Road Network Development Issues

1) **Road Density**
   Road Density is the lowest in the country, only ½ of the other areas of the Philippines.

2) **Pavement Ratio**
   Pavement ratio is slightly higher than the DPWH-National's level. However, there are still 207 km of national road remains un-paved.

3) **Road Condition of Paved Roads**
   Paved road condition in ARMM is much better than those of DPWH-National, but still 152 km of paved roads are in bad/very bad condition.

4) **Missing Link**
   There are 7 missing links, thus wide areas remain inaccessible, and people are forced to make a long detour. Hence, there are many areas with accessibility problems.

5) **Road Maintenance**
   Road maintenance needs to be strengthened, but fund is limited.

12.2 FUTURE ROAD NETWORK DEVELOPMENT VISIONS

In due consideration of the region's development issues and constraints, the road network development visions were established as follows;

Region's Development Issues	Road Network Development Visions
• Conflict affected area • The poorest region in the country • Agri-fishery is the dominant industry, thus the sector's development is the key for overall regional development and poverty reduction.	1) Establishment of Road Network for Universal Development of all areas which contributes to peace building. 2) Establishment of Road Network for Agro-fishery Development through which poverty reduction will be attained 3) Establishment of Road network which attains reliable and smooth mobility of people and freight for social and economic activities.

Above visions are further explained as follows;

1) Establishment of Road Network for Universal Development of All Areas which contributes to peace building

Road network which attains regional integration, easier access to basic social services and easier coordination among regions

- To provide appropriate road network by eliminating missing links and providing additional roads.
- To provide easy access to hospitals, government centers, etc.

2) Establishment of Road Networks which contributes to agro-fishery development through which poverty reduction will be attained

- To reduce transport cost
- To provide access to potential areas which are not developed yet
- To provide better access to markets and agro-industry centers.
- To achieve better inter-modal transhipment
- To provide reliable means of transportation (harvested agri-products can be transported to markets or other destinations without delay)
- To support on-going and proposed agri-related projects

3) Establishment of Road Networks which attains reliable and smooth mobility of people and freight for social and economic activities

- To provide reliable, fast and comfortable means of transportation
- To reduce transport cost

12.3 ROAD NETWORK DEVELOPMENT STRATEGY

Road network development strategies in relation to visions were established as shown below;

VISION	STRATEGY
• Road Network for Universal development of all areas which contributes to peace building • Road Network for Agro-fishery development and Poverty Reduction • Road Network for smooth mobility	• Increase Road Density - Improve Provincial Roads to National Road Standards - Construction of new roads, but selectively • Eliminate missing links • Improvement of gravel/earth roads to paved roads • Rehabilitation of paved roads in bad/very bad condition • Preservation of existing road assets by intensified road maintenance • Improvement of Farm-to-Market roads

12.4 ROAD NETWORK DEVELOPMENT TARGETS

Road network development targets were established as shown below;

TARGETS

	Present	By 2015	By 2025
1) Road Density (including Provincial Roads upgrading)	***0.076***	***0.085*** (+100 km)	***0.095*** (+120 km)
2) Pavement Ratio	***76.8%***	***80%*** (+30 km)	***95%*** (+130 km)
3) Road in Good/Fair Condition	***71.1%***	***80%*** (+65 km)	***95%*** (+100 km)
4) No. of Missing Link	***7***	***5*** (remove 2 missing link)	***0*** (remove 5 missing links)
5) Temporary Bridges/ Bridges Need Replacement	***35***	***25*** (10 Bridge Replacement)	***0*** (25 Bridge Replacement)

CHAPTER 13

ROAD NETWORK DEVELOPMENT MASTER PLAN

13.1 MASTER PLAN FORMULATION PROCEDURE

The master plan formulation procedure is shown in **Figure 13.1-1**.

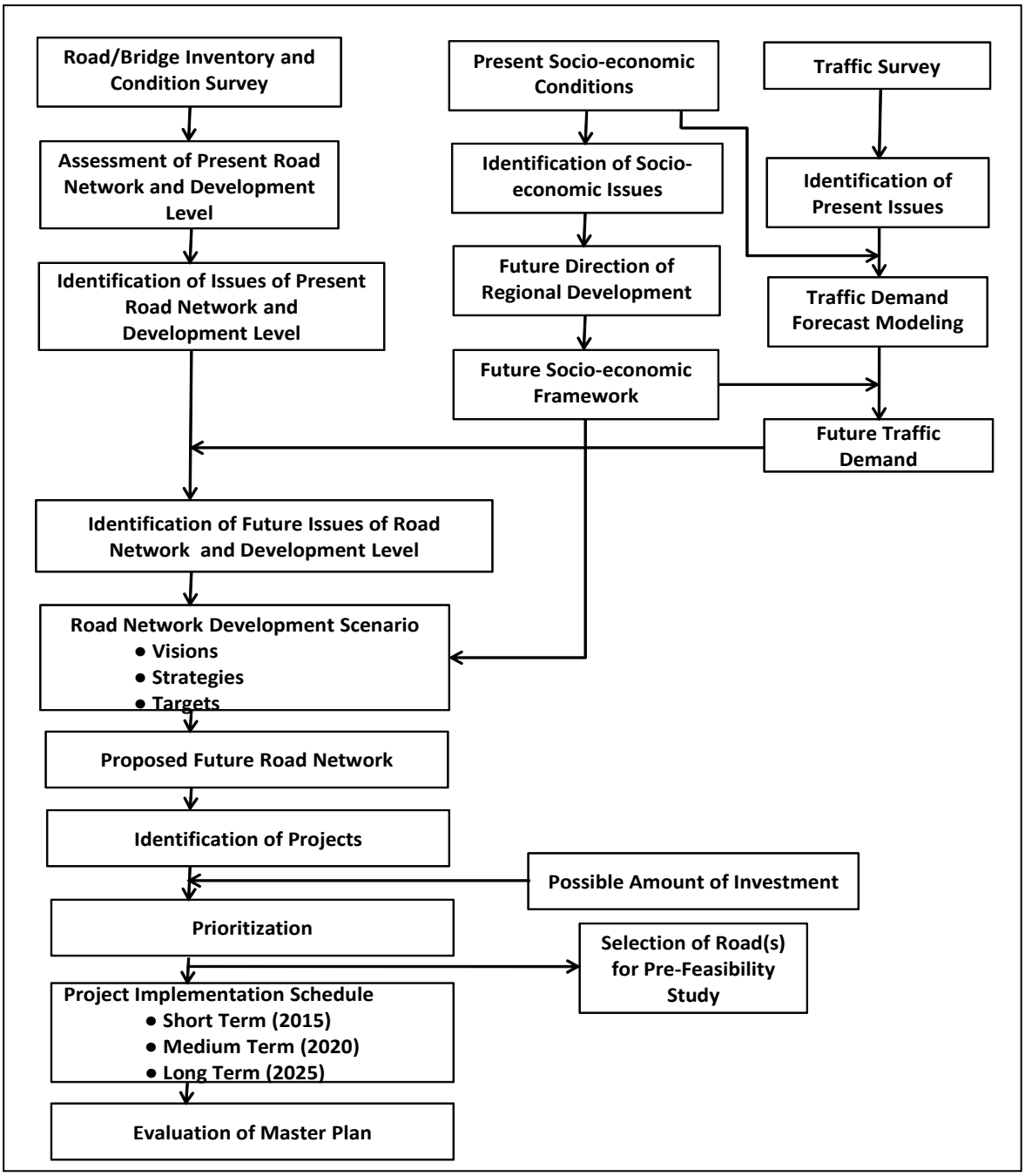


FIGURE 13.1-1 MASTER PLAN FORMULATION PROCEDURE

13.2 PROPOSED FUTURE ROAD NETWORK

13.2.1 Procedure to Develop Future Road Network

Procedure to develop future road network is shown in **Figure 13.2.1-1**.

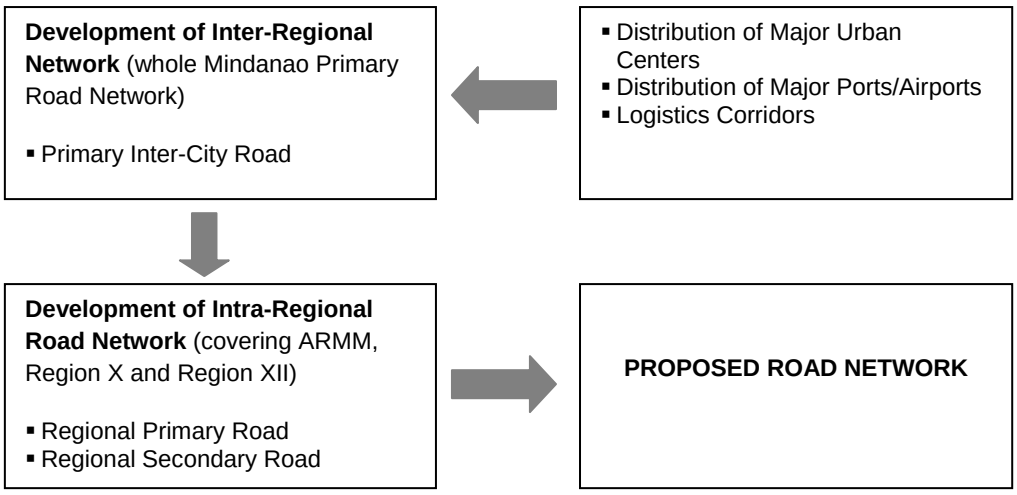


FIGURE 13.2.1-1 PROCEDURE TO DEVELOP FUTURE ROAD NETWORK

Definition of 3 classes of roads is as follows;

Primary Inter-City Road

- Major road which connects Mega Urban Centers, Primary Urban Centers, Secondary Urban Centers, and major ports and airports to each other.
- Major road which functions as a logistic corridor in Mindanao Island.
- Major road which provides access to Nautical Highway.

Regional Primary Road

- Major road which links Primary Inter-city Road each other.
- Important road within the Region to form regional physical framework for even development.

Regional Secondary Road

- Major road which links Primary Inter-city Roads and Regional Primary Roads each other
- Functions as collector/distributor road.

13.2.2 Primary Inter-city Road Network in Mindanao

Urban centers are the places of accumulation of population and commercial, business, industrial and administrative and social activities. Urban centers are the places of traffic generation and attraction.

Urban centers are dependent on each other for their economic and social activities. Inter-Regional Road Network should be planned to connect important urban centers. Urban centers were classified into 3 categories.

Classification of Urban Centers:

MEGA URBAN CENTER	:	Population over 500,000 with base port and/or port
PRIMARY URBAN CENTER	:	Population between 200,000 and 500,000

Classification of urban centers and their distribution is shown in **Figure 13.2.2-1**.

Proposed Mindanao primary Inter-city road network is shown in **Figure 13.2.2-2**.

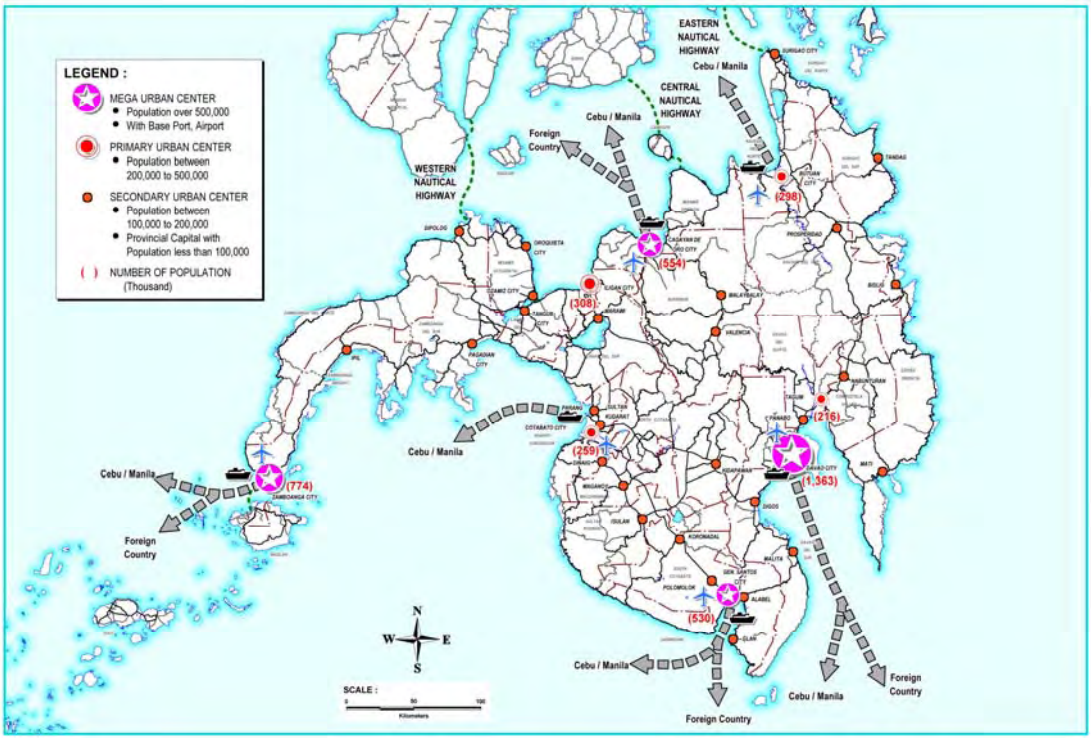


FIGURE 13.2.2-1 DISTRIBUTION OF URBAN CENTERS

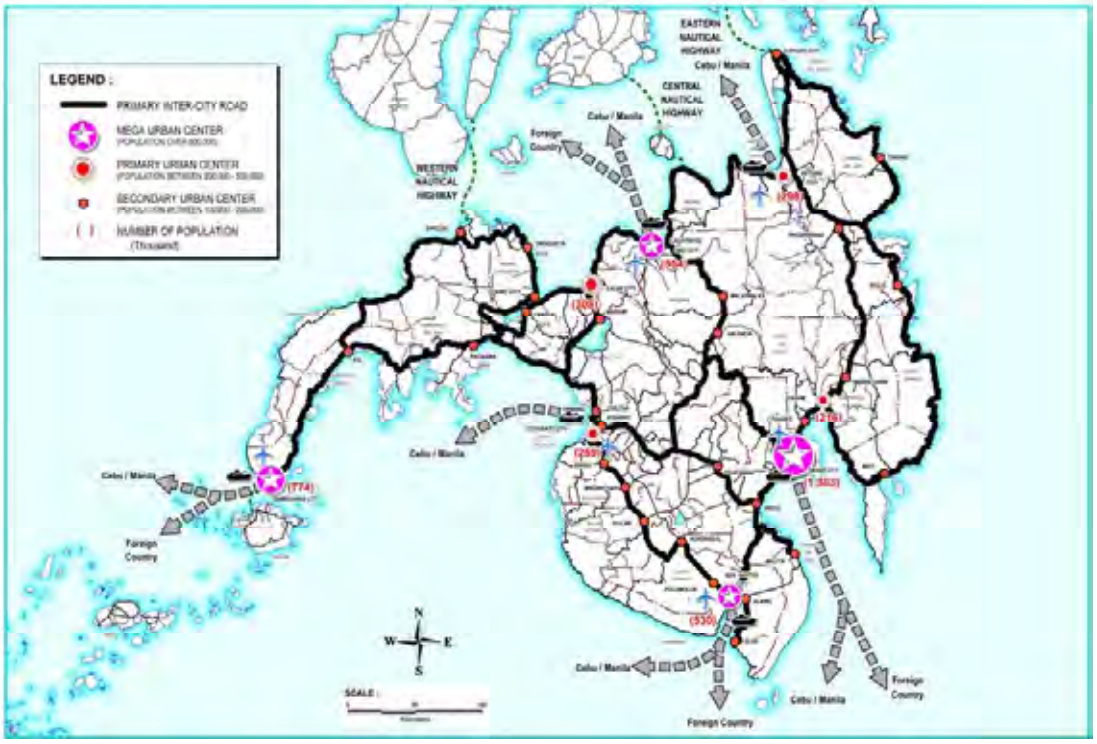


FIGURE 13.2.2-1 MINDANAO PRIMARY INTER-CITY ROAD NETWORK

13.2.3 Regional Primary and Secondary Roads

Basic concepts to form Regional Primary and Secondary Road Network are as follows (refer to **Figure 13.2.3-1**);

- To form flexible road networks around Cotabato City by linking three Primary Inter-city Roads each other.
- To form an alternative route to connect Cotabato City with General Santos City.
- To form major links to connect two Primary Inter-city Roads each other.

13.2.4 Proposed Road Network

Proposed road network for ARMM, Region X and Region XII is shown in **Figure 13.2.4-1**.

FIGURE 13.2.3-1 BASIC CONCEPT OF FORMULATING REGIONAL PRIMARY AND SECONDARY ROADS

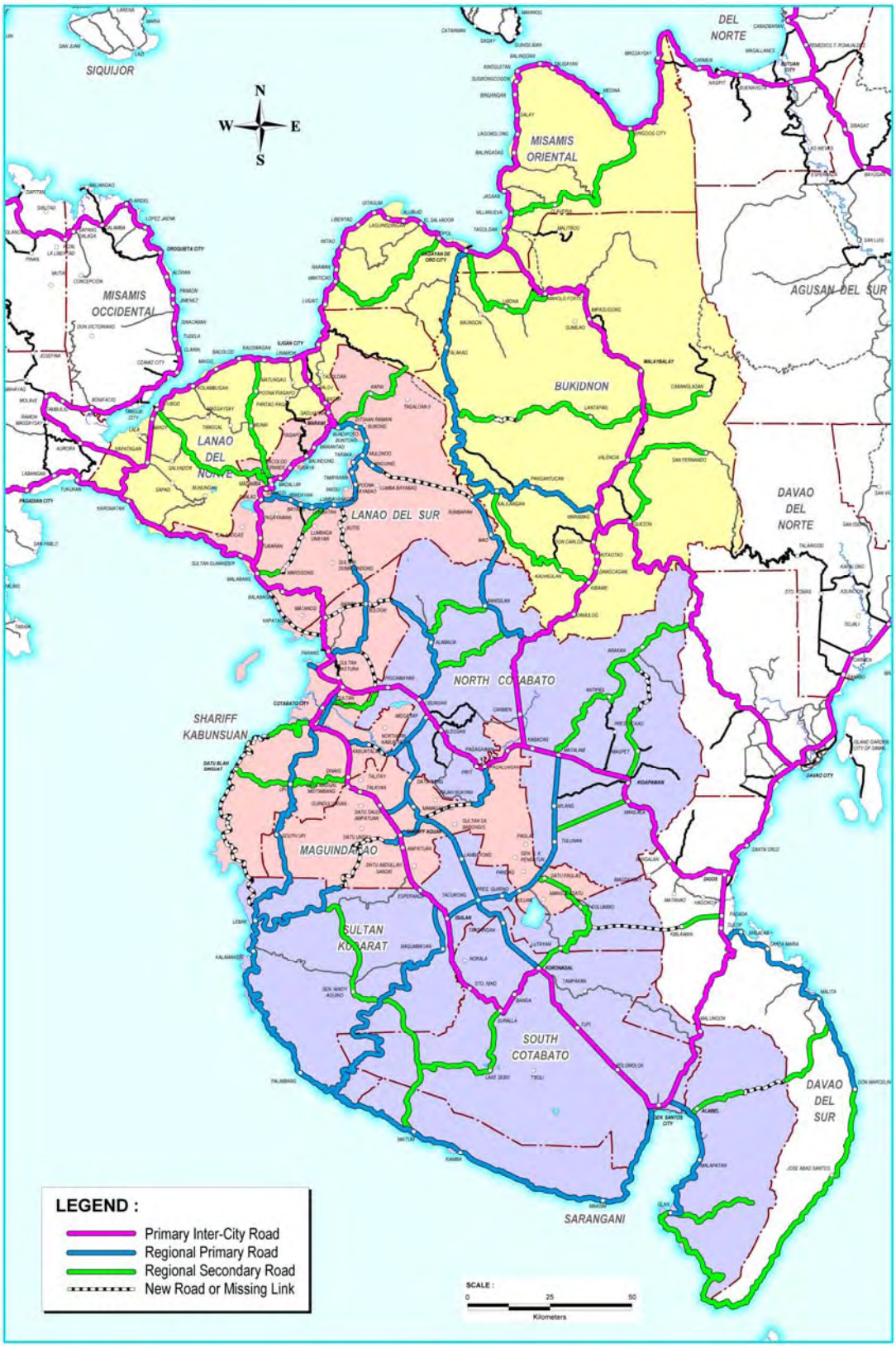


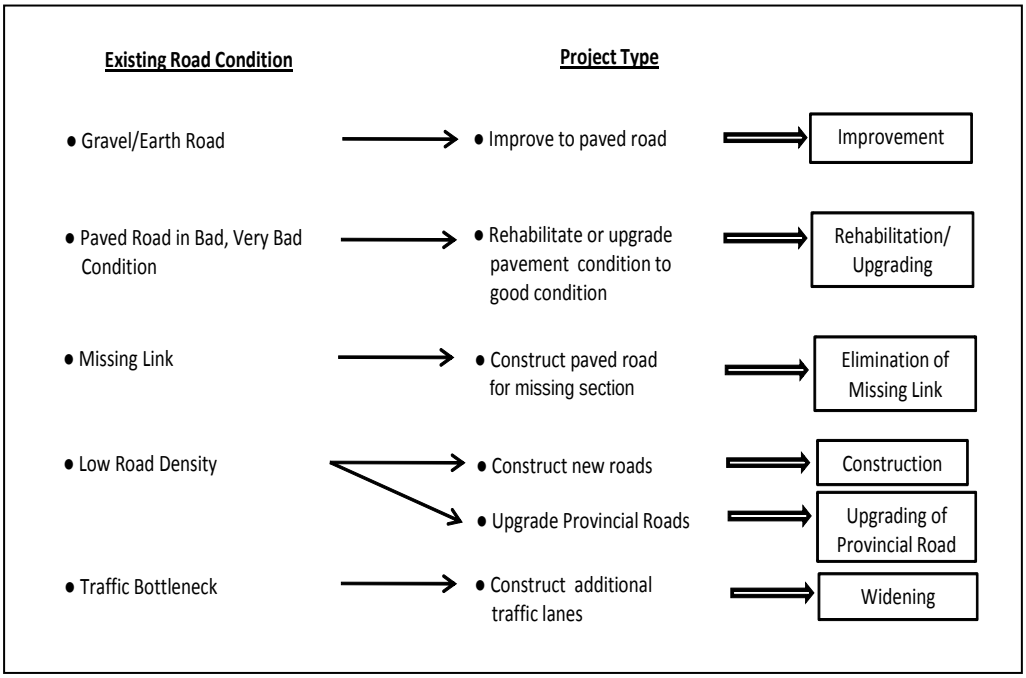
FIGURE 13.2.4-1 PROPOSED ROAD NETWORK FOR ARMM, REGIONS X AND XII

13.3 PROJECT IDENTIFICATION

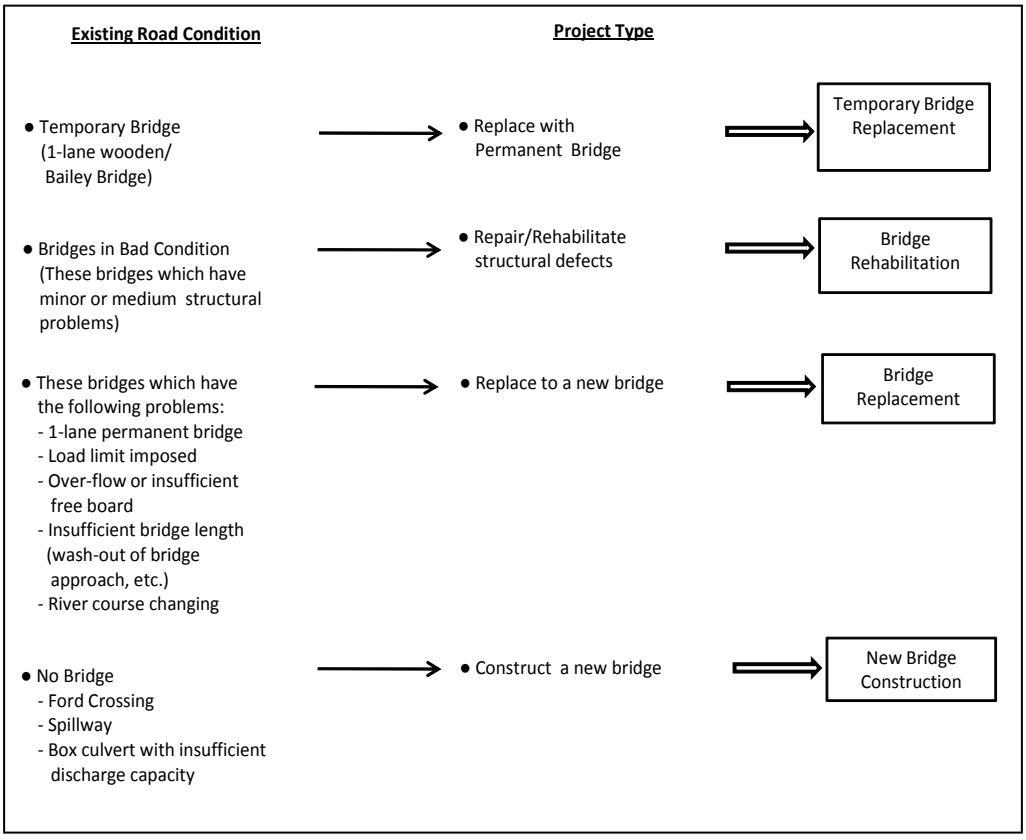
13.3.1 Project Identification Criteria

Project Identification criteria was established as follows;

ROAD PROJECT IDENTIFICATION CRITERIA



BRIDGE PROJECT IDENTIFICATION CRITERIA



13.3.2 Identified Road/Bridge Projects

Based on the results of the road/bridge inventory and condition survey and the proposed road network, road/bridge projects were identified and shown in **Table 13.3.2-1**.

TABLE 13.3.2-1(1/3) PROJECT LIST: ARMM

Road Class	Road No.	Road Name	Road Length	Type of Works					Construction Cost	Engineering Services			Land Aquisition & Compensation	Sub-total	Total
				New Construction	New Construction (Missing Link)	Improvement of Existing Earth / Gravel Road	Rehabilitation of Existing PPC Paved Road (Overlay)	Bridge Replacement / Rehabilitation		F/S	D/D	S/V			
			(km)	(km)	(km)	(km)	(km)	(m)	(Mil. PHP)	2.00%	4.00%	8.00%	(Mil. PHP)	(Mil. PHP)	(Mil. PHP)
Primary Inter-City Road	L1-1	Iligan-Marawi Road	4.2	0.0	0.0	0.0	4.2	0.0	**88.8**	1.8	3.6	7.1	0.0	**12.4**	**101.2**
	L1-2	Marawi-Marantao Road	9.3	(on-going)					**-**	-	-	-	-	**-**	**-**
	L2-2(2)	Marawi-Marabang Road (Pualas-Balindong Sec)	19.5	(on-going)					**-**	-	-	-	-	**-**	**-**
	L2-2(1)	Marawi-Marabang Road (Malabang-Pualas Sec)	36.5	0.0	0.0	0.0	56.0	0.0	**1,183.7**	23.7	47.3	94.7	0.0	**165.7**	**1,349.4**
	MC-1	Bito-Marawi Road	4.1	0.0	0.0	0.0	4.1	0.0	**83.5**	1.7	3.3	6.7	0.0	**11.7**	**95.2**
	MC-2	Marawi-Bacung Road	3.5	0.0	0.0	0.0	3.5	0.0	**68.6**	1.4	2.7	5.5	0.0	**9.6**	**78.2**
	L2-1	Cotabato-Malabang-Lanao del Norte Road	64.5	0.0	0.0	0.0	64.5	310.0	**1,554.5**	31.1	62.2	124.4	0.0	**217.6**	**1,772.1**
	SK-1	Davao-Cotabato Road	8.8	0.0	0.0	0.0	8.8	0.0	**179.3**	3.6	7.2	14.3	0.0	**25.1**	**204.4**
	SK-2	WYE Length Davao-Cotabato Road	0.4	0.0	0.0	0.0	0.4	0.0	**7.4**	0.1	0.3	0.6	0.0	**1.0**	**8.4**
	SK-3	Cotabato-Lanao Road	51.9	0.0	0.0	5.4	46.5	410.0	**1,410.8**	28.2	56.4	112.9	0.0	**197.5**	**1,608.3**
	SK-6	Simuay-Landsan-Parang Road	12.9	0.0	0.0	0.0	12.9	35.0	**289.5**	5.8	11.6	23.2	0.0	**40.5**	**330.0**
	SK-4	Salimbao-Delta Bridge Road	0.4	0.0	0.0	0.0	0.4	0.0	**8.6**	0.2	0.3	0.7	0.0	**1.2**	**9.8**
	SK-5	Lamsan-Simuay Jct. Road	1.0	0.0	0.0	0.0	1.0	0.0	**20.4**	0.4	0.8	1.6	0.0	**2.9**	**23.2**
	SK-9	Marbel-Ala-Cotabato Road	27.2	0.0	0.0	0.0	27.2	0.0	**554.2**	11.1	22.2	44.3	0.0	**77.6**	**631.8**
	M-1	Marbel-Ala-Cotabato Road	32.9	0.0	0.0	0.0	32.9	240.0	**853.0**	17.1	34.1	68.2	0.0	**119.4**	**972.4**
	M-5	Kabacan-Pagalungan Road	13.7	0.0	0.0	0.0	13.7	300.0	**496.8**	9.9	19.9	39.7	0.0	**69.6**	**566.3**
	Total		**290.8**	**0.0**	**0.0**	**5.4**	**276.1**	**1,295.0**	**6,799.0**	**136.0**	**272.0**	**543.9**	**0.0**	**951.9**	**7,750.8**
Regional Primary Road	L1-3	Marawi-Masiu Road	33.0	(on-going)					**-**	-	-	-	-	**-**	**-**
	L2-3	Masiu-Ganassi Road	30.0	(on-going)					**-**	-	-	-	-	**-**	**-**
	L1-4	Mulondo-Wao Road	75.2	5.7	30.4	0.0	39.1	30.0	**1,859.6**	37.2	74.4	148.8	108.2	**368.6**	**2,228.2**
	MC-6	Marawi-Pugaan Road	7.5	0.0	0.0	0.0	7.5	60.0	**186.1**	3.7	7.4	14.9	0.0	**26.0**	**212.1**
	L2p-1	SK Border-Butig-Lumbayanague Road	31.0	0.0	25.0	0.0	6.0	0.0	**851.9**	17.0	34.1	68.2	75.0	**194.3**	**1,046.1**
	SKp-1	Parang-Buldon Road	29.0	0.0	0.0	22.4	6.6	165.0	**762.6**	15.3	30.5	61.0	0.0	**106.8**	**869.4**
	SK-7	Landsan-Polloc Road	3.6	0.0	0.0	0.0	3.6	0.0	**65.7**	1.3	2.6	5.3	0.0	**9.2**	**74.9**
	SK-8	Parang Wharf Road	0.8	0.0	0.0	0.0	0.8	0.0	**15.0**	0.3	0.6	1.2	0.0	**2.1**	**17.1**
	SK-10	Awang-Upi-Lebak Road	38.2	(on-going)					**-**	-	-	-	-	**-**	**-**
	M-2	Awang-Upi-Lebak Road	30.6	(on-going)					**-**	-	-	-	-	**-**	**-**
	SKn-2	Matanog-Alamada Road (Matanog-Buldon Sec)	20.0	20.0	0.0	0.0	0.0	0.0	**595.0**	11.9	23.8	47.6	60.0	**143.3**	**738.3**
	SKn-3	Matanog-Alamada Road (Buldon-Alamada Sec)	15.0	15.0	0.0	0.0	0.0	0.0	**446.3**	8.9	17.9	35.7	45.0	**107.5**	**553.8**
	SKn-5	Kabacan-Midsayap Road	20.0	20.0	0.0	0.0	0.0	0.0	**595.0**	11.9	23.8	47.6	60.0	**143.3**	**738.3**
	M-3	Dulawan-Marbel Road	3.5	0.0	0.0	0.0	7.0	215.0	**284.7**	5.7	11.4	22.8	0.0	**39.9**	**324.5**
	M-4	Kidapawan-Ala Road	14.3	0.0	0.0	0.0	14.3	155.0	**364.6**	7.3	14.6	29.2	0.0	**51.0**	**415.6**
	Mp-2	Datu Saudi Ampatuan Road	9.0	0.0	0.0	0.0	9.0	0.0	**155.6**	3.1	6.2	12.5	0.0	**21.8**	**177.4**
	Mn-1	Sultan sa Barongis-Pagalungan Road	35.0	35.0	0.0	0.0	0.0	0.0	**1,041.3**	20.8	41.7	83.3	105.0	**250.8**	**1,292.1**
	Mp-1	Maganoy-Sultan sa Barongis Road	22.2	0.0	0.0	7.0	15.2	0.0	**403.5**	8.1	16.1	32.3	0.0	**56.5**	**460.0**
	Mp-3	Maganoy-Lebak Road	31.0	0.0	25.0	4.7	1.3	0.0	**885.6**	17.7	35.4	70.8	75.0	**199.0**	**1,084.5**
	SKn-7	Cotabato City East Diversion Road	11.8	(on-going)					**-**	-	-	-	-	**-**	**-**
	Total		**460.7**	**95.7**	**80.4**	**34.1**	**110.4**	**625.0**	**8,512.5**	**170.2**	**340.5**	**681.0**	**528.2**	**1,720.0**	**10,232.4**
Regional Secondary Road	L1-5	Marawi-Kapai Road	12.0	0.0	0.0	0.3	11.7	0.0	**185.3**	3.7	7.4	14.8	0.0	**25.9**	**211.3**
	L1p-1	Balindong-Pantao Ragat Road	8.0	0.0	0.0	2.0	6.0	0.0	**133.2**	2.7	5.3	10.7	0.0	**18.7**	**151.9**
	MC-3	Marawi-Landing Road	0.8	0.0	0.0	0.0	0.8	0.0	**12.3**	0.2	0.5	1.0	0.0	**1.7**	**14.1**
	MC-4	Marawi-Cadre Road	0.7	0.0	0.0	0.0	0.7	0.0	**12.3**	0.2	0.5	1.0	0.0	**1.7**	**14.1**
	MC-5	Marawi-Msu Road	1.0	0.0	0.0	0.0	1.0	0.0	**16.1**	0.3	0.6	1.3	0.0	**2.2**	**18.3**
	MC-7	Marawi-Kapai Road	6.6	0.0	0.0	0.0	6.6	8.0	**110.2**	2.2	4.4	8.8	0.0	**15.4**	**125.7**
	MC-8	Marawi-Marcos Blvd Road	1.8	0.0	0.0	0.0	1.8	135.0	**131.6**	2.6	5.3	10.5	0.0	**18.4**	**150.1**
	MC-9	Bito-Marawi-Agus Road	1.1	0.0	0.0	0.0	1.1	0.0	**17.7**	0.4	0.7	1.4	0.0	**2.5**	**20.1**
	L2-4	Ganassi-Tubod Road	11.0	0.0	0.0	5.8	5.2	0.0	**190.5**	3.8	7.6	15.2	0.0	**26.7**	**217.2**
	L2p-2	Malabang-Marogong-Tubaran-Bayang Road	32.0	0.0	25.0	4.8	2.2	0.0	**739.3**	14.8	29.6	59.1	75.0	**178.5**	**917.8**
	L2p-3	Madalum-Munai Road	6.0	0.0	0.0	0.0	6.0	0.0	**100.1**	2.0	4.0	8.0	0.0	**14.0**	**114.1**
	L2n-1	Parang-Balabagan Road	20.0	20.0	0.0	0.0	0.0	0.0	**492.3**	9.8	19.7	39.4	60.0	**128.9**	**621.2**
	SKn-1	Parang-Balabagan Road	10.0	10.0	0.0	0.0	0.0	0.0	**246.2**	4.9	9.8	19.7	30.0	**64.5**	**310.6**
	SK-11	Awang Airport Road	0.8	0.0	0.0	0.0	0.8	0.0	**12.8**	0.3	0.5	1.0	0.0	**1.8**	**14.6**
	SKp-2	Tamontaka-Tapian Road	20.1	0.0	0.0	15.3	4.8	160.0	**447.3**	8.9	17.9	35.8	0.0	**62.6**	**509.9**
	SKn-6	Tapian-Lebak Road	50.0	50.0	0.0	0.0	0.0	0.0	**1,230.8**	24.6	49.2	98.5	150.0	**322.3**	**1,553.1**
	SKp-3	Diang-Upi Road	21.5	0.0	0.0	21.2	0.3	0.0	**429.0**	8.6	17.2	34.3	0.0	**60.1**	**489.0**
	SKp-5	Diang-Upi Road Phase II	20.5	0.0	0.0	18.9	1.6	110.0	**465.8**	9.3	18.6	37.3	0.0	**65.2**	**531.0**
	SKp-4	Pinaring-Simsiman Road	22.2	0.0	0.0	21.6	0.6	55.0	**450.0**	9.0	18.0	36.0	0.0	**63.0**	**513.0**
	SKn-4	Manuangan-Parang Road	20.0	20.0	0.0	0.0	0.0	0.0	**492.3**	9.8	19.7	39.4	60.0	**128.9**	**621.2**
	Total		**266.1**	**100.0**	**25.0**	**89.9**	**51.2**	**468.0**	**5,915.0**	**118.3**	**236.6**	**473.2**	**375.0**	**1,203.1**	**7,118.1**
Grand Total			**1,017.6**	**195.7**	**105.4**	**129.4**	**437.7**	**2,388.0**	**21,226.4**	**424.5**	**849.1**	**1,698.1**	**903.2**	**3,874.9**	**25,101.4**

TABLE 13.3.2-1(2) PROJECT LIST: REGION X

Road Class	Road No.	Road Name	Road Length	Type of Works				Construction Cost	Engineering Services			Land Aquisition & Compensation	Sub-total	Total
				New Construction	New Construction (Missing Link)	Improvement of Existing Earth / Gravel Road	Rehabilitation of Existing PPC Paved Road (Overlay)		F/S	D/D	S/V			
			(km)	(km)	(km)	(km)	(km)	(Mil. PHP)	2.00%	4.00%	8.00%	(Mil. PHP)	(Mil. PHP)	(Mil. PHP)
Primary Inter-City Road	PI-1(1)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Butuan-Cagayan de Oro Sec.)	121.3	0.0	0.0	0.0	121.3	**2,471.8**	49.4	98.9	197.7	0.0	**346.1**	**2,817.9**
	PI-1(2)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Cagayan de Oro-Iligan Sec.)	81.2	0.0	0.0	0.0	81.2	**1,654.5**	33.1	66.2	132.4	0.0	**231.6**	**1,886.2**
	PI-1(3)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Iligan-Tubod Sec.)	68.7	0.0	0.0	0.0	68.7	**1,399.8**	28.0	56.0	112.0	0.0	**196.0**	**1,595.8**
	PI-2	Sayre Highway	136.9	0.0	0.0	0.0	136.9	**2,893.2**	57.9	115.7	231.5	0.0	**405.1**	**3,298.3**
	PI-3	Maramag-Kibawe-Kabacan Road	45.1	0.0	0.0	0.0	45.1	**952.2**	19.0	38.1	76.2	0.0	**133.3**	**1,085.5**
	PI-4	Davao-Bukidnon Road	59.3	0.0	0.0	0.0	59.3	**1,252.4**	25.0	50.1	100.2	0.0	**175.3**	**1,427.7**
	PI-5	Iligan-Marawi Road	22.1	0.0	0.0	11.1	11.0	**530.4**	10.6	21.2	42.4	0.0	**74.3**	**604.7**
	PI-6	Tubod-S.N. Dimaporo Road	23.6	0.0	0.0	0.0	23.6	**481.3**	9.6	19.3	38.5	0.0	**67.4**	**548.7**
	PI-7	Kapatagan-R.Magsaysay Road	13.3	0.0	0.0	0.0	13.3	**271.0**	5.4	10.8	21.7	0.0	**37.9**	**308.9**
	PI-8	Cotabato-Marabang-Lanao Del Norte Road	27.4	0.0	0.0	0.0	27.4	**558.7**	11.2	22.3	44.7	0.0	**78.2**	**636.9**
	Total		**598.8**	**0.0**	**0.0**	**11.1**	**587.7**	**12,465.4**	**249.3**	**498.6**	**997.2**	**0.0**	**1,745.2**	**14,210.6**
Regional Primary Road	RP-1	Cagayan de Oro-Talakag-Maramag Road	165.8	0.0	0.0	73.2	92.6	**3,562.3**	71.2	142.5	285.0	0.0	**498.7**	**4,061.0**
	RP-2	Wao-Kililangan Road	7.1	0.0	0.0	0.0	7.1	**132.9**	2.7	5.3	10.6	0.0	**18.6**	**151.5**
	Total		**172.9**	**0.0**	**0.0**	**73.2**	**99.7**	**3,695.2**	**73.9**	**147.8**	**295.6**	**0.0**	**517.3**	**4,212.5**
Regional Secondary Road	RS-1	Gingoog-Villanueva Road	71.9	0.0	0.0	55.0	16.9	**1,381.9**	27.6	55.3	110.6	0.0	**193.5**	**1,575.3**
	RS-2	Cagayan de Oro-Manolo Fortich Road	54.7	0.0	0.0	45.6	9.1	**1,064.4**	21.3	42.6	85.2	0.0	**149.0**	**1,213.4**
	RS-3	Mindanao East-Wesr Lateral Road	127.9	0.0	10.0	117.9	0.0	**2,603.3**	52.1	104.1	208.3	30.0	**394.5**	**2,997.8**
	RS-4	Tagum-Bukidnon Road	61.7	(On going)				**-**	-	-	-	-	**-**	**-**
	RS-5	Kalilangan-Kibawe Road	56.4	0.0	0.0	56.4	0.0	**1,127.5**	22.5	45.1	90.2	0.0	**157.8**	**1,285.3**
	RS-6	Cagayan de Oro-Manticao Road	60.0	0.0	0.0	60.0	0.0	**1,199.9**	24.0	48.0	96.0	0.0	**168.0**	**1,367.9**
	RS-7	Kauswagan-Munai-Madalum Road	25.0	0.0	0.0	25.0	0.0	**500.0**	10.0	20.0	40.0	0.0	**70.0**	**569.9**
	RS-8	Ganassi-Tubod Road	23.0	0.0	0.0	23.0	0.0	**424.3**	8.5	17.0	33.9	0.0	**59.4**	**483.7**
	Total		**480.6**	**0.0**	**10.0**	**382.9**	**26.0**	**8,301.2**	**166.0**	**332.0**	**664.1**	**30.0**	**1,192.2**	**9,493.4**
Ground Total			**1,252.3**	**0.0**	**10.0**	**467.2**	**713.5**	**24,461.9**	**489.2**	**978.5**	**1,956.9**	**30.0**	**3,454.7**	**27,916.5**

TABLE 13.3.2-1(3) PROJECT LIST: REGION XII

Road Class	Road No.	Road Name	Road Length	Type of Works				Construction Cost	Engineering Services			Land Aquisition & Compensation	Sub-total	Total
				New Construction	New Construction (Missing Link)	Improvement of Existing Earth / Gravel Road	Rehabilitation of Existing PPC Paved Road (Overlay)		F/S	D/D	S/V			
			(km)	(km)	(km)	(km)	(km)	(Mil. PHP)	2.00%	4.00%	8.00%	(Mil. PHP)	(Mil. PHP)	(Mil. PHP)
Primary Inter-City Road	PI-1	Davao-Cotabato Road	55.4	0.0	0.0	0.0	55.4	**1,128.2**	22.6	45.1	90.3	0.0	**158.0**	**1,286.2**
	PI-2	Cotabato-Digos Road	58.0	0.0	0.0	0.0	58.0	**1,136.7**	22.7	45.5	90.9	0.0	**159.1**	**1,295.9**
	PI-3	Maramag-Kibawe-Kabacan Road	48.6	0.0	0.0	0.0	48.6	**991.1**	19.8	39.6	79.3	0.0	**138.8**	**1,129.8**
	PI-4	Gen. Santos-Cotabato Road	134.6	0.0	0.0	0.0	134.6	**2,741.8**	54.8	109.7	219.3	0.0	**383.9**	**3,125.6**
	PI-5	Gen. Santos-Digos Road	39.0	0.0	0.0	0.0	39.0	**794.9**	15.9	31.8	63.6	0.0	**111.3**	**906.1**
	Total		**335.6**	**0.0**	**0.0**	**0.0**	**335.6**	**6,792.7**	**135.9**	**271.7**	**543.4**	**0.0**	**951.0**	**7,743.7**
Regionary Primary Road	RP-1	Libungan-Buldon-Matanog Road	17.5	0.0	0.0	17.5	0.0	**404.8**	8.1	16.2	32.4	0.0	**56.7**	**461.5**
	RP-2	Wao-Carmen Road	35.0	0.0	0.0	35.0	0.0	**809.7**	16.2	32.4	64.8	0.0	**113.4**	**923.0**
	RP-3	Kabuntalan-Midsayap Road	15.0	0.0	0.0	15.0	0.0	**301.3**	6.0	12.1	24.1	0.0	**42.2**	**343.5**
	RP-4	Midsayap-Datumang Road	13.1	(On going)				**-**	-	-	-	-	**-**	**-**
	RP-5	Pagalungan-Mamasapano Road	15.0	15.0	0.0	0.0	0.0	**357.4**	7.1	14.3	28.6	45.0	**95.0**	**452.4**
	RP-6	Kidapawan-Ala Road	48.4	0.0	0.0	0.0	48.4	**836.2**	16.7	33.4	66.9	0.0	**117.1**	**953.2**
	RP-7	Buluan-Islan Road	22.7	0.0	0.0	0.0	22.7	**392.6**	7.9	15.7	31.4	0.0	**55.0**	**447.5**
	RP-8	Koronadal-Tacurong-Midsayap Road	36.5	0.0	0.0	10.0	26.5	**659.2**	13.2	26.4	52.7	0.0	**92.3**	**751.5**
	RP-9	Gen. Santos-Glan-Kalipagan Road	51.2	(On going)				**-**	-	-	-	-	**-**	**-**
	RP-10	Gen. Santos-Kiamba-Kalamansig Road	221.7	0.0	0.0	93.2	128.5	**4,471.0**	89.4	178.8	357.7	0.0	**625.9**	**5,096.9**
	RP-11	Isulan-Palimbang Road	75.1	0.0	0.0	40.1	35.0	**1,657.8**	33.2	66.3	132.6	0.0	**232.1**	**1,889.9**
	RP-12	Cotabato-Upi-Kalamansig Road	39.0	(On going)				**-**	-	-	-	-	**-**	**-**
	RP-13	Magnoy-Lebak Road	49.3	0.0	0.0	49.3	0.0	**1,231.7**	24.6	49.3	98.5	0.0	**172.4**	**1,404.2**
	Total		**639.5**	**15.0**	**0.0**	**260.2**	**261.0**	**11,121.7**	**222.4**	**444.9**	**889.7**	**45.0**	**1,602.0**	**12,723.7**
Regionary Secondary Road	RS-1	Banisilan-Alamada Road	25.0	0.0	0.0	25.0	0.0	**500.0**	10.0	20.0	40.0	0.0	**70.0**	**569.9**
	RS-2	Carmen-Libuagan Road	25.0	0.0	0.0	25.0	0.0	**500.0**	10.0	20.0	40.0	0.0	**70.0**	**569.9**
	RS-3	Matalam-Roxas Road	50.0	0.0	0.0	50.0	0.0	**999.9**	20.0	40.0	80.0	0.0	**140.0**	**1,139.9**
	RS-4	Kidapawan-Arakan-Davao Road	75.4	30.0	0.0	45.4	0.0	**1,646.4**	32.9	65.9	131.7	90.0	**320.5**	**1,966.8**
	RS-5	Tulunan-Makilala Road	25.0	0.0	0.0	0.0	25.0	**416.9**	8.3	16.7	33.4	0.0	**58.4**	**475.3**
	RS-6	Koronadal-Columbio-Datu Paglas Road	30.0	0.0	0.0	0.0	30.0	**500.3**	10.0	20.0	40.0	0.0	**70.0**	**570.3**
	RS-7	Padada-Kiblawan-Columbio Road	25.0	25.0	0.0	0.0	0.0	**615.4**	12.3	24.6	49.2	75.0	**161.2**	**776.5**
	RS-8	Lais-Alabel Road	32.6	0.0	15.0	15.0	0.0	**669.2**	13.4	26.8	53.5	45.0	**138.7**	**807.9**
	RS-9	Gen. Santos-Glan-Kalipagan Road	54.3	(On going)				**-**	-	-	-	-	**-**	**-**
	RS-10	Saralla-Lake Sebu-Maitum Road	75.1	0.0	0.0	45.1	30.0	**1,402.8**	28.1	56.1	112.2	0.0	**196.4**	**1,599.2**
	RS-11	Saltan Kudarat-South Cotabato Link Road	90.0	0.0	0.0	0.0	90.0	**1,500.8**	30.0	60.0	120.1	0.0	**210.1**	**1,711.0**
	RSn-1	Tapian-Lebak Road	20.0	20.0	0.0	0.0	0.0	**455.7**	9.1	18.2	36.5	60.0	**123.8**	**579.5**
	Total		**527.5**	**75.0**	**15.0**	**205.5**	**175.0**	**9,207.3**	**184.1**	**368.3**	**736.6**	**270.0**	**1,559.0**	**10,766.3**
Ground Total			**1,502.5**	**90.0**	**15.0**	**465.7**	**771.6**	**27,121.6**	**542.4**	**1,084.9**	**2,169.7**	**315.0**	**4,112.0**	**31,233.7**

13.4 STANDARD DESIGN

13.4.1 Design Standard

DPWH-National's minimum design standard is shown in **Table 13.4.1-1**, which basically defines the standard in accordance with traffic volume.

Under the Master Plan, it is recommended to apply the design standard to each class of roads as follows;

	AADT Range
• Primary Inter-city Road	More than 2,000
• Regional Primary Road	1,000 – 2,000
• Regional Secondary Road	400 – 1,000

13.4.2 Proposed Typical Cross Sections

Proposed typical road sections by class of road and by type of work are shown in **Table 13.4.2 -1**.

TABLE 13.4.1-1 MINIMUM DESIGN STANDARD PHILIPPINE HIGHWAYS

ADT AVERAGE DAILY TRAFFIC ON OPENING	UNDER 200	200-400	400-1000		1000-2000		MORE THAN 2000	
			MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE
DESIGN SPEED (km/h)								
FLAT TOPOGRAPHY	60	70	70	90	80	95	90	100
ROLLING TOPOGRAPHY	40	50	60	80	60	80	70	90
MOUNTAINOUS TOPOGRAPHY	30	40	40	50	50	60	60	70
RADIUS (meter)								
FLAT TOPOGRAPHY	120	160	160	280	220	320	260	350
ROLLING TOPOGRAPHY	55	85	120	220	120	220	160	280
MOUNTAINOUS TOPOGRAPHY	30	50	50	80	80	120	180	160
GRADE (PERCENT)								
FLAT TOPOGRAPHY	6.0	6.0	5.0	3.0	4.0	3.0	4.0	3.0
ROLLING TOPOGRAPHY	8.0	7.0	6.0	5.0	5.0	5.0	5.0	4.0
MOUNTAINOUS TOPOGRAPHY	10.0	9.0	8.0	6.0	7.0	6.0	1.0	5.0
PAVEMENT WIDTH (m)	4.0	5.5 ; 6.0	6.10		6.70		6.70	7.30
SHOULDER WIDTH (m)	0.50	1.00	1.50	2.00	2.50	3.00	3.00	
RIGHT-OF-WAY WIDTH (m)	20	30	30		30	30	60	
SUPERELEVATION (m/m)	0.10 (MAX)		0.10 (MAX)		0.10 (MAX)		0.10 (MAX)	
NON-PASSING SIGHT DISTANCE (meter)								
FLAT TOPOGRAPHY	70	90	90	135	115	150	135	160
ROLLING TOPOGRAPHY	40	60	70	115	70	115	90	135
MOUNTAINOUS TOPOGRAPHY	40	40	40	60	60	70	70	90
PASSING SIGHT DISTANCE (meter)								
FLAT TOPOGRAPHY	420	490	490	615	560	645	615	675
ROLLING TOPOGRAPHY	270	350	420	560	420	560	490	615
MOUNTAINOUS TOPOGRAPHY	190	270	270	350	360	420	420	490
TYPE OF SURFACING	GRAVEL, CRUSHED GRAVEL, OR CRUSHED STONE BIT, PRESERVATIVE TREATMENT, SINGLE OR DOUBLE BIT, SURFACE TREATMENT, BITUMINOUS MACADAM PAVEMENT		BITUMINOUS MACADAM PAVEMENT, DENSE OR OPEN GRADED PLANT MIX SURFACE COURSE, BITUMINOUS CONCRETE SURFACE COURSE		BITUMINOUS CONCRETE SURFACE COURSE		BITUMINOUS CONCRETE SURFACE COURSE, PORTLAND CEMENT CONCRETE PAVEMENT	

SOURCE: Design Guidelines, Criteria and Standards, Bureau of Design, DPWH

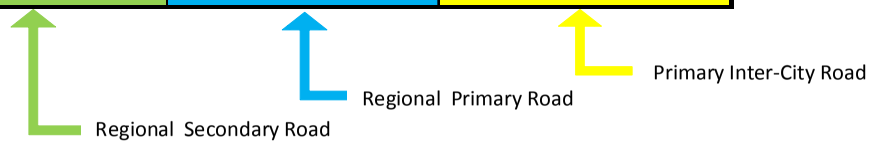


TABLE 13.4.2 -1 (1/5) PROPOSED TYPICAL CROSS SECTION – NEW ROAD CONSTRUCTION

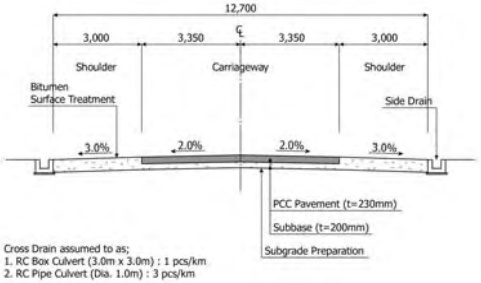
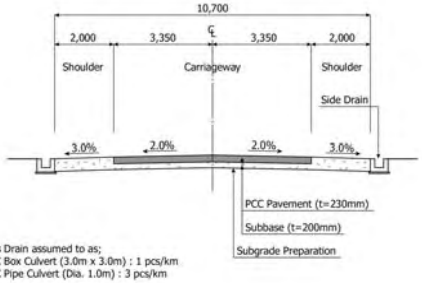
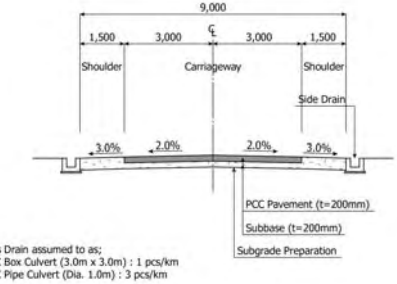
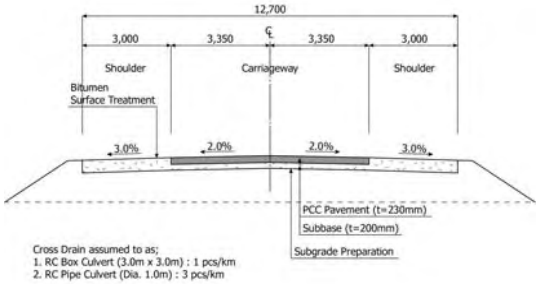
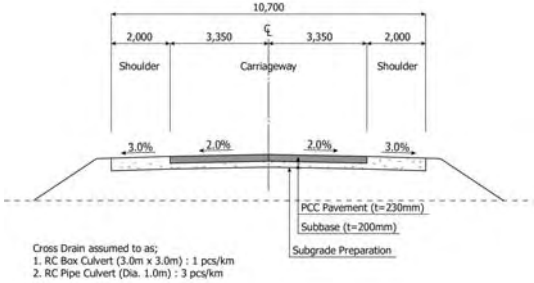
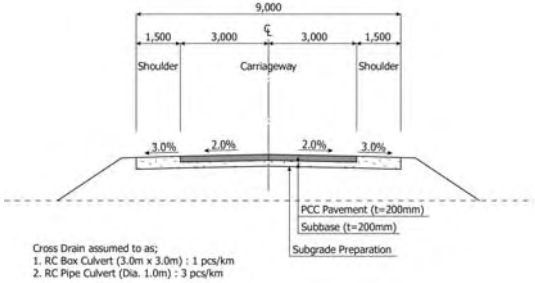
Primary Inter-City Road	Regional Primary Road	Regional Secondary Road
Urban Area CS111 	Urban Area CS121 	Urban Area CS131 
Flat Area CS112 	Flat Area CS122 	Flat Area CS132 

TABLE 13.4.2-1 (2/5) PROPOSED TYPICAL CROSS SECTION – IMPROVEMENT OF EXISTING GRAVEL/EARTH ROAD

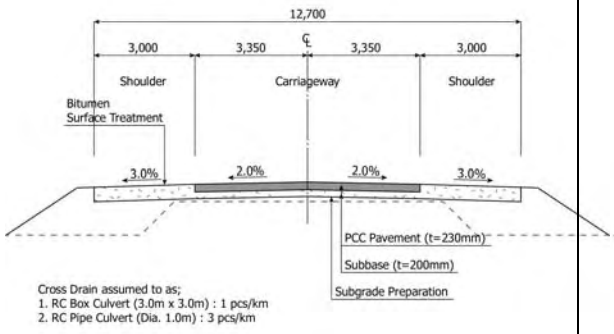
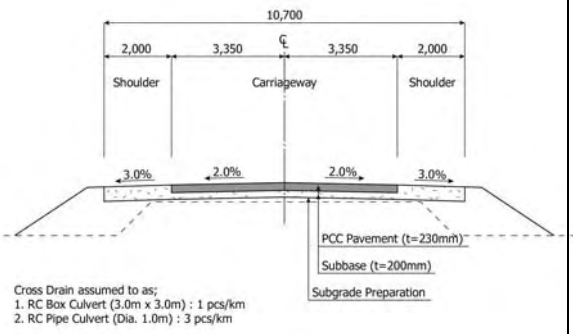
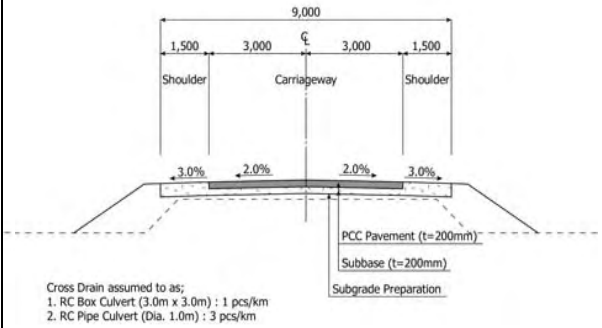
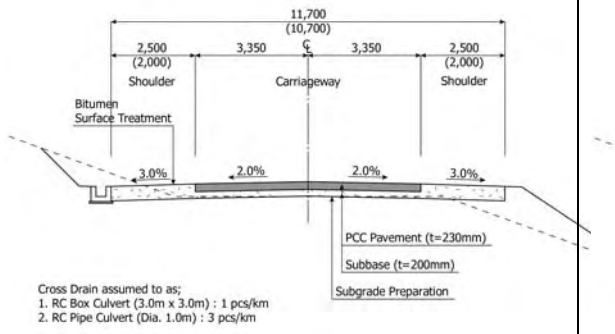
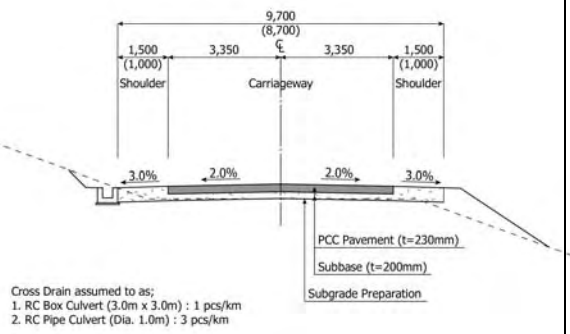
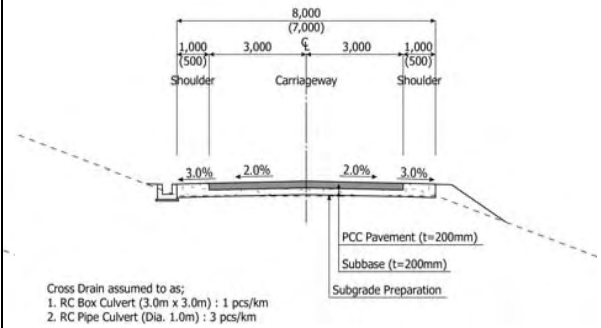
Primary Inter-City Road	Regional Primary Road	Regional Secondary Road
Flat Area CS211 	Flat Area CS221 	Flat Area CS231 
Rolling and Mountainous Area CS212 	Rolling and Mountainous Area CS222 	Rolling and Mountainous Area CS232 

TABLE 13.4.2-1 (3/5) PROPOSED TYPICAL CROSS SECTION – REHABILITATION OF EXISTING PCC PAVED ROAD (OVERLAYING)

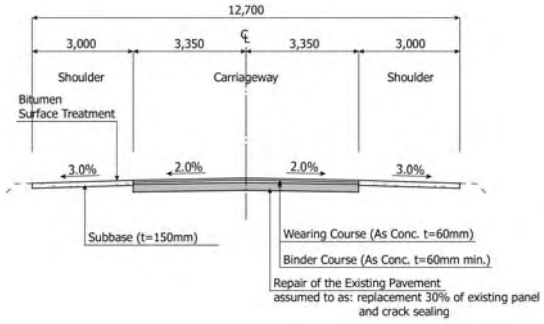
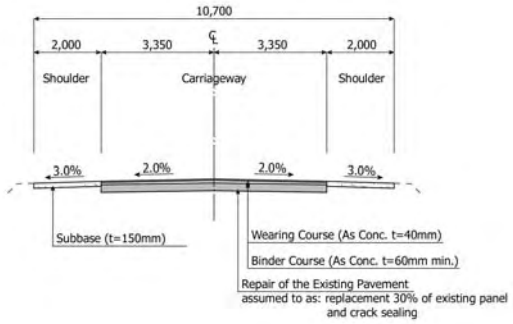
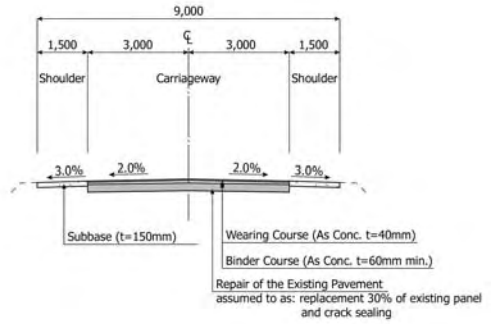
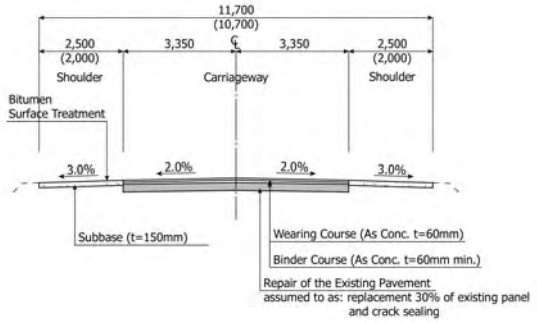
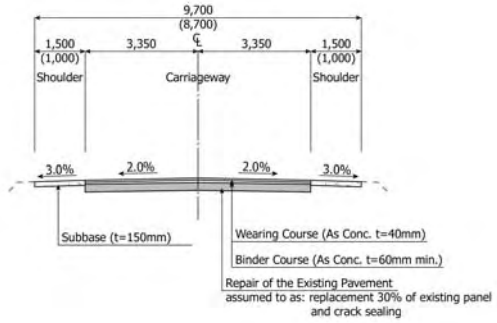
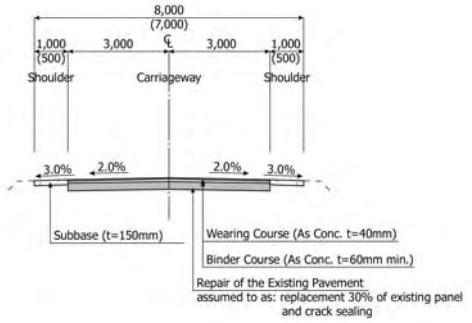
Primary Inter-City Road	Regional Primary Road	Regional Secondary Road
Flat Area CS311 	Flat Area CS321 	Flat Area CS331 
Rolling and Mountainous Area CS312 	Rolling and Mountainous Area CS322 	Rolling and Mountainous Area CS332 

TABLE 13.4.2-1 (4/5) PROPOSED TYPICAL CROSS SECTION – RENEWAL OF EXISTING PCC PAVED ROAD

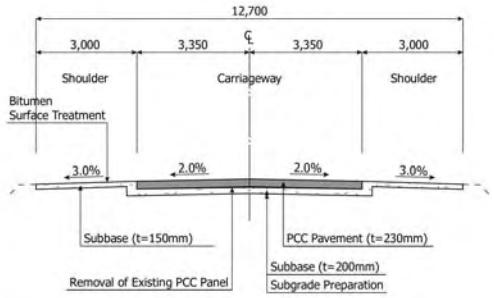
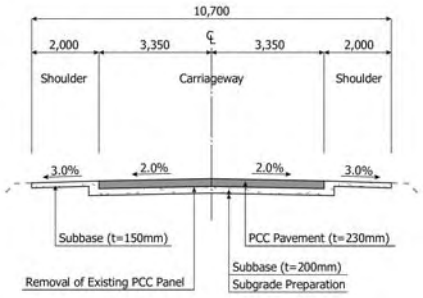
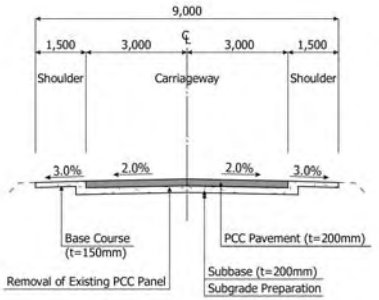
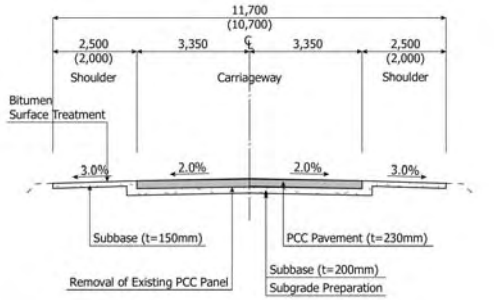
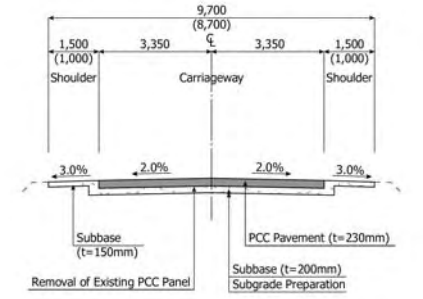
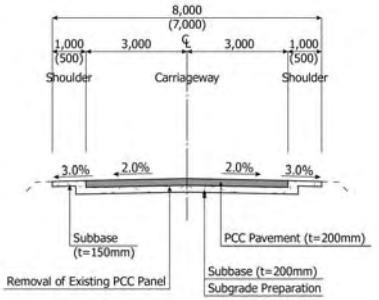
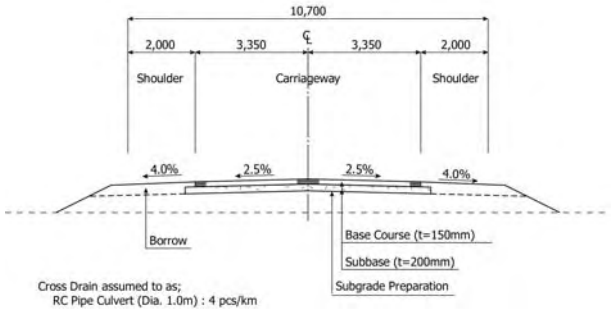
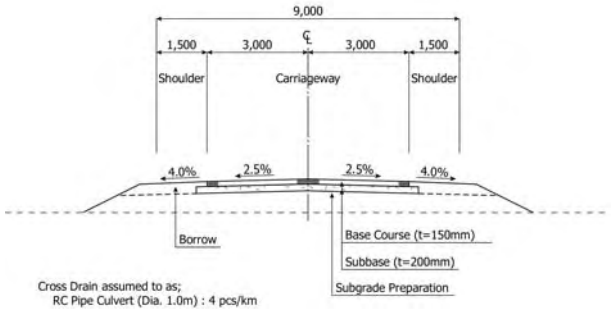
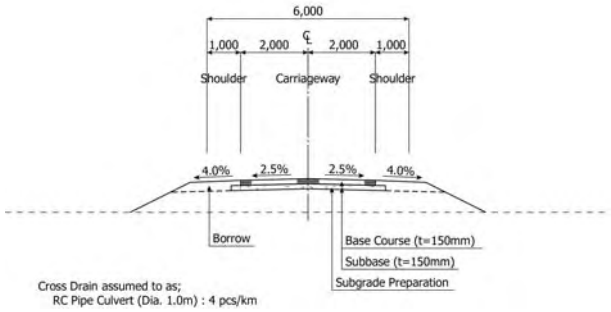
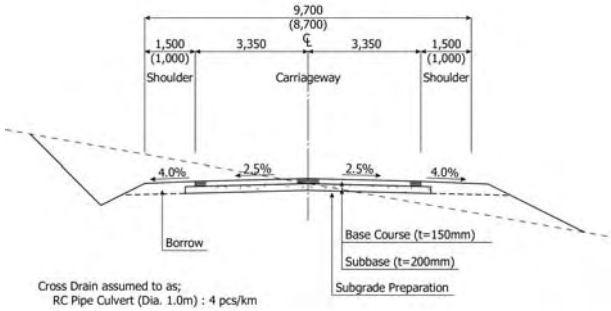
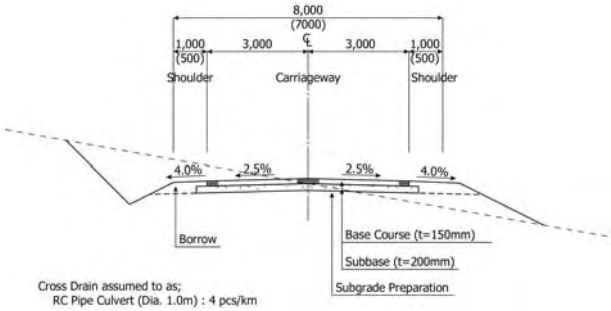
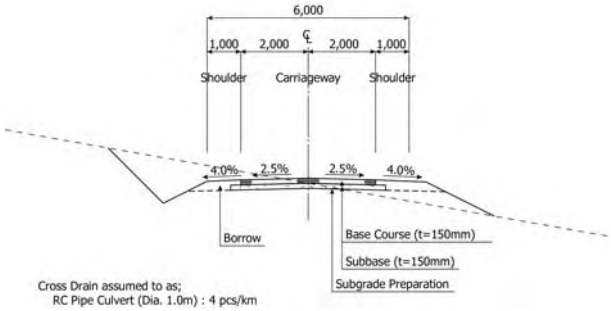
Primary Inter-City Road	Regional Primary Road	Regional Secondary Road
Flat Area CS411 	Flat Area CS421 	Flat Area CS431 
Rolling and Mountainous Area CS412 	Rolling and Mountainous Area CS422 	Rolling and Mountainous Area CS432 

TABLE 13.4.2-1 (5/5) PROPOSED TYPICAL CROSS SECTION – NEW CONSTRUCTION OF GRAVEL ROAD

Regional Primary Road	Regional Secondary Road	Barangay Road
Flat Area CS511 	Flat Area CS521 	Flat Area CS531 
Rolling and Mountainous Area CS512 	Rolling and Mountainous Area CS522 	Rolling and Mountainous Area CS532 

13.5 PROJECT COST ESTIMATE

13.5.1 Construction Cost Estimate

Unit prices of construction materials, unit prices of equipment, labor cost, and unit prices of major construction items are shown in **Tables 13.5.1-1** to **13.5.1-4**, respectively.

TABLE 11.5.1-1 UNIT PRICES OF CONSTRUCTION MATERIALS

Unit Prices : May 2009

	Materials	Unit	Unit Price (peso)
A.	Cement Concrete Materials		
1	Portland cement	*bags*	220.00
2	Fine Aggregates (River Sand)	*cu.m*	350.00
3	Coarse Aggregates (River Aggregates)	*cu.m*	450.00
4	Coarse Aggregates (Crushed Stone)	*cu.m*	1,050.00
5	Admixture (Water Reducing)	*LT*	100.00
B.	Re-bar		
6	Reinforcing Bars, Deformed (Grade 40)	*Kg*	36.00
7	Reinforcing Bars, Deformed (Grade 60)	*Kg*	36.50
C.	Form Materials		
8	Form Timber (2inch x 2inch x 10feet)	*pcs*	90.00
9	Coco Lumber (2x2x12)	*pcs*	108.00
10	Plywood (t=12mm)	*pcs*	720.00
11	Forms(M)	*sq.m*	850.00
12	Forms(L)	*sq.m*	800.00
D.	Pavement Materials		
13	Straight Asphalt (60/70)	*LT*	60.00
14	Tack Coat	*LT*	60.00
15	Prime Coat	*LT*	70.00
16	Fine Aggregates	*cu.m*	350.00
17	Coarse Aggregates	*cu.m*	450.00
18	Hot-mixed Asphalt Material (Wearing)	*Ton*	2,580.00
19	Hot-mixed Asphalt Material (Binder)	*Ton*	2,530.00
20	Base Course Material	*cu.m*	500.00
21	Sub-base Material	*cu.m*	400.00
E.	Earthwork Materials and so on		
22	Filling Material（10km）	*cu.m*	550.00
23	Structural Filling Material（10km）	*cu.m*	650.00
24	Coblestone	*cu.m*	950.00
25	Crushed gravel	*cu.m*	1,050.00
26	River Gravel	*cu.m*	800.00
27	Boulders	*cu.m*	950.00
F.	Drainages		
28	Reinforced Concrete Pipe Dia 600mm	*m*	1,000.00
29	Reinforced Concrete Pipe Dia 900mm	*m*	2,200.00
30	Reinforced Concrete Pipe Dia 1000mm	*m*	2,800.00
G.	Others		
31	Gabion Mattress (2x1x0.5m)	*pcs*	4,900.00
32	Joint Filler (t=20mm)	*sq.m*	1,940.00
33	Filter Cloth	*sq.m*	200.00
34	Grass Sodd	*sq.m*	210.00
35	Welding rod	*kg*	120.00
36	GI Pipe 100mm	*m*	1,450.00
37	Paint	*gal*	600.00
38	Steel (H-Beam, SSp)	*ton*	65,000.00
39	Propane Gas/Acetelane	*Tank*	651.00
40	Oxygen (big tube)	*Tank*	400.00
41	Fuel (Gasoline)	*Litter*	35.10
54	Diesel	*Litter*	28.15

TABLE 13.5.1-2 UNIT PRICES OF MAJOR EQUIPMENT (HOURLY RATE)

	Equipment	Unit	Unit Price (peso)	Fuel/Lubricant (peso)	Operator (peso)	Total (peso)
1	Crane	*hour*	664.57	579.15	62.50	1,400.00
2	Bulldozer (D60)	*hour*	1,564.28	579.15	62.50	2,300.00
3	Dumptruck , 6.88- 9.1 cu.m	*hour*	408.75	579.15	62.50	1,100.00
4	Vibratory compactor (10 Ton)	*hour*	916.74	386.10	62.50	1,400.00
5	Transit mixer (5cu.m)	*hour*	564.24	579.15	62.50	1,300.00
6	Payloader (2.29 cu.m)	*hour*	771.31	579.15	62.50	1,500.00
7	Roadgrader 125 Hp	*hour*	1,041.44	386.10	62.50	1,500.00
8	Backhoe 1.15 cu.m 148 Hp	*hour*	1,464.63	579.15	62.50	2,200.00
9	Water Truck	*hour*	566.73	386.10	62.50	1,100.00
10	Welding Machine (300 amp)	*hour*	57.54	48.26	0.00	200.00
12	Truck	*hour*	335.58	386.10	62.50	800.00
13	Concrete Vibrator (32mm)	*hour*	26.26	48.26	0.00	100.00
14	Plate Compactor	*hour*	68.37	48.26	0.00	200.00
15	Gas Welding	*hour*	57.54	0.00	0.00	100.00
16	Bagger Mixer (0.1cu.m)	*hour*	39.06	48.26	0.00	100.00
17	Bar Cutter and Bender (32mm)	*hour*	167.13	0.00	0.00	200.00
18	Chain Saw	*hour*	22.44	48.26	0.00	100.00
19	Tamping Rammer	*hour*	148.44	193.05	0.00	400.00
20	Submersible Pumps (100mm)	*hour*	166.18	193.05	0.00	400.00
21	Breaker	*hour*	43.49	0.00	0.00	100.00

TABLE 13.5.1-3 MONTHLY, DAILY AND HOURLY LABOR COST

Code	Category	Labor Index 262.62	Basic+Allowance		Monthly Fringe Benefits						TOTAL RATE		
			Daily	Monthly 25	SSS	Phil-Health	ECC (SSS +MR+EC)	Pag-ibig	13th Month Pay	Sick & Vacation Leave	MONTHLY	DAILY	HOURLY Ph/Hr
L001	Foreman	2.15	564.63	14,116.00	999.30	125.00	36.00	282.00	1,176.00	1,176.00	17,910.00	716.00	90
L002	Asst. Foreman	1.98	519.99	13,000.00	928.70	125.00	33.00	260.00	1,083.00	1,083.00	16,513.00	661.00	83
L003	Skilled Laborer	1.74	456.96	11,424.00	822.70	125.00	29.00	228.00	952.00	952.00	14,533.00	581.00	73
L004	Semi-skilled Laborer	1.37	359.79	8,995.00	646.00	125.00	23.00	180.00	750.00	750.00	11,469.00	459.00	57
L005	Unskilled Laborer	1.00	262.62	6,566.00	469.30	106.25	17.00	131.00	547.00	547.00	8,384.00	335.00	42
L006	Truck Driver (light)	1.33	349.28	8,732.00	610.70	125.00	22.00	175.00	728.00	728.00	11,121.00	445.00	56
L007	Truck Driver (Heavy)	1.58	414.94	10,373.00	752.00	125.00	26.00	207.00	864.00	864.00	13,211.00	528.00	66
L008	Mason	1.33	349.28	8,732.00	610.70	125.00	22.00	175.00	728.00	728.00	11,121.00	445.00	56
L009	Carpenter	1.33	349.28	8,732.00	610.70	125.00	22.00	175.00	728.00	728.00	11,121.00	445.00	56
L010	Electrician	1.37	359.79	8,995.00	646.00	125.00	23.00	180.00	750.00	750.00	11,469.00	459.00	57
L011	Plumber	1.37	359.79	8,995.00	646.00	125.00	23.00	180.00	750.00	750.00	11,469.00	459.00	57
L012	Painter	1.33	349.28	8,732.00	610.70	125.00	22.00	175.00	728.00	728.00	11,121.00	445.00	56
L013	Steelman	1.93	506.86	12,671.00	893.30	125.00	32.00	253.00	1,056.00	1,056.00	16,086.00	643.00	80
L014	Welder	1.58	414.94	10,373.00	752.00	125.00	26.00	207.00	864.00	864.00	13,211.00	528.00	66
L015	Equipt Optr.Oiler	1.33	349.28	8,732.00	610.70	125.00	22.00	175.00	728.00	728.00	11,121.00	445.00	56
L016	Equipt Optr.Mech	1.58	414.94	10,373.00	752.00	125.00	26.00	207.00	864.00	864.00	13,211.00	528.00	66
L017	Equip Optr(light)	1.58	414.94	10,373.00	752.00	125.00	26.00	207.00	864.00	864.00	13,211.00	528.00	66
L018	Equip Optr(Medium)	1.61	422.82	10,570.00	752.00	125.00	27.00	211.00	881.00	881.00	13,447.00	538.00	67
L019	Equip Optr(Heavy)	1.65	433.32	10,833.00	787.30	125.00	28.00	217.00	903.00	903.00	13,796.00	552.00	69

Notes :

a) Monthly Wages are based on 25 days per month, eight (8) hours per day.
b) SSS = Amount representing employer's contribution, Graduated Scale (as Amended by Resolution No. 20 - dated 15 January 2003, Schedule of Contribution, Effective March 2003)
c) PhilHealth = Amount representing employer's contribution, Graduated Scale (PhilHealth Advisory, Effective January 2005)
d) Employee's Compensation = Amount representing employer's contribution, (Sshedule of contrbutions, Effective June 2005)
e) Pag-ibig = 2% of basic monthly pay below P5,000 and P100 above P5000.
f) 13th month Pay , Sick Leave and Vacation Leave = Basic Monthly Salary divided by 12 .
g) Rate per Day = Total Monthly Salary divided 25 days per month.

Sources :

National Wages and Productivity Commission
Department of Labor and Employment (DOLE)
Bureau of Labor and Employment Statistics, SSS, and Local Contractors

TABLE 11.5.1-4 UNIT PRICES OF MAJOR CONSTRUCTION ITEMS

Unit Prices : May 2009

CODE	DESCRIPTION	UNIT	Unit Price (peso)
1.	**SITE CLEARING**		
	CLEARING AND GRUBBING	SQ.M	10
2.	**DEMOLITION**		
	REMOVAL OF EXISTING PCC PAVEMENT	SQ.M	300
3.	**DRAINAGES**		
	EXCAVATION FOR OPEN DRAINS	CU.M	280
	BACKFILLING USING THE EXCAVATED	CU.M	400
	BACKFILLING USING IMPORTED/SELECTED MATERIAL	CU.M	600
	CONCRETE PIPE CULVERT (φ800mm)	M	5,400
	CONCRETE PIPE CULVERT (φ1000mm)	M	5,700
	PVC DRAIN PIPES (φ150mm)	M	---
4.	**EARTHWORKS FOR ROADWAY**		
	REMOVAL OF UNSUITABLE MATERIAL	CU.M	240
	EXCAVATION	CU.M	240
	EMBANKMENT	CU.M	300
	SODDING	SQ.M	435
5.	**SUBGRADE, SUBBASE, BASE COURSE AND GRAVEL WEARING COURSE**		
	SUBGRADE PREPARATION	SQ.M	10
	SUBBASE (CBR>40)	CU.M	500
	BASECOURSE (CBR>80)	CU.M	800
6.	**PAVEMENT**		
	PRIME COAT/INVERT BITUMEN EMULSION	SQ.M	132
	TACK COAT	SQ.M	39
	BITUMINOUS SURFACE TREATMENT	SQ.M	35
	BINDER COURSE (HOT MIXED ASPHALT CONCRETE) T=60MM	SQ.M	680
	WEARING COURSE (HOT MIXED ASPHALT CONCRETE) T=40MM	SQ.M	500
	WEARING COURSE (HOT MIXED ASPHALT CONCRETE) T=60MM	SQ.M	700
	PORTLAND CEMENT CONCRETE PAVEMENT T=200MM	SQ.M	1,220
	PORTLAND CEMENT CONCRETE PAVEMENT T=230MM	SQ.M	1,400
7.	**STRUCTURES**		
	EXCAVATION OF SOFT MATERIAL FOR STRUCTURES (0 - 2 m)	CU.M	150
	EXCAVATION OF SOFT MATERIAL FOR STRUCTURES (2 - 4 m)	CU.M	250
	EXCAVATION OF SOFT MATERIAL FOR STRUCTURES (4 - 5 m)	CU.M	866
	EXCAVATION OF HARD MATERIAL FOR STRUCTURES	CU.M	1,050
	BACKFILLING TO UTILIZING/MATERIAL FROM EXCAVATION	CU.M	450
	BACKFILLING TO UTILIZING/IMPORTED MATERIAL	CU.M	950
	FOUNDATION FILL/CRUSHED STONE FILL	CU.M	2,100
	FOUNDATION CONCRETE LINING	SQ.M	700
	MANUFACTURING, SUPPLYING AND DELIVERING PREFABRICATED PILES (RC 40x40cm)	M	5,600
	MANUFACTURING, SUPPLYING AND DELIVERING PREFABRICATED PILES (RC 50x50cm)	M	8,400
	INSTALLATION OF PREFABRICATED PILES (RC 40x40, DRIVING PILE) (DEPTH: 0 - 20 m)	M	3,000
	INSTALLATION OF PREFABRICATED PILES (RC 50x50, DRIVING PILE) (DEPTH: 0 - 20 m)	M	4,000
	MANUFACTURING, SUPPLYING AND DELIVERING PREFABRICATED PILES (PC 40x40cm)	M	7,000
	MANUFACTURING, SUPPLYING AND DELIVERING PREFABRICATED PILES (PC 50x50cm)	M	9,000
	INSTALLATION OF PREFABRICATED PILES (PC 40x40, DRIVING PILE) (DEPTH: 0 - 20 m)	M	3,000
	INSTALLATION OF PREFABRICATED PILES (PC 50x50, DRIVING PILE) (DEPTH: 0 - 20 m)	M	4,000
	FORMWORK FOR STRUCTURE	SQ.M	1,400
	RE-BAR WORK/MILD STEEL BARS (GRADE 40)	TON	56,000
	RE-BAR WORK/HIGH YIELD STRESS STEEL BARS (GRADE 60)	TON	56,500
	CAST IN SITU CONCRETE FOR STRUCTURES/18N	CU.M	6,700
	CAST IN SITU CONCRETE FOR STRUCTURES/24N	CU.M	8,100
	PLAIN PACKED STONE MASONRY WALLS (CLASS B)	CU.M	4,000
	CEMENT-MORTARED STONE MASONRY WALL (CLASS B)	CU.M	4,775

13.5.2 Road and Bridge Construction Cost

Based on the unit prices of construction items, road construction cost per km class of road and type of work were estimated as shown in **Table 13.5.2-1**. Bridge construction cost per m is shown in **Table 13.5.2-2**.

13.5.3 Engineering Cost

Engineering cost was estimated based on the past experiences as shown below;

- Feasibility Study ---------- 2% of Construction Cost
- Detailed Design ---------- 4% of Construction Cost
- Construction Supervision ---------- 8% of Construction Cost

13.5.4 Cost of ROW Acquisition and Resettlement of Affected Families

Cost of ROW Acquisition and resettlement of affected families was estimated as follows;

- Unit Price of ROW Acquisition and resettlement of affected families = 100 pesos per square meter
- Width of ROW to be acquired = 30 m

Unit cost per km for ROW acquisition and resettlement of affected families was 3.0 Million Pesos per km.

TABLE 13.5.2-1 (1.2) Distribution of Maior Urban Centers

unit: x 1,000 pesos

Case	Road Class	Area	Cost per KM													
			Construction Cost								Engineering Services			Land Acqui-sition, Compe-nsation	Subtotal	Total
			Direct Cost			Over-head	Profit	Contin-gency	VAT	Subtotal	F/S	D/D	S/V			
			FC	LC	Total	6.00%	6.00%	5.00%	12.00%		2.00%	4.00%	8.00%			
New Construction	Primary Inter-City Road	Urban	11,191	9,687	**20,878**	1,253	1,253	1,044	2,505	**26,933**	539	1,077	2,155	3,000	**6,771**	**33,704**
		Flat	11,229	8,894	**20,123**	1,207	1,207	1,006	2,415	**25,958**	519	1,038	2,077	3,000	**6,634**	**32,592**
		Rolling	12,422	10,329	**22,750**	1,365	1,365	1,138	2,730	**29,348**	587	1,174	2,348	3,000	**7,109**	**36,457**
		Mt.	13,418	11,112	**24,530**	1,472	1,472	1,227	2,944	**31,645**	633	1,266	2,532	3,000	**7,431**	**39,076**
	Regional Primary Road	Urban	10,630	9,128	**19,758**	1,185	1,185	988	2,371	**25,487**	510	1,019	2,039	3,000	**6,568**	**32,055**
		Flat	10,306	8,164	**18,470**	1,108	1,108	924	2,216	**23,826**	477	953	1,906	3,000	**6,336**	**30,162**
		Rolling	11,617	9,621	**21,238**	1,274	1,274	1,062	2,549	**27,397**	548	1,096	2,192	3,000	**6,836**	**34,233**
		Mt.	12,639	10,424	**23,063**	1,384	1,384	1,153	2,768	**29,752**	595	1,190	2,380	3,000	**7,165**	**36,917**
	Regional Secondary Road	Urban	9,014	7,741	**16,755**	1,005	1,005	838	2,011	**21,614**	432	865	1,729	3,000	**6,026**	**27,640**
		Flat	8,680	6,793	**15,473**	928	928	774	1,857	**19,960**	399	798	1,597	3,000	**5,794**	**25,754**
		Rolling	9,680	7,984	**17,664**	1,060	1,060	883	2,120	**22,787**	456	911	1,823	3,000	**6,190**	**28,977**
		Mt.	10,456	8,625	**19,081**	1,145	1,145	954	2,290	**24,615**	492	985	1,969	3,000	**6,446**	**31,061**
Improvement of Existing Earth/Gravel Road	Primary Inter-City Road	Flat	9,405	7,820	**17,225**	1,034	1,034	861	2,067	**22,221**	444	889	1,778	0	**3,111**	**25,332**
		Rolling	10,270	8,713	**18,983**	1,139	1,139	949	2,278	**24,488**	490	980	1,959	0	**3,429**	**27,917**
		Mt.	11,278	9,530	**20,808**	1,248	1,248	1,040	2,497	**26,841**	537	1,074	2,147	0	**3,758**	**30,599**
	Regional Primary Road	Flat	8,487	7,085	**15,572**	934	934	779	1,869	**20,088**	402	804	1,607	0	**2,813**	**22,901**
		Rolling	9,719	8,213	**17,932**	1,076	1,076	897	2,152	**23,133**	463	925	1,851	0	**3,239**	**26,372**
		Mt.	10,497	8,871	**19,368**	1,162	1,162	968	2,324	**24,984**	500	999	1,999	0	**3,498**	**28,482**
	Regional Secondary Road	Flat	6,772	5,677	**12,449**	747	747	622	1,494	**16,059**	321	642	1,285	0	**2,248**	**18,307**
		Rolling	7,737	6,565	**14,302**	858	858	715	1,716	**18,449**	369	738	1,476	0	**2,583**	**21,032**
		Mt.	8,418	7,085	**15,503**	930	930	775	1,860	**19,998**	400	800	1,600	0	**2,800**	**22,798**
Rehabilitation of Existing PCC Paved Road (Overlaying)	Primary Inter-City Road	Flat	8,386	6,806	**15,192**	912	912	760	1,823	**19,599**	392	784	1,568	0	**2,744**	**22,343**
		Rolling	8,719	7,076	**15,795**	948	948	790	1,895	**20,376**	408	815	1,630	0	**2,853**	**23,229**
		Mt.	9,061	7,325	**16,386**	983	983	819	1,966	**21,137**	423	845	1,691	0	**2,959**	**24,096**
	Regional Primary Road	Flat	7,468	5,939	**13,407**	804	804	670	1,609	**17,294**	346	692	1,384	0	**2,422**	**19,716**
		Rolling	7,777	6,186	**13,963**	838	838	698	1,676	**18,013**	360	721	1,441	0	**2,522**	**20,535**
		Mt.	8,098	6,414	**14,512**	871	871	726	1,741	**18,721**	374	749	1,498	0	**2,621**	**21,342**
	Regional Secondary Road	Flat	6,662	5,299	**11,961**	718	718	598	1,435	**15,430**	309	617	1,234	0	**2,160**	**17,590**
		Rolling	6,946	5,502	**12,448**	747	747	622	1,494	**16,058**	321	642	1,285	0	**2,248**	**18,306**
		Mt.	7,226	5,701	**12,927**	776	776	646	1,551	**16,676**	334	667	1,334	0	**2,335**	**19,011**

TABLE 13.5.2-1 (2.2) ROAD CONSTRUCTION COST

Renewal of Existing PCC Paved Road	Primary Inter-City Road	Flat	7,866	6,281	**14,147**	849	849	707	1,698	**18,250**	365	730	1,460	0	**2,555**	**20,805**
		Rolling	8,145	6,504	**14,649**	879	879	732	1,758	**18,897**	378	756	1,512	0	**2,646**	**21,543**
		Mt.	8,431	6,705	**15,136**	908	908	757	1,816	**19,525**	391	781	1,562	0	**2,734**	**22,259**
	Regional Primary Road	Flat	7,602	6,070	**13,672**	820	820	684	1,641	**17,637**	353	705	1,411	0	**2,469**	**20,106**
		Rolling	7,904	6,286	**14,190**	851	851	710	1,703	**18,305**	366	732	1,464	0	**2,562**	**20,867**
		Mt.	8,186	6,510	**14,696**	882	882	735	1,764	**18,959**	379	758	1,517	0	**2,654**	**21,613**
	Regional Secondary Road	Flat	6,164	4,882	**11,046**	663	663	552	1,326	**14,250**	285	570	1,140	0	**1,995**	**16,245**
		Rolling	6,383	5,056	**11,439**	686	686	572	1,373	**14,756**	295	590	1,180	0	**2,065**	**16,821**
		Mt.	6,607	5,212	**11,819**	709	709	591	1,418	**15,246**	305	610	1,220	0	**2,135**	**17,381**
New Construction of Gravel Road	Regional Primary	Flat	3,159	2,268	**5,427**	326	326	271	651	**7,001**	140	280	560	3,000	**3,980**	**10,981**
		Rolling	3,637	2,634	**6,271**	376	376	314	753	**8,090**	162	324	647	3,000	**4,133**	**12,223**
		Mt.	3,819	2,799	**6,618**	397	397	331	794	**8,537**	171	341	683	3,000	**4,195**	**12,732**
	Rural Feeder	Flat	2,767	2,004	**4,771**	286	286	239	573	**6,155**	123	246	492	3,000	**3,861**	**10,016**
		Rolling	4,386	3,023	**7,409**	445	445	370	889	**9,558**	191	382	765	3,000	**4,338**	**13,896**
		Mt.	4,656	3,236	**7,892**	474	474	395	947	**10,182**	204	407	815	3,000	**4,426**	**14,608**
	Barangay	Flat	2,057	1,465	**3,522**	211	211	176	423	**4,543**	91	182	363	3,000	**3,636**	**8,179**
		Rolling	2,375	1,699	**4,074**	244	244	204	489	**5,255**	105	210	420	3,000	**3,735**	**8,990**
		Mt.	2,660	1,903	**4,563**	274	274	228	548	**5,887**	118	235	471	3,000	**3,824**	**9,711**

TABLE 13.5.2-2 BRIDGE CONSTRUCTION COST

unit: x 1,000 pesos

Class	Bridge Length (m)	Cost per (Br.)															Cost per (m)
		Construction Cost									Engineering Services			Land Acquisition, Compensation	Subtotal	Total	
		Direct Cost			Overhead	Profit	Contingency	VAT	Subtotal	Cost per (m)	F/S	D/D	S/V				
		FC	LC	Total	6.00%	6.00%	5.00%	12.00%			2.00%	4.00%	8.00%				
Medium	210.0	73,978	49,898	**123,876**	7,433	7,433	6,194	14,865	**159,801**	**760.96**	3,196	6,392	12,784	0	22,372	**182,173**	**867.49**
Small	60.0	30,785	17,949	**48,735**	2,924	2,924	2,437	5,848	**62,868**	**1,047.80**	1,257	2,515	5,029	0	8,801	**71,669**	**1,194.48**

13.6 PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT

13.6.1 System of the Philippines

1) GENERAL

The "**Philippine Environmental Policy**", enacted as **Presidential Decree** (**PD**) **1151**, was the Philippine's first policy on environment. It took effect in 1977, and required all national government agencies, government-owned and controlled corporations, as well as private corporations, firms and entities to prepare Environmental Impact Statements (EIS) for every action, project or undertaking that will significantly affect the quality of the environment.

Based on PD 1151's policy statement, **Presidential Decree (PD) 1586** was issued on the following year. It formally established the **Philippine Environmental Impact Statement** (**EIS**) **System**. Under this law, no person, partnership or corporation shall undertake or operate any in part such declared ECP *(*Environmentally Critical Project) and projects within Environmentally Critical Areas (ECAs) without first securing an Environmental Compliance Commitment (ECC). Major categories for ECPs and ECAs were established through **Presidential Proclamation No. 2146**, series of 1981.

In 1992, the Department of Environment and Natural Resources (DENR) issued Department Administrative Order (DAO) No. 21, which embodied the implementing rules and regulations for environmental impact assessments. To further strengthen the EIS System, DAO 21 was superseded by DAO No. 96-37. In 2002, the Office of the President, issued Administrative Order No. 42 (A.O. 42) to rationalize the implementation of the Philippine EIS System to make it a more effective planning tool for sustainable development.

To address deficiencies in the EIA system that hindered its effectiveness as a tool for proper environmental management, another department order was issued--- **DAO No. 03 Series of 2003 or DAO 2003-30**. Said DAO also aims to institutionalize the incorporation of environmental concerns in the country's effort to hasten national development in the most efficient manner so that neither the environment nor national development is compromised. The corresponding **Procedural Manual** was prepared by the EMB and implemented in January 2005. In August 2007, EMB updated the guidelines and came up with the "**Revised Procedural Manual (RPM) of DAO 2003-30**", which superseded the Procedural Manual issued in 2005.

One of the most significant improvements in procedure is the exclusion from ECC application previous requirements such as submittal of permits, clearances, and the likes from other concerned government agencies. As experienced in the past, such requirements unnecessarily obstruct the EIA evaluation process. Another important feature of the RPM is that it reinforces Malacañang Administrative Order No. 42 which requires Proponents to

conduct simultaneously the Environmental Impact Study and the Feasibility Study (FS). Following this procedure, EIA documents are prepared when prospective proposals are more concrete than mere concept and become available before the project has reached a stage of investment or commitment towards implementation.

On October 1, 2009, the latest EIA guideline took effect through a Memorandum from the Secretary of the DENR, entitled, "***New Processing Periods for the Environmental Impact Statement (EIS) System & Corresponding Guidelines***". Based on the said Memo, processing period for applications for Environmental Compliance Certificates (ECCs) and Certificates of Non-Coverage (CNCs) should be as follows:

ECCs (Projects Covered by EIS System)	-	**20 Working Days**
CNCs (Projects Not Covered by EIS System	-	**1 Working Day**

Processing time starts when application is accepted and proof of payment is presented at the designated processing office.

Based on the same Memo the following rules and regulations were promulgated:

(i) Processing of ECCs and CNCs should concentrate and focus on the environmental aspects of the project that have scientific basis and are verifiable. Socio-economic political and other aspects of the project shall be the responsibility of legally mandated agencies and institutions, especially the Local Government Units.

(ii) Application documents for ECCs and CNCs should be simplified to make them focus on essential information.

(iii) Sectoral scoping guidelines should be issued to guide proponents in the preparation of their Environmental Impact Assessment (EIA) Studies.

(iv) Presence of DENR-EMB as well as the EIA Review Committee in the proponents conduct of scoping activities should be optional for the proponent rather than required.

(v) Permits, licenses, clearances, endorsements and other similar documents from other National Government Agencies and Local Government Units should no longer be required, as prerequisites for the processing of ECC and CNC applications.

(vi) Requirements involving public participation such as public scoping, socio-economic/perceptions survey, public hearing/consultation and similar activities should no longer be required as prerequisites for and as part of the processing of ECC and CNC applications. However, proponents of Environmental Impact Statement based applications may submit documentations of public scoping and public hearing/consultation activities (if applicable).

(vii) Additional information should no longer be asked from the proponent upon acceptance of the application.

(viii) Internal and other government aspects should be used in the review of ECC and CNC applications. Use of external/private reviewers is strongly discouraged. And

(ix) ALL ECC/CNC applications, corresponding status and decision documents, should be properly and timely recorded into the DENR-EMB online information system

2) EIA SYSTEM

Environmental Impact Assessment (EIA), as defined under the Philippine EIS System (PEISS), is a process that involves the prediction and evaluation of likely impacts of a project on the environment during the various phases of implementation, i.e., pre-construction, commissioning, operation and abandonment. It also includes an appropriate management plan which aims to prevent, mitigate and enhance measures to protect the environment and the community's welfare. Through the EIA, negative environmental impacts of proposed actions are significantly reduced through a reiterative review process of locational planning, design and other alternatives, followed by the formulation of environmental management and monitoring plans.

After examining the EIA document, the DENR-EMB, decides whether to grant or deny an **Environmental Compliance Certificate (ECC)**. After ECC issuance, the next stage is the application for approvals from other concerned national government agencies as well as Local Government Units (LGUs), after which the project can commence with its implementation.

a) Policy and Basic Operating Principles

Based on the Procedural Manual of DAO 2003-30, the key operating principles in the implementation of the Philippine EIS System are:

(i) The EIS System is concerned primarily with assessing the direct and indirect impacts of a project on the biophysical and human environment and in ensuring that these impacts are addressed by appropriate environmental protection and enhancement measures.

(ii) The EIS System helps Proponents to incorporate environmental considerations when planning their projects as well as in determining the environment's impact on their project.

(iii) Project Proponents are responsible for determining and disclosing all relevant information necessary for a systematic assessment of the environmental impacts of their projects;

(iv) The review of EIA Reports by EMB are guided by three (3) general criteria namely:

- that environmental considerations are integrated into the overall project planning,
- that the assessment is technically sound and proposed environmental mitigation measures are effective, and
- that the EIA process is based on a timely, informed and meaningful public participation of potentially-affected communities;

(v) Effective review of the EIA Reports depends mainly on timely, full, and accurate disclosure of relevant information by project Proponents and other stakeholders in the EIA process;

b) The EIA Process in Relation to the Project Cycle

Within the project cycle, the most ideal stage to conduct the EIA is during the Feasibility Study (FS) stage because it is at this point wherein the Proponent defines its range of actions and considers project alternatives. The link between the EIA process and the project cycle can be described as follows (Please refer to **Figure 13.6.1-1**[1]):

i) **Between Project Conceptualization and Pre-Feasibility Stage** – EIA-related activities include self-screening whether the project is covered or not by the Philippine EIS System. If covered, the Proponent undertakes self-determination of all requirements in preparation for the ECC application. During this stage the Proponent carries out an initial rapid site and impact assessment to determine critical aspects of project location, and have an initial scope of key issues;

ii) **During preparation of the Feasibility Study** - Proponent commences detailed Environmental Impact Assessment. The formulated Environmental Management Plan and corresponding costs and benefits are inputted into the FS as a basis for decision making regarding final project options, locational planning, and design. It is at this stage when the formal EIA application is started, wherein positive review and evaluation of the submitted EIA documentation is expected to result to an issuance of the Environmental Compliance Commitment, or ECC;

iii) ***During Detailed Engineering Design (DED)*** - During this stage, which is post-ECC, generic measures identified during the EIA study at the FS stage are detailed based on the project facility design and operational specifications. Additional baseline monitoring may also be done prior to construction or implementation of the project to provide a more substantive basis for defining the environmental management and monitoring plans;

iv) ***Project Construction/Operations and throughout the project lifetime*** – During these stages, environmental mitigation measures are fully implemented, and monitoring of the Proponent's environmental performance is continuously done. Findings and lessons learned are fed back into the project cycle for continual improvement of the project, with corresponding updating of the environmental management plans of the project. Major improvements may need new formal applications for DENR approvals, which shall then be related to previous approvals for an integrated environmental management approach of the project.

[1] Taken from Fig. 1-1 of the Revised Procedural Manual of DENR Administrative Order (DAO) 2003-30, prepared and issued by the DENR Environmental Management Bureau (EMB).

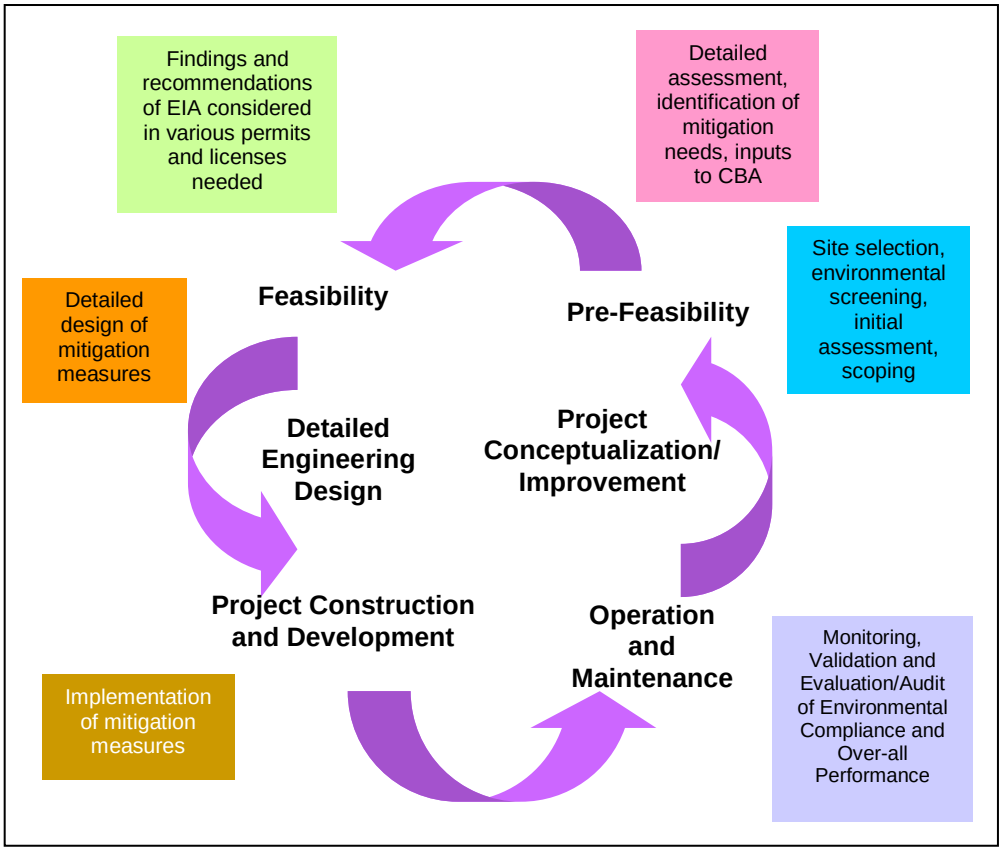


FIGURE 13.6.1-1 EAI PROCESS AND PROJECT CYCLE

3) ROW ACQUISITION POLICIES AND PROCEDURE

The following description of R-O-W policies and procedures is based on Philippine Republic Acts along with its corresponding Implementing Rules and Regulations (IRR), Presidential Decrees, Executive Orders, Rules of Court, Ministry/Department Orders, and Department Policies on land ownership and Infrastructure Right-of-Way (IROW) acquisition, and the DPWH Department Order (D.O.) No. 5, Series of 2003. Since the 1930's, laws on ROW acquisition have been amended and repealed several times to improve the procedures, minimize irregularities, and avoid delays in project implementation. Since previous laws have been superseded, only the most current pieces of legislation shall be presented in considerable detail.

a) Right-of-Way Acquisition Policies and Legal Bases

A list of applicable Philippine legislation (Republic Acts, Presidential Decrees, Executive Orders), Implementing Rules and Regulations, and Department Orders are presented in the succeeding table. Please note that although some sections of precedent laws have been amended by succeeding ones, salient provisions that were retained are still included here for these are still in effect and binding.

TABLE 13.6.1-1 GOVERNMENT POLICIES PERTAINING TO LAND ACQUISITION

Year	Policy	Title/Salient Features
2007	LARRIP Policy, 3rd Ed.	Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy • Includes the **DPWH's Indigenous Peoples' Policy** based on the Indigenous Peoples' Rights Act (IPRA) and the National Commission on Indigenous Peoples (NCIP) Administrative Order No. 1, series of 2006, or the Free and Prior Informed Consent Guidelines of 2006 • Covers all Indigenous Peoples (IPs) or Indigenous Cultural Communities (ICCs) whether they are living **inside** or **outside** an area covered by a Certificate of Ancestral Domain Title (CADT) or Certificate of Ancestral Land Title (CALT), including those that have pending applications to be declared as ancestral domain • In general **no Indigenous Peoples Action Plan** (IPAP) is required for projects that are **voluntarily solicited** or **initiated by IPs**. Nevertheless, they are still **eligible** to receive compensation and entitlements mentioned in Chapter III of the LARRIPP • Provides a comprehensive policy on provision of **safeguard instruments** to IPs/ICCs as described in Chapter IV and Table IV.2 of the LARRIPP
2003	D.O. 327	"*Guidelines for Land Acquisition and Resettlement Action Plans (LAPRAPs) for Infrastructure Projects*" • LAPRAP document shall describe the project, expected impacts and mitigating measures, socio-economic profile of APs, **compensation package**, **timetable of implementation**, institutional arrangements, participation, consultation, and grievance procedures • LAPRAP shall be prepared using inputs from the **IROW Action Plan**, the census and socioeconomic survey conducted, detailed engineering study, and **parcellary survey results** • LAPRAP shall be the basis for qualifying and compensating APs for lands, structures and/or improvements, that are **partially** or **fully** affected by the Department's infrastructure projects • Provision of **resettlement sites** shall be the **responsibility of the Local Government Units (LGUs)** concerned, with assistance from the concerned government agencies tasked with providing housing

		• An **Indigenous People's Action Plan** (IPAP) shall be formulated for indigenous peoples (IP) if they are affected by the Department's infrastructure projects
2003	D.O. 5	"*Creation of the Infrastructure Right of Way and Resettlement Project Management Office (IROW-PMO) and the Implementation of the Improved IROW Process*" • Implementing Office (IO) shall ensure that **IROW costs** are always **included** in **project budgets** • The IO shall provide an estimated cost breakdown of each project to the IROW and Resettlement PMO and the CFMS prior to any disbursement of funds. The **first priority** of the budget for a project shall be all **costs prior to construction**. • If ROW costs differ from the approved ROW budget after detailed design has been finalized, a **budget adjustment shall be approved**. • A Land Acquisition Plan and Resettlement Action Plan (**LAPRAP**) shall be prepared for all projects, whether **local** or **foreign funded**, that will require Right-of-Way (ROW) acquisitions, using a **standardized compensation package** • The determination of Affected Persons (APs) and improvements shall be based on the **cutoff date**, which is the start of the census of APs and tagging for improvements • The IO shall prepare the final **as-built ROW Plan** upon completion of the project, for submission to the IROW and Resettlement PMO.
2000	I.R.R. of R.A. 8974	"*Implementing Rules and Regulations of R.A. 8974* (*An Act to Facilitate the Acquisition of Right-of-Way, Site, or Location for National Government Infrastructure Projects and for Other Purposes)* • Set the **1st offer for negotiated sale** of land (just compensation) as the price indicated in the **current zonal valuation issued by the BIR** for the area where the property is located • Set the valuation of improvements on the land to be acquired using the "**replacement cost method**", which is defined as the "*amount necessary to replace the improvements/ structures based on the current market prices for materials, equipment, labor, contractor's profit and overhead, and all other attendant costs associated with the acquisition*". • Provided for the engagement of **government financing institutions or private appraisers** to undertake appraisal of the land and/or improvements/structures, to **determine its fair market value** • **Tasked the NHA to establish and develop squatter**

2000	R. A. 8974	*"An Act to Facilitate the Acquisition of Right-of-Way, Site, or Location for National Government Infrastructure Projects and for Other Purposes*" • Prescribed **new standards for the assessment of the value of the land** subject of expropriation proceedings or negotiated sale, namely: o The classification and used for which the property is suited o The size, shape or location, tax declaration and zonal valuation of the land o The price of the land as manifested in the ocular findings, oral, as well as documentary evidence presented o The reasonable disturbance compensation for the removal and/or demolition of certain improvement on the land and for the value of improvements thereon o The developmental costs for improving the land o The value declared by the owners o The current price of similar lands in the vicinity; and o Such facts and events as to enable the affected property owners to have sufficient funds to acquire similarly-situated lands of approximate areas as those required from them by the government, and thereby rehabilitate themselves as early as possible • Mandates the BIR to come up with **updated zonal valuation** for areas subject to expropriation proceedings, within 60 days from the date of expropriation case • Mandated the DPWH (as Chair) and other agencies involved in ROW acquisition to adopt the necessary Implementing Rules and Regulations for the equitable valuation of the improvements and/or structures on the land to be expropriated
1999	DPWH Policy Framework for LARR	"*Policy Framework for Land Acquisition, Resettlement and Rehabilitation*" • Government projects must serve the common good • All efforts must be exercised to ensure that:

		○ Adverse social impacts are **avoided**, **minimized**, and/or **mitigated** ○ Everybody, including Affected Persons (APs), will **benefit** from the projects ○ APs are provided with sufficient compensation and assistance for lost assets which will assist them to **improve** or at least **maintain** their pre-project standard of living; ○ Project stakeholders (which include APs) are **consulted** regarding the projects' design, implantation, and operation • Only those APs found to be residing in, doing business, or cultivating land or having rights over resources within, the project area as of the date of the census surveys (i.e., cut-off date) are eligible for compensation for lost assets.
1997	Rule 67, Rules of Civil Procedure	"*Rule 67 – Expropriation*" • Gives the plaintiff (DPWH) the right to take or enter upon the possession of a real property involved **if a deposit is made** with an authorized government depositary an amount equivalent to the assessed value of the property for purposes of taxation to be held by such bank subject to the orders of the court
1992	R.A. 7279	*Urban Development and Housing Act of 1992*" • **Uplift** the conditions of the **underprivileged and homeless citizens** in urban areas and in resettlement areas by making available to them decent housing at affordable cost, basic services, and employment opportunities • Provide for an equitable land tenure system that shall guarantee **security of tenure** to Program beneficiaries but shall respect the rights of small property owners and ensure the payment of just compensation
1992	R.A. 7279	• **Eviction** or **demolition** of informal settlers may be allowed under the following situations: ○ When persons or entity occupy danger areas such as esteros, railroad tracks, garbage dumps, riverbanks, shorelines, waterways, and other public places such as sidewalks, roads, parks, and playgrounds ○ When **government infrastructure project with available funding** are about to be implemented ○ When there is a court order for eviction and demolition

		• If eviction or demolition will involve underprivileged and homeless citizens, as defined in the same law, they should be properly **relocated** prior to any dismantling of properties • Section 5 of the IRR directs the LGU or the government agency authorized to demolish to create a Task Force on Relocation and Resettlement to ensure smooth and effective implementation of all relocation and resettlement operations • After effectivity of R.A.7279, barangay, municipal ot city government shall prevent construction of any kind of illegal dwelling units or structures within danger areas • LGUs shall prepare a comprehensive land use plan for their respective localities in accordance with the provisions of the Act
1991	R.A. 7160	"*Local Government Code of 1991"* • An LGU may exercise the power of eminent domain for public use, purpose, or welfare of the poor and the landless such as for **socialized housing**, upon payment of just compensation pursuant to the provisions of the Constitution and pertinent laws
1988	E.O. 239	"*Creating Appraisal Committees in Metropolitan Manila Area*" • Created the City Appraisal Committee and Municipal Appraisal Committees in the Metropolitan Manila area for assessment of fair market value of real property in Metro Manila • The government shall deposit 10% of the amount of just compensation provided under 1533, five (5) days after which the court shall issue Writ of Possession (WOP) • Payment for improvement shall be based on the physical inventory report proposed and certified by an affidavit of the claimant and affidavit of two (2) adjoining landowners
1978	P.D. 1533	*Establishing Uniform Basis for Determining Compensation* • The government is entitled to immediate possession of properties and improvements and the power of demolition upon filing of the petition for expropriation and the deposit of 10% of compensation amount determined by this decree in the Philippine National Bank (PNB)
1936	C.A. 141	"*Commonwealth Act 141*" • Citizens of the Philippines acquire public land through public auction. Article of free patent is provided for natural born citizen of the Philippines who continuously occupied and cultivated the land since 1926 or before

		• Land acquired through this law is subject to a Right-of-Way not exceeding 20 m in width for public use with damages paid for improvements only; This ROW limit is further expanded to 60 m by P.D. 635
Note: R.A. – Republic Act P. D. – Presidential Decree E.O. – Executive Order I.R.R. – Implementing Rules and Regulations D.O. – Department Order		
Source: DPWH ESSO, 2007. *Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples Policy, 3rd Edition.* Herrera, A.N. 2003. *IROW Process Design Report*. National Roads Improvement and Management Program Phase I. DPWH		

b) Procedures for Owners with Legal Claim to Land (Includes Commercial and Industrial Establishments)

Based on D.O. 5, the basis for the first offer in acquiring land shall be based on estimates computed in the Resettlement Action Plan (RAP). That is, for land, compensation is computed based on the **updated BIR zonal valuation**, and for improvements, on **replacement cost** (with no salvage value), as described in the Implementing Rules and Regulations (I.R.R.) of Republic Act (R. A.) 8974.

Property owners who refuse the first offer are given a **second offer** based on the recommendation of the Appraisal Committee or an Independent Land Appraiser, whichever is lower. It is ideal that prior to negotiations, the Parcellary Survey Report and the RAP have been prepared and duly approved by concerned authorities. In accordance with Section 7 of the IRR for RA 8974, the property owner shall be given 15 days within which to accept the second offer as payment for his property.

Government shall initiate **expropriation proceedings** in cases where the property owner refuses the second offer. After the refusal of the second offer, a Final Notice of Taking shall be hand carried by the IROW Agent and properly received by the property owner. If said property owner still refused to accept the offer, or have not responded whatsoever within the 15-day period, as provided for in Section 7 of the IRR for RA 8974, expropriation proceedings shall be initiated.

For **negotiated sale**, the following procedures shall be carried out:

Step 1 A **Contract of Sale** (for the land) is executed between the Government and the property Owner. For properties with structures and improvements, an **Agreement to Demolish and Remove Improvements** (**ADRI**) shall likewise be prepared.

Step 2 If the owner accepts the offer to acquire their property, the Implementing Office, with assistance from the property owner shall prepare all necessary documents for filing the ROW claim.

Step 3 A **Deed of Absolute Sale** (**DAS**) and the **Agreement to Demolish and Remove Improvements** (**ADRI**) are then executed between the DPWH and the property owner. These documents shall be duly approved by the concerned DWPH Official as provided for in D.O. No. 5, Series of 2003, and registered with the Register of Deeds of the respective province/city/municipality where the property is located.

Pre-requisites and Conditions to be Complied With in the Preparation of the Deed of Absolute Sale:

- If the subject property is registered or titled, the vendor must be the registered owner of the said property and should possess a clear and clean title under the *Torrens System*, free of any lien and encumbrances whatsoever. A photocopy of the title forms part of the Deed;

- If the subject property is unregistered or untitled, the vendor shall submit a certified true copy of the tax declaration and an indemnity bond, which must either be a surety bond or property bond. Either of these bonds shall remain in force until the government obtains the corresponding title to the subject property;

- If the owner of a property is a corporation, a certified copy of the resolution of the governing board of such corporation or partnership, authorizing any of its officers to execute the deed shall be attached to the said deed. In the case of a partnership, the managing partner should execute the deed;

- If the owner is already deceased, the heirs must first consolidate their ownership of the property either thru court proceedings or thru an extra-judicial settlement, subject to the provisions of Rule 74 of the New Rules of Court;

- If the property is under guardianship or administratorship, approval by the proper court of the deed of sale executed by the guardian or administrator/executor shall first be secured. The corresponding Letters of Administratorship and/or Guardianship shall be submitted as an integral part of the Deed;

- If the property being sold was acquired under Commonwealth Act 141, also known as the Public Land Act, the government shall be entitled to a twenty (20) meters strip free under Section 112 of CA 141, or sixty (60) meters strip under P. D. 635, if the property was acquired by the owner after 1975;

- If it appears that the property is subject to the provisions of Section 4 Rule 74 of the New Rules of Court and the period of two (2) years from the registration of the consolidation or settlement has not yet expired, an indemnity bond (either surety or property bond), conditioned for the payment of any

adverse claim against the property filed within the said period of two (2) years, should be posted;

- If the vendor is represented by an Attorney-In-Fact, the corresponding special power of Attorney should be attached to, and made an integral part of the deed of sale. If the vendor is residing abroad at the time of the sale, such special power of attorney should be duly attested by the Philippine Consulate of the country where the vendor resides;
- Where the subject property is mortgaged, the consent of the mortgager to sale of the said property, or release of the mortgage must first be secured;

- If the property is a conjugal property, a deed of conveyance or sale must be executed in the proper form by the parties concerned, specifically describing the property to be sold. The marital consent of the spouse of the owner-vendor should generally be indicated in the deed; the deed of conveyance must be witnessed by at least two persons and if the vendor affixed his signature by thumb mark, same should be witnessed by two additional persons;

- All Realty Estate taxes due on the property must have been paid as evidenced by a tax clearance certificate issued by the proper authority;

- The accountant concerned should also witness the contract, and his signature shall be considered as constituting a certification that funds for the purpose is available (LOI 968);

- The papers and documents submitted in support of the claim in every case should be carefully verified as to their authenticity and genuineness in order to forestall fraud

Step 4 A **Certificate of Availability of Funds (CAF)** in the proper form, duly verified by the Auditor concerned, indicating the particular source and nature of the funds to be used in payment of the consideration of the sale, shall be secured and attached to the DAS;

Step 5 The Right-of-Way Engineer, in addition to verifying the ownership of the lot to be purchased, as well as any encumbrance to which such lot may have been subjected to, shall also verify and inspect the actual lot to be purchased to determine whether the classification made by the Assessor is in accordance with the **actual use** of the property (Section 19, P. D. 464). A certification to this effect shall be issued by the Right-of-Way Engineer;

Step 6 The Deed of Sale is signed by the Owner of the property, and the approving authority of DPWH. Determination of the proper approving authority of the DAS shall be as follows;

- For IROW Costs up to P3M - District Engineer
- For IROW Costs up to P5M - Regional Director or the PMO Director
- For IROW Costs up to P10M - Assistant Secretary
- For IROW Costs up to P15M - Undersecretary
- IROW Costs of any amount shall be approved by the Secretary

Step 7 The signed DAS is brought to the DPWH for approval of the Secretary

Step 8 The DAS is then notarized. To avoid penalties, capital gains tax must be settled on or before the 5th day of the month within which it was notarized. All necessary taxes (i.e., tax declaration and Real Property Tax arrears, if any, and the transfer tax) must be settled prior to payment of capital gains tax

Step 9 Payment of capital gains tax, documentary stamps, shall be made to the Bureau of Internal Revenue (BIR). A **Certificate Authorizing Registration** (CAR) shall then be issued by the BIR.

Step 10 Approved DAS is then registered with the concerned **Register of Deeds** or at pertinent municipalities where the property is located. The title of the property shall be annotated at the back if only a portion of the property is purchased by the government. If the whole property was purchased by the government, the old title will be cancelled and a new one shall be issued to the government.

Step 11 Payment of Claims

Conditions/Requirements Prior to Release of Payment

- Payment for land should be made only after the corresponding DAS had been registered with the concerned Register of Deeds and Torrens *Title* to the subject lot is already transferred in the name of the government. For partially affected parcel of lands, payments should be made only after the corresponding DAS had already been annotated at the back of the title of the subject lot;

- If the Deed of Conveyance was not signed by the owner but was signed by his duly and legally constituted agent, the owner should also be notified in writing of the amount due him as payment of his property. Accordingly, the treasury warrant or check for the payment of said property should be drawn in favor of the registered owner;

- Officials or employees responsible for releasing checks or warrants should require positive identification of the payee before releasing these checks or warrants;

  Note: *District/City and Regional Offices as well as Project Management Offices of the DPWH shall* ***act on the claim within forty eight (48) hours*** *from the time of receipt. Should there be no sufficient funds to pay all claims presented with complete documents* and *ready for payment, the smaller claims should be given priority in payment; and in case the amount of claim are equal, priority of payment shall be based on the period/date the property/lot was taken by the government.*

4) RESETTLEMENT POLICIES AND PROCEDURE

In accordance with international standards, the most basic and important resettlement policy is to make every effort to **avoid any need for land**

acquisition or resettlement. However in cases wherein resettlement is inevitable, Resettlement Plans (RP) must be prepared.

a) Procedures for Formulating Resettlement Plans

For infrastructure projects, formulation of Resettlement Plans, whether the requirement is an abbreviated or full RP, is the responsibility of DPWH's Implementing Office. Assistance can be sought from the IROW and Resettlement Project Management Office, the Environmental and Social Services Office (ESSO), or private consulting firms. Resettlement Plans shall be formulated based on the following:

- Initial categorization/screening of road sections based on anticipated impacts from resettlement;
- Disclosure and explanation of policy and legal frameworks for resettlement to Project Affected Families (PAF);
- Consultation with potential PAF to obtain their inputs on avoiding or mitigating involuntary resettlement and determine their concerns, needs and preferences;
- Census and socioeconomic survey of all PAF and complete inventories of their assets, including estimation of compensation for structures and improvements;
- Social impact assessment and validation that the entitlement matrix have covered all resettlement entitlements;
- Consultation meetings with PAF to explain relocation plans and rehabilitation strategy, including income restoration (if required) and improvement of their living conditions;
- Inclusion of itemized budget for all resettlement activities in the total project cost for each road section;
- Formulation of implementation schedule for each RP;
- Detailed and comprehensive procedures for grievance redress mechanism;
- Conceptualization of Institutional Framework for resettlement activities;
- Recommendation of internal and external monitoring program and final evaluation;

Major Policies on Relocation of Informal Settlers

If the project involves displacement of informal settlers, the following legal frameworks can be used in describing the resettlement plan. These are:

(i) Republic Act 7279 (Urban Development and Housing Act of 1992) and its Implementing Rules and Regulations

(ii) DPWH Department Order No. 5, Series of 2003

(iii) DPWH's Policy Framework for Land Acquisition, Resettlement, and Rehabilitation

RA 7279 - Urban Development and Housing Act of 1992

One of the main objectives of this act is to "*Provide decent shelter to the underprivileged and homeless citizens in urban areas and resettlement areas whose lives are generally marked by economic insecurities and whose occupancy of land is uncertain*"". As such, several guidelines were enacted by various government agencies such as the Housing and Land Use Regulatory Board (HLRB), Housing and Urban Development Coordinating Council (HUDCC), National Housing Authority (NHA), Land Management Bureau (LMB) and the National Mapping and Resource Information Authority (NAMRIA).

One of these is the guideline which directs all city and municipal governments to conduct an inventory of lands, after which sites for **socialized housing** are delineated. Under this Act, potential socialized housing program beneficiaries must first register with the Barangay Registration Committee (BRC) in their respective areas. It should be noted however, that not all informal settlers are entitled to be resettled in these areas. The following qualifications make applicants eligible to be included in the Master List of underprivileged and homeless citizens:

- Must be a Filipino citizen of legal age;
- The combined family income must fall within the NEDA-defined poverty threshold;
- Must not own any real property whether in the urban or rural areas and must not have been a beneficiary of any government housing program except those in leasehold or rental arrangements;
- Must not be a professional squatter nor a member of a squatting syndicate; and
- Must be the head of the family

Salient points of DPWH D.O. No. 5, Series of 2003 include:

- It shall be applicable to **all** foreign-assisted and locally funded projects.
- Implementing Office (IO) shall ensure that IROW costs are always **included** in project budgets.
- IO shall formulate a **IROW Action Plan** during the project identification stage. The Action Plan will contain the estimated budget for all IROW costs including inflation and contingencies, schedule of implementation, and the areas to be acquired.

- The IO shall provide an estimated cost breakdown of each project to the IROW and Resettlement PMO and the CFMS prior to any disbursement of funds. The **first priority** of the budget for a project shall be all costs prior to construction.

- If IROW costs differ from the approved IROW budget after detailed design has been finalized, a **budget adjustment** shall be approved.

- The **Environmental Compliance Certificate** (ECC) shall be secured before the detailed design for all projects. However, for projects costing over P300 million, the ECC shall be secured before National Economic and Development Authority (NEDA) / Infrastructure (ICC) approval.

- **Parcellary Surveys** shall be conducted for all projects in accordance with DO 187 series 2002.

- A **Resettlement Action Plan** (RAP) shall be prepared for all projects using a standardized compensation package.

- The determination of Project Affected Persons (PAPs) and improvements shall be based on the **cutoff date**, which is the start of the census of PAPs and tagging for improvements.

- The first mode of acquisition shall be to request **donation** from the property owner.

- If the property owner does not donate the property, then negotiations for purchase of land and improvements, shall follow based on the provisions of Republic Act 8974 and its IRR. Hence, the first offer shall be the **current BIR zonal value** for land, and replacement cost for improvements (there shall be no salvage value)

- If the first offer is not accepted, the value of the second offer shall be based on the Resolution of the appropriate **Appraisal Committee** subject to the approval of the Implementing Office (IO). If the IO does not agree with the Appraisal Committee's Resolution, then the IO shall engage the services of an **Independent Land Appraiser** to determine the value. The value of the second offer shall be the lower of the two values. In case the property owner refuses the second offer, the IO initiates expropriation proceedings.

- It is the responsibility of the IO to **obtain** and **validate** all necessary documents for IROW claims.

- IROW claims shall be **screened**, fully **verified** and **validated**, and the supporting documents authenticated prior to payment.

- Legal Staff in the respective Regional Office shall review Deeds of Absolute Sale (DOAS) up to Php 5 Million. Legal Service in the Central Office shall review Deeds of Absolute Sale over Php 5 Million.

- Valid claims for all lands, structures and other improvements will be paid in full in accordance with government rules and regulations. The IO shall pay all taxes and encumbrances of the property up to the amount in the Deed of Absolute Sale, and shall then deduct the amount of the capital gains tax and encumbrances from the payment due the property owner.

- The IROW and Resettlement PMO shall monitor the releases and disbursement of IROW funds made by the IOs.

- All IOs shall properly liquidate all IROW disbursements and **submit quarterly reports** of payments made for all claims to the IROW and Resettlement PMO.

- All IROW must be **fully acquired** and cleared before the issuance of the Notice of Award for the project.

- IO shall properly file all documents pertaining to the acquisition of IROW and shall effect the **transfer of titles** or other tenurial instruments in the name of the Republic of the Philippines within three months from the perfection of the Deed of Absolute Sale, or in the case of expropriation, from the date of full payment.

- District Offices shall be responsible and accountable for the proper and ensure that encroachments, structures, and informal **management of all IROW** settlers are not allowed within the IROW limits. All District Engineers through the Regional Directors shall submit monthly reports of the status of IROW to the IROW and Resettlement PMO.

- In the event that a utility company does not comply with the IO notification to relocate the utility within the specified time period, the IO shall issue a final notice to the utility company with a time period specified. If the utility company still does not comply with the final notice, the IO shall clear the utility and **bill the utility company** accordingly.

- All utilities must be **fully cleared** from the IROW before the issuance of the Notice of Award for the project.

- The use of IROW for facilities and utilities shall be in accordance with DPWH guidelines and will be strictly enforced by the respective District Office.

- The IO shall prepare the final **as-built** IROW Plan upon completion of the project, for submission to the IROW and Resettlement PMO.

Salient Points of DPWH's Policy Framework for Land Acquisition, Resettlement, and Rehabilitation

- All Project Affected Persons (PAPs) residing in, working, doing business, or cultivating land, or having rights over resources within the project area as of the Cut-off Date (i.e., date of the census surveys) are entitled to compensation for their lost assets, incomes, jobs and businesses at **replacement cost**;

- In cases when the remaining assets of a PAP are not viable for continued use, he will be entitled to **full compensation** for the entire affected assets;

- When payment is made for an agricultural land acquired by the DPWH, the landowner will be **exempted** from capital gains tax on the compensation paid to him; In addition, other expenses such as registration fee, transfer taxes, documentary stamp tax, and notional fees will be paid by DPWH for property transfers made through land acquisition;

- Replacement agricultural land, premise/business plot will be **as close as possible** to the land that was lost and/or **acceptable** to the PAPs;

- All replacement land for agriculture, residential, and business will be provided with **secured tenure status** and without any additional cost, taxes, surcharge to the PAPs at the time of transfer;

- The previous level of community services and access to resources will be **maintained or improved** after the resettlement;

- The general mechanism for compensation of lost **residential** and **commercial** land will be through **land-for-land or cash compensation at replacement cost**.

- Tenants are entitled to assistance to transfer to a new location

b) Entitlements of Project Affected Persons

Based on DPWH's resettlement policy which is embodied in DPWH's Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples Policy (LARRIPP), 3rd Ed., Series of 2007, the application of legal doctrines with regards to compensation to APs are guided by the following Entitlement Matrix.

TABLE 13.6.2-1 ENTITLEMENT MATRIX SHOWING MODES OF COMPENSATION FOR PROJECTS IMPLEMENTED BY DPWH (MODIFIED FROM DPWH LARRIPP, 3RD ED. 2007)

Type of Loss	Application	Entitled Person	Compensation/ Entitlements
LAND (Classified as Agricultural, Residential, Commercial, or Institutional)	More than 20% of the total landholding loss or where less than 20% lost but the remaining land holding become economically unviable	Project Affected Family (PAF) with Transfer Certificate of Title (TCT) or Tax Declaration (TD, which can be legalized to full title)	PAF will be entitled to: • Cash compensation for loss of land and at 100% replacement cost for structures, at the informed request of PAFs Land valuation shall be, in accordance with Section 5 of RA 8974, computed based on: • Classification and use for which the property is suited; • The development costs for improving the land; • The value declared by the owners; • The current selling price of similar lands in the vicinity; • The reasonable disturbance compensation for the removal and/or demolition of certain improvement on the land and for the value of improvement thereon;

			• The size, shape, or location, tax declaration and zonal valuation of the land; • The price of the land as manifested in the ocular findings, oral as well as documentary evidence presented; and • Such facts and events as to enable the affected property owners to have sufficient funds to acquire similarly-situated lands of approximate areas as those required from them by the government, and thereby rehabilitate themselves as early as possible • If feasible, land for land will be provided in terms of a new parcel of land of equivalent productivity, at a location acceptable to PAFs • Holders of free or homestead patents and CLOA under CA 141, Public Lands Act will be compensated on land improvements only • Holders of Certificates of Land Ownership Award (CLOA) granted under the Comprehensive Agrarian Reform Act shall be compensated for land at zonal value • Cash compensation for damaged crops at market value at the time of taking • Rehabilitation assistance in the form of skills training and simple financial management equivalent to the amount of P15,000.00 per family, if the present means of livelihood is no longer viable and the PAF will have to engage in a new income activity
		PAF without TCT	• Cash compensation for damaged crops at market value at the time of taking

			• Agricultural lessors are entitled to disturbance compensation equivalent to five (5) times the average of the gross harvest for the past three (3) years but not less than P15,000.00
	Less than 20% of the total landholding lost or where the remaining land holding is still viable for use	PAF with TCT or Tax Declaration (TD, which can be legalized to full title)	PAF will be entitled to: • Cash compensation for loss of land and structures at 100% replacement cost at the informed request of PAFs. Valuation of compensation for land shall be the same as described above for PAFs holding Transfer Certificate of Title (TCT) or Tax Declaration (TD, which can be legalized to full title) • Holders of free or homestead patents and CLOA under CA 141, Public Lands Act will be compensated on land improvements only • Holders of Certificates of Land Ownership Award (CLOA) granted under the Comprehensive Agrarian Reform Act shall be compensated for land at zonal value • Cash compensation for damaged crops at market value at the time of taking
		PAF without TCT	• Cash compensation for damaged crops at market value at the time of taking • Agricultural lessors are entitled to disturbance compensation equivalent to five (5) times the average of the gross harvest for the past three (3) years but not less than P15,000.00
STRUCTURES (Classified as Residential/ Commercial/ Industrial)	More than 20% of the total landholding loss or where less than 20% lost but the remaining	PAF with TCT or Tax Declaration (TD, which can be legalized to full title)	PAF will be entitled to: • Cash compensation for entire structure at 100% of **replacement cost** which is defined as the "*amount necessary to replace the*

	structures no longer function as intended or no longer viable for continued use		• Rental subsidy for the time between the submittal of complete documents and the release of payment on land, equivalent to prevailing rental rate of structure of equal type and dimension
		PAF without TCT	PAF will be entitled to: • Cash compensation for entire structure at 100% of replacement cost • Rental subsidy for the time between the submittal of complete documents and the release of payment on land, equivalent to three (3) times the prevailing rental rate of structure of equal type and dimension • Free transportation for PAFs who are relocating, including shanty dwellers in urban areas who opt to go back to their place of origin (e.g., province) or to shift to government relocation sites
		PAFs who own shops and other commercial establishments to cover for their computed income loss	• Computed income loss during demolition and reconstruction of their shops but not to exceed one (1) month period
	Less than 20% of the total landholding lost or where the remaining structure can still function and is viable for continued use	PAF with TCT or Tax Declaration (TD, which can be legalized to full title)	PAF will be entitled to: • Cash compensation for affected portion of the structure to be computed based on replacement cost

		PAF without TCT	• Cash compensation for affected portion of the structure to be computed based on replacement cost
		PAFs who own shops and other commercial establishments to cover for their computed income loss	• Computed income loss during demolition and reconstruction of their shops but not to exceed one (1) month period
IMPROVEMENTS	Severely or marginally affected	PAF with or without TCT, Tax Declaration., etc.	PAF will be entitled to: • Cash compensation for the affected improvements at replacement cost
CROPS, TREES, PERRENIALS			PAF will be entitled to: • Cash compensation for crops, trees, and perennials at current market value as prescribed by the concerned LGUs and DENR

13.6.2 EIA Requirements for Horizontal Infrastructure Projects

STEP 1: Determine if project is located within Environmentally Critical Areas (ECAs) or not. See list below

1. All areas declared by law (NIPAS) as national parks, watershed reserves, wildlife preserves, sanctuaries
2. Areas set aside as aesthetic potential tourist spots
3. Areas which constitute the habitat of any endangered or threatened species of Philippine wildlife (flora and fauna)
4. Areas of unique historic, archaeological or scientific interests
5. Areas which are traditionally occupied by cultural communities or tribes (IPs)
6. Areas frequently visited and/or hard hit by natural calamities (geologic hazards, floods, typhoons, volcanic activity, etc.)
7. Areas with critical slopes
8. Areas classified as prime agricultural lands
9. Recharged areas of aquifers
10. Water bodies characterized by one or any combination of the following conditions: tapped for domestic use, within declared protected areas; which support wildlife & fishery activities
11. Mangrove areas characterized by: with primary pristine & dense young growth, adjoining mouths of major rivers, natural buffers against shore erosion, productive fishing grounds
12. Coral reefs characterized by: With 50% and above live coralline cover; spawning and nursery grounds for fish; act as natural breakwater of coastlines

STEP 2: **Determine Project Grouping and Type of EIA document to prepare**

Group I: Environmentally Critical Projects in both Environmentally Critical Area (ECA) and Non-Environmentally Critical Area (Non-ECA)	New Roads and Widening	No Critical Slope (gradient < 40%)	Length ≥ 20 km	EIS	ECC
		With Critical Slope (gradient ≥ 40%)	Length ≥ 10 km	EIS	ECC
	New Bridges and Viaducts		Length ≥ 10 km	EIS	ECC

Group II: Non-Environmentally Critical Projects (NECP) in Environmentally Critical Area (ECA)	New Roads and Widening	No Critical Slope (gradient < 40%)	Length < 2 km	PDR	CNC
			2 km ≤ L < 10 km	IEEC	ECC
			10 km ≤ L < 20 km	IEER	ECC
		With Critical Slope (gradient ≥ 40%)	Length < 2 km	PDR	CNC
			2 km ≤ L < 5 km	IEEC	ECC
			5 km ≤ L < 10 km	IEER	ECC
	New Bridges and Viaducts		Length < 80 m	PDR	CNC
			80 m ≤ L < 2 km	IEEC	ECC
			2 km ≤ L < 10 km	IEER	ECC
	Rehabilitation WITHOUT realignment*		2 km ≤ L < 20 km	IEEC	ECC
			Length ≥ 20 km	IEER	ECC
	Rehabilitation WITH realignment*		2 km ≤ L < 10 km	IEEC	ECC
			Length ≥ 10 km	IEER	ECC
	Improvement Projects WITHOUT widening*		2 km ≤ L < 10 km	IEEC	ECC
			10 km ≤ L < 20 km	IEER	ECC
	Improvement Projects WITH widening*		2 km ≤ L < 5 km	IEEC	ECC
			5 km ≤ L < 20 km	IEER	ECC

Group III: Non-Environmentally Critical Projects (NECP) in Non-Environmentally Critical Area (NECA)	Asset Preservation/ Maintenance of Existing Roads*	Length < 2 km	Optional CNC application	
		Length ≥ 2km	PDR	CNC
	Rehabilitation WITHOUT realignment*	Regardless of Length	PDR	CNC
	Rehabilitation WITH realignment*		PDR	CNC
	Improvement Projects WITHOUT widening*		PDR	CNC
	Improvement Projects WITH widening*		PDR	CNC
Note: * Based on practice only, not explicitly stated in Revised Procedural Manual for AO 2003-30 of DENR				

STEP 3: Prepare the necessary EIA document to obtain ECC/CNC

13.6.3 Preliminary Environmental Impact Assessment

Preliminary environmental impact assessment of projects is shown in **Table 13.5.3-1**.

TABLE 13.6.3-1(1/3) PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT : ARMM

Road Class	Road No.	Road Name	Project Group	Type of Document	Type of Permit	Remarks
Primary Inter-City Road	L1-1	Iligan-Marawi Road	III	PDR	CNC	-
	L2-2(1)	Marawi-Marabang Road (Malabang-Pualas Sec)	III	PDR	CNC	Water Shed
	MC-1	Bito-Marawi Road	III	PDR	CNC	-
	L2-1	Cotabato-Malabang-Lanao del Norte	III	PDR	CNC	Including SK-2, SK-3, SK-4, SK-5, SK-6
	SK-9	Cotabato-General Santos Road	III	PDR	CNC	Including: M-1
	SK-1	Davao-Cotabato Road	III	PDR	CNC	Including: M-5
Regional Primary Road	L1-4	Mulondo-Wao Road	I	EIS	ECC	Water Shed
	L2p-1	SK Border-Butig-Lumbayanague Road	I	EIS	ECC	Including: SKp-1/Water Shed
	SK-7	Landsan-Polloc	III	PDR	CNC	-
	SK-8	Parang Wharf Road	III	PDR	CNC	-
	SKn-2	Matanog-Alamada Road (Matanog-Buldon Sec)	I	EIS	ECC	Including: SKn-3
	SKn-5	Kabacan-Midsayap Road	I	EIS	ECC	-
	M-3	Dulawan-Marbel Road	III	PDR	CNC	-
	M-4	Kidapawan-Ala Road	III	PDR	CNC	-
	Mp-2	Datu Saudi Ampatuan Road	III	PDR	CNC	-
	Mn-1	Sultan sa Barongis-Pagalungan Road	III	PDR	CNC	-
	Mp-1	Maganoy-Sultan sa Barongis Road	III	PDR	CNC	-
	Mp-3	Maganoy-Lebak Road	III	PDR	CNC	-
Regional Secondary Road	L1-5	Marawi-Kapai Road	III	PDR	CNC	-
	L1p-1	Balindong-Pantao Ragat Road	III	PDR	CNC	-
	MC-3	Marawi-Landing Road	III	PDR	CNC	-
	MC-4	Marawi-Cadre Road	III	PDR	CNC	-
	MC-5	Marawi-Msu Road	III	PDR	CNC	-
	MC-7	Marawi-Kapai Road	III	PDR	CNC	-
	MC-8	Marawi-Marcos Blvd Road	III	PDR	CNC	-
	L2-4	Ganassi-Tubod Road	III	PDR	CNC	-
	L2p-2	Malabang-Marogong-Tubaran-Bayang Road	I	EIS	ECC	-
	L2p-3	Madalum-Munai Road	III	PDR	CNC	-
	L2n-1	Parang-Balabagan Road	I	EIS	ECC	Including: SKn-1
	SK11	Awang Airport Road	III	PDR	CNC	-
	SKp-2	Tamontaka-Tapian Road	III	PDR	CNC	-
	SKn-6	Tapian-Lebak Road	I	EIS	ECC	-
	SKp-3	Diang-Upi Road	III	PDR	CNC	-
	SKp-5	Diang-Upi Road Phase II	I	EIS	ECC	-
	SKp-4	Limbo-Pinaring-Manuangan Road	III	PDR	CNC	-
	SKn-4	Manuangan-Parang Road	III	PDR	CNC	-

Note: EIS : Environmental Impact Statement
PDR : Project Description Report
ECC : Environmental Compliance Certificate
CNC : Certificate of Non-Compliance

TABLE 13.6.3-1(2/3) PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT : REGION X

Road Class	Road No.	Road Name	Project Group	Type of Document	Type of Permit	Remarks
Primary Inter-City Road	PI-1 (1)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Butuan-Cagayan de Oro Sec.)	III	PDR	CNC	-
	PI-1 (2)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Cagayan de Oro-Iligan Sec.)	III	PDR	CNC	-
	PI-1 (3)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Iligan-Tubod Sec.)	III	PDR	CNC	-
	PI-2	Sayre Highway	III	PDR	CNC	-
	PI-3	Maramag-Kibawe-Kabacan Road	III	PDR	CNC	-
	PI-4	Davao-Bukidnon Road	III	PDR	CNC	-
	PI-5	Iligan-Marawi Road	III	PDR	CNC	-
	PI-6	Tubod-S.N. Dimaporo Road	III	PDR	CNC	-
	PI-7	Kapatagan-R. Magsaysay Road	III	PDR	CNC	-
	PI-8	Cotabato-Marabang-Lanao Del Norte Road	III	PDR	CNC	-
Regional Primary Road	RP-1	Cagayan de Oro-Talakag-Maramag Road	III	PDR	CNC	-
	RP-2	Wao-Kililangan Road	III	PDR	CNC	-
Regional Secondary Road	RS-1	Gingoog-Villanueva Road	III	PDR	CNC	-
	RS-2	Cagayan de Oro-Manolo Fortich Road	III	PDR	CNC	-
	RS-3	Mindanao East-West Lateral Road	III	PDR	CNC	-
	RS-5	Kalilangan-Kibawe Road	III	PDR	CNC	-
	RS-6	Cagayan de Oro-Manticao Road	III	PDR	CNC	-
	RS-7	Kauswagan-Munai-Madalum Road	III	PDR	CNC	-
	RS-8	Ganassi-Tubod Road	III	PDR	CNC	-

Note: EIS : Environmental Impact Statement
PDR : Project Description Report
ECC : Environmental Compliance Certificate
CNC : Certificate of Non-compliance

TABLE 13.6.3-1(3/3) PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT : REGION XII

Road Class	Road No.	Road Name	Project Group	Type of Document	Type of Permit	Remarks
Primary Inter-City Road	PI-1	Davao-Cotabato Road	III	PDR	CNC	-
	PI-2	Cotabato-Digos Road	III	PDR	CNC	-
	PI-3	Maramag-Kibawe-Kabacan Road	III	PDR	CNC	-
	P1-4	Gen. Santos-Cotabato Road	III	PDR	CNC	-
	PI-5	Gen. Santos-Digos Road	III	PDR	CNC	-
Regional Primary Road	RP-1	Libungan-Buldon-Matanog Road	I	EIS	ECC	-
	RP-2	Wao-Carmen Road	III	PDR	CNC	-
	RP-3	Kabuntalan-Midsayap Road	III	PDR	CNC	-
	RP-5	Pagalungan-Mamasapano Road	I	EIS	ECC	-
	RP-6	Kidapawan-Ala Road	I	EIS	ECC	-
	RP-7	Buluan-Islan Road	III	PDR	CNC	-
	RP-8	Koronadal-Tacurong-Midsayap Road	III	PDR	CNC	-
	RP-10	Kalamansig-Maitum-Gen. Santos Road	III	PDR	CNC	-
	RP-11	Isulan-Palimbang Road	III	PDR	CNC	-
	RP-13	Magnoy-Lebak Road	III	PDR	CNC	-
Regional Secondary Road	RS-1	Banisilan-Alamada Road	III	PDR	CNC	-
	RS-2	Carmen-Libuagan Road	III	PDR	CNC	-
	RS-3	Matalam-Roxas Road	III	PDR	CNC	-
	RS-4	Kidapawan-Arakan-Davao Road	I	EIS	ECC	-
	RS-5	Tulunan-Makilala Road	III	PDR	CNC	-
	RS-6	Koronadal-Columbio-Datu Paglas Road	III	PDR	CNC	-
	RS-7	Padada-Kiblawan-Columbio Road	I	EIS	ECC	-
	RS-8	Lais-Alabel Road	I	EIS	ECC	-
	RS-10	Saralla-Lake Sebu-Maitum Road	I	EIS	ECC	-
	RS-11	Sultan Kudarat-South Cotabato Link Rd.	I	EIS	ECC	-
	RSn-1	Tapian-Lebak Road	III	PDR	CNC	-

Note: EIS : Environmental Impact Statement
PDR : Project Description Report
ECC : Environmental Compliance Certificate
CNC : Certificate of Non-compliance

13.6.4 SCOPING OF PROPOSED PROJECTS

Proposed projects were grouped into the following types and scoping of each type of project is presented in Annex 13-1.

Type 1: Improvement of existing gravel road to paved road (no ROW acquisition required)

Type 1-1: Do not pass through Protected Area

Type 1-2: Passes through Protected Area

Type 2: Rehabilitation of Existing Pavement (No ROW acquisition required)

Type 2-1: Do not pass through Protected Area

Type 2-2: Passes through Protected Area

Type 3: Elimination of missing link and New road construction. (ROW acquisition and resettlement of PAPs required).

Type 3-1: Do not pass through Protected Area

Type 3-2: Passes through Protected Area

13.7 PROJECT PRIORITY AND IMPLEMENTATION SCHEDULE

13.7.1 Project Prioritization Criteria

The Study Team had a series of discussions with DPWH-ARMM Counterpart Team and jointly developed the following project prioritization criteria.

1) Items to be evaluated and weight of each item

Evaluation Items	Weight
a) Road Class	5
b) Degree of Inconvenience/Problem	15
c) Economic Return	25
d) Contribution to Agricultural Development	15
e) Type of Work	25
f) Environmental Impact	5
g) Synergy Effect to Other Related Projects	5
h) Consistency to Regional Development Plan	5
TOTAL	**100**

2) Evaluation Method and Weight of Sub-items

a) Road Class **Weight**

- Primary Inter-City Road ---------- 5
- Regional Primary Road ---------- 4
- Regional Secondary Road ---------- 3

b) Degree of Inconvenience/Problem (DI)

DI = (Road Condition) x (DI Factor) x AADT

whereas;

DI = Degree of Inconvenience
AADT = Annual Average Daily Traffic (PCU/day)

AADT

AADT for the missing link or a new road is that of "with project case", or AADT

To be attracted if a link exists.

DI Factor

i) Paved Road	**DI Factor**
Good/Fair Condition	1
Bad Condition	5
Very Bad Condition	10

ii) Un-paved Road

Good/Fair Condition	5
Bad Condition	10
Very Bad Condition	15

iii) Missing Link and New Road

Missing Link	
Detour Distance over 100 km	30
Detour Distance 50-100 km	25
Detour Distance less than 50 km	15
New Road	
Detour Distance over 100 km	25
Detour Distance 50-100 km	20
Detour Distance less than 50 km	15

DI for Existing Road

$DI_1 = (L_1 \times 1 + L_2 \times 5 + L_3 \times 10 + L_4 \times 5 + L_5 \times 10 + L_6 \times 15) / L \times AADT$

DI for Missing Link

$DI_2 = (L_7 \times 30 \text{ or } 25 \text{ or } 20) \times AADT / L + D_1$

DI for New Road

$DI_3 = (L_8 \times 25 \text{ or } 20 \text{ or } 15) \times AADT / L + D_1$

where;

L_1 = segment length of paved road in good/fair condition
L_2 = segment length of paved road in bad condition
L_3 = segment length of paved road in very bad condition
L_4 = segment length of unpaved road in good/fair condition
L_5 = segment length of unpaved road in bad condition
L_6 = segment length of unpaved road in very bad condition
L_7 = missing section
L_8 = new road length
L = road length in km

Range of DI Value	Weight
Over 30,000	15
10,000 – 30,000	12
5,000 – 10,000	9
1,000 – 5,000	6
500 – 1,000	3
Less than 500	2

c) Economic Return (ER)

ER = DI/ Construction cost per km in Million Pesos

Range of ER	Weight
Over 1,000	25.0
800 – 1,000	22.5
600 – 800	20.0
400 – 600	17.5
200 – 400	15.0
100 – 200	12.5
Less than 100	10.0

d) Contribution to Agricultural Development

CAD = (Agricultural Land Area served by the Road) / Road Length

where;

- Agricultural Land Area in sq. Km
- Road Length in km

Range of CAD	**Weight**
Over 12	15.0
9 - 12	12.5
7 - 9	10.0
5 - 7	7.5
3 - 5	5.0
Less than 3	2.5

e) Type of Work

Type of Work	**Weight**
• Rehabilitation/Upgrading of Paved Road	25
• Upgrading of Provincial Road to National Road Standard	25
• Improvement of Un-paved Road	22
• Elimination of Missing Link	22
• Construction of a New Road	15
• Widening of Traffic Lanes	10

f) Environmental Impact

Social Impact	3
• No ROW acquisition and no families affected by the Project	3
• ROW Acquisition and Resettlement of Families Required	1
Impact on Natural Environment	2
• Negligible impact on Natural Environment	2
• Project passes thru protected or Reserved Area	1

g) Synergy Effect of Other Related Projects

• There is a proposed irrigation project	5
• No proposed irrigation project	3

h) Consistent to the Regional Development Plan/ DPWH Medium Plan

- Included 5
- Not Included 3

13.7.2 Implementation Priority of Projects

Based on the established project priority criteria, al projects were evaluated their implementation priority each concerned region. Implementation priority of projects is shown in **Table 13.7.2-1**. Road section names are shown in **Figure 13.7.2-1.**

FIGURE 13.7.2-1 ROAD SECTION AND ROAD NAME

TABLE 13.7.2-1 (1/3) Implementation Priority of Projects: ARMM

Road Class			Road No.	Road Name	Project Prioritization Criteria																Total	Ranking	Project Cost		Remarks
					(a)		(b)		(c)		(d)		(e)	(f)			(g)		(h)						
					Road Class		Degree of Inconvenience / Problem		Economic Return		Contribution to Agricultural Development		Type of Works	Environmental Impact			Synergy Effect of Other Related Projects		Consistency to Regional Development Plan						
Primary Inter-City Road	Regional Primary Road	Regional Secondary Road				5.0		15.0		25.0		15.0	25.0	Social impact	Natural Environment	5.0		5.0		5.0	100.0		Individual Project Cost	Amount of Project Cost	
																							Mil. PHP	Mil. PHP	
X			**L1-1**	Iligan-Marawi Road	1	**5.0**	32,476	**15.0**	1,536.5	**25.0**	2.0	**2.5**	1 **25.0**	3.0	1.0	**4.0**	0	**3.0**	2	**3.0**	**82.5**	**1**	101.2	101.2	-
X			**SK-1**	Davao-Cotabato Road	1	**5.0**	17,925	**12.0**	494.3	**17.5**	5.0	**7.5**	1 **25.0**	3.0	1.0	**4.0**	1	**5.0**	1	**5.0**	**81.0**	**2**	770.8	872.0	Including: M-5
	X		**M-4**	Kidapawan-Ala Road	2	**4.0**	6,217	**9.0**	243.2	**15.0**	8.0	**10.0**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	1	**5.0**	**76.0**	**3**	415.6	1,287.6	-
X			**MC-1**	Bito-Marawi Road	1	**5.0**	14,034	**12.0**	688.8	**20.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**75.5**	**4**	95.2	1,382.8	-
	X		**L2p-1**	SK Border-Butig-Lumbayanague Road	2	**4.0**	6,614	**9.0**	245.8	**15.0**	5.0	**7.5**	2 **25.0**	1.0	1.0	**2.0**	0	**3.0**	1	**5.0**	**70.5**	**5**	1,046.1	2,428.9	Including: SKp-1
X			**SK-9**	Cotabato-General Santos Road	1	**5.0**	3,424	**6.0**	146.2	**12.5**	5.0	**7.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	1	**5.0**	**69.0**	**6**	1,604.2	4,033.2	Including: M-1
	X		**Mp-1**	Maganoy-Sultan sa Barongis Road	2	**4.0**	1,119	**6.0**	61.6	**10.0**	10.0	**12.5**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**68.5**	**7**	460.0	4,493.2	-
		X	**SKp-4**	Pinaring - Simsiman Road	3	**3.0**	3,650	**6.0**	180.1	**12.5**	8.0	**10.0**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**67.5**	**8**	513.0	5,006.1	-
		X	**SKp-2**	Tamontaka-Tapian Road	3	**3.0**	2,643	**6.0**	118.8	**12.5**	5.0	**7.5**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	1	**5.0**	**67.0**	**9**	509.9	5,516.0	-
	X		**Mp-2**	Datu Saudi Ampatuan Road	2	**4.0**	400	**2.0**	23.1	**10.0**	12.0	**15.0**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**67.0**	**9**	177.4	5,693.4	-
	X		**L1-4**	Mulondo-Wao Road	2	**4.0**	5,341	**9.0**	215.9	**15.0**	0.5	**2.5**	1 **25.0**	1.0	1.0	**2.0**	0	**3.0**	1	**5.0**	**65.5**	11	2,228.2	7,921.6	-
		X	**MC-4**	Marawi-Cadre Road	3	**3.0**	5,730	**9.0**	343.6	**15.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**65.5**	11	14.1	7,935.7	-
X			**L2-1**	Cotabato-Malabang-Lanao del Norte Road	1	**5.0**	2,473	**6.0**	99.3	**10.0**	5.0	**7.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**64.5**	13	3,751.8	11,687.5	Including: SK-2, SK-3, SK-4, SK-5, SK-6
X			**L2-2(1)**	Marawi-Marabang Road (Malabang-Pualas Sec)	1	**5.0**	400	**2.0**	12.3	**10.0**	9.0	**12.5**	1 **25.0**	3.0	1.0	**4.0**	0	**3.0**	2	**3.0**	**64.5**	13	1,349.4	13,036.9	-
		X	**L2p-2**	Malabang-Marogong-Tubaran-Bayang Road	3	**3.0**	4,946	**6.0**	214.1	**15.0**	5.0	**7.5**	2 **25.0**	1.0	1.0	**2.0**	0	**3.0**	2	**3.0**	**64.5**	13	917.8	13,954.6	-
	X		**Mp-3**	Maganoy-Lebak Road	2	**4.0**	5,250	**9.0**	183.8	**12.5**	0.2	**2.5**	2 **25.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**62.0**	16	1,084.5	15,039.2	-
	X		**M-3**	Dulawan-Marbel Road	2	**4.0**	491	**2.0**	6.0	**10.0**	7.0	**10.0**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**62.0**	16	324.5	15,363.7	-
		X	**MC-7**	Marawi-Kapai Road	3	**3.0**	3,030	**6.0**	181.5	**12.5**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**60.0**	18	125.7	15,489.4	-
		X	**SK-11**	Awang Airport Road	3	**3.0**	2,000	**6.0**	124.5	**12.5**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**60.0**	18	14.6	15,504.0	-
		X	**SKp-3**	Diang-Upi Road	3	**3.0**	1,854	**6.0**	92.9	**10.0**	2.0	**2.5**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.5**	20	489.0	15,993.0	-
		X	**MC-8**	Marawi-Marcos Blvd Road	3	**3.0**	3,222	**6.0**	44.1	**10.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.5**	20	150.1	16,143.1	-
		X	**MC-5**	Marawi-Msu Road	3	**3.0**	1,000	**6.0**	62.3	**10.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.5**	20	18.3	16,161.4	-
		X	**MC-3**	Marawi-Landing Road	3	**3.0**	1,000	**6.0**	64.8	**10.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.5**	20	14.1	16,175.5	-
		X	**L1p-1**	Balindong-Pantao Ragat Road	3	**3.0**	1,550	**6.0**	93.1	**10.0**	0.2	**2.5**	2 **25.0**	3.0	1.0	**4.0**	0	**3.0**	2	**3.0**	**56.5**	24	151.9	16,327.4	-
		X	**L2p-3**	Madalum-Munai Road	3	**3.0**	1,140	**6.0**	68.4	**10.0**	0.2	**2.5**	2 **25.0**	3.0	1.0	**4.0**	0	**3.0**	2	**3.0**	**56.5**	24	114.1	16,441.4	-
		X	**L1-5**	Marawi-Kapai Road	3	**3.0**	995	**3.0**	64.4	**10.0**	4.0	**5.0**	1 **25.0**	3.0	1.0	**4.0**	0	**3.0**	2	**3.0**	**56.0**	26	211.3	16,652.7	-
		X	**L2-4**	Ganassi-Tubod Road	3	**3.0**	731	**3.0**	42.2	**10.0**	0.2	**2.5**	1 **25.0**	3.0	1.0	**4.0**	0	**3.0**	1	**5.0**	**55.5**	27	217.2	16,869.9	-
	X		**SK-7**	Landsan-Polloc Road	2	**4.0**	707	**3.0**	39.2	**10.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**55.5**	27	74.9	16,944.8	-
	X		**SK-8**	Parang Wharf Road	2	**4.0**	600	**3.0**	32.0	**10.0**	0.0	**2.5**	1 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**55.5**	27	17.1	16,961.9	-
		X	**SKp-5**	Diang-Upi Road Phase II	3	**3.0**	945	**3.0**	41.5	**10.0**	0.5	**2.5**	2 **25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**54.5**	30	531.0	17,492.9	-
	X		**SKn-2**	Matanog-Alamada Road (Matanog-Buldon Sec)	2	**4.0**	100	**2.0**	3.4	**10.0**	5.0	**7.5**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**47.5**	31	1,292.1	18,785.0	Including: SKn-3
	X		**Mn-1**	Sultan sa Barongis-Pagalungan Road	2	**4.0**	471	**2.0**	15.8	**10.0**	5.0	**7.5**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**47.5**	31	1,292.1	20,077.1	-
		X	**L2n-1**	Parang-Balabagan Road	3	**3.0**	900	**3.0**	36.6	**10.0**	1.0	**2.5**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	1	**5.0**	**44.5**	33	931.8	21,008.9	Including: SKn-1
		X	**SKn-4**	Manuangan-Parang Road	3	**3.0**	400	**2.0**	16.3	**10.0**	3.0	**5.0**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**44.0**	34	621.2	21,630.1	-
	X		**SKn-5**	Kabacan-Midsayap Road	2	**4.0**	200	**2.0**	6.7	**10.0**	2.5	**2.5**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**42.5**	35	738.3	22,368.5	-
		X	**SKn-6**	Tapian-Lebak Road	3	**3.0**	225	**2.0**	9.1	**10.0**	0.2	**2.5**	5 **15.0**	1.0	2.0	**3.0**	0	**3.0**	2	**3.0**	**41.5**	36	1,553.1	23,921.5	-

Table 13.7.2-1 (2/3) Implementation Priority of Projects: Region X

Road Class	Road No.	Road Name	Project Prioritization Criteria																Total	Ranking
			(a) Road Class		(b) Degree of Inconvenience/ Problem		(c) Economic Return		(d) Contribution to Agricultural Development		(e) Type of Works		(f) Environmental Impact			(g) Synergy Effect of Other Related Projects		(h) Consistency to Regional Development Plan		
				5.0		15.0		25.0		15.0		25.0	Social Impact	Natural Environment	5.0		5.0		5.0	100.0	
Primary Inter-City Road	PI-1(1)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Butuan-Cagayan de Oro Sec.)	1	**5.0**	59,291	**15.0**	2,910	**25.0**	5.0	**7.5**	1	**25.0**	3.0	2.0	**5.0**	1	**5.0**	1	**5.0**	**92.5**	**1**
	PI-1(2)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Cagayan de Oro-Iligan Sec.)	1	**5.0**	65,209	**15.0**	3,200	**25.0**	4.0	**5.0**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	1	**5.0**	**88.0**	**5**
	PI-1(3)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Iligan-Tubod Sec.)	1	**5.0**	34,556	**15.0**	1,696	**25.0**	6.0	**7.5**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**88.5**	**3**
	PI-2	Sayre Highway	1	**5.0**	30,935	**15.0**	1,464	**25.0**	8.0	**10.0**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**91.0**	**2**
	PI-3	Maramag-Kibawe-Kabacan Road	1	**5.0**	9,255	**9.0**	438	**17.5**	8.0	**10.0**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**77.5**	**8**
	PI-4	Davao-Bukidnon Road	1	**5.0**	20,000	**12.0**	946	**22.5**	8.0	**10.0**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**85.5**	**6**
	PI-5	Iligan-Marawi Road	1	**5.0**	50,045	**15.0**	2,085	**25.0**	6.0	**7.5**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**88.5**	**3**
	PI-6	Tubod-S.N. Dimaporo Road	1	**5.0**	15,008	**12.0**	737	**20.0**	6.0	**7.5**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**80.5**	**7**
	PI-7	Kapatagan-R.Magsaysay Road	1	**5.0**	1,500	**6.0**	74	**10.0**	4.0	**5.0**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**62.0**	11
	PI-8	Cotabato-Marabang-Lanao Del Norte Road	1	**5.0**	3,508	**6.0**	172	**12.5**	2.0	**2.5**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**62.0**	11
Regional Primary Road	RP-1	Cagayan de Oro-Talakag-Maramag Road	2	**4.0**	2,000	**6.0**	93	**10.0**	0.5	**2.5**	1	**25.0**	3.0	1.0	**4.0**	1	**5.0**	2	**3.0**	**59.5**	15
	RP-2	Wao-Kililangan Road	2	**4.0**	2,000	**6.0**	107	**12.5**	5.0	**7.5**	1	**25.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**66.0**	**9**
Regional Secondary Road	RS-1	Gingoog-Villanueva Road	3	**3.0**	1,977	**6.0**	103	**12.5**	0.5	**2.5**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.0**	16
	RS-2	Cagayan de Oro-Manolo Fortich Road	3	**3.0**	4,235	**6.0**	218	**15.0**	4.0	**5.0**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**62.0**	11
	RS-3	Mindanao East-Wesr Lateral Road	3	**3.0**	3,235	**6.0**	159	**12.5**	0.5	**2.5**	3	**22.0**	1.0	1.0	**2.0**	0	**3.0**	1	**5.0**	**56.0**	19
	RS-5	Kalilangan-Kibawe Road	3	**3.0**	3,000	**6.0**	150	**12.5**	7.0	**10.0**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**64.5**	**10**
	RS-6	Cagayan de Oro-Manticao Road	3	**3.0**	2,000	**6.0**	100	**12.5**	0.4	**2.5**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.0**	16
	RS-7	Kauswagan-Munai-Madalum Road	3	**3.0**	2,000	**6.0**	100	**12.5**	0.4	**2.5**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	2	**3.0**	**57.0**	16
	RS-8	Ganassi-Tubod Road	3	**3.0**	2,652	**6.0**	144	**12.5**	3.0	**5.0**	3	**22.0**	3.0	2.0	**5.0**	0	**3.0**	1	**5.0**	**61.5**	14

Table 13.7.2-1 (3/3) Implementation Priority of Projects: Region XII

Road Class	Road No.	Road Name	Project Prioritization Criteria																Total	Ranking	Remarks
			(a) Road Class		(b) Degree of Inconvenience/ Problem		(c) Economic Return		(d) Contribution to Agricultural Development		(e) Type of Works		(f) Environmental Impact			(g) Synergy Effect of Other Related Projects		(h) Consistency to Regional Development Plan			
				5.0		15.0		25.0		15.0		25.0	Social Impact	Natural Environ-ment	5.0		5.0		5.0	100.0		
Primary Inter-City Road	PI-1	Davao-Cotabato Road	1	5.0	23,788	12.0	1,167	25.0	5.0	7.5	1	25.0	3.0	2.0	5.0	1	5.0	2	3.0	87.5	2	-
	PI-2	Cotabato-Digos Road	1	5.0	46,552	15.0	2,375	25.0	4.0	5.0	1	25.0	3.0	1.0	4.0	0	3.0	2	3.0	85.0	5	-
	PI-3	Maramag-Kibawe-Kabacan Road	1	5.0	7,500	9.0	368	15.0	10.0	12.5	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	77.5	6	-
	PI-4	Gen. Santos-Cotabato Road	1	5.0	30,919	15.0	1,517	25.0	15.0	15.0	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	96.0	1	-
	PI-5	Gen. Santos-Digos Road	1	5.0	39,990	15.0	1,963	25.0	3.0	5.0	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	86.0	4	-
Regional Primary Road	RP-1	Libungan-Buldon-Matanog Road	2	4.0	2,429	6.0	105	12.5	3.0	5.0	3	22.0	3.0	2.0	5.0	0	3.0	1	5.0	62.5	12	-
	RP-2	Wao-Carmen Road	2	4.0	3,000	6.0	130	12.5	4.0	5.0	3	22.0	3.0	2.0	5.0	0	3.0	1	5.0	62.5	12	-
	RP-3	Kabuntalan-Midsayap Road	2	4.0	6,000	9.0	299	15.0	10.0	12.5	3	22.0	3.0	2.0	5.0	0	3.0	2	3.0	73.5	9	-
	RP-5	Pagalungan-Mamasapano Road	2	4.0	400	2.0	17	10.0	5.0	7.5	5	15.0	1.0	1.0	2.0	1	5.0	2	3.0	48.5	24	-
	RP-6	Kidapawan-Ala Road	2	4.0	4,568	6.0	264	15.0	15.0	15.0	1	25.0	3.0	1.0	4.0	0	3.0	2	3.0	75.0	8	-
	RP-7	Buluan-Isan Road	2	4.0	4,000	6.0	231	15.0	15.0	15.0	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	76.0	7	-
	RP-8	Koronadal-Tacurong-Midsayap Road	2	4.0	10,890	12.0	603	20.0	15.0	15.0	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	87.0	3	-
	RP-10	Kalamansig-Maitum-Gen. Santos Road	2	4.0	2,001	6.0	99	10.0	3.0	5.0	1	25.0	3.0	2.0	5.0	0	3.0	1	5.0	63.0	11	-
	RP-11	Isulan-Palimbang Road	2	4.0	1,534	6.0	70	10.0	0.5	2.5	3	22.0	3.0	2.0	5.0	1	5.0	2	3.0	57.5	17	-
	RP-13	Magnoy-Lebak Road	2	4.0	2,000	6.0	80	10.0	0.3	2.5	3	22.0	3.0	2.0	5.0	0	3.0	2	3.0	55.5	20	-
Regional Secondary Road	RS-1	Banisilan-Alamada Road	3	3.0	1,500	6.0	75	10.0	2.0	2.5	3	22.0	3.0	2.0	5.0	0	3.0	1	5.0	56.5	19	-
	RS-2	Carmen-Libuagan Road	3	3.0	2,250	6.0	113	12.5	1.0	2.5	3	22.0	3.0	2.0	5.0	0	3.0	2	3.0	57.0	18	-
	RS-3	Matalam-Roxas Road	3	3.0	1,500	6.0	75	10.0	4.0	5.0	3	22.0	3.0	2.0	5.0	0	3.0	1	5.0	59.0	16	-
	RS-4	Kidapawan-Arakan-Davao Road	3	3.0	1,265	6.0	58	10.0	1.0	2.5	3	22.0	1.0	2.0	3.0	0	3.0	2	3.0	52.5	22	-
	RS-5	Tulunan-Makilala Road	3	3.0	3,000	6.0	180	12.5	3.0	5.0	1	25.0	3.0	2.0	5.0	0	3.0	2	3.0	62.5	12	-
	RS-6	Koronadal-Columbio-Datu Paglas Road	3	3.0	2,000	6.0	120	12.5	5.0	7.5	1	25.0	3.0	2.0	5.0	0	3.0	1	5.0	67.0	10	-
	RS-7	Padada-Kiblawan-Columbio Road	3	3.0	1,000	6.0	41	10.0	0.5	2.5	5	15.0	1.0	2.0	3.0	0	3.0	1	5.0	47.5	25	-
	RS-8	Lais-Alabel Road	3	3.0	1,036	6.0	50	10.0	0.4	2.5	4	22.0	1.0	2.0	3.0	0	3.0	2	3.0	52.5	22	-
	RS-10	Saralla-Lake Sebu-Maitum Road	3	3.0	2,085	6.0	112	12.5	2.0	2.5	3	22.0	3.0	1.0	4.0	1	5.0	1	5.0	60.0	15	-
	RS-11	Saltan Kudarat-South Cotabato Link Road	3	3.0	750	3.0	45	10.0	0.2	2.5	1	25.0	3.0	1.0	4.0	0	3.0	2	3.0	53.5	21	-
	RSn-1	Tapian-Lebak Road	3	3.0	338	2.0	15	10.0	0.2	2.5	5	15.0	1.0	2.0	3.0	0	3.0	2	3.0	41.5	26	-

13.7.3 Implementation Schedule

Implementation schedule of all projects was prepared based on the following considerations and shown in **Table 13.7.3-1** and **Figures 13.7.3-1** to **13.7.3-4**;

- Implementation priority of projects
- On-going projects
- Road projects of which a feasibility study is on-going
- Implementation schedule of a road which connect 2 or 3 regions (i.e. ARMM and Region X or ARMM and Region XII, etc.,) is so planned that road sections in both Regions is constructed at the same time.

Table 13.7.3 – 1 (1/3) Implementation Schedule of Road Projects: ARMM

Road No.	Road Name	Road Class: Primary Inter-City	Road Class: Regional Primary	Road Class: Regional Secondary	Road Length (km)	Project Cost (Mil. PHP)	Implementing Schedule	Remarks
L1-2	Marawi-Marantao Road	X			9.3	0.0	On-going	On-going
L2-2(2)	Marawi-Marabang Road (Pualas-Balindong Sec)	X			19.5	0.0	On-going	On-going
MC-2	Marawi-Bacung Road	X			3.5	0.0	On-going	On-going
L1-1	Iligan-Marawi Road	X			4.2	101.2	A4	
SK-1	Davao-Cotabato Road	X			22.5	770.8	A2	Including M-5
MC-1	Bito-Marawi Road	X			4.1	95.2	B4	
SK-9	Marbel-Ala-Cotabato Road	X			60.1	1,604.2	A2	Including M-1
L2-1	Cotabato-Malabang-Lanao del Norte Road	X			131.1	3,751.8	B1	Including SK-2, SK-3, SK-4, SK-5 and SK-6
L2-2(1)	Marawi-Marabang Road (Malabang-Pualas Sec)	X			36.5	1,349.4	B1	
Total Cost by Term (Million PHP) (Primary Inter-City Road)							F/S 43.4; D/D 86.9; Const. 2,297.9; Total **2,428.3** / F/S 91.2; D/D 182.3; Const. 4,372.9; Total **4,646.4** / F/S 0.0; D/D 0.0; Const. 598.0; Total **598.0**	
L1-3	Marawi-Masiu Road		X		33.0	0.0	On-going	On-going
L2-3	Masiu-Ganassi Road		X		30.0	0.0	On-going	On-going
MC-6	Marawi-Pugaan Road		X		7.5	0.0	On-going	On-going
SK-10	Awang-Upi-Lebak Road		X		38.2	0.0	On-going	On-going
M-2	Awang-Upi-Lebak Road		X		30.6	0.0	On-going	On-going
SKn-7	Cotabato City East Diversion Road		X		11.8	0.0	On-going	On-going
M-4	Kidapawan-Ala Road		X		14.3	415.6	A5	
L2p-1	SK Border-Butig-Lumbayanague Road		X		60.0	1,046.1	A3	Including SKp-1
Mp-1	Maganoy-Sultan sa Barongis Road		X		22.2	460.0	A5	
Mp-2	Datu Saudi Ampatuan Road		X		9.0	177.4	A5	
L1-4	Mulondo-Wao Road		X		75.2	2,228.2	B3	
Mp-3	Maganoy-Lebak Road		X		31.0	1,084.5	B2	
M-3	Dulawan-Marbel Road		X		3.5	324.5	A5	
SK-7	Landsan-Polloc Road		X		3.6	74.9	C1	
SK-8	Parang Wharf Road		X		0.8	17.1	C1	
SKn-2	Matanog-Alamada Road (Matanog-Buldon Sec)		X		35.0	1,292.1	B3	Including SKn-3
Mn-1	Sultan sa Barongis-Pagalungan Road		X		35.0	1,292.1	C2	
SKn-5	Kabacan-Midsayap Road		X		20.0	738.3	A5	
Total Cost by Term (Million PHP) (Regional Primary Road)							F/S 53.1; D/D 106.2; Const. 884.4; Total **1,043.7** / F/S 75.7; D/D 151.5; Const. 2,805.8; Total **3,033.0** / F/S 22.4; D/D 44.9; Const. 5,006.8; Total **5,074.1**	
MC-9	Bito-Marawi-Agus Road			X	1.1	0.0	On-going	On-going
SKp-4	Limbo-Pinaring-Manuangan Road			X	22.2	513.0	A1	
SKp-2	Tamontaka-Tapian Road			X	20.1	509.9	A1	
MC-4	Marawi-Cadre Road			X	0.7	14.1	B4	
L2p-2	Malabang-Marogong-Tubaran-Bayang Road			X	32.0	917.8	B1	
MC-7	Marawi-Kapai Road			X	6.6	125.7	B4	
SK-11	Awang Airport Road			X	0.8	14.6	C1	
SKp-3	Diang-Upi Road			X	21.5	489.0	B2	
MC-8	Marawi-Marcos Blvd Road			X	1.8	150.1	B4	
MC-5	Marawi-Msu Road			X	1.0	18.3	B4	
MC-3	Marawi-Landing Road			X	0.8	14.1	B4	
L1p-1	Balindong-Pantao Ragat Road			X	8.0	151.9	C3	
L2p-3	Madalum-Munai Road			X	6.0	114.1	C3	
L1-5	Marawi-Kapai Road			X	12.0	211.3	C3	
L2-4	Ganassi-Tubod Road			X	11.0	217.2		F/S On-going
SKp-5	Diang-Upi Road Phase II			X	20.5	531.0	C4	
L2n-1	Parang-Balabagan Road			X	30.0	931.8	B1	Including SKn-1
SKn-4	Manuangan-Parang Road			X	20.0	621.2	A3	
SKn-6	Tapian-Lebak Road			X	50.0	1,553.1	C4	
Total Cost by Term (Million PHP) (Regional Secondary Road)							F/S 31.6; D/D 63.2; Const. 1,766.5; Total **1,861.3** / F/S 43.8; D/D 87.6; Const. 2,177.9; Total **2,309.2** / F/S 42.6; D/D 85.1; Const. 2,799.8; Total **2,927.5**	
Ground Total (Million PHP)							F/S 128.1; D/D 256.3; Const. 4,948.8; Total **5,333.3** / F/S 210.7; D/D 421.4; Const. 9,356.6; Total **9,988.6** / F/S 65.0; D/D 130.0; Const. 8,404.6; Total **8,599.6**	
							F/S 403.8; D/D 807.6; Const. 22,710.0; Total **23,921.5**	

Estimated Possible Investment Amount				
	ARMM	1,433.0	1,829.0	2,334.0
	DPWH-National	6,600.0	8,300.0	10,700.0
	Total	8,033.0	10,129.0	13,034.0

Note: : F/S : D/D : Tendering : Construction

Project Cost of On-going Project is not Included

Table 13.7.3-1 (2/3) Implementation Schedule of Road Projects: Region X

Road No.	Road Name	Road Class: Primary Inter-City	Road Class: Regional Primary	Road Class: Regional Secondary	Road Length (km)	Project Cost (Mil. PHP)	Implementing Schedule	Remarks
							On-going: 2009, 2010 / Short Term: 2011, 2012, 2013, 2014, 2015 / Middle Term: 2016, 2017, 2018, 2019, 2020 / Long Term: 2021, 2022, 2023, 2024, 2025	
PI-1(1)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Butuan-Cagayan de Oro Sec.)	X			121.3	2,817.9	A4	
PI-2	Sayre Highway	X			136.9	3,298.3	A3	
PI-1(3)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Iligan-Tubod Sec.)	X			68.7	1,595.8	A4	
PI-5	Iligan-Marawi Road	X			22.1	604.7	A4	
PI-1(2)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Cagayan de Oro-Iligan Sec.)	X			81.2	1,886.2	A4	
PI-4	Davao-Bukidnon Road	X			59.3	1,427.7	B3	
PI-6	Tubod-S.N. Dimaporo Road	X			23.6	548.7	B1	
PI-3	Maramag-Kibawe-Kabacan Road	X			45.1	1,085.5	A3	
PI-8	Cotabato-Marabang-Lanao Del Norte Road	X			27.4	636.9	B1	
PI-7	Kapatagan-R.Magsaysay Road	X			13.3	308.9	B1	
Total Cost by Term (Million PHP) (Primary Inter-City Road)							F/S 198.0; D/D 396.1; Const. 3,984.2; Total **4,578.3** / F/S 51.3; D/D 102.5; Const. 8,125.9; Total **8,279.7** / F/S 0.0; D/D 0.0; Const. 1,352.6; Total **1,352.6**	
RP-2	Wao-Kilillangan Road		X		7.1	151.5	B3	
RP-1	Cagayan de Oro-Talakag-Maramag Road		X		165.8	4,061.0	B3	
Total Cost by Term (Million PHP) (Regional Primary Road)							F/S 0.0; D/D 0.0; Const. 0.0; Total **0.0** / F/S 73.9; D/D 147.8; Const. 0.0; Total **221.7** / F/S 0.0; D/D 0.0; Const. 3,990.8; Total **3,990.8**	
RS-4	Tagum-Bukidnon Road			X	61.7	0.0		On-going
RS-5	Kalilangan-Kibawe Road			X	56.4	1,285.3	B3	
RS-2	Cagayan de Oro-Manolo Fortich Road			X	54.7	1,213.4	C5	
RS-8	Ganassi-Tubod Road			X	23.0	483.7		F/S On-going
RS-1	Gingoog-Villanueva Road			X	71.9	1,575.3	C5	
RS-6	Cagayan de Oro-Manticao Road			X	60.0	1,367.9	C5	
RS-7	Kauswagan-Munai-Madalum Road			X	25.0	569.9	C3	
RS-3	Mindanao East-Wesr Lateral Road			X	127.9	2,997.8		F/S On-going
Total Cost by Term (Million PHP) (Regional Secondary Road)							F/S 60.6; D/D 121.1; Const. 3,299.9; Total **3,481.5** / F/S 22.5; D/D 45.1; Const. 0.0; Total **67.6** / F/S 82.9; D/D 165.8; Const. 5,695.5; Total **5,944.2**	
Ground Total (Million PHP)							F/S 258.6; D/D 517.2; Const. 7,284.0; Total **8,059.8** / F/S 147.7; D/D 295.4; Const. 8,125.9; Total **8,569.1** / F/S 82.9; D/D 165.8; Const. 11,038.8; Total **11,287.6**	
							F/S 489.2; D/D 978.5; Const. 26,448.8; Total **27,916.5**	
Estimated Possible Investment Amount							21,900.0	27,900.0	35,600.0	

Note: : F/S : D/D ×××××××××××××× : Tendering : Construction

Project Cost of On-going Project is not Included

Table 13.7.3-1 (3/3) Implementation Schedule of Road Projects: Region XII

Road No.	Road Name	Road Class: Primary Inter-City	Road Class: Regional Primary	Road Class: Regional Secondary	Road Length (km)	Project Cost (Mil. PHP)	Implementing Schedule	Remarks
							On-going: 2009, 2010 / Short Term: 2011, 2012, 2013, 2014, 2015 / Middle Term: 2016, 2017, 2018, 2019, 2020 / Long Term: 2021, 2022, 2023, 2024, 2025	
PI-4	Gen. Santos-Cotabato Road	X			134.6	3,125.6	A2	
PI-1	Davao-Cotabato Road	X			55.4	1,286.2	A2	
PI-5	Davao-Digos Road	X			39.0	906.1	A2	
PI-2	Cotabato-Digos Road	X			58.0	1,295.9	A2	
PI-3	Maramag-Kibawe-Kabacan Road	X			48.6	1,129.8	A3	
	Total Cost by Term (Million PHP) (Primary Inter-City Road)						F/S 135.9; D/D 271.7; Const. 7,217.2; Total **7,624.8** / F/S 0.0; D/D 0.0; Const. 118.9; Total **118.9** / F/S 0.0; D/D 0.0; Const. 0.0; Total **0.0**	
RP-4	Midsayap-Datumang Road		X		13.1	0.0		On-going
RP-9	Gen. Santos-Glan-Kalipagan Road		X		51.2	0.0		On-going
RP-12	Cotabato-Upi-Kalamansig Road		X		39.0	0.0		On-going
RP-8	Koronadal-Tacurong-Midsayap Road		X		36.5	751.5	A5	
RP-7	Buluan-Islan Road		X		22.7	447.5	A5	
RP-6	Kidapawan-Ala Road		X		48.4	953.2	A5	
RP-3	Kabuntalan-Midsayap Road		X		15.0	343.5	A5	
RP-10	Gen. Santos-Kiamba-Kalamansig Road		X		221.7	5,096.9		F/S On-going
RP-2	Wao-Carmen Road		X		35.0	923.0	B1	
RP-1	Libungan-Buldon-Matanog Road		X		17.5	461.5	B3	
RP-11	Isulan-Palimbang Road		X		75.1	1,889.9	C4	
RP-13	Magnoy-Lebak Road		X		49.3	1,404.2	B2	
RP-5	Pagalungan-Mamasapano Road		X		15.0	452.4	C2	
	Total Cost by Term (Million PHP) (Regional Primary Road)						F/S 133.2; D/D 266.4; Const. 4,828.7; Total **5,228.3** / F/S 48.9; D/D 97.8; Const. 4,036.9; Total **4,183.7** / F/S 40.3; D/D 80.6; Const. 3,190.8; Total **3,311.7**	
RS-9	Gen. Santos-Glan-Kalipagan Road			X	54.3	0.0		On-going
RS-6	Koronadal-Columbio-Datu Paglas Road			X	30.0	570.3	B2	
RS-5	Tulunan-Makilala Road			X	25.0	475.3	B2	
RS-10	Saralla-Lake Sebu-Maitum Road			X	75.1	1,599.2	B2	
RS-3	Matalam-Roxas Road			X	50.0	1,139.9	B3	
RS-2	Carmen-Libuagan Road			X	25.0	569.9	C2	
RS-1	Banisilan-Alamada Road			X	25.0	569.9	C2	
RS-11	Saltan Kudarat-South Cotabato Link Road			X	90.0	1,711.0	C4	
RS-4	Kidapawan-Arakan-Davao Road			X	75.4	1,966.8	B2	
RS-8	Lais-Alabel Road			X	32.6	807.9	C4	
RS-7	Padada-Kiblawan-Columbio Road			X	25.0	776.5	B2	
RSn-1	Tapian-Lebak Road			X	20.0	579.5	C4	
	Total Cost by Term (Million PHP) (Regional Secondary Road)						F/S 0.0; D/D 0.0; Const. 0.0; Total **0.0** / F/S 111.6; D/D 223.3; Const. 3,270.7; Total **3,605.6** / F/S 72.5; D/D 145.0; Const. 6,943.2; Total **7,160.7**	
	Ground Total (Million PHP)						F/S 269.1; D/D 538.1; Const. 12,045.9; Total **12,853.1** / F/S 160.6; D/D 321.1; Const. 7,426.5; Total **7,908.2** / F/S 112.8; D/D 225.6; Const. 10,134.0; Total **10,472.4**	
							F/S 542.4; D/D 1,084.9; Const. 29,606.4; Total **31,233.7**	
	Estimated Possible Investment Amount						19,700.0 / 25,200.0 / 32,100.0	

Note: : F/S : D/D : Tendering : Construction

Project Cost of On-going Project is not Included

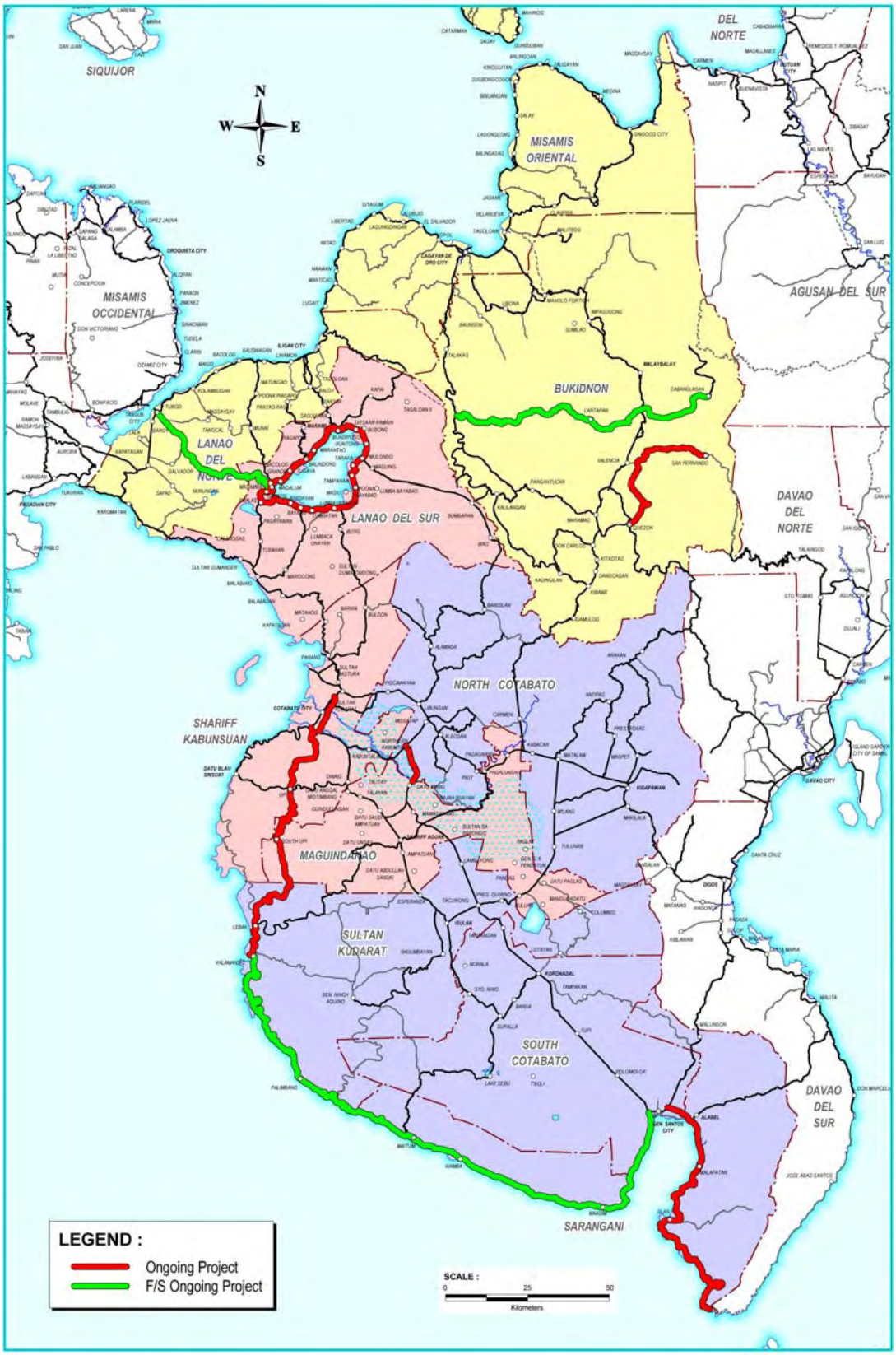


FIGURE 13.7.3-1 ON-GOING PROJECTS AND FEASIBILITY STUDY ON-GOING ROADS

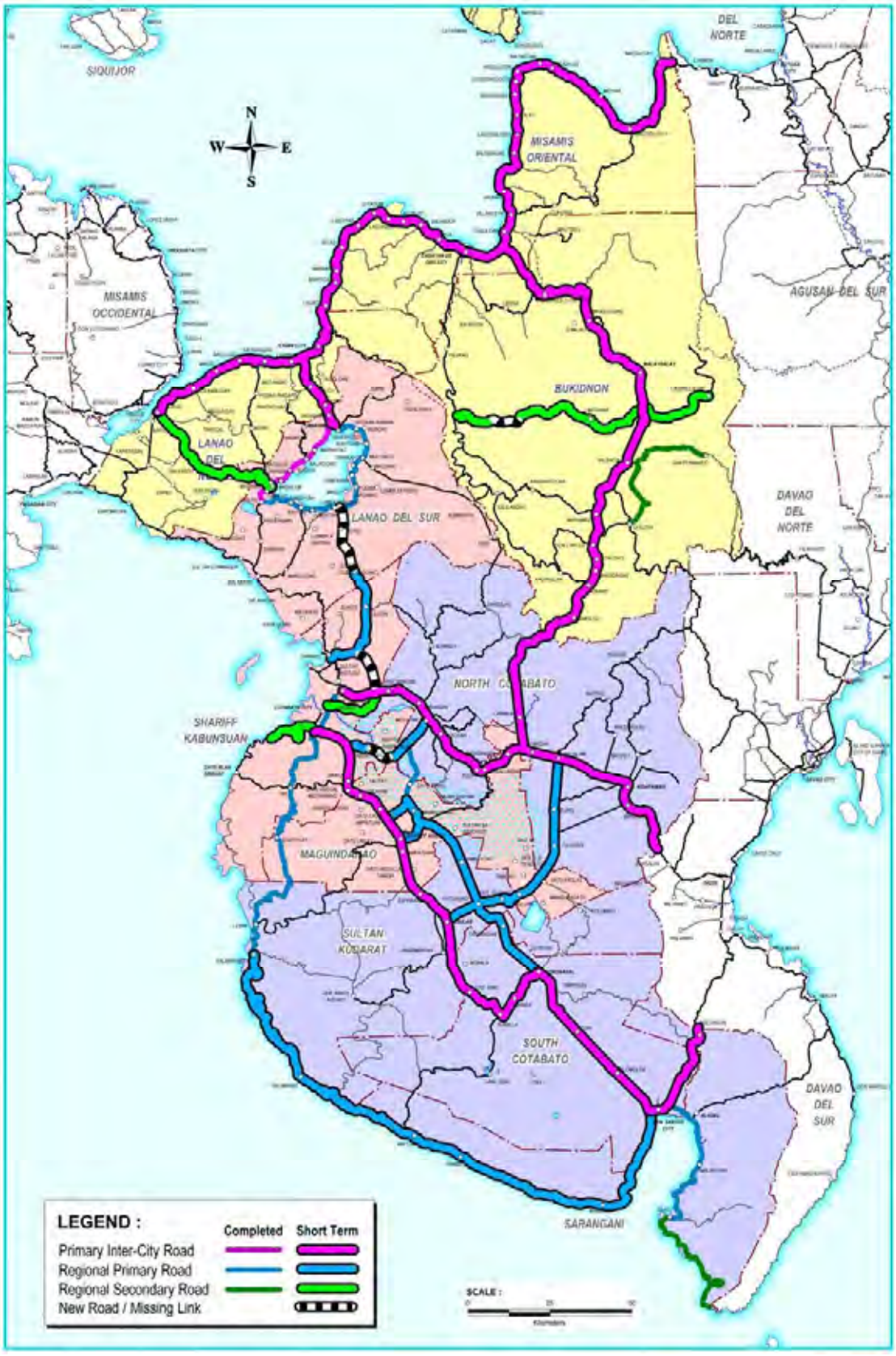


FIGURE 13.7.3-2 PROPOSED SHORT-TERM PROJECTS (2011-2015)

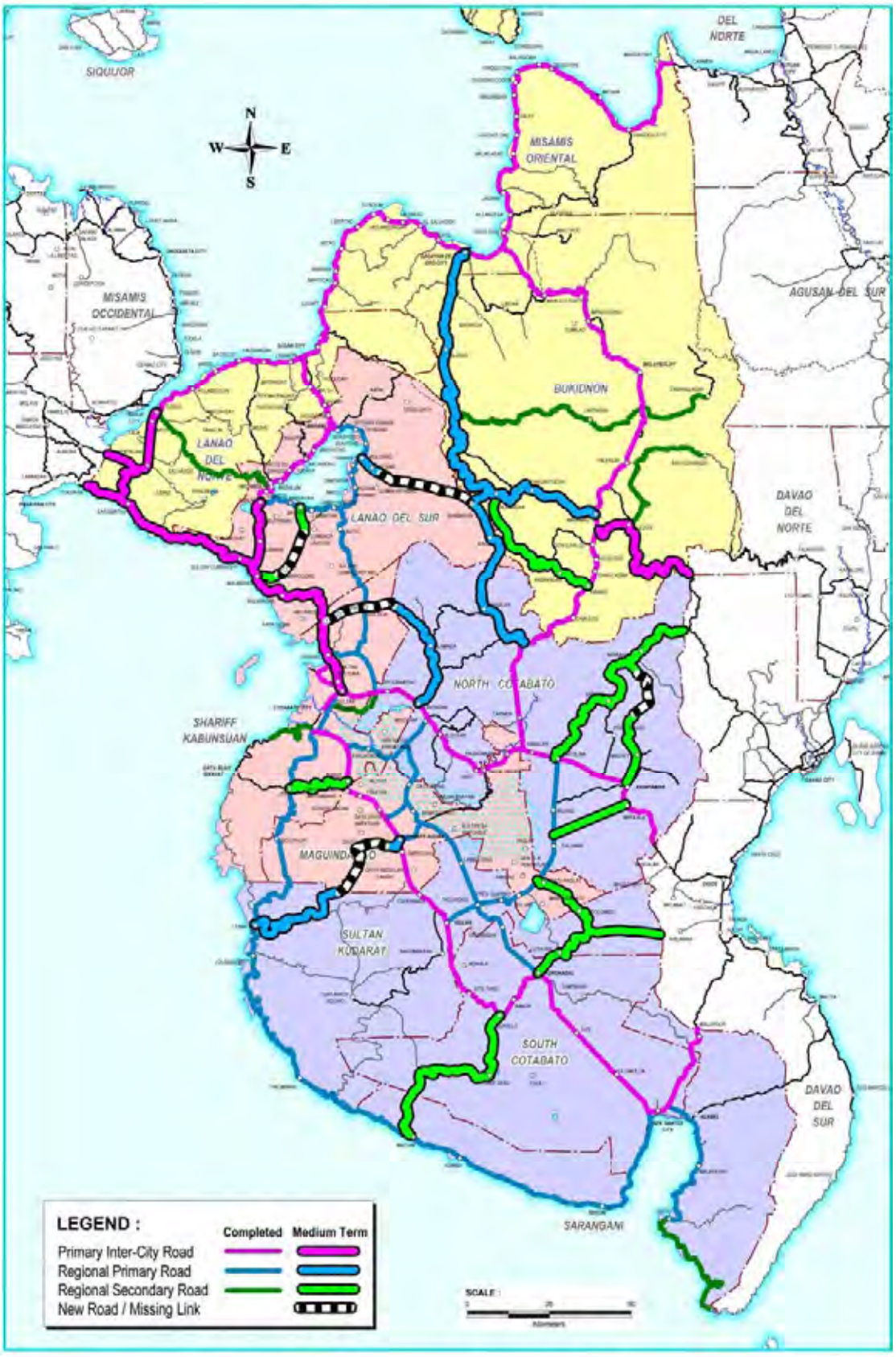


FIGURE 13.7.3-3 PROPOSED MEDIUM TERM PROJECTS (2016-2020)

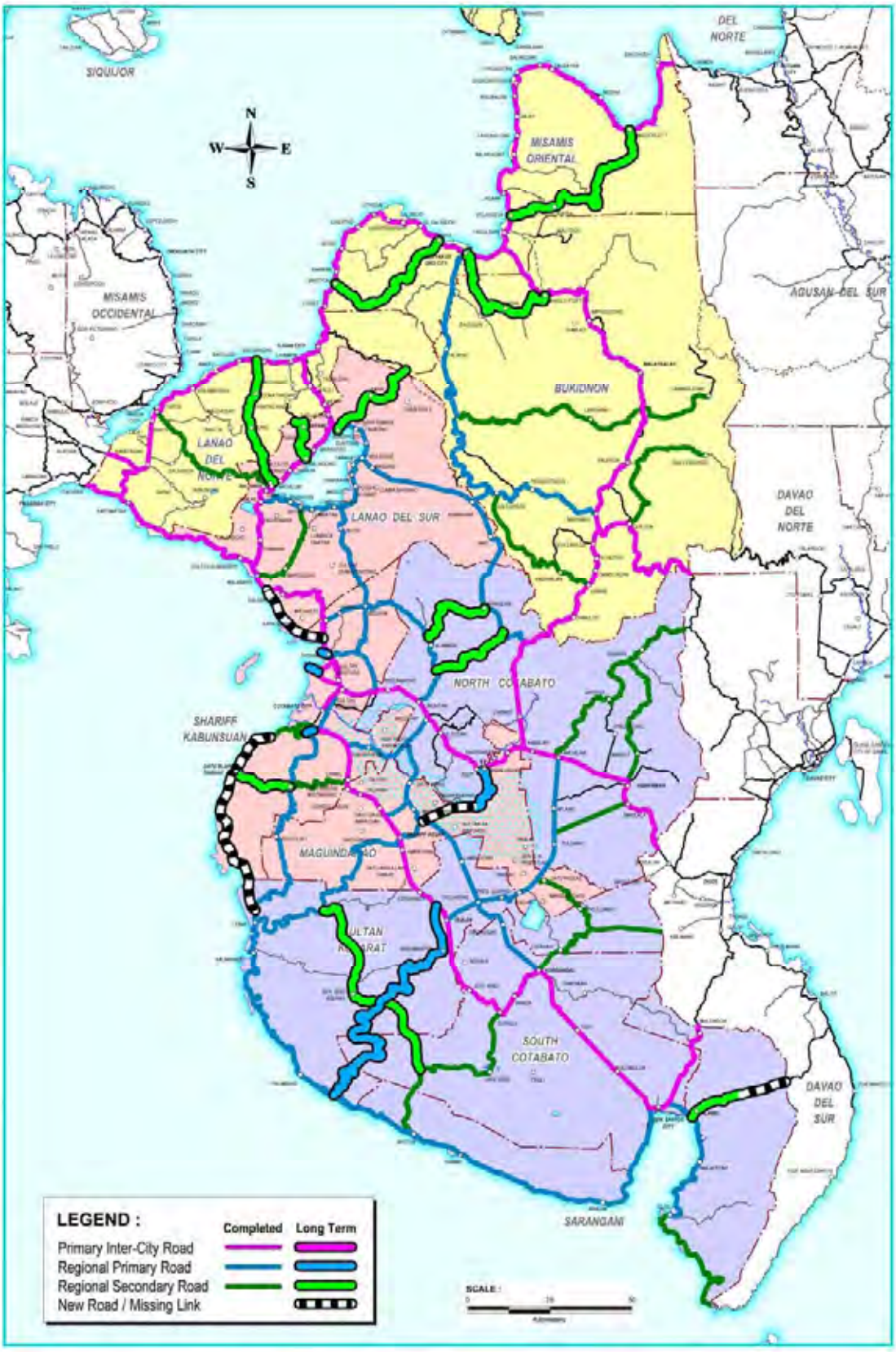


FIGURE 13.7.3-4 PROPOSED LONG TERM PROJECTS (2021-2025)

13.8 IMPROVEMENT OF TRAFFIC CONDITION UNDER THE MASTER PLAN

13.8.1 Traffic Assignment Results Under the Master Plan

Traffic assignment was undertaken for each stage of Master Plan under the following conditions and shown in **Figures 13.8.1-1 to 13.8.1-4.**

Master Plan Road Network	Traffic Demand	Figure No.
Year 2011	Year 2011	Fig. 13.8.1-1
Year 2015	Year 2015	Fig. 13.8.1-2
Year 2020	Year 2020	Fig. 13.8.1-3
Year 2025	Year 2025	Fig. 13.8.1-4

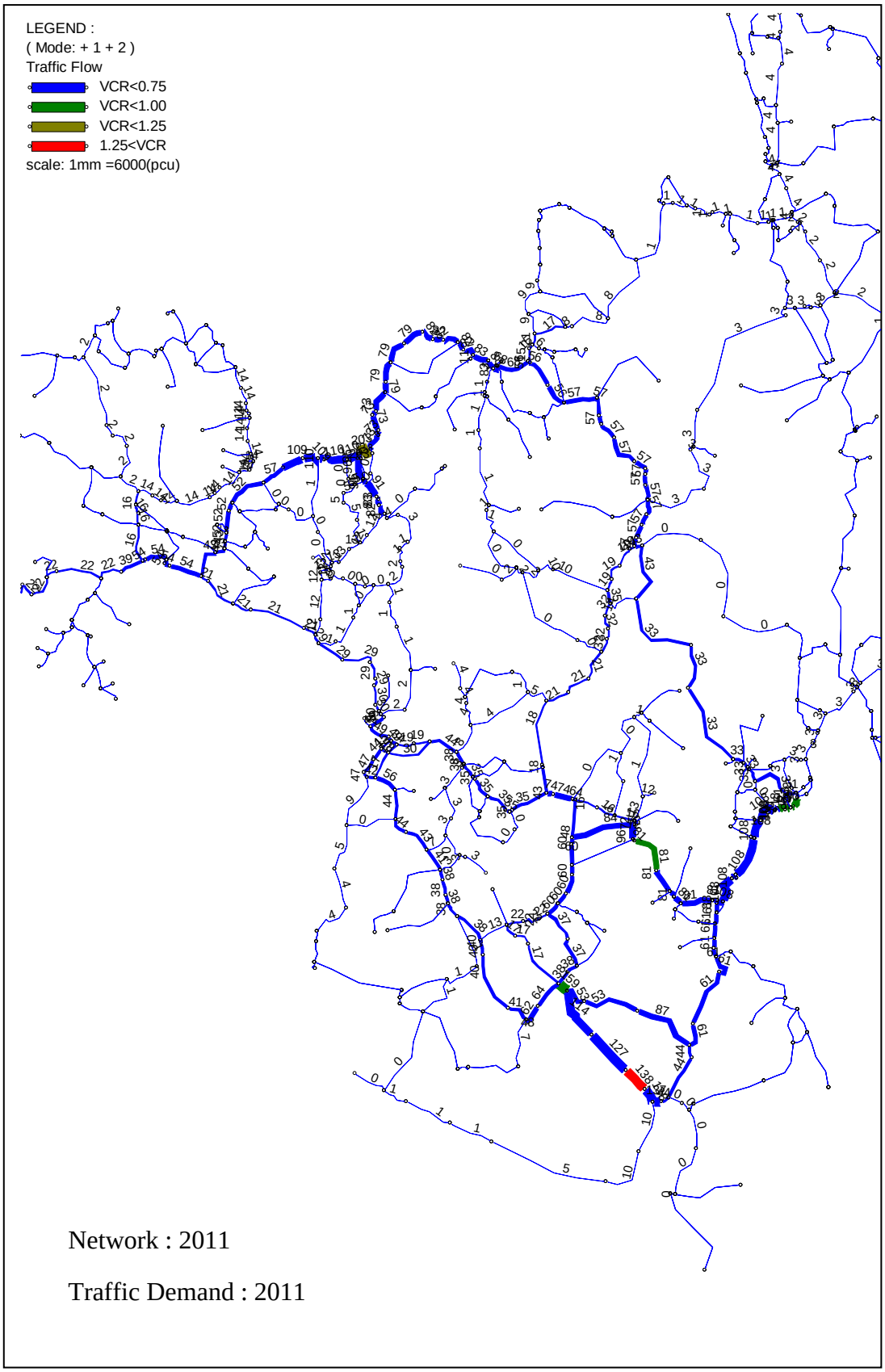


FIGURE 13.8.1-1 TRAFFIC CONDITION IN YEAR 2011 under the Master Plan

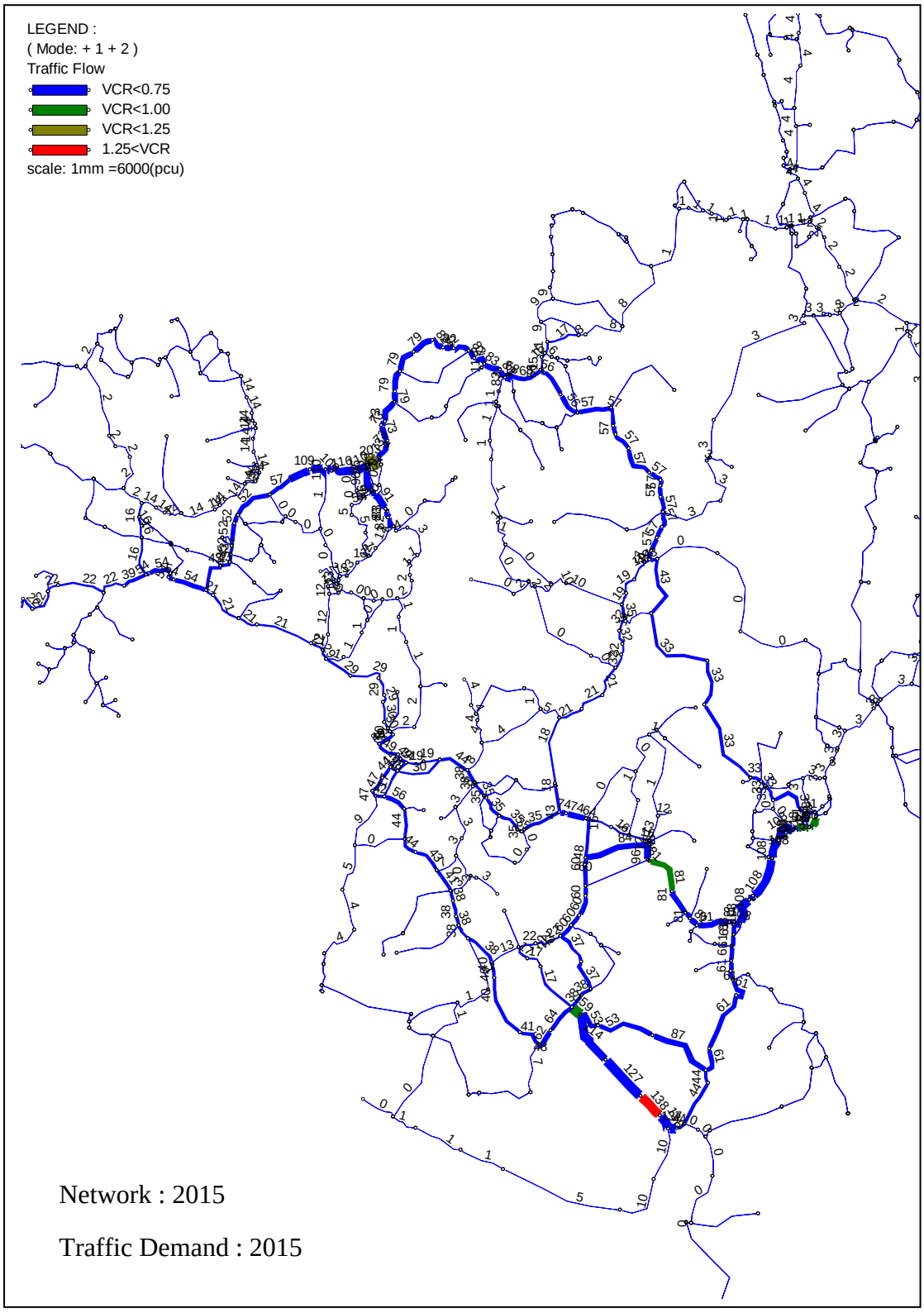


FIGURE 13.8.1-2 TRAFFIC CONDITION IN YEAR 2015 under the Master Plan

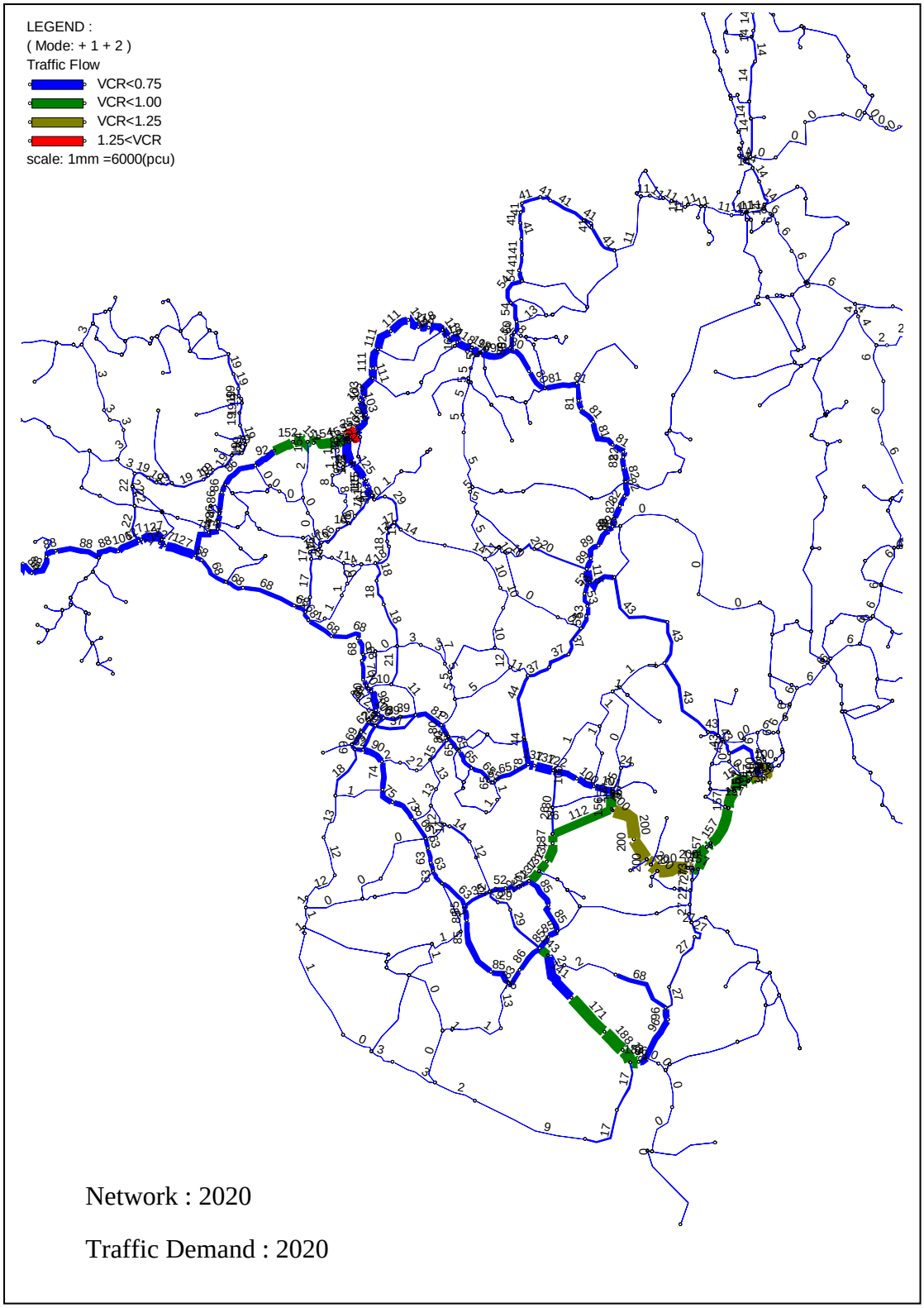


FIGURE 13.8.1-3 TRAFFIC CONDITION IN YEAR 2020 under the Master Plan

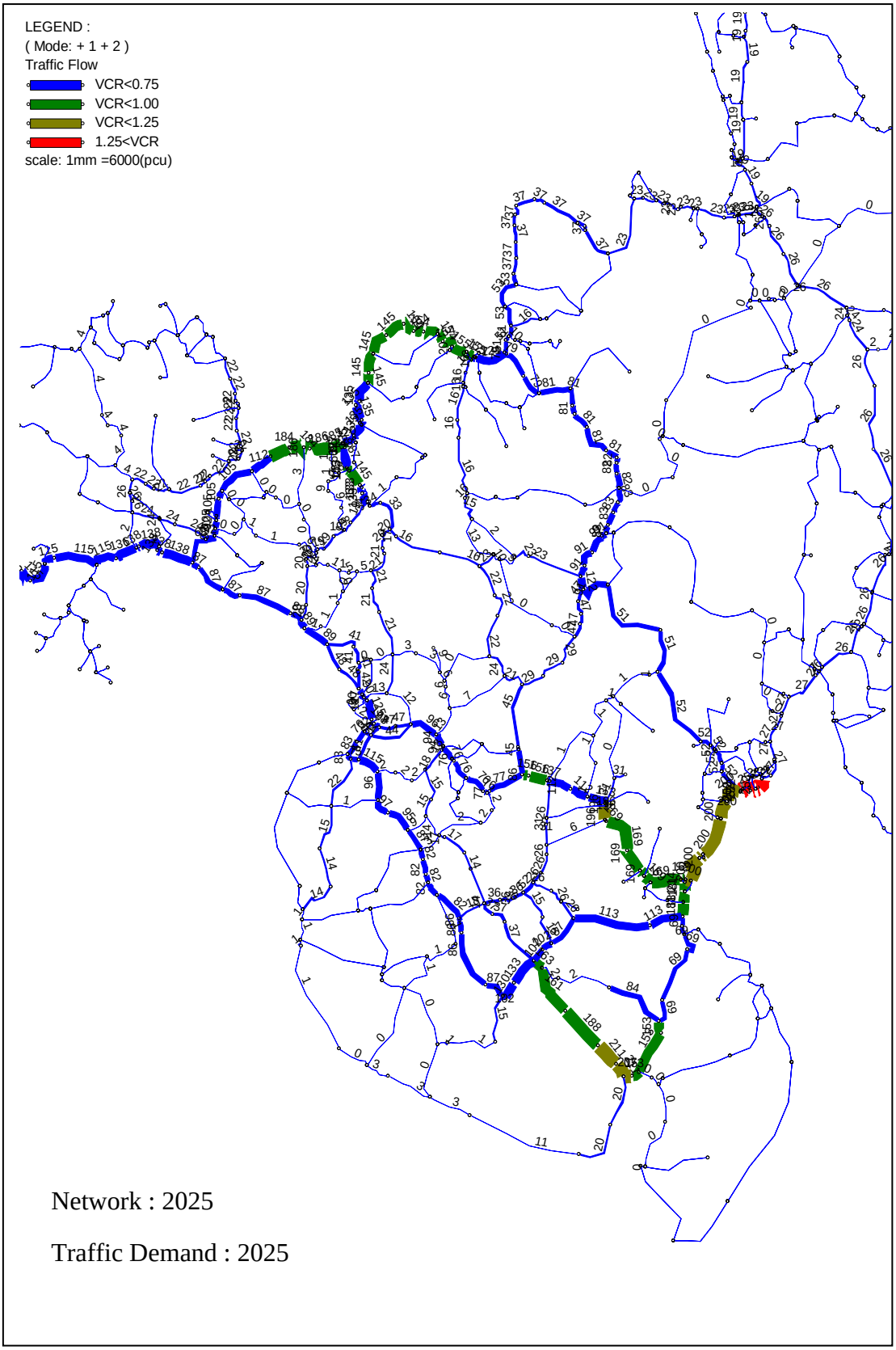


FIGURE 13.8.1-4 TRAFFIC CONDITION IN YEAR 2025 under the Master Plan

13.8.2 Improvement of Traffic Condition under the Master Plan

Traffic conditions under each stage of the Master Plan were summarized in **Table 13.8.2-1.**

TABLE 13.8.2-1 TRAFFIC CONDITION UNDER EACH STAGE OF MASTER PLAN

Indications		2011	2015	2020	2025
Total Travel Distance (1,000 km x pcu)	With	10,041	14,144	17,894	21,975
	Without	10,132	14,317	17,963	22,726
	With/without	0.99	0.99	1.0	0.97
Total Travel Time (1,000 hrs x pcu)	With	193.4	224.3	253.8	331.0
	Without	195.2	270.1	286.7	363.6
	With/without	0.99	0.83	0.88	0.91
Total Capacity Distance (1,000 km x pcu)	With	147,969	156,286	165,787	175,142
	Without	146,404	146,404	146,404	146,404
	With/without	1.01	1.07	1.13	1.20
Average Travel Speed (km/hr)	With	51.9	63.1	64.5	66.4
	Without	51.9	51.0	50.5	49.8
	With/without	1.00	1.24	1.28	1.33
Demand Capacity Ratio	With	0.07	0.09	0.11	0.13
	Without	0.07	0.10	0.11	0.14
	With/without	1.00	0.90	1.00	0.93

When the Master Plan is realized, major improvement in traffic condition will be made on the following:

- Travel time improvement

  In 2025, travel time will be saved by 32,600 hours per day.

- Total capacity

  In 2025, traffic capacity of roads increased by 1.20 times.

- Average Travel Speed

  In 2025, average travel speed will be improved by 1.33 times.

13.9 ECONOMIC EVALUATION OF THE MASTER PLAN

13.9.1 Evaluation Methodology and Assumptions

The Master Plan projects was evaluated from the economic viewpoint, following a cost-benefit analysis, of which procedure is shown in **Figure 13.9.1-1.**

Economic cost is a monetary expression of goods and services to be actually consumed for implementation of a project. All the transfer costs (taxes and subsidies) are deducted from the financial costs measured in market price. In addition, shadow wage rates (SWRs) were applied to unskilled labor costs included in the project cost. The same process is taken to estimate unit costs of vehicle operation which were used to estimate economic benefits, by excluding all taxes and applying the SWRs to labor cost of mechanics and crews.

Economic benefit is defined as the amount saved in travel costs due to a project. Travel costs consist of two components, vehicle operating cost (VOC) and travel time cost (TTC). These are the benefits most direct and comparatively easy to quantify. It is obvious that there exist other benefits, such as safety improvement, inducement of urban development, and mitigation of traffic congestion. In this study, however, those kinds of benefits were difficult to quantify and thus excluded in order to avoid an arbitrary evaluation.

Benefits of a project were measured through so-called “with” and “without” comparison. Using the results of traffic assignment to a network with the project and also to the same network but without the project, total VOC and TTC of each case were calculated. The benefit is regarded as the difference between “with” and “without cases.

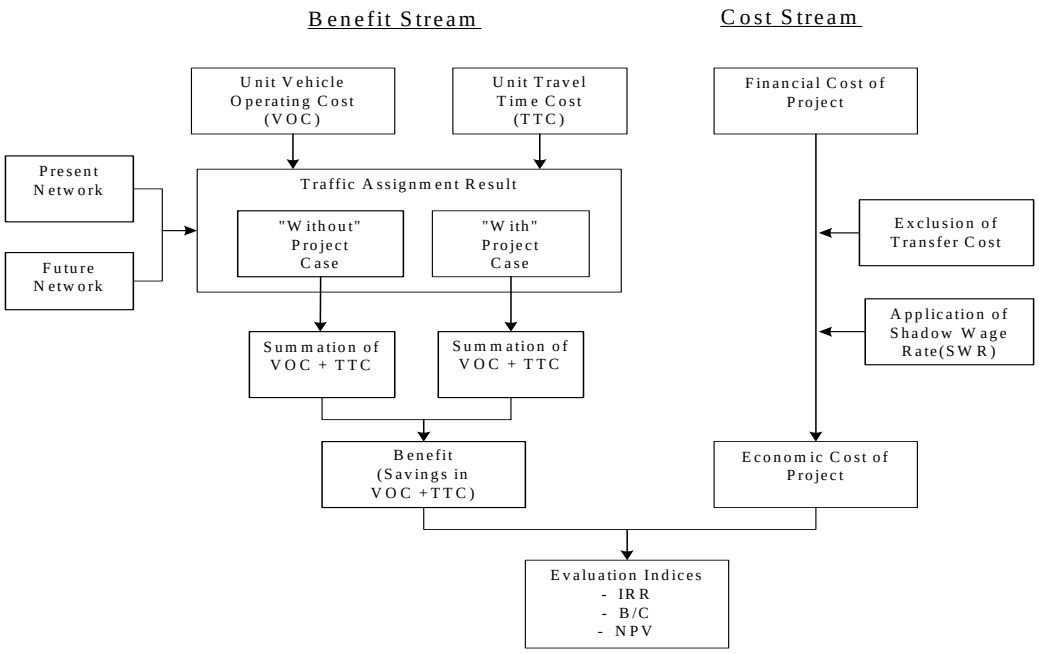


FIGURE 13.9.1-1 WORK FLOW FOR ECONOMIC EVALUATION

Economic cost and benefit were compared through a discount cash flow analysis. The discount rate (DR) adopted is 15% which is widely used in the Philippines. As evaluation indicators, internal rate of return (IRR), benefit/cost ratio (B/C) and net present value (NPV) were calculated. They are defined as below:

- Internal Rate of Return(IRR): $\sum \frac{B_n}{(1+r)^n} = \sum \frac{C_n}{(1+r)^n}$
- Net Present $\sum \frac{B_n - C_n}{(1+DR)^n}$
- B/C $\sum \frac{B_n}{(1+DR)^n} \div \sum \frac{C_n}{(1+DR)_n}$

Pro-forma cash flow of a project to be evaluated is prepared for the period of 2009 to 2030.

Although the physical life of an infrastructure project is 50 to 60 years, economic life is assumed to be 20 years, taking into account future rapid urban growth and changes of socioeconomic conditions. Thus, every investment is not completely depreciated within the analytical period until 2030. Therefore, residual value of each project in 2031 is calculated and added to the benefit stream.

13.9.2 Estimation of Vehicle Operating Cost

Vehicle operating cost (VOC) is one of the main sources of economic benefit. The operating cost per unit distance is estimated by type of vehicle, such as motor-tricycle, car, van, jeepney, bus and truck.

In the Philippines, DPWH has been periodically updating VOC data in order to use as an input to the HDM Model for the appraisal of highway development and maintenance projects. The VOC estimates in this Study depended on the basic information and assumptions of the DPWH‘s data.

(1) Basic Vehicle Operating Cost

The basic vehicle operating costs refer to those costs incurred while driving on an ideal paved road with a smooth surface (International Roughness Index (IRI) at arund 2.5), straight alignment, with no horizontal curves and roadside friction, and under smooth traffic flows.

The unit VOC and TTC provided by DPWH are shown in **Table 13.9.2-1** and **Table 13.9.2-2.**

Table 13.9.2-1 Unit VOC by Vehicle Type as of September 2006

(Pesos per veh-km)

Velocity (km/hour)	1. Motor-tricycle	2. Passenger Car	3. Passenger Utility	4. Good Utility	5. Small Bus	6. Rigid Truck 2ax
20	2.98	10.56	8.80	10.09	19.66	20.94
30	2.48	9.09	7.40	8.34	16.65	17.96
40	2.15	8.02	6.40	7.07	14.47	15.92
50	2.03	7.47	5.91	6.44	13.36	15.01
60	2.03	7.21	5.72	6.15	12.83	14.67
70	2.10	7.13	5.71	6.07	12.62	14.63
80	2.20	7.16	5.82	6.15	12.59	14.75
90	2.29	7.25	6.01	6.31	12.64	14.94
100	2.36	7.36	6.23	6.50	12.72	15.07
110	2.40	7.46	6.43	6.69	12.79	15.07
120	2.42	7.54	6.61	6.84	12.81	15.07

Source: DPWH

Table 13.9.2-2 Unit TTC by Vehicle Type as of September 2006

(Pesos/person/hour)

Reprersentative Vehicle Type	Working Time	Non-Working Time
Passenger Car	400	100
Motor-tricycle	100	25
Public Utility		
Bus		

Source: DPWH

The unit VOC and TTC used in this study were updated as shown in **Table 13.9.2-3** and **Table 13.9.2-4**, using inflation rates during 2006 to 2009.

Table 13.9.2-3 Updated Unit VOC by Vehicle Type as of 2009

(Pesos per veh-km)

Velocity (km/hour)	1. Motor-tricycle	2. Passenger Car	3. Passenger Utility (Jeepny)	4. Good Utility	5. Small Bus	6. Rigid Truck 2ax
20	4.01	13.12	9.36	12.06	15.80	29.46
50	2.61	9.28	6.16	7.55	10.40	19.35
80	2.75	8.77	5.98	7.02	9.88	18.08
100	2.93	8.94	6.37	7.32	10.08	18.23
120	3.00	9.11	6.74	7.64	10.19	18.23

Table 13.9.2-4 Updated Unit TTC by Vehicle Type as of September 2009

(Psesos/person/hour)

Presentative Vehicle Type	Travel Time Cost
Passenger Car	419
Motor-tricycle	105
Public Utility	
Bus	

(2) Vehicle Operating Cost by Road Condition

As previously stated, the Basic VOC is the cost on an ideal paved road with a smooth surface. Where road conditions are worse, VOC becomes higher. Data shown in **Table 13.9.2-5** are prepared for the adjustment of unit VOC according to various road conditions. The VOC coefficient in the table is multiplied to the unit VOC. For a road in a hilly area and mountainous area, the estimated unit VOC is readjusted by multipling 1.1 and 1.2, respectively.

TABLE 13.9.2.5 VOC ADJUSTMENT FACTOR

Road Surface	Condition	VOC Coefficient	
		Passenger Cars	Trucks
Paved Road	Bad	1.40	1.60
Gravel Road	Bad	1.60	1.90

Source: DPWH

Note: For a road in a hilly area and mountainous area, the estimated unit VOC is readjusted by multiplying1.1 and 1.2, respectively

13.8.3 Project Economic Cost

(1) Initial Cost

Project costs estimated in **Section 13.5.2** are so-called financial costs of the projects, where the prices are measured in market price. Those costs were converted into economic costs through the following procedures:

1) The estimated financial cost includes the value added tax (VAT) of 12%. This national tax was excluded, because it is a transfer cost and not a part of the project input of goods and services.

2) According to the home page of the Philippines Central Bank, the unemployment in the Philippines ranges from 7 to 8%. According to the formula proposed by J. Haveman, the economic value of the wage paid to unskilled labor under such a high employment rate is never as high as the wage determined in the market. The shadow wage of unskilled labor is usually from 85% to 90% of the legally stipulated minimum wage.

$$\text{Shadow Wage} = \text{Market Wage} \times (1.25 - \text{Unemployment Rate} / 0.2)$$

$$= \text{Market Wage} \times (0.85 \sim 0.90)$$

The economic cost through the conversion with above-mentioned 1) and 2) is shown in **Table 13.9.3-1**. The ratio to a financial cost of an economic cost, it might be called a standard conversion coefficient: SCF, became 0.90. Economic cost by project is shown in **Table 13.9.3-2.**

Table 13.9.3-2 Economic Costs of the Project

(Mil. PHP)

	Financial Cost (A)	Economic Cost (B)	(B)/(A)
ARMM	19,704.3	17,832.9	0.91
Region X	24,435.0	22,023.9	0.90
Region XII	26,136.7	23,595.6	0.90
Total	**70,276.0**	**63,452.4**	**0.90**

The investment amount according to the annual implementation schedule is shown in **Figure 13.9.3-2.**

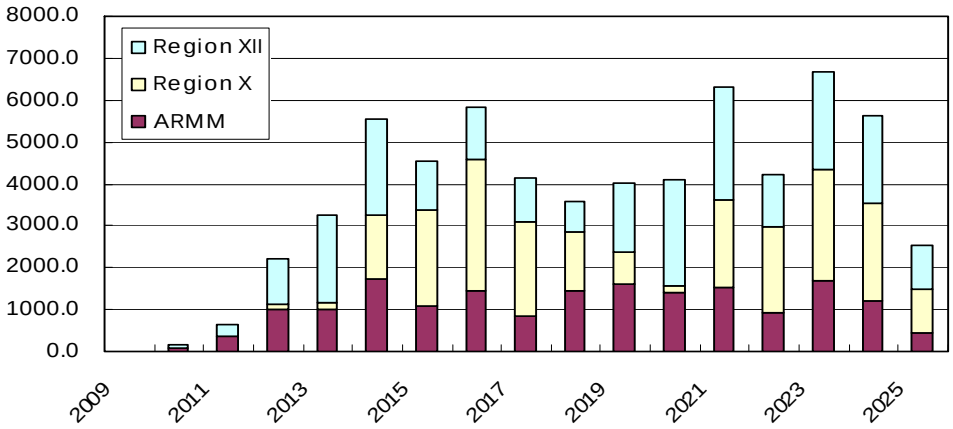


FIGURE 13.9.3-2 Annual Investment Schedule (in Economic Cost)

Table 13.8.3-2 (1/2) Financial Costa and Economic Cost by Project (ARMM)

Region	Road Class	Road No.	Road Name	Road Length	Financial Cost	Economic Cost
				(km)	(Mi. PHP)	(Mi. PHP)
ARMM	Primary Inter-City Road	L1-1	Iligan-Marawi Road	4.2	101.2	91.1
		L1-2	Marawi-Marantao Road	9.3	-	-
		L2-2(2)	Marawi-Marabang Road (Pualas-Balindong Sec)	19.5	-	-
		L2-2(1)	Marawi-Marabang Road (Malabang-Pualas Sec)	36.5	1,349.4	1,215.3
		MC-1	Bito-Marawi Road	4.1	95.2	85.8
		MC-2	Marawi-Bacung Road	3.5	-	-
		L2-1	Cotabato-Malabang-Lanao del Norte Road	64.5	1,772.1	1,596.6
		SK-1	Davao-Cotabato Road	8.8	204.4	184.1
		SK-2	WYE Length Davao-Cotabato Road	0.4	8.4	7.6
		SK-3	Cotabato-Lanao Road	10.8	603.5	544.3
		SK-6	Simuay-Landsan-Parang Road	12.9	330.0	297.3
		SK-4	Salimbao-Delta Bridge Road	0.4	9.8	8.8
		SK-5	Lamsan-Simuay Jct. Road	1.0	23.2	20.9
		SK-9	Marbel-Ala-Cotabato Road	27.2	631.8	569.1
		M-1	Marbel-Ala-Cotabato Road	32.9	972.4	876.3
		M-5	Kabacan-Pagalungan Road	13.7	566.3	510.6
		Sub-Total		**249.7**	**6,667.8**	**6,007.8**
	Regional Primary Road	L1-3	Marawi-Masiu Road	33.0	-	-
		L2-3	Masiu-Ganassi Road	30.0	-	-
		L1-4	Mulondo-Wao Road	7.8	186.2	167.7
		MC-6	Marawi-Pugaan Road	7.5	-	-
		L2p-1	SK Border-Butig-Lumbayanague Road	25.0	922.9	840.3
		SKp-1	Parang-Buldon Road	29.0	869.4	784.5
		SK-7	Landsan-Polloc Road	3.6	74.9	67.5
		SK-8	Parang Wharf Road	0.8	17.1	15.4
		SK-10	Awang-Upi-Lebak Road	38.2	-	-
		M-2	Awang-Upi-Lebak Road	30.6	-	-
		SKn-2	Matanog-Alamada Road (Matanog-Buldon Sec)	20.0	738.3	672.2
		SKn-3	Matanog-Alamada Road (Buldon-Alamada Sec)	15.0	553.8	504.2
		SKn-5	Kabacan-Midsayap Road	20.0	738.3	672.2
		M-3	Dulawan-Marbel Road	3.5	324.5	292.7
		M-4	Kidapawan-Ala Road	14.3	415.6	374.6
		Mp-2	Datu Saudi Ampatuan Road	9.0	177.4	159.8
		Mn-1	Sultan sa Barongis-Pagalungan Road	35.0	1,292.1	1,176.4
		Mp-1	Maganoy-Sultan sa Barongis Road	22.2	460.0	414.6
		Mp-3	Maganoy-Lebak Road	6.0	161.6	145.8
		SKn-7	Cotabato City East Diversion Road	11.8	-	-
		Sub-Total		**362.3**	**6,932.2**	**6,288.0**
	Regional Secondary Road	L1-5	Marawi-Kapai Road	12.0	211.3	190.3
		L1p-1	Balindong-Pantao Ragat Road	8.0	151.9	136.9
		MC-3	Marawi-Landing Road	0.8	14.1	12.7
		MC-4	Marawi-Cadre Road	0.7	14.1	12.7
		MC-5	Marawi-Msu Road	1.0	18.3	16.5
		MC-7	Marawi-Kapai Road	6.6	125.7	113.2
		MC-8	Marawi-Marcos Blvd Road	1.8	150.1	135.4
		MC-9	Bito-Marawi-Agus Road	1.1	-	-
		L2-4	Ganassi-Tubod Road	11.0	-	-
		L2p-2	Malabang-Marogong-Tubaran-Bayang Road	7.0	141.2	127.4
		L2p-3	Madalum-Munai Road	6.0	114.1	102.7
		L2n-1	Parang-Balabagan Road	20.0	621.2	566.5
		SKn-1	Parang-Balabagan Road	10.0	310.6	283.2
		SK-11	Awang Airport Road	0.8	14.6	13.2
		SKp-2	Tamontaka-Tapian Road	20.1	509.9	460.1
		SKn-6	Tapian-Lebak Road	50.0	1,553.1	1,416.2
		SKp-3	Diang-Upi Road	21.5	489.0	441.4
		SKp-5	Diang-Upi Road Phase II	20.5	531.0	479.2
		SKp-4	Limbo-Pinaring-Manuangan Road	22.2	513.0	463.0
		SKn-4	Manuangan-Parang Road	20.0	621.2	566.5
		Sub-Total		**241.1**	**6,104.2**	**5,537.2**
	Total			**853.1**	**19,704.3**	**17,832.9**

Table 13.9.3-2 (2/2) Financial Cost and Economic Cost by Project (Region X & XII)

Region	Road Class	Road No.	Road Name	Road Length (km)	Financial Cost (Mi. PHP)	Economic Cost (Mi. PHP)
Region X	Primary Inter-City Road	PI-1(1)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Butuan-Cagayan de Oro Sec.)	121.3	2,817.9	2,538.0
		PI-1(2)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Cagayan de Oro-Iligan Sec.)	81.2	1,886.2	1,698.8
		PI-1(3)	Butuan-Cagayan de Oro-Iligan-Tubod Road (Iligan-Tubod Sec.)	68.7	1,595.8	1,437.3
		PI-2	Sayre Highway	136.9	3,298.3	2,970.6
		PI-3	Maramag-Kibawe-Kabacan Road	45.1	1,085.5	977.7
		PI-4	Davao-Bukidnon Road	59.3	1,427.7	1,285.9
		PI-5	Iligan-Marawi Road	22.1	604.7	545.3
		PI-6	Tubod-S.N. Dimaporo Road	23.6	548.7	494.2
		PI-7	Kapatagan-R.Magsaysay Road	13.3	308.9	278.3
		PI-8	Cotabato-Marabang-Lanao Del Norte Road	27.4	636.9	573.7
			Sub-Total	**598.8**	**14,210.6**	**12,799.7**
	Regional Primary Road	RP-1	Cagayan de Oro-Talakag-Maramag Road	165.8	4,061.0	3,661.8
		RP-2	Wao-Kililangan Road	7.1	151.5	136.5
			Sub-Total	**172.9**	**4,212.5**	**3,798.3**
	Regional Secondary Road	RS-1	Gingoog-Villanueva Road	71.9	1,575.3	1,421.4
		RS-2	Cagayan de Oro-Manolo Fortich Road	54.7	1,213.4	1,095.0
		RS-3	Mindanao East-Wesr Lateral Road	127.9	-	-
		RS-4	Tagum-Bukidnon Road	61.7	-	-
		RS-5	Kalilangan-Kibawe Road	56.4	1,285.3	1,160.3
		RS-6	Cagayan de Oro-Manticao Road	60.0	1,367.9	1,234.8
		RS-7	Kauswagan-Munai-Madalum Road	25.0	569.9	514.5
		RS-8	Ganassi-Tubod Road	23.0	-	-
			Sub-Total	**480.6**	**6,011.9**	**5,425.9**
			Total	**1,252.3**	**24,435.0**	**22,023.9**
Region XII	Primary Inter-City Road	PI-1	Davao-Cotabato Road	55.4	1,286.2	1,158.4
		PI-2	Cotabato-Digos Road	58.0	1,295.9	1,167.2
		PI-3	Maramag-Kibawe-Kabacan Road	48.6	1,129.8	1,017.6
		PI-4	Gen. Santos-Cotabato Road	134.6	3,125.6	2,815.2
		PI-5	Davao-Digos Road	39.0	906.1	816.2
			Sub-Total	**335.6**	**7,743.7**	**6,974.6**
	Regionary Primary Road	RP-1	Libungan-Buldon-Matanog Road	17.5	461.5	416.6
		RP-2	Wao-Carmen Road	35.0	923.0	833.2
		RP-3	Kabuntalan-Midsayap Road	15.0	343.5	310.1
		RP-4	Midsayap-Datumang Road	13.1	-	-
		RP-5	Pagalungan-Mamasapano Road	15.0	452.4	412.6
		RP-6	Kidapawan-Ala Road	48.4	953.2	858.5
		RP-7	Buluan-Islan Road	22.7	447.5	403.1
		RP-8	Koronadal-Tacurong-Midsayap Road	36.5	751.5	677.3
		RP-9	Gen. Santos-Glan-Kalipagan Road	51.2	-	-
		RP-10	Gen. Santos-Kiamba-Kalamansig Road	221.7	-	-
		RP-11	Isulan-Palimbang Road	75.1	1,889.9	1,704.5
		RP-12	Cotabato-Upi-Kalamansig Road	39.0	-	-
		RP-13	Magnoy-Lebak Road	49.3	1,404.2	1,267.6
			Sub-Total	**639.5**	**7,626.7**	**6,883.4**
	Regionary Secondary Road	RS-1	Banisilan-Alamada Road	25.0	569.9	514.5
		RS-2	Carmen-Libuagan Road	25.0	569.9	514.5
		RS-3	Matalam-Roxas Road	50.0	1,139.9	1,029.0
		RS-4	Kidapawan-Arakan-Davao Road	75.4	1,966.8	1,784.1
		RS-5	Tulunan-Makilala Road	25.0	475.3	428.0
		RS-6	Koronadal-Columbio-Datu Paglas Road	30.0	570.3	513.6
		RS-7	Padada-Kiblawan-Columbio Road	25.0	776.5	708.1
		RS-8	Lais-Alabel Road	32.6	807.9	733.6
		RS-9	Gen. Santos-Glan-Kalipagan Road	54.3	-	-
		RS-10	Saralla-Lake Sebu-Maitum Road	75.1	1,599.2	1,442.4
		RS-11	Saltan Kudarat-South Cotabato Link Road	90.0	1,711.0	1,540.9
		RSn-1	Tapian-Lebak Road	20.0	579.5	528.9
			Sub-Total	**527.5**	**10,766.3**	**9,737.5**
			Total	**1,502.5**	**26,136.7**	**23,595.6**
			Grand Total	**3,608.0**	**70,276.0**	**63,452.4**

(2) Operating and Maintenance Costs

The operating and maintenance costs of a road are influenced by the type and defect of pavement. And, even if we try to conduct desirable operating and maintenance, we have also restrictions of budget.

The desirable operating and maintenance costs which is estimated by the type and defect of pavement are shown in **Table 13.9.3-3**

Table 13.9.3-3 Estimated O&M Costs by Type and Defect of Pavement (Without Budget Constraint)

Type and Defect of Pavement	O&M Cost (Pesos/km/year)	Remarks
Gravel & Earth	799,403	Durable Period: 5-7years
Concrete Pavement (Good Condition)	374,863	Durable Period: around 20years
Concrete Pavement (Fair Condition)	454,379	
Concrete Pavement (Bad Condition)	561,809	
Concrete Pavement (Very Bad Condition)	775,568	

On the other hand, actually budgeted amount of the O&M cost of the national road of the ARMM area in the 2009 fiscal year was 110,581,600 pesos.

Table 13.9.3-5 Maintenance of Infrastructure under the DPWH-ARMM Maint. & Other Operating Expenses (MOOE) Budget in the GAA, in Php

	2006	**2007**	**2008**	**2009**
Total GAA for ARMM	6,691.2M	8,644.3M	8,331.5M	9,249.0M
Out of which: Total MOOE	180,609,000	210,214,000	215,230,000	221,701,000
Of which: Maintenance of Infrastructure (Net)	171,320,000	188,452,000	188,452,000	188,452,000
1. National Roads	110,581,600	110,581,600	110,581,600	110,581,600
2. Portshore Protection	12,983,300	16,645,400	16,645,400	16,645,400
3. Flood Control	14,900,400	19,103,200	19,103,200	19,103,200
4. Office Buildings	10,616,400	13,610,900	13,610,900	13,610,900
5. School Buildings	20,137,900	25,818,000	25,818,000	25,818,000
6. Water Supply	2,100,400	2,692,000	2,692,000	2,692,000

Source: GAAs for 2006 to 2009; and DPWH-ARMM, October 2008

The unit price of actual operating and maintenance of roads can be obtained by comparing the above-mentioned budgeted amount with estimated O&M costs without the budget constraint of the national roads in ARMM area as shown below.

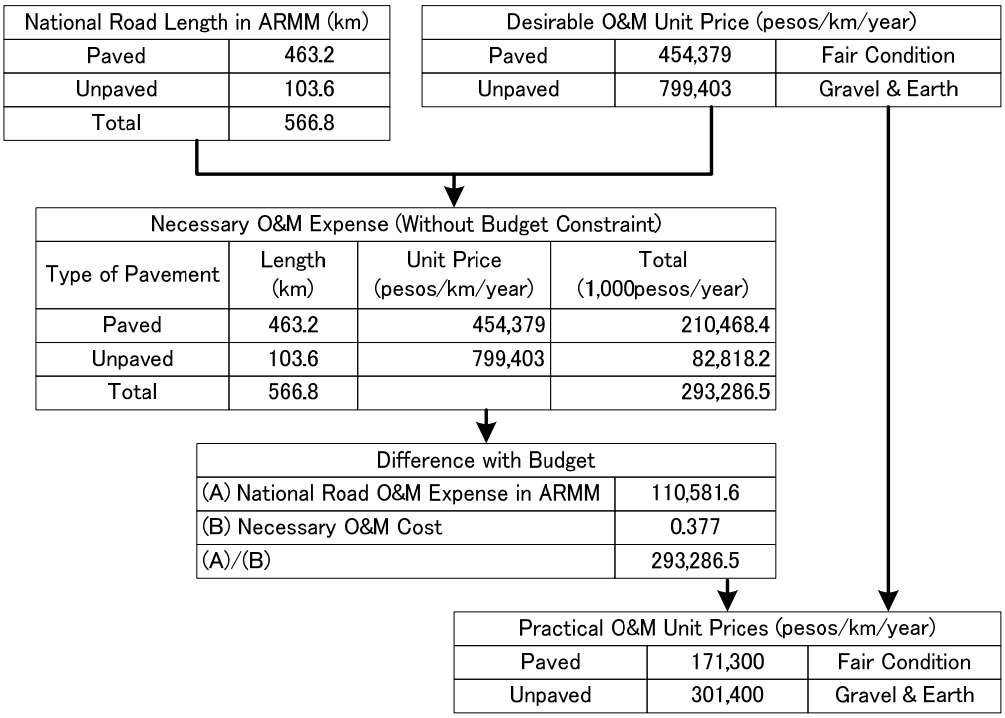


Table 13.9.3-5 and **Figure 13.9.3-2** indicate O&M expense by 2025 in the study area estimated taking account of that practical O&M unit price. Even if road length is extended, annual O&M expense will decrease because the unpaved road's length will go to decrease.

Table 13.9.3-5 Estimation of O&M Expense

Year	Road Length (km)			Operating & Maintenance Expense
	Paved	Unpaved	Total	
2009	2,548.1	1,278.2	3,826.3	821.7
2010	2,568.6	1,269.5	3,838.1	822.6
2011	2,742.9	1,095.2	3,838.1	800.0
2012	2,765.9	1,072.2	3,838.1	797.0
2013	2,802.8	1,035.3	3,838.1	792.2
2014	2,930.7	917.4	3,848.1	778.5
2015	3,043.9	824.2	3,868.1	769.8
2016	3,091.3	801.8	3,893.1	771.2
2017	3,154.4	758.7	3,913.1	769.0
2018	3,154.4	758.7	3,913.1	769.0
2019	3,154.4	758.7	3,913.1	769.0
2020	3,224.2	718.9	3,943.1	769.0
2021	3,324.4	643.7	3,968.1	763.5
2022	3,462.4	535.7	3,998.1	754.6
2023	3,606.1	427.0	4,033.1	746.4
2024	3,808.1	260.0	4,068.1	730.7
2025	4,123.9	44.2	4,168.1	719.7

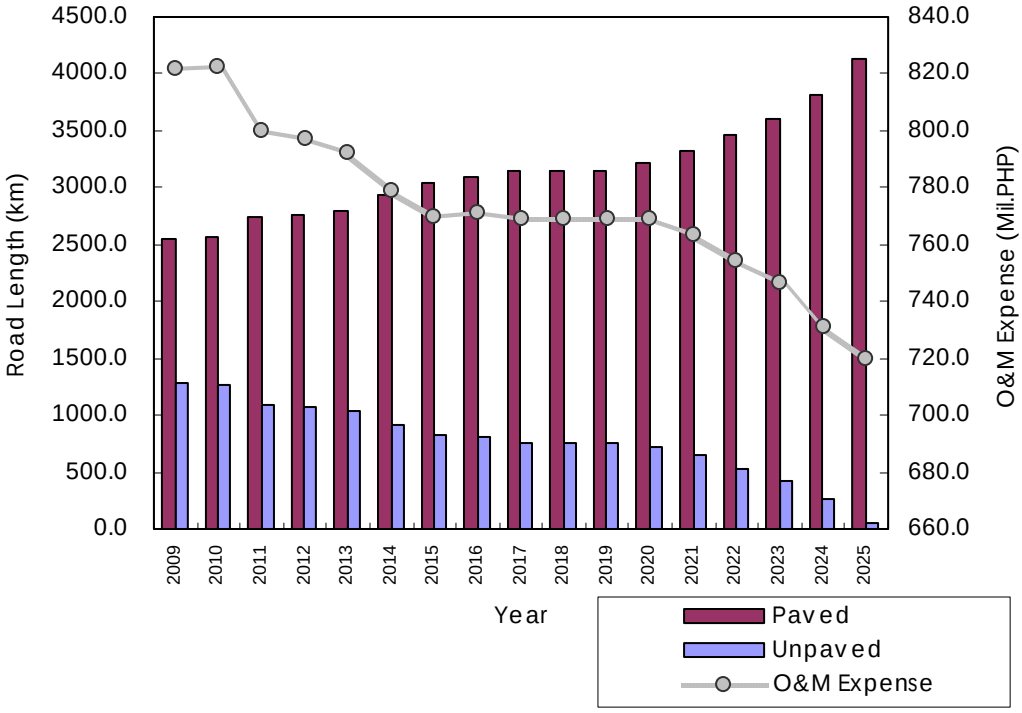


Figure 13.9.3-2 Estimation of O&M Expense

13.9.4 Economic Evaluation

(1) Economic Benefit

The following three items are considered as economic benefits in this M/P.

- Saving in Vehicle Operating Cost (VOC)
- Saving in Travel Time Cost (TTC)
- Saving in O&M Expense

1) VOC Saving

The unit VOC by vehicle type and operating speed calculated in **Section 13.9.2** is multiplied by the estimated traffic volume by section, and then total VOC of the whole road network is computed by summarizing them. Since estimated traffic volume is composed of passenger cars and trucks, unit VOC is also aggregated into these two vehicle types. The passenger car comprises a passenger car, jeepney and small bus. The rigid truck 2AX is adopted as a representative of the trucks as shown below;

Vehicle Type of Unit VOC Calculation	Vehicle Type For Traffic Assignment
1. Motor-Tricycle	
2. Passenger Car	1. Passenger Car
3. Jeepney	
4. Good Utility	2. Truck
5. Small Bus	
6. Rigid Truck 2Axle	

Since the passenger cars include three types of a vehicle (Passenger Car, Jeepney and Small Bus), the unit VOC for the passenger cars was weight-averaged by the ratio of Passenger Car 67.6%, Jeepney 27.4%, and Small Bus 5.0% that was the ratio of vehicle type of the traffic volume survey in the study area (excluded part of the islands). **Table 13.9.4-1** shows the weighted unit VOC by vehicle type.

Table 13.9.4-1 Unit VOC by Vehicle Type as of 2009

(Pesos per veh-km)

Velocity (km/hour)	Passenger Car	Truck
20	10.89	29.46
30	9.06	24.71
40	7.81	21.91
50	7.15	19.35
60	6.84	18.61
70	6.73	18.25
80	6.74	18.08
90	6.82	18.19
100	6.92	18.23
110	7.02	18.23
120	7.10	18.23

A total VOC of the whole road network was calculated with this unit VOC and estimated traffic volume. Then, the benefit of the projects in 2015, 2020, and 2025 was computed by the comparison of "with" case and "without" case. At that time, the correction factor by type of pavement described in **Table 13.9.2-5** was taken into consideration as well as the unit VOC by operating speed. The road network and OD table of a "with" case and "without" case in each target year are shown below.

Table 13.9.4-2 Outline of With and Without Cases

		2015	**2020**	**2025**
With Case	OD	2015OD	2020OD	2025OD
	Network	Proposed Short-term Projects	Proposed Medium-term Projects	Proposed Long-term Projects
Without Case	OD	2015OD	2020OD	2025OD
	Network	Existing Network + Ongoing Projects	Existing Network + Ongoing Projec	Existing Network + Ongoing Projec

(2) Travel Time Saving

According to the DPWH data of the fiscal year 2008, the time value per work hour is 419 pesos among those who are on a passenger car and 105 pesos among the others. From the roadside OD survey result, of the total person trips in the study area, business trips account for 69.6%, commuting to work places and commuting back home 6.5%. By assigning 100% of the time value mentioned above to trips during work hours and 50% to the time spent for commuting, it is reasonable to assume that the average time value during travel comes to 72.9% for the total person trips.

The time value was estimated as shown below from the assumptions above. The reduction of travel time was obtained for each mode from the traffic assignment, and the economic benefit was calculated by multiplying the total reduction by the time value.

Passenger Car 419×0.729×2.75＝840.0 pesos/hour/veh.
Others 105×0.729×8.94＝684.3 pesos/hour/veh.
All Passenger Cars 840.0×0.338＋684.3×0.662＝736.9 pesos/hour/veh.

Where, 419, 105: Unit TTC by vehicle type
2.75, 8.94: Average number of passenger by vehicle type
0.338, 0.662: Vehicle composition by vehicle type

(3) Saving of Operating and Maintenance Expense

The O&M expense of gravel or earth roads is high by about 1.8 times compared with that of concrete pavement. The saving of the O&M expense in the Master Plan is calculated by the reduction amount in the annual O&M expense by paving gravel or earth roads.

The amount of benefits from (1) to (3) mentioned above is arranged and shown in **Table 13.9.4-3**.

Table 13.9.4-3 Amount of Economic Benefits in Each Year

(X 1,000pesos/da y)

	VOC Saving	TTC Saving	O & M Costs Saving	Total
2015	6,060.20	11,232.72	161.82	17,454.74
2020	4,879.12	14,464.11	199.36	19,542.59
2025	15,526.36	24,641.01	439.84	40,607.21

(2) Evaluation Result

Table 13.9.4-4 shows the economic cash flow over the project period for calculating economic internal rate of return (EIRR). The overall EIRR was estimated at 24.2%. According to NEDA's criteria, the threshold value to judge the economic feasibility of a project is 15% in the Philippines. Thus, this Master Plan is concluded to be highly feasible from the economic point of view.

Table 13.9.4-4 Cash Flow of Economic Cost and Benefit

(Mil. PHP)

	Cost			Benefit				Net Cash Flow
	Construction	Maintenance	Total	VOC	TTC	Reduction of Maintenance Cost	Total	
2009	9.0	821.7	830.7	0.0	0.0	0.0	0.0	-830.7
2010	167.6	822.6	990.2	0.0	0.0	1.1	1.1	-989.1
2011	640.1	800.0	1,440.1	0.0	0.0	23.8	23.8	-1,416.3
2012	2,204.8	797.0	3,001.8	553.0	1,025.0	26.8	1,604.8	-1,397.0
2013	3,263.1	792.2	4,055.2	1,106.0	2,050.0	31.6	3,187.6	-867.7
2014	5,559.5	778.5	6,338.0	1,659.0	3,075.0	46.9	4,780.9	-1,557.1
2015	4,556.6	769.8	5,326.5	2,212.0	4,099.9	59.1	6,371.0	1,044.5
2016	5,831.9	771.2	6,603.1	2,125.8	4,335.8	62.0	6,523.6	-79.5
2017	4,154.2	769.0	4,923.2	2,039.5	4,571.7	67.6	6,678.8	1,755.6
2018	3,559.0	769.0	4,328.0	1,953.3	4,807.6	67.6	6,828.5	2,500.5
2019	4,010.8	769.0	4,779.9	1,867.1	5,043.5	67.6	6,978.2	2,198.3
2020	4,095.6	769.0	4,864.6	1,780.9	5,279.4	72.8	7,133.0	2,268.5
2021	6,316.4	763.5	7,079.8	2,558.1	6,022.3	82.5	8,663.0	1,583.1
2022	4,235.0	754.6	4,989.6	3,335.4	6,765.2	96.6	10,197.2	5,207.6
2023	6,690.3	746.4	7,436.7	4,112.6	7,508.1	110.7	11,731.5	4,294.8
2024	5,639.8	730.7	6,370.5	4,889.9	8,251.1	132.5	13,273.4	6,902.9
2025	2,518.7	719.7	3,238.5	5,667.1	8,994.0	160.5	14,821.6	11,583.2
2026	0.0	719.7	719.7	5,854.1	9,290.8	160.5	15,305.4	14,585.7
2027	0.0	719.7	719.7	6,047.3	9,597.4	160.5	15,805.2	15,085.5
2028	0.0	719.7	719.7	6,246.9	9,914.1	160.5	16,321.5	15,601.8
2029	0.0	719.7	719.7	6,453.0	10,241.2	160.5	16,854.8	16,135.1
2030	-17,223.3	719.7	-16,503.6	6,666.0	10,579.2	160.5	17,405.7	33,909.3
Total	46,229.1	16,742.7	62,971.8	67,127.0	121,451.3	1,912.5	190,490.8	127,519.0

EIRR	**24.2%**
NPV(R=15%)	**7,026.5**
B/C(R=15%)	**1.34**

(3) Sensitivity Analysis

Sensitivity analyses were conducted to check the impact of changes in the input conditions of this economic evaluation. The analyses were made concerning the following two conditions:

a) Project cost is increased by 10% and 20%.
b) Project benefit is lessened by 10% and 20%.

Table 13.9.4-5 presents the results of the above sensitivity tests. The project will remain feasible even under the condition where the estimated project cost increases by 20% or the project benefit is lessened by 20%. The project will become unfeasible only when these conditions happen to occur simultaneous. For example, the case of 20% benefit-down and 10% cost-up will make the project unfeasible. It seems rather sensitive to the benefit. However, besides the benefits accounted in this section, there are undoubtedly other significant benefits (i.e., rise of land value, improvement of accessibility to public facilities, development of reliable road network against a natural disaster, impact on commodity prices and etc). That is, the sensitivity analysis proves that the feasibility of the Project is quite stable against the project cost and the project benefit.

Table 13.9.4-5 Sensitivity Analysis

EIRR (%)

		Change in Benefit		
		Base Case	-10%	-20%
Change in Cost	Base Case	24.2	20.5	16.9
	+10%	21.7	18.3	14.9
	+20%	19.4	16.3	13.2

NPV (Mil.PHP)

		Change in Benefit		
		Base Case	-10%	-20%
Change in Cost	Base Case	7,026.5	4,260.1	1,493.7
	+10%	5,462.7	2,696.3	-70.1
	+20%	3,898.9	1,132.5	-1,633.9

B/C

		Change in Benefit		
		Base Case	-10%	-20%
Change in Cost	Base Case	1.34	1.21	1.07
	+10%	1.25	1.12	1.00
	+20%	1.16	1.05	0.93