CHAPTER 7
PROJECT COST ESTIMATE

7.1 GENERAL

The Project Cost consisting of Civil Work Cost, ROW Acquisition Cost, Administration Cost, Consultancy Cost (D/D, C/S, and etc.).

The Project Costs of the following two (2) options were estimated.

Option-1 Stage Construction
- Initial Stage: 2-lane Construction
- Widening 4-lane Stage

Option-2 Full Development (4-lane from the beginning)

7.2 CIVIL WORK COST

1) Unit Prices of Construction Items

Unit price analysis of major construction items was undertaken. Major unit prices adopted by the study were compared with other projects/studies and shown in **Table 7.2-1.**

2) Civil Work Cost

Civil work cost for Option-1: Stage Development is shown in **Table 7.2-2.** Civil work cost for Option-2: Full Development is shown in **Table 7.2-3**. Major quantity of Option-2 by contract package is shown it Table 7.2-4**.**

Currency component by foreign, local and tax by construction item was determined by referencing previous studies and projects.

TABLE 7.2-1 COMPARISON OF UNIT PRICE (1/2)

PAY ITEM NO.	DESCRIPTION	UNIT	Mega Manila CLEX Unit Cost Year 2011	Year 2009 FS CLEX Unit Cost	Tarlac-La Union Toll Expressway Unit Cost Year 2007	Plaridel Bypass Road Unit Cost Year 2010	C2 Project Year 2010
2.0	**MAIN HIGHWAY**						
C	**EARTHWORKS**						
100(1)	Clearing and Grubbing	ha	90,846.53	99,968.19	92,756.16	105,175.04	
101(1)a	Removal of Structure and Obstruction	cu.m	1,679.33				
101(1)b	Removal of Structure and Obstruction (Masonry)	sq.m	503.80				
101(1)d	Removal of Structure and Obstruction (Concrete Pavement)	sq.m	245.78			292.12	
101(2)	Removal of Facilities (Tel, Electric, Billboads,Traffic sign et	ea	5,171.31				
102(1)	Unsuitable Excavation	cu.m.	219.50	219.50	169.31	213.90	467.60
103(1)	Structure Excavation, Common Material	cu.m.	586.73			450.15	705.92
103(1)	Structure Excavation, Common Material, Below O.W.L	cu.m.	616.28	581.60		487.51	
103(3)	Fundation Back fill	cu.m.	565.00	361.55			662.35
104(1)e	Embankment from Borrow Material	cu.m.	943.76	1,099.45	546.90	1,113.85	
105(1)	Subgrade Preparation	l.s.	37.18		19.97	32.81	
	SUB-TOTAL (PART C)						
D	**SUBBASE AND BASE COURSE**						
200	Aggregate Subbase Course	cu.m.	879.97	1,010.89	883.00	905.29	688.84
202	Crushed Aggregate Base Course	cu.m.	1,177.00	1,263.62	1,285.49		771.85
206	Cement Treated Base Course	cu.m.	2,333.70	2,333.70		2,649.58	
	SUB-TOTAL (PART D)						
E	**SURFACE COURSES**						
301(1)	Bituminous Prime Coat, MC-701 (0.45 L/m2)	tonne	67,331.52	51,140.09	50,943.45		
302(2)	Bituminous Tack Coat, Emulsified Asphalt, SS-1 (1.0 L/m2)	tonne	67,062.72	50,470.36	43,589.13		
310 (1)	Bituminous Concrete Binder Course, Hot Laid (t=50mm)	sq.m	906.65	870.80	397.84		
310 (2)	Bituminous Concrete Surface Course, Hot Laid (t=50mm)	sq.m	924.31	874.57	441.04		
311	Portland Cement Concrete Pavement t=300 mm	sq.m	2,887.66		2,048.79	1,750.65	2,887.60
	SUB-TOTAL (PART E)						
F	**BRIDGES**						
400(17)b	Concrete Piles cast in Drilled Holes (1200mm) excluding Re	l.m.	19,980.16				
400(17)c	Concrete Piles cast in Drilled Holes (1500mm) excluding Re	l.m.	27,088.40				
400(17)g	Concrete Piles cast in Drilled Holes (1800mm) excluding Re	l.m.	34,729.30				
400(17)h	Concrete Piles cast in Drilled Holes (2000mm) excluding Re	l.m.	41,917.69				
401(1)	Railing, (Concrete Bridge Railing)	l.m.	5,006.92	5,447.87	5,442.02		5,488.02
404 (1)	Reinforcing Steel, Grade 60 (Bridge)	kg	63.90	57.78	68.90	64.63	53.13
404 (2)	Reinforcing Steel, Grade 40	kg	60.28	76.95	68.76	63.22	
405(1)	Lean Concrete, 17Mpa	cu.m.	4,073.75			5,097.36	3,291.96
405(1)d	Structural Concrete Class AA 28Mpa for Pile Cap	cu.m.	5,623.00				
405(1)d	Structural Concrete Class AA 28Mpa for Column	cu.m.	11,663.24				
405(1)e	Structural Concrete Class AA 28Mpa for Coping	cu.m.	14,057.94				
405(1)f	Structural Concrete Class AA 28Mpa for Diaphragm	cu.m.	18,354.30				
405(1)g	Structural Concrete Class AA 28Mpa for Deck Slab	cu.m.	14,564.68		7,770.61		
405(1)h	Structural Concrete Class P 38Mpa for Coping	cu.m.	13,301.58				
405(1)i	Structural Concrete Class P 38Mpa for Column	cu.m.	10,862.72				
405(1)j	Structural Concrete Class AA 21Mpa for Parapet, Curb, Mec	cu.m.	8,425.88	9,822.57		9,362.44	8,750.49
405(1)k	Non Shrink Grout 41Mpa including wiremesh for Girder Ris	cu.m.	80,462.16				
406(1)a	PSC Member (AASHTO Girder Type V) L = 26m	each	1,097,554.21				
406(1)b	PSC Member (AASHTO Girder Type V) L = 30m	each	1,121,873.50	1,226,072.23		1,083,118.77	
406(1)c	PSC Member (AASHTO Girder Type V) L = 35 m	each	1,162,519.33			1,463,240.93	1,036,139.94
406(1)d	PSC Member (AASHTO Girder Type V) L = 40 m	each		1,563,099.10		1,688,230.06	1,281,500.37
406(3)	Prestressing Steel	kg	152.90				

TABLE 7.2-1 COMPARISON OF UNIT PRICE (2/2)

408	Structural Steel	kg	183.23				
412(1)b	Elastomeric Bearing Pad (606 x 306 x 60mm)	pcs	6,985.16			6,698.16	
SPL 414(c)	Steel Girder Shoe Type F	each	110,377.79				
SPL 414(d)	Ruber Filler (400 x 150 x 50mm)	each	865.83				
SPL 414(e)	Hard Rubber Filler & Restrainer Bolts Dia 30mm	sets	1,573.81				
SPL 416(1)a	Pile Dynamic Analysis	each	719,017.58				610,081.85
SPL 416(1)b	Pile Integrity Test	each	43,667.04	47,363.27			57,206.74
SPL 417(1)b	Cast Iron Deck Drain	each	19,679.57				
SPL 417(2)a	Collector Pipe (150mm dia PVC)	l.m.	791.70				
SPL 417(2)b	Collector Pipe (200mm dia PVC)	l.m.	1,153.20				1,141.06
SPL 418(a)	Expansion Joint, Type A (M80 Multiplex)	l.m.	29,418.63			28,025.63	
SPL 418(b)	Expansion Joint, (SR 2.5A Waboflex)	l.m.	1,528.83				
SPL 414	Metal Decking (8 mm thk)	sq.m.	2,428.25				
SPL 420	Cofferdam	l.s.	100,000,000.00	257,225,375.00			
	SUB-TOTAL (PART F)						
G	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**						
500(1)a	RCPC, 610 mm dia.	l.m.	3,082.45				
500(1)b	RCPC, 910 mm dia.	l.m.	4,250.84	4,250.84			3,643.47
500(1)c	RCPC, 1220 mm dia.	l.m.	7,005.56	7,005.56			8,062.48
500(1)d	RCBC, 1.5m x 1.5m	l.m.	19,053.05	19,053.05			
500(1)e	RCBC, 2 m x 2 m	l.m.	30,484.87				
500(1)f	RCBC, 3 m x 3 m	l.m.	51,210.80	51,210.80	50,334.43		
502(1)	Manholes	each	28,779.72				29,094.72
502(3)	Catch Basin Manhole Drop Inlet	each	32,233.28				
504(5)a	Grouted Riprap Class A (Slope Protection)	cu.m	3,946.61	3,946.61	2,659.60	3,656.07	
504(5)b	Grouted Riprap Class A (Side Ditch)	cu.m	3,794.21	3,794.21		3,820.74	
SPL 515	Mechanically Stabilized Earth (MSE) Wall	sq.m.	10,174.75	6,779.31			
600a	Rolled Gutter (Median) 600mm x 200mm	l.m.	1,048.33				
600(1) b	Asphalt Curb Type B3	l.m.	360.74				
603(3)a	Single Metal Beam Guardrail (w/Post)	l.m.	3,796.71	3,673.98	2,587.23	2,701.72	
603(3)b	Double Metal Beam Guardrail (w/Post)	l.m.	6,597.25	6,635.04			
603(3)c	Lane Divider K-650-GS	l.m.	6,164.87				
604(1)	Fancing (Barbed Wire)	l.m.	790.93				
604(2)	Fancing (Chain Link)	l.m.	1,400.83		3,125.00		
610	Sodding	sq.m.	726.35	726.35			
	SUB-TOTAL (PART G)						
H	**MISCELLANEOUS STRUCTURES**						
600(1)	Concrete Curb	lm	1,333.21				
605(1)a	Warning Signs	each	14,173.35		7,641.56	11,352.69	
605(2)	Regulatory Signs	each	14,034.06		9,835.16	11,352.69	
605(3)a	Informatory Signs (3.50m x 2.00m)	each	285,563.50				
605(3)b	Informatory Signs (4.50m x 2.50m)	each	388,903.66				
612(1)	Reflectorized Thermoplastic Pavement Markings	sq.m.	1,087.90		1,084.34	942.82	1,181.58
612(2)	Reflectorized Studs 100x400x20	each	752.32		1,264.03	1,646.64	
613	Seeding with Coconet	sq.m.	166.01		482.50	265.83	
SPL 620	Concrete Barrier (New Jersey Type)	lm	4,660.55				
SPL	Installation of Fiber Optic	lm	6,881.28				
SPL	Noise Barrier	lm	48,031.19				
SPL 1110	Toll Road Linghting	each	158,671.93				
4.0	**TOLL PLAZA AND SERVICE AREA**						
SPL 801	Truck Weigning Station	set	3,564,478.23				
SPL 1041(3)a	Toll Island,	each	138,225.73		244,743.42		
SPL 1041(4)	Crash Attenuators,	set	45,779.29		25,618.17		
SPL 1000	Toll Booth (Type 1)	each	387,204.43		358,635.27		
SPL 1010	Toll Booth (Maxi Type 2)	each	841,889.37				
SPL 1020	Toll Plaza	sq.m.	21,755.00		20,000.00		
SPL 1030	Toll Collection System	l.s.	40,000,000.00		39,657,500.00		
SPL 1040	Traffic Control System	l.s.	350,000,000.00	392,991,218.00			
SPL 1050	Toll Plaza Lighting System	each	307,858.73				
SPL 1120	Service Area incruding Lighting System and Toilet	l.s.	20,000,000.00	4,400,000.00			
SPL 1130	Toll Operation Building	l.s.	100,000,000.00				
SPL 1140	Toll House (4 unit)	Unit	4,500,000.00				

TABLE 7.2-2 CIVIL WORK COST OF OPTION-1 (1/3)

Unit: Php

PAY ITEM NO.	DESCRIPTION	QUANTITY	UNIT	Unit Cost	Civil Work Cost	COST COMPONENT			Remarks
						Foreign Currency (FC)	Local Currency (LC)	TAXES	
1.0	GENERAL REQUIREMENTS								
A	FACILITIES FOR THE ENGINEER	1.00	ls.	75,177,654.05	75,177,654.05	30,205,307.43	35,798,882.88	9,173,463.74	
B	OTHER GENERAL REQUIREMENTS								
SPL B.2.1	Construction Health and Safety	1.00	ls.	2,177,280.00	2,177,280.00	777,600.00	1,131,054.55	268,625.45	
SPL B.2.2	Mobilization / Demobilization (1.0% of Civil Works)	1.00	ls.	117,355,215.27	117,355,215.27	41,912,576.88	60,963,748.19	14,478,890.20	
SPL B.3.1	Environmental Monitoring Action Plan	1.00	ls.	5,000,000.00	5,000,000.00	1,785,714.29	2,597,402.60	616,883.12	
SPL 2000	Traffic Management During Construction	1.00	ls.	29,084,160.00	29,084,160.00	10,387,200.00	15,108,654.55	3,588,305.45	
SPL 3000	Day Work	1.00	PS.	10,000,000.00	10,000,000.00	3,571,428.57	5,194,805.19	1,233,766.23	
	SUB-TOTAL (PART B)				163,616,655.27	58,434,519.74	84,995,665.08	20,186,470.46	
	SUB-TOTAL GENERAL REQUIREMENTS				238,794,309.32	88,639,827.17	120,794,547.96	29,359,934.19	
2.0	MAIN HIGHWAY								
C	EARTHWORKS								
100(1)	Clearing and Grubbing	195.00	ha	90,846.53	17,715,073.35	6,326,811.91	9,202,635.51	2,185,625.93	
101(1)a	Removal of Structure and Obstruction (Fence)	440.00	lm	1,679.33	738,906.67	263,895.24	383,847.62	91,163.81	
101(1)d	Removal of Structure and Obstruction (Shoulder Pavement)	2,875.00	sq.m	245.78	706,617.50	252,363.39	367,074.03	87,180.08	
102(1)	Unsuitable Excavation	817,506.60	cu.m.	219.50	179,442,698.70	64,086,678.11	93,216,986.34	22,139,034.26	
103(1)	Structure Excavation, Common Material	46,475.00	cu.m.	586.73	27,268,276.75	9,738,670.27	14,165,338.57	3,364,267.91	
103(1)	Structure Excavation, Common Material, Below O.W.L	33,348.80	cu.m.	616.28	20,552,198.46	7,340,070.88	10,676,466.73	2,535,660.85	
103(3)	Fundation Back fill	43,302.30	cu.m.	565.00	24,465,799.50	8,737,785.54	12,709,506.23	3,018,507.73	
104(1)e	Embankment from Borrow Material	4,221,168.12	cu.m.	943.76	3,983,769,624.93	1,422,774,866.05	2,069,490,714.25	491,504,044.63	
105(1)	Subgrade Preparation	-	sq.m	37.18					
	SUB-TOTAL (PART C)				4,254,659,195.86	1,519,521,141.38	2,210,212,569.28	524,925,485.20	
D	SUBBASE AND BASE COURSE								
200	Aggregate Subbase Course	382,816.89	cu.m.	879.97	336,867,378.69	120,309,778.10	174,996,040.88	41,561,559.71	
202	Crushed Aggregate Base Course	183,036.31	cu.m.	1,177.00	215,433,736.87	76,940,620.31	111,913,629.54	26,579,487.02	
206	Cement Treated Base Course	102,557.70	cu.m.	2,333.70	239,338,904.49	85,478,180.18	124,331,898.44	29,528,825.88	
	SUB-TOTAL (PART D)				791,640,020.05	282,728,578.59	411,241,568.86	97,669,872.60	
E	SURFACE COURSES								
301(1)	Bituminous Prime Coat, MC-701 (1.0 L/m2)	2,285.70	tonne	67,331.52	153,899,655.26	54,964,162.59	79,947,872.86	18,987,619.81	
302(2)	Bituminous Tack Coat, Emulsified Asphalt, SS-1 (0.45 L/m2)	271.39	tonne	67,062.72	18,200,151.58	6,500,054.14	9,454,624.20	2,245,473.25	
310 (1)	Bituminous Concrete Binder Course, Hot Laid (t=50mm)	713,526.97	sq.m	906.65	646,919,227.35	231,042,581.20	336,061,936.29	79,814,709.87	
310 (2)	Bituminous Concrete Surface Course, Hot Laid (t=50mm)	607,301.73	sq.m	924.31	561,335,062.06	200,476,807.88	291,602,629.64	69,255,624.54	
311	Portland Cement Concrete Pavement t=300 mm	5,900.00	sq.m	2,887.66	17,037,194.00	6,084,712.14	8,850,490.39	2,101,991.47	
	SUB-TOTAL (PART E)				1,397,391,290.25	499,068,317.95	725,917,553.38	172,405,418.93	

TABLE 7.2-2 CIVIL WORK COST OF OPTION-1 (2/3)

Unit: Php

PAY ITEM NO.	DESCRIPTION	QUANTITY	UNIT	Unit Cost	Civil Work Cost	COST COMPONENT			Remarks
						Foreign Currency (FC)	Local Currency (LC)	TAXES	
F	BRIDGE STRUCTURE CONSTRUCTION								
400(17)a	Concrete Piles cast in Drilled Holes (1200mm) excluding Re-Bar	9,306.00	l.m.	19,980.16	185,935,368.96	66,405,488.91	96,589,802.06	22,940,077.99	
400(17)b	Concrete Piles cast in Drilled Holes (2000mm) excluding Re-Bar	45.00	l.m.	41,917.69	1,886,296.05	673,677.16	979,894.05	232,724.84	
401(1)	Railing, (Concrete Bridge Railing)	7,354.00	l.m.	5,006.92	36,820,889.68	13,150,317.74	19,127,734.90	4,542,837.04	
404 (1)	Reinforcing Steel, Grade 60 (Bridge)	17,779,388.60	kg	63.90	1,136,102,931.54	405,751,046.98	590,183,341.06	140,168,543.50	
405(1)	Lean Concrete, 17Mpa	2,066.30	cu.m.	4,073.75	8,417,589.63	3,006,282.01	4,372,773.83	1,038,533.78	
405(1)a	Structural Concrete Class AA 28Mpa for Pile Cap	6,537.60	cu.m.	5,623.00	36,760,924.80	13,128,901.71	19,096,584.31	4,535,438.77	
405(1)b	Structural Concrete Class AA 28Mpa for Column	2,628.10	cu.m.	11,663.24	30,652,161.04	10,947,200.37	15,923,200.54	3,781,760.13	
405(1)c	Structural Concrete Class AA 28Mpa for Coping	5,977.90	cu.m.	14,057.94	84,036,959.53	30,013,199.83	43,655,563.39	10,368,196.31	
405(1)d	Structural Concrete Class AA 28Mpa for Diaphragm	1,022.10	cu.m.	18,354.30	18,759,930.03	6,699,975.01	9,745,418.20	2,314,536.82	
405(1)e	Structural Concrete Class AA 28Mpa for Deck Slab	9,518.90	cu.m.	14,564.68	138,639,732.45	49,514,190.16	72,020,640.23	17,104,902.06	
405(1)f	Structural Concrete Class AA 28Mpa for Abutment, Wingwall	7,679.90	cu.m.	9,627.72	73,939,926.83	26,407,116.72	38,410,351.60	9,122,458.50	
405(1)g	Structural Concrete Class AA 28Mpa for Approach Slab	756.00	cu.m.	7,643.32	5,778,349.92	2,063,696.40	3,001,740.22	712,913.30	
405(1)h	Structural Concrete Class AA 28Mpa for Girder	561.60	cu.m.	11,941.37	6,706,273.39	2,395,097.64	3,483,778.39	827,397.37	
405(1)i	Structural Concrete Class AA 21Mpa for Parapet, Curb, Median	1,094.20	cu.m.	8,425.88	9,219,597.90	3,292,713.53	4,789,401.50	1,137,482.86	
405(1)j	Structural Concrete Class AA 28Mpa for Box Culvert	75,155.80	cu.m.	8,480.81	637,382,414.93	227,636,576.76	331,107,748.02	78,638,090.15	
405(1)k	Non Shrink Grout 41Mpa including wiremesh for Girder Riser	34.30	cu.m.	80,462.16	2,759,852.09	985,661.46	1,433,689.40	340,501.23	
406(1)a	PSC Member (AASHTO Girder Type V) L = 23.5m	5.00	each	910,352.00	4,551,760.00	1,625,628.57	2,364,550.65	561,580.78	
406(1)b	PSC Member (AASHTO Girder Type V) L = 28.5m	10.00	each	1,086,062.50	10,860,625.00	3,878,794.64	5,641,883.12	1,339,947.24	
406(1)c	PSC Member (AASHTO Girder Type V) L = 30m	26.00	each	1,121,873.50	29,168,711.00	10,417,396.79	15,152,577.14	3,598,737.07	
406(1)d	PSC Member (AASHTO Girder Type V) L = 33.5 m	356.00	each	1,126,773.50	401,131,366.00	143,261,202.14	208,379,930.39	49,490,233.47	
406(1)e	PSC Member (AASHTO Girder Type V) L = 35 m	20.00	each	1,162,519.33	23,250,386.60	8,303,709.50	12,078,122.91	2,868,554.19	
412(1)b	Elastomeric Bearing Pad (606 x 306 x 60mm)	874.00	pcs	6,985.16	6,105,029.84	2,180,367.80	3,171,444.07	753,217.97	
SPL 414(d)	Ruber Filler (400 x 150 x 50mm)	1,748.00	each	865.83	1,513,470.84	540,525.30	786,218.62	186,726.92	
SPL 414(e)	Hard Rubber Filler & Restrainer Bolts Dia 30mm	389.00	sets	1,573.81	612,212.09	218,647.18	318,032.25	75,532.66	
SPL 416(1)a	Pile Dynamic Analysis	28.00	each	719,017.58	20,132,492.24	7,190,175.80	10,458,437.53	2,483,878.91	
SPL 416(1)b	Pile Integrity Test	536.00	each	43,667.04	23,405,533.44	8,359,119.09	12,158,718.67	2,887,695.68	
SPL 417(1)b	Cast Iron Deck Drain	788.00	each	19,679.57	15,507,501.16	5,538,393.27	8,055,844.76	1,913,263.13	
SPL 417(2)a	Collector Pipe (150mm dia PVC)	669.50	l.m.	791.70	530,043.15	189,301.15	275,347.09	65,394.93	
SPL 417(2)b	Collector Pipe (200mm dia PVC)	4,919.00	l.m.	1,153.20	5,672,590.80	2,025,925.29	2,946,800.42	699,865.10	
SPL 418(a)	Expansion Joint, Type A (M80 Multiplex)	474.00	l.m.	29,418.63	13,944,430.62	4,980,153.79	7,243,860.06	1,720,416.76	
SPL 420	Cofferdam	1.00	PS	200,000,000.00	200,000,000.00	71,428,571.43	103,896,103.90	24,675,324.68	
	SUB-TOTAL (PART F)				**3,170,185,351.54**	**1,132,209,054.12**	**1,646,849,533.27**	**391,126,764.15**	
G	DRAINAGE AND SLOPE PROTECTION STRUCTURES								
500(1)a	RCPC, 610 mm dia.	6,608.00	l.m.	3,082.45	20,368,804.49	7,274,573.03	10,581,197.14	2,513,034.32	
500(1)c	RCPC, 1220 mm dia.	9,120.00	l.m.	7,005.56	63,890,704.92	22,818,108.90	33,189,976.58	7,882,619.44	
502(1)	Manholes	315.00	each	28,779.72	9,065,611.80	3,237,718.50	4,709,408.73	1,118,484.57	
504(5)a	Grouted Riprap Class A (Slope Protection)	27,691.00	cu.m	3,946.61	109,285,577.51	39,030,563.40	56,771,728.58	13,483,285.54	
504(5)b	Grouted Riprap Class A (Side Ditch)	56,613.00	cu.m	3,794.21	214,801,610.73	76,714,860.98	111,585,252.33	26,501,497.43	
600a	Rolled Gutter (Median) 600mm x 200mm	15,732.00	l.m.	1,048.33	16,492,327.56	5,890,116.99	8,567,442.89	2,034,767.69	
600(1) b	Asphalt Curb Type B3	64,423.00	l.m.	360.74	23,239,953.02	8,299,983.22	12,072,702.87	2,867,266.93	
603(3)a	Single Metal Beam Guardrail (w/Post)	64,423.00	l.m.	3,796.71	244,595,448.33	87,355,517.26	127,062,570.56	30,177,360.51	
603(3)b	Double Metal Beam Guardrail (w/Post)	28,800.00	l.m.	6,597.25	190,000,800.00	67,857,428.57	98,701,714.29	23,441,657.14	

TABLE 7.2-2 CIVIL WORK COST OF OPTION-1 (3/3)

Unit: Php

PAY ITEM NO.	DESCRIPTION	QUANTITY	UNIT	Unit Cost	Civil Work Cost	COST COMPONENT			Remarks
						Foreign Currency (FC)	Local Currency (LC)	TAXES	
603(3)c	Lane Divider K-650-GS	-	l.m.	6,164.87	-	-	-	-	
604(2)	Fancing (Chain Link)	64,735.00	l.m.	1,400.83	90,682,730.05	32,386,689.30	47,107,911.71	11,188,129.03	
610	Sodding	-	sq.m.	726.35	-	-	-	-	
	SUB-TOTAL (PART G)				**982,423,568.41**	**350,865,560.15**	**510,349,905.67**	**121,208,102.60**	
H	**MISCELLANEOUS STRUCTURES**								
605(1)a	Warning Signs	84.00	each	14,173.35	1,190,561.40	425,200.50	618,473.45	146,887.45	
605(2)	Regulatory Signs	148.00	each	14,034.06	2,077,040.88	741,800.31	1,078,982.28	256,258.29	
605(3)a	Informatory Signs (3.50m x 2.00m)	45.00	each	285,563.50	12,850,357.50	4,589,413.39	6,675,510.39	1,585,433.72	
605(3)b	Informatory Signs (4.50m x 2.50m)	10.00	each	388,903.66	3,889,036.60	1,388,941.64	2,020,278.75	479,816.20	
612(1)	Reflectorized Thermoplastic Pavement Markings	47,079.00	sq.m.	1,087.90	51,217,244.10	18,291,872.89	26,606,360.57	6,319,010.64	
612(2)	Reflectorized Studs 100x400x20	1,406.00	each	752.32	1,057,761.92	377,772.11	549,486.71	130,503.09	
613	Seeding with Coconet	757,353.78	sq.m.	166.01	125,728,301.02	44,902,964.65	65,313,403.13	15,511,933.24	
SPL	Installation of Fiber Optic	30,420.00	lm	6,881.28	209,328,678.84	74,760,242.44	108,742,170.82	25,826,265.57	
SPL 1110	Toll Road Linghting	422.00	each	158,671.93	66,959,554.46	23,914,126.59	34,784,184.14	8,261,243.73	
SPL200	Relocation of High-tension Electric Cable and Tower	1.00	PS	50,000,000.00	50,000,000.00	17,857,142.86	25,974,025.97	6,168,831.17	
	SUB-TOTAL (PART H)				**524,298,536.71**	**187,249,477.40**	**272,362,876.21**	**64,686,183.10**	
	SUB-TOTAL MAIN HIGHWAY				**11,120,597,962.83**	**3,971,642,129.58**	**5,776,934,006.67**	**1,372,021,826.58**	
3.0	**TOLL PLAZA AND SERVICE AREA**								
SPL 801	Truck Weigning Station	4.00	set	3,564,478.23	14,257,912.92	5,092,111.76	7,406,708.01	1,759,093.15	
SPL 1041(3)a	Toll Island,	23.00	each	138,225.73	3,179,191.70	1,135,425.61	1,651,528.16	392,237.94	
SPL 1041(4)	Crash Attenuators,	23.00	set	45,779.29	1,052,923.56	376,044.13	546,973.28	129,906.15	
SPL 1000	Toll Booth (Type 1)	15.00	each	387,204.43	5,808,066.45	2,074,309.45	3,017,177.38	716,579.63	
SPL 1010	Toll Booth (Maxi Type 2)	8.00	each	841,889.37	6,735,114.96	2,405,398.20	3,498,761.02	830,955.74	
SPL 1020	Toll Plaza	1,833.22	sq.m.	21,755.00	39,881,701.10	14,243,464.68	20,717,766.81	4,920,469.62	
SPL 1030	Toll Collection System	1.00	l.s.	40,000,000.00	40,000,000.00	14,285,714.29	20,779,220.78	4,935,064.94	
SPL 1040	Traffic Control System	1.00	l.s.	350,000,000.00	350,000,000.00	125,000,000.00	181,818,181.82	43,181,818.18	
SPL 1050	Toll Plaza Lighting System	52.00	each	307,858.73	16,008,653.96	5,717,376.41	8,316,183.88	1,975,093.67	
SPL 1120	Service Area incruding Lighting System and Toilet	1.00	l.s.	20,000,000.00	20,000,000.00	7,142,857.14	10,389,610.39	2,467,532.47	
SPL 1130	Toll Operation Building	1.00	l.s.	100,000,000.00	100,000,000.00	35,714,285.71	51,948,051.95	12,337,662.34	
SPL 1140	Toll House (4 unit)	4.00	Unit	4,500,000.00	18,000,000.00	6,428,571.43	9,350,649.35	2,220,779.22	
	SUB-TOTAL TOLL PLAZA				**614,923,564.65**	**219,615,558.81**	**319,440,812.81**	**75,867,193.04**	
	TOTAL				**11,974,315,836.81**	**4,279,897,515.56**	**6,217,169,367.43**	**1,477,248,953.82**	

TABLEs 7.2-3 CIVIL WORK COST BY CONTRACT PACKAGE: OPTION-2

Unit: Million Pesos at 2011 Price

		Package 1				Package 2				Total			
		Foreign Cost	Local Cost	Tax	Total	Foreign Cost	Local Cost	Tax	Total	Foreign Cost	Local Cost	Tax	Total
A	Facilities for Engineer	15.10	17.90	4.59	37.59	15.10	17.90	4.59	37.59	30.21	35.80	9.17	75.18
B	Other General Requirements	27.42	39.88	9.47	76.77	31.02	45.12	10.71	86.85	58.43	85.00	20.19	163.62
C	Earthworks	627.68	912.99	216.83	1,757.50	891.84	1,297.22	308.09	2,497.16	1,519.52	2,210.21	524.93	4,254.66
D	Subbase and Base Course	109.87	159.82	37.96	307.65	172.86	251.43	59.71	483.99	282.73	411.24	97.67	791.64
E	Surface Course	178.15	259.13	61.54	498.82	320.92	466.79	110.86	898.57	499.07	725.92	172.41	1,397.39
F	Bridge Structure Construction	788.75	1,147.27	272.48	2,208.50	343.46	499.58	118.65	961.69	1,132.21	1,646.85	391.13	3,170.19
G	Drainage and Slope Protection Structures	137.14	199.48	47.38	383.99	213.73	310.87	73.83	598.43	350.87	510.35	121.21	982.42
H	Miscellaneous Structures	61.06	88.82	21.09	170.97	126.19	183.55	43.59	353.33	187.25	272.36	64.69	524.30
Total		**1,945.17**	**2,825.27**	**671.34**	**5,441.78**	**2,115.11**	**3,072.46**	**730.04**	**5,917.61**	**4,060.28**	**5,897.73**	**1,401.38**	**11,359.39**
I	Toll Plaza and Service Area	13.03	18.95	4.50	36.48	206.59	300.49	71.37	578.44	219.62	319.44	75.87	614.92
Grand Total		**1,958.20**	**2,844.22**	**675.84**	**5,478.26**	**2,321.70**	**3,372.95**	**801.41**	**6,496.05**	**4,279.90**	**6,217.17**	**1,477.25**	**11,974.32**

TABLE 7.2-4 MAJOR QUANTITIES BY CONTRACT PACKAGE: OPTION-2

Items		Unit	Quantity		
			Package 1	Package 2	Total
1.00	Earthworks				
1.10	Unsuitable Excavation	cu.m	270,017.60	547,489.00	817,506.60
1.20	Embankment from Barrow Material	cu.m	1,745,999.00	2,475,169.12	4,221,168.12
2.00	Subbase and Base Course				
2.10	Aggregate Subbase Course	cu.m	179,347.89	203,469.00	382,816.89
2.20	Crushed Aggregate Base Course	cu.m	59,916.00	123,120.31	183,036.31
2.30	Cement Treated Base Course	cu.m	33,982.00	68,575.70	102,557.70
3.00	Surface Course				-
3.10	Bitumimous Concrete Binder Course (t=50mm)	sq.m	235,266.90	478,260.07	713,526.97
3.20	Bitumimous Concrete Surface Course (t=50mm)	sq.m	238,445.00	368,856.73	607,301.73
4.00	Bridge Structure				
4.10	Concrete Piles Cast in Drilled Holes (Ø1200mm)	l.m	8,550.00	756.00	9,306.00
4.20	Reinforcing Steel, Grade 60 (Bridge)	kg	11,313,203.10	6,466,185.50	17,779,388.60
4.30	Structural Concrete Glass AA for Deck Slab	cu.m	8,555.80	963.10	9,518.90
4.40	Structural Concrete Glass AA for Abutment	cu.m	4,706.80	2,973.10	7,679.90
4.50	Structural Concrete Glass AA for Box Culvert	cu.m	27,650.80	47,505.00	75,155.80
4.60	AASHTO Girder Type V, L=33.5m	each	344.00	12.00	356.00
5.00	Drainage and Slope Protection Structure				
5.10	RCPC (Ø1200mm)	l.m	3,354.00	5,766.00	9,120.00
5.20	Grouted Riprap Class A (Slope Protection)	cu.m	21,479.00	6,212.00	27,691.00
5.30	Grouted Riprap Class A (Side Ditch)	cu.m	19,971.00	36,642.00	56,613.00
5.40	Single Metal Beam Guardrail	l.m	21,474.00	42,949.00	64,423.00
5.50	Double Metal Beam Guardrail	l.m	9,679.00	19,121.00	28,800.00
5.60	Fencing	l.m	23,553.00	41,182.00	64,735.00
6.00	Miscellaneous Structures				
6.10	Warning Sign	each	32.00	52.00	84.00
6.20	Regulatory Sign	each	56.00	92.00	148.00
6.30	Reflectorial Thermoplastic Pavement Marking	sq.m	17,018.00	30,061.00	47,079.00

7.3 ROW ACQUISITION COST

ROW acquisition cost was estimated as shown in **Table 7.3-1**.

TABLE 7.3-1 COST ESTIMATION OF ROW ACQUISITION

Location	Acquired area	Zonal Value	Market Value	Cost	Remarks
	A (m2)	Z (Peso/)	Z 200%-250%	LAC	
Tarlac I/C	29,094.00	142	284	8,262,696.00	
Sta. 0+184 - 1+800	96,960.00	142	284	27,536,640.00	
Sta. 1+180 - 7+640	350,400.00	142	284	99,513,600.00	
Junction	5,719.00	142	284	1,624,196.00	
Sta. 7+640 - 8+580	56,400.00	142	284	16,017,600.00	
Sta. 8+580 - 19+900	675,600.00	142	284	191,870,400.00	
	3,600.00	200	500	1,800,000.00	1 House
Aliaga I/C	30,588.00	142	284	8,686,992.00	
	1,076.00	200	500	538,000.00	3 Houses
Sta. 19+900 - 26+000	361,200.00	142	284	102,580,800.00	
	4,800.00	200	500	2,400,000.00	3 Houses
Cabanatuan City Bypass I/C	37,197.00	142	284	10,563,948.00	
	1,085.00	200	500	542,500.00	1 House
Sta. 26+000 - 30+429	260,940.00	142	284	74,106,960.00	
	4,800.00	200	500	2,400,000.00	15 Houses
Cabanatuan I/C	89,463.00	142	284	25,407,492.00	
	2,215.00	200	500	1,107,500.00	9 Houses
			0	0.00	
Total	**2,011,137.00**			**574,959,324.00**	

			Issued by LGU
Street/Subdivision	Vicinity	Classification	6th Revision ZV/sq.m
Paddy Field	Region III	RF	142.00
Residential	Region III	RR	200.00

7.4 ADMINISTRATIVE COST

Administrative cost was estimated as follows;

- Option-1: 2.0% of civil work cost of total initial stage civil work cost
- Option-2: 1.2% of civil work cost of 4-lane construction.

7.5 CONSULTANCY COST

Various consultancy services are required as follows;

Option-1: STAGE CONSTRUCTION

- **Initial Stage: 2-lane construction utilizing Japan's ODA**

1) Detailed Design
2) Tender Assistance for Selection of Civil Work Contractor
3) Review of Detailed Design and Construction Supervision
4) Transaction Advisory Services for Selection of Concessionaire
   – Bid Document Preparation

– Tender Assistance

5) Design and Construction Supervision of Toll Facility Installation (Private Sector)
6) Independent Consultant for Toll Facility Installation (Cost shall be shared by the Government and the Concessionaire)

- **Widening to 4-lane stage**

7) Independent Consultant for Detailed Design Stage and Construction Stage (cost shall be shared by the Government and the Concessionaire)
8) Detailed Design for Widening (Concessionaire)
9) Construction Supervision (Concessionaire)

Option-2: FULL DEVELOPMENT (4-lane from the beginning)

Consultancy services of 1) to 6) above are required. The summary of consultancy cost estimate is shown in **Table 7.5-1** and detailed consulting cost is attached in **Annex 7.5-1.**

TABLE 7.5-1 SUMMARY OF CONSULTANCY SERVICE COST

Consultancy Service	Option		Currency Component (Million Pesos)			
	Option-1	Option-2	Foreign	Local	Tax	Total
1) Detailed Design (D/D)	○	○	152.00	18.20	20.42	190.62
2) Tender Assistance for Selection of Civil Work Contractor	○	○	27.32	4.56	3.83	35.71
3) Review of D/D and Construction Supervision (C/S)	○		245.51	77.44	38.76	361.71
4) Transaction Advisory Service of Concessionaire						
– Bid Document Preparation	○	○	47.98	2.76	6.09	56.83
– Tender Assistance	○	○	44.23	3.96	5.78	53.97
5) Design and Construction Supervision of Toll Facility Installation (Private Sector)	○	○	31.15	7.30	4.60	43.05
6) Independent consultant for Toll Facility Installation	○	○	40.35	2.94	5.20	48.49
7) Independent Consultant for D/D Stage and Construction Stage (Private Sector)	○		76.48	18.97	11.44	106.89
8) D/D for Widening (Private Sector)	○		47.54	5.86	6.40	59.80
9) C/S for Widening (Private Sector)	○		70.12	23.33	11.22	104.65
Consultancy Cost of Option-1 (Stage Development)			782.68	165.32	113.72	1,061.72
Consultancy Cost of Option-2 (Full Development)			588.54	117.16	84.68	764.21

7.6 SUMMARY OF PROJECT COST

Estimated costs were summarized for each option by currency component (foreign, local and tax components) and by cost sharing (GOP, ODA and Private components).

Table 7.6-1 (1) Option-1 by Currency Component
Table 7.6-1 (2) Option-1 by Cost Sharing
Table 7.6-2 (1) Option-2 by Currency Component
Table 7.6-2 (2) Option-1 by Cost Sharing

Consultancy cost estimate and assignment schedule are presented in **Annex 7.6-1.**

TABLE 7.6-1(1) SUMMARY OF PROJECT COST: BASE COST
OPTION-1 STAGE DEVELOPMENT

Unit: Million Pesos in 2011 Price

Item		Total	Currency Component		
			Foreign	Local	Tax
Civil Work Cost	Initial Stage (2-lane)	8,796.31	3,145.31	4,565.86	1,085.14
	Toll Facility Installation	614.93	219.62	319.44	75.87
	Widening to 4-lane	2,989.88	1,071.05	1,550.05	368.78
	Sub-total	12,401.12	4,435.98	6,435.35	1,529.79
Consultancy Services Cost	Detailed Design	190.62	152.00	18.20	20.42
	Tender Assistance	35.71	27.32	4.56	3.83
	Review of D/D and Construction Supervision	361.71	245.51	77.44	38.76
	Transaction Service : Document Preparation	56.83	47.98	2.76	6.09
	Transaction Service : Tender Assistance	53.97	44.23	3.96	5.78
	Design / Supervision of Toll Facility Installation	43.05	31.15	7.30	4.60
	Independent Consultant : Toll Facility Installation	48.49	40.35	2.94	5.20
	Widening to 4-lane Detailed Design	59.80	47.54	5.86	6.40
	Widening to 4-lane Construction Supervision	104.65	70.12	23.33	11.20
	Independent Consultant : Detailed Design	38.87	30.90	3.81	4.16
	Independent Consultant : Construction Stage	68.02	45.58	15.16	7.28
	Sub-total	1,061.72	782.68	165.32	113.72
Row Acquisition Cost		574.96	-	513.36	61.60
Administrative Cost		188.22	-	188.22	-
Total		14,199.85	5,218.66	7,302.25	1,705.11

TABLE 7.6-1(2) SUMMARY OF PROJECT COST: BASE COST
OPTION-1 STAGE DEVELOPMENT

Unit : Million Pesos in 2011 Price

Item		Total	Cost Sharing		
			GOP	ODA	Private
Civil Work Cost	Initial Stage (2-lane)	8,796.31	1,085.14	7,711.17	-
	Toll Facility Installation	614.93	-	-	614.93
	Widening to 4-lane	2,989.88	-	-	2,989.88
	Sub-total	12,401.12	1,085.14	7,711.17	3,604.81
Consultancy Services Cost	Detailed Design	190.62	20.42	170.20	-
	Tender Assistance	35.71	3.83	31.88	-
	Review of D/D and Construction supervision	361.71	38.76	322.95	-
	Transaction Service : Document Preparation	56.83	6.09	50.74	-
	Transaction Service : Tender Assistance	53.97	5.78	48.19	-
	Design / Supervision of Toll Facility Installation	43.05	-	-	43.05
	Independent Consultant : Toll Facility Installation	48.49	24.25	-	24.24
	Widening to 4-lane Detailed Design	59.80	-	-	59.80
	Widening to 4-lane Construction Supervision	104.65	-	-	104.65
	Independent Consultant : Detailed Design	38.87	19.43	-	19.44
	Independent Consultant : Construction Stage	68.02	34.01		34.01
	Sub-total	1,061.72	152.57	623.96	285.19
Row Acquisition Cost		574.96	574.96	-	-
Administrative Cost		188.22	188.22	-	-
Total		14,226.02	2,000.89	8,335.13	3,890.00

Note: GOP shoulders Tax component.
ODA finances Foreign and Local Components

TABLE 7.6-2(1) SUMMARY OF PROJECT COST: BASE COST
OPTION-2 FULL DEVELOPMENT

Unit : Million Pesos in 2011 Price

Item		Total	Currency Component		
			Foreign	Local	Tax
Civil Work Cost	4-lane Construction	11,359.39	4,060.69	5,897.33	1,401.37
	Toll Facility Installation	614.93	219.62	319.44	75.87
	Sub-total	11,974.32	4,280.31	6,216.77	1,477.24
Consultancy Services Cost	Detailed Design	190.62	152.00	18.20	20.42
	Tender Assistance	35.71	27.32	4.56	3.83
	Review of D/D and Construction Supervision	361.71	245.51	77.44	38.76
	Transaction Service : Document Preparation	56.83	47.98	2.76	6.09
	Transaction Service : Tender Assistance	53.97	44.23	3.96	5.78
	Design / Supervision of Toll Facility Installation	43.05	31.15	7.30	4.60
	Independent Consultant : Toll Facility Installation	48.49	40.35	2.94	5.20
	Sub-total	790.38	588.54	117.16	84.68
Row Acquisition Cost		574.96	-	513.36	61.60
Administrative Cost		143.69	-	143.69	-
Total		13,483.35	4,868.85	6,990.98	1,623.52

TABLE 7.6-2(2) SUMMARY OF PROJECT COST: BASE COST
OPTION-2 FULL DEVELOPMENT

Unit : Million Pesos in 2011 Price

Item		Total	Cost Sharing		
			GOP	ODA	Private
Civil Work Cost	4-lane Construction	11,359.39	1,401.37	9,958.02	-
	Toll Facility Installation	614.93	-	-	614.93
	Sub-total	11,974.32	1,401.37	9,958.02	614.93
Consultancy Services Cost	Detailed Design	190.62	20.42	170.20	-
	Tender Assistance	35.71	3.83	31.88	-
	Construction Supervision	361.74	38.76	322.98	-
	Transaction Service : Document Preparation	56.83	6.09	50.74	-
	Transaction Service : Tender Assistance	53.97	5.78	48.19	-
	Design / Supervision of Toll Facility Installation	43.05	-	-	43.05
	Independent Consultant : Toll Facility Installation	48.49	24.25	-	24.24
	Sub-total	790.41	99.13	623.99	67.29
Row Acquisition Cost		574.96	574.96	-	-
Administrative Cost		143.69	143.69	-	-
Total		13,483.38	2,219.15	10,582.01	682.22

Note: GOP shoulders Tax Component
ODA finances Foreign and Local components.

7.7 OPERATION AND MAINTENANCE COST

Operation and maintenance cost by option is summarized as follows;

O & M Cost
(Option-1 : 2-lane)

Unit: Million Pesos

		Total
O & M Cost (2-lane)	Operation Cost	91.91
	Maintenance Cost	16.85
	Insurance Cost	13.65
	Sub-Total	122.41
	Periodic Maintenance Cost (every 5 years)	327.92

Note: Price Escalation Rate
*Foreign Component : **1.6%** per annum*
*Local Component : **3.8%** per annum*

Foreign Exchange Rate
US$ 1 = 81.2 Yen
US$ 1 = 43.7 Php
1 Php = 1.86 Yen

O & M Cost
(Option-2 : 4-lane)

Unit: Million Pesos

		Total
O & M Cost (4-lane)	Operation Cost	100.40
	Maintenance Cost	20.82
	Insurance Cost	16.97
	Sub-Total	138.19
	Periodic Maintenance Cost (every 5 years)	420.02

Note: Price Escalation Rate
*Foreign Component : **1.6%** per annum*
*Local Component : **3.8%** per annum*

Foreign Exchange Rate
US$ 1 = 81.2 Yen
US$ 1 = 43.7 Php
1 Php = 1.86 Yen

Cost breakdown of O & M of 2-lane expressway and 4-lane expressway is shown in **Table 7.7-1** and **7.7-2,** respectively. Insurance cost estimate is shown in **Table 7.7-3.**

TABLE 7.7-1 COST BREAKDOWN OF O&M COST OF 2-LANE EXPRESSWAY

Routine Maintenance Work Yearly Cost for CLLEX (Cost per PHP)
(2-lane)

Exchange Rate : $ 1.0 = Php 43.5

Description of Routine Maintenance	Unit	Unit Rate Php	Quantity	Amount Php	Php/km
Patch Bituminous Pavement (0.5% of Total Quantity)	m2	870	2,790.0	2,427,300	78,300
Repair & Replace Guardrail (5% of TQ)	Lm	1827	1,550.0	2,831,850	91,350
Replace Lighting Lamps (5% of TQ)	each	23,165	10.0	231,650	7,473
Repair or Replace Lighting Poles (5% of TQ)	each	36,000	10.0	360,000	11,613
General Roadway Maintenance (Total Length)	km	20,880	31.0	647,280	20,880
Clean Drainage (5% of TL)	Lm	43.5	3,100.0	134,850	4,350
Clean Culverts	Ea	6,525	124.0	809,100	26,100
Repair Culverts	Ea	22,838	124.0	2,831,850	91,350
Inspect Bridge (TL)	Lm	87	3,605.0	313,635	10,117
Repair Bridge (0.5% of TQ)	m2	1,827	180.3	329,317	10,623
Repaint Road Marking Lines (5% of TQ)	Km	163,908	7.0	1,143,258	36,879
Repair Signs (10% of TQ)	each	16,965	5.0	84,825	2,736
Pickup Litter (Road Cleaning) (TL)	Km	36,975	31.0	1,146,225	36,975
Miscellaneous Maintenance (TL)	Km	65,250	31.0	2,022,750	65,250
Maintenance Management (10% of above cost)	Year	1,531,389	1	1,531,389	49,400
Routine Maintenance				**16,845,279**	**543,396**

Operation Cost (Every Year)
(2-lane)

Description	Unit	Unit Rate Php	Quantity	Amount/Year Php	Php/km
Electricity	Kwh	10.00	1,500,000.00	15,000,000.00	483,870.97
Cost of Staff	each/yr	261,000.00	211.00	55,071,000.00	1,776,483.87
Running Cost for Office and Toll Booths	m2	6,960.00	1,263.48	8,793,820.80	283,671.64
Maintenance for Toll System	month	1,087,500.00	12.00	13,050,000.00	420,967.74
Total of O/M Cost				**91,914,820.80**	**2,964,994.22**

Periodic Maintenance (Every Five Years)
(2-lane)

Description	Unit	Unit Rate Every 5Year Php	Quantity	Amount/5 Year Php
Pavement Overlays (TQ) (50% area)	L.S	210,230,000.00	1.00	210,230,000.00
Bridge (TQ) (2.8%)	L.S	65,860,000.00	1.00	65,860,000.00
Lighting (TQ) (18%)	L.S	11,833,000.00	1.00	11,830,000.00
Toll Collection System	L.S	40,000,000.00	1.00	40,000,000.00
Total of Periodic Maintenance (Every Five Years)				**327,920,000.00**

TABLE 7.7-2 COST BREAKDOWN OF O&M COST OF 4-LANE EXPRESSWAY

Routine Maintenance Work Yearly Cost for CLLEX (Cost per PHP)
(4-lane)

Exchange Rate : $ 1.0 = Php 43.5

Description of Routine Maintenance	Unit	Unit Rate Php	Quantity	Amount Php	Php/km
Patch Bituminous Pavement (0.5% of Total Quantity)	m2	870	3,100.0	2,697,000	87,000
Repair & Replace Guardrail (5% of TQ)	Lm	1827	1,550.0	2,831,850	91,350
Replace Lighting Lamps (5% of TQ)	each	23,165	20.0	463,300	14,945
Repair or Replace Lighting Poles (5% of TQ)	each	36,000	20.0	720,000	23,226
General Roadway Maintenance (Total Length)	km	33,400	31.0	1,035,400	33,400
Clean Drainage (5% of TL)	Lm	43.5	3,100.0	134,850	4,350
Clean Culverts	Ea	6,525	124.0	809,100	26,100
Repair Culverts	Ea	22,838	124.0	2,831,850	91,350
Inspect Bridge (TL)	Lm	87	3,605.0	313,635	10,117
Repair Bridge (0.5% of TQ)	m2	1,827	180.3	329,317	10,623
Repaint Road Marking Lines (5% of TQ)	Km	163,908	14.0	2,294,712	74,023
Repair Signs (10% of TQ)	each	16,965	5.0	84,825	2,736
Pickup Litter (Road Cleaning) (TL)	Km	36,975	31.0	1,146,225	36,975
Miscellaneous Maintenance (TL)	Km	104,400	31.0	3,236,400	104,400
Maintenance Management (10% of above cost)	Year	1,892,846	1	1,892,846	61,060
Routine Maintenance				**20,821,310**	**671,655**

Operation Cost (Every Year)
(4-lane)

Description	Unit	Unit Rate Php	Quantity	Amount/Year Php	Php/km
Electricity	Kwh	10.00	1,800,000.00	18,000,000.00	580,645
Cost of Staff	each/yr	261,000.00	232.00	60,552,000.00	1,953,290
Running Cost for Office and Toll Booths	m2	6,960.00	1,263.48	8,793,820.80	283,672
Maintenance for Toll System	month	1,087,500.00	12.00	13,050,000.00	420,968
Total of O/M Cost				**100,395,820.80**	**3,238,575**

Periodic Maintenance (Every Five Years)
(4-lane)

Description	Unit	Unit Rate Every 5Year Php	Quantity	Amount/5 Year Php
Pavement Overlays (TQ) (50% area)	L.S	279,400,000.00	1.00	279,400,000.00
Bridge (TQ) (2.8%)	L.S	88,570,000.00	1.00	88,570,000.00
Lighting (TQ) (18%)	L.S	12,050,000.00	1.00	12,050,000.00
Toll Collection System	L.S	40,000,000.00	1.00	40,000,000.00
Total of Periodic Maintenance (Every Five Years)				**420,020,000.00**

TABLE 7.7-3 COST BREAKDOWN OF INSURANCE COST

Insurance Cost during Detailed Engineering Design and Construction Stage
Option - 1 : Widening Stage

Items	Scope of Coverage	Insured Amount	Insurance Cost	
			Rate of Insured Amount	Amount (Million Pesos)
DED Stage Total				5.98
Professional Indemnity Insurance	Accidents during the construction period due to the defect of the Detailed Engineering Design.	Civil Work Cost (2,990 Million Pesos)	0.20%	5.98
Construction Stage Total				26.91
Contractor's All Risk Insurance including Third Party Insurance	(Sec.-1) Material Damage: Physical loss and/or damage to permanent works, materials, etc. (Sec.-2) Third Party Liability	Civil Work Cost (2,990 Million Pesos)	0.20%	26.91

Insurance Cost during Operation and Maintenance Stage
(Initial Stage of 2-lane)

Items	Scope of Coverage	Insured Amount	Insurance Cost	
			Rate of Insured Amount	Amount (Million Pesos)
All Risk Insurance	Physical loss or damage including but not limited to earthquake, flood, typhoon	1/2 of Civil Work Cost (4,705.62 Million Pesos)	0.25%	11.76
Third Party Insurance	Death, bodily injury, loss and damage to third party due to facility operator's fault	500 Million Pesos	0.20%	1.00
Business Interruption Insurance	Loss of revenue due to any interruption caused by loss or damage under "All Risk"	One-half of the estimated revenue in 2018 (217.18 Million Pesos)	0.25%	0.54
Crime Insurance	Loss and/or damage due to any illegal act by employee or third party.	One-half of the estimated revenue in 2018 (217.18 Million Pesos)	0.16%	0.35
Total				**13.65**

Note: Taxation against Insurance Cost is included in the Ratio of Insured Amount. It consists of Documentary Stamped Tax (12.5%), VAT (12%) and Municipal Tax (0.2%)

Insurance Cost during Operation and Maintenance Stage
(4-lane)

Items	Scope of Coverage	Insured Amount	Insurance Cost	
			Rate of Insured Amount	Amount (Million Pesos)
All Risk Insurance	Physical loss or damage including but not limited to earthquake, flood, typhoon	1/2 of Civil Work Cost (5,987.16 Million Pesos)	0.25%	14.97
Third Party Insurance	Death, bodily injury, loss and damage to third party due to facility operator's fault	500 Million Pesos	0.20%	1.00
Business Interruption Insurance	Loss of revenue due to any interruption caused by loss or damage under "All Risk"	One-half of the estimated revenue in 2018 (244.55 Million Pesos)	0.25%	0.61
Crime Insurance	Loss and/or damage due to any illegal act by employee or third party.	One-half of the estimated revenue in 2018 (244.55 Million Pesos)	0.16%	0.39
Total				**16.97**

7.8 PROJECT COST OF PHASE II: CABANATUAN – SAN JOSE SECTION

Project cost estimate by 2010 FS was updated as shown below;

PROJECT COST OF PHASE - II

Item	2010 FS (4-lane) (2009 Price)	Up-dated to 2011 Price (4-lane)	2-lane Cost (2011 Price)
Civil Work Cost	12,188.1	13,056.1	10,444.9
Physical Contingency (5%)	609.4	652.8	522.2
Engineering Services	1,689.2	1,809.5	1,447.6
- D/D & Tender (4%)	563.1	603.2	482.6
- Construction Supervision (8%)	1,126.1	1,206.3	965.0
Land Acquisition	829.5	888.6	888.6
Administrative Cost	1,306.0	1,399.0	1,119.2
Total	16,622.2	17,806.0	14,422.5

Source: 2009 Price from 2010 FS

Note:
- Inflation Rate : 2009 - 3.20% 2009-2011 : 1.0712
  2010 - 3.80%
- Cost of 2-lane expressway with overtaking lane :
  80% of 4-lane expressway cost

CHAPTER 8
ECONOMIC AND FINANCIAL EVALUATION

8.1 ECONOMIC EVALUATION

8.1.1 Methodology

The economic analysis shall be determined whether the construction and operation of the proposed project will be feasible based on the benefits and costs to be derived from the project. The transport projects such as Central Luzon Link Expressway (CLLEX) can play a very important role in strengthen of the economic growth. It is required however, that the project must be economically viable, satisfying the government-prescribed hurdle rates.

Annual economic cost and benefits shall be estimated under "with project" and "without project" case. The difference in economic costs and benefits in both cases shall be attributed to the project and subjected to economic feasibility measurement. The economic feasibility of the project shall be indicated by the economic internal rate of return (EIRR), benefit-cost ratio (B/C), and net present value (NPV) at an assumed discount rate of 15%, which is acceptable social discount rate for economic appraisal of public investment projects in the country. The hurdle rates for economic feasibility are the following: EIRR $\geq$ 15%, B/C $\geq$ 1.0, and NPV $\geq$ 0. Sensitivity of the project arising from adverse changes in costs and benefits shall be examined to establish the capacity of the project to exhibit economic feasibility under these cases.

(1) General Work Flow of Economic Evaluation

Figure 8.1.1-1 shows the work flow of economic evaluation.

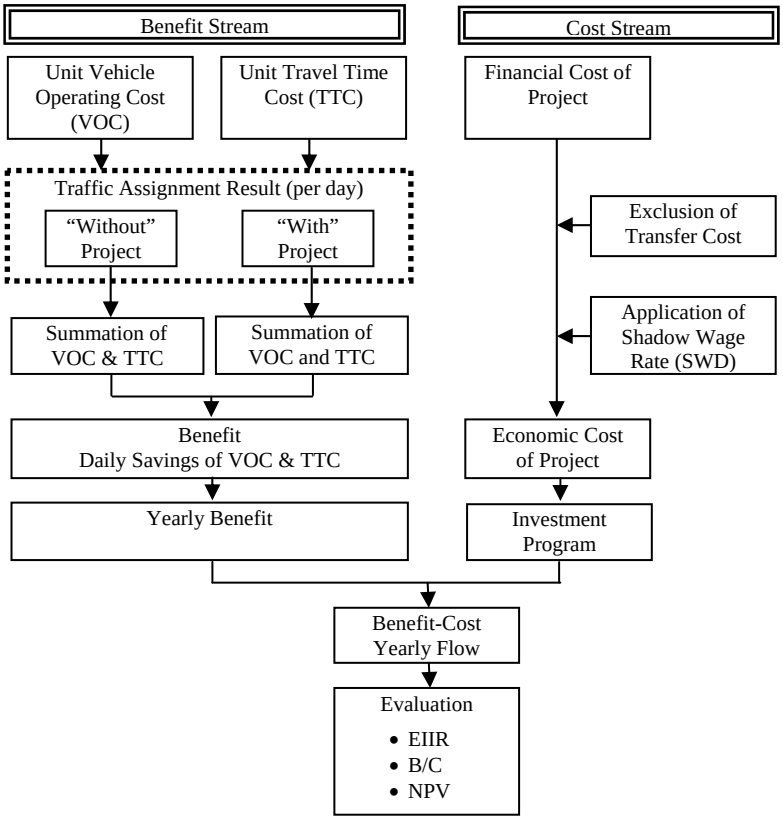


FIGURE 8.1.1-1 WORK FLOW OF ECONOMIC EVALUATION

(2) Indicators of Economic Evaluation

Economic costs and benefits throughout the project life periods are compared by a discount cash flow analysis. The discount rate (hereinafter referred to as "DR") is at 15%, which is widely used in Philippines as a social discount rate. For economic evaluation, three indicators are calculated: Economic Internal Rate of Return (hereinafter referred to as "EIRR"), Benefit/Cost Ratio (hereinafter referred to as "B/C") and Net Present Value (hereinafter referred to as "NPV"). In addition, the economic life is assumed to be 30 years, taking into account future rapid growth and changes of socioeconomic conditions. Therefore, the Pro-forma cash flow of a project evaluation will be prepared for 2011-2046. They are defined as **Table 8.1.1-1**.

TABLE 8.1.1-1 INDICATORS OF ECONOMIC EVALUATION

No.	Indicators	Calculation Formula or Value
1	Discount rate (DR)	15% in Philippines as a social discount rate
2	Economic Internal Rate of Return (EIIR)	r satisfying: $\sum \frac{B_n}{(1+r)^n} = \sum \frac{C_n}{(1+r)^n}$ *B*: benefit, *C*: Cost
3	Benefit/Cost Ratio (B/C)	$\sum \frac{B_n}{(1+DR)^n} \div \sum \frac{C_n}{(1+DR)_n}$
4	Net Present Value (NPV)	$\sum \frac{B_n - C_n}{(1+DR)^n}$
5	Pro-forma cash flow of a project evaluation	Period for 2011-2046

Source: JICA Study Team

(3) Economic Evaluation Case

Table 8.1.1.-2 shows the economic evaluation case.

TABLE 8.1.1-2 ECONOMIC EVALUATION CASE

Case 1-1	CLLEX(Phase-1) Initial stage 2-lane in year 2017 then widening 4-lane in year 2026
Case 1-2	CLLEX(Phase-1) Completed 4-lane in year 2017
Case 2	CLLEX(Phase-2) 2-lane Construction
Case 3-1	CLLEX(Phase-1+ Phase-2) Phase-1:Initial stage 2-lane in year 2017 then widening 4-lane in year 2026 Phase-2:2-lane in year 2021
Case 3-2	CLLEX(Phase-1+ Phase-2) Phase-1:4-lane in year 2017 Phase-2:2-lane in year 2021

8.1.2 Economic Cost of the Project

(1) Initial Cost

The project cost must be estimated by shadow price in the cost benefit analysis. This is because market price is distorted by governmental system and policies such as custom duty, and market intervention. The shadow price expresses the real value of the resources.

The Project cost of CLLEX (Phase-1) is estimated in market prices in Chapter 7. They are converted into economic cost and the residual cost after the project life is calculated for economic evaluation, taking the following process.

(a) Out of material and equipment cost, import duty and value added tax (VAT) at 12% are deducted.

(b) The foreign exchange cost is applied with shadow price of 1.2 while the unskilled labor at 0.6

(c) The life year will be considered at 30 years.

(d) The required costs for operation and maintenance were examined in **Chapter 7** in market price. These data are converted into economic price.

TABLE 8.1.2-1 ESTIMATED ECONOMIC COST (Case 1-1)

CLLEX Phase-1(initial stage 2-lane) Year 2011 Price

Million Pesos

Description	Financial Cost(A)	Economic Cost(B)	Rate=(B/A)
Initial Stage 2-lane			
1. Civil Work			
1.1 CW excl. Toll Facility	9,236.13	8,609.41	0.93
1.2 Toll Facility	645.67	601.85	0.93
2. ROW Acquisition	574.96	513.36	0.89
3. Detailed Eng. Design and Tender Doc.	237.65	249.84	1.05
4. Construction Supervision	352.32	361.86	1.03
5. Preparation of Bid Doc for Concessionaire Selection	116.34	123.24	1.06
6. Design and Construction Supervision of Toll Facility	45.20	46.91	1.04
7. Independent Consultant	50.91	53.93	1.06
8. Administration Cost	122.34	122.34	1.00
Widening Stage 4-lane			
1. Civil Work	2,899.88	2,702.11	0.93
2. Detailed Engineering Design	62.79	66.05	1.05
3. Construction Supervision	109.88	112.85	1.03
4. Independent Consultant for D/D	40.81	42.93	1.05
5. Independent Consultant for C/S	71.42	73.35	1.03
6. Administration Cost	65.88	65.88	1.00
Total	**14,632.18**	**13,745.92**	**0.94**

Source: JICA Study Team

TABLE 8.1.2-2 ESTIMATED ECONOMIC COST (Case 1-2)

CLLEX Phase-1(4-lane) Year 2011 Price

Million Pesos

Description	Financial Cost(A)	Economic Cost(B)	Rate=(B/A)
4 lane development			
1. Civil Work			
1.1 CW excl. Toll Facility	11,927.36	11,117.78	0.93
1.2 Toll Facility	645.67	601.85	0.93
2. ROW Acquisition	574.96	513.36	0.89
3. Detailed Eng. Design and Tender Doc.	237.65	249.84	1.05
4. Construction Supervision	352.32	361.86	1.03
5. Preparation of Bid Doc for Concessionaire Selection	116.34	123.24	1.06
6. Design and Construction Supervision of Toll Facility	45.20	46.91	1.04
7. Independent Consultant	50.91	53.93	1.06
8. Administration Cost	143.69	143.69	1.00
Total	**14,094.10**	**13,212.46**	**0.94**

Source: JICA Study Team

The Project cost of CLLEX (Phase-2) was estimated in the Feasibility Study for the Proposed Central Luzon Expressway (CLEX) 2010 by DPWH. Based on this project and the rate of financial cost /economic cost, the economic cost were estimated.

TABLE 8.1.2-3 ESTIMATED ECONOMIC COST (Case 2)

CLLEX Phase-2 (2-lane) Year 2011 Price

Million Pesos

	Financial Cost (4-lane)	Financial Cost (2-lane)	Rate of Fin. Cost / Eco. Cost	Economic Cost (2-lane)
	(a)	(b=a*0.8)	(c)	(d=c*b)
1. Civil Work Cost	13,056.1	10,444.9	0.93	9,713.7
2. Physical Contingency	1,305.6	1,044.5	0.93	971.4
3.Engineering Services	1,809.5	1,447.6	1.05	1,520.0
4. Land Acquisition	888.6	888.6	0.88	781.9
5.Administatrative Cost	274.2	219.4	1.00	219.4
Total	**17,334.0**	**14,044.9**		**13,206.4**
Remarks	Financial cost were estimated by 2009 price (2010FS) * inflation rate (7.1% per two years)	Phase-1 Project Cost (2-lane cost vs. 4-lane cost)	Phase-1 Estimated rate	

Source: JICA Study Team

Table 8.1.2-4 ~ 6 shows the implementation schedule and yearly initial cost flow.

TABLE 8.1.2-4 IMPLEMENTATION SCHEDULE AND INITIAL COST (ECONOMIC COST) PER YEAR
CASE 1-1 PHASE-1, INITIAL STAGE 2-LANE, WIDENING

	Economic Cost	2012	2013	2014	2015	2016	2017	~	2022	2023	2024	2025
Initial Stage 2 lane												
1 Civil Work												
1.1 Civil Work excluding Toll Facility	8,609.41											
1.2 Toll Facility	601.85											
2 ROW Acquisition	513.36											
3 Detailed Engineering Design,Tender	249.84											
4 Construction Supervision	361.86											
5 Preparation of Bid Doc for Concessionaire	123.24											
6 Design and Construction	46.91											
7 Independent Consultant	53.93											
8 Administration Cost	122.34											
Widening Stage 4lane												
1 Civil Work	2,702.1											
2 Detailed Engineering Design	66.1											
3 Construction Supervision	112.8											
4 Independent Consultant for D/D	42.9											
5 Independent Consultant for C/S	73.3											
6 Administration Cost	65.9											
Initial Cost (Economic Cost) Million Peso	**13,745.9**	**85**	**495**	**1,532**	**3,950**	**3,933**	**689**		**0**	**131**	**1,466**	**1,467**

Source: JICA Study Team

TABLE 8.1.2-5 IMPLEMENTATION SCHEDULE AND INITIAL COST (ECONOMIC COST) PER YEAR CASE 1-2 PHASE-1, 4 -LANE

	Economic Cost	2012	2013	2014	2015	2016	2017
4 lane							
1 Civil Work							
1.1 Civil Work excluding Toll Facility	11,117.78						
1.2 Toll Facility	601.85						
2 ROW Acquisition	513.36						
3 Detailed Engineering Design,Tender	249.84						
4 Construction Supervision	361.86						
5 Preparation of Bid Doc for Concessionaire	123.24						
6 Design and Construction Supervision of Toll	46.91						
7 Independent Consultant	53.93						
8 Administration Cost	143.69						
Initial Cost (Economic Cost) Million Peso	**13,212.5**	**85**	**495**	**1,532**	**3,950**	**3,933**	**689**

Source: JICA Study Team

TABLE 8.1.2-6 IMPLEMENTATION SCHEDULE AND INITIAL COST (ECONOMIC COST) PER YEAR CASE 2 PHASE-2, 2 -LANE

	Economic Cost	2012	2013	2014	2015	2016
1 Civil Work	10,685.10					
2 Engineering Services	1,520.00					
3 ROW Acquisition	781.90					
4 Administration Cost	219.40					
Initial Cost (Economic Cost) Million Peso	**130,206.40**		**953**	**2,786**	**4,734**	**4,734**

Source: JICA Study Team

(2) Operation and Maintenance Cost

The Operation and Maintenance Cost was estimated. The operation cost is for daily road/traffic management of the road facility. The maintenance cost consists of the routine maintenance and the periodic maintenance. The operation and maintenance costs was estimated and shown in **Table 8.1.2-7.**

TABLE 8.1.2-7 OPERATION AND MAINTENANCE AND OTHER COSTS

Million Pesos

Item		Financial Cost (A)	Economic Cost (B)	Rate (B/A)
Phase-1 2-lane				
1	O &M Cost per year	108.8	97.11	0.89
2	Insurance Cost per year	13.7	12.19	0.89
3	Periodic M Cost every 5 years	287.9	257.07	0.89
Phase-1 4-lane				
1	O &M Cost per year	121.2	108.23	0.89
2	Insurance Cost per year	17.0	15.15	0.89
3	Periodic M Cost every 5 years	380.0	339.30	0.89
Phase-2 2-lane				
1	O &M Cost per year	126.9	113.29	0.89
2	Insurance Cost per year	15.9	14.22	0.89
3	Periodic M Cost every 5 years	335.9	299.92	0.89

Source: JICA Study Team

8.1.3 Economic Benefit of the Project

Economic benefits are calculated according to multiplied the estimated traffic volumes and unit Vehicle Operating Cost (VOC) /Travel Time Cost (TTC) respectively for each case, and the amount of 'without' case minus 'with' case is considered as the benefit provided by the project.

(1) Unit Vehicle Operating Cost (VOC) and Unit Travel Time Cost (TTC)

(a) Unit Vehicle Operating Cost (VOC)

The VOC per unit distance is estimated by type of vehicle being composed of the following components; they are a) fuel cost, b) oil cost, c) tire cost, d) spare parts cost, e) depreciation cost, f) capital opportunity cost and g) crew and overhead cost. The type of vehicles is motor-tricycle, car, van, Jeepney, bus and truck.

The Department of Public Works and Highways (DPWH) has been periodically updating VOC data in order to use as input to the HDM Model for the appraisal of highway development and maintenance projects. There are the detailed data of VOC in 2006 (see **Table 8.1.3-1**), therefore, these data are revised and updated in accordance with the recent price indices (in 2011) by type of related goods, exchange rate of local currency. They are summarized in **Table 8.1.3-2**.

TABLE 8.1.3-1 UNIT VOC BY VEHICLE TYPE IN SEPTEMBER 2006

(Pesos per veh-km)

Speed (km/hour)	1. Motor-tricycle	2. Passenger Car	3. Jeepny	4. Good Utility	5. Small Bus	6. Large Bus	7. Rigid Truck 2ax	8. Rigid Truck 3ax	9.Rigid Truck 4ax	10. Rigid Truck 5ax
20	2.98	10.56	8.80	10.09	19.66	30.58	20.94	32.30	35.25	37.27
30	2.48	9.09	7.40	8.34	16.65	25.74	17.96	27.71	30.84	32.83
40	2.15	8.02	6.40	7.07	14.47	22.26	15.92	24.66	28.08	30.08
50	2.03	7.47	5.91	6.44	13.36	20.54	15.01	23.48	27.23	29.25
60	2.03	7.21	5.72	6.15	12.83	19.79	14.67	23.31	27.33	29.31
70	2.10	7.13	5.71	6.07	12.62	19.67	14.63	23.71	27.82	29.72
80	2.20	7.16	5.82	6.15	12.59	19.94	14.75	24.37	28.51	30.37
90	2.29	7.25	6.01	6.31	12.64	20.01	14.94	24.44	29.29	31.14
100	2.36	7.36	6.23	6.50	12.72	20.01	15.07	24.44	29.75	31.59
110	2.40	7.46	6.43	6.69	12.79	20.01	15.07	24.44	29.75	31.59
120	2.42	7.54	6.61	6.84	12.81	20.01	15.07	24.44	29.75	31.59

Source: DPWH

TABLE 8.1.3-2 UNIT VOC BY VEHICLE TYPE IN 2011

(Pesos per veh-km)

Speed (km/hour)	1. Motorcycle/ Tricycle	2. Passenger Car	3. Jeepney	4. Good Utility	5. Small Bus	6. Large Bus	7. Rigid Truck 2axle	8. Rigid Truck 3axle	9. Rigid Truck 4axle	10. Rigid Truck 5axle
20	4.42	14.46	10.32	13.30	17.42	26.15	32.48	43.45	46.69	49.23
50	2.88	10.23	6.79	8.32	11.47	17.38	21.33	30.05	34.40	36.91
80	3.03	9.67	6.59	7.74	10.89	17.45	19.93	30.10	35.07	37.45
100	3.23	9.86	7.02	8.07	11.11	17.54	20.10	30.16	36.34	38.71
120	3.31	10.04	7.43	8.42	11.23	17.54	20.10	30.16	36.34	38.71

Source: DPWH, JICA Study Team

The VOC saving in whole road network will be calculated according to multiplied the estimated traffic volumes and unit VOC. The unit VOC by type of vehicles will be corresponded to the four (4) vehicle types of estimated traffic volume such as 1) Passenger Car, 2) Jeepney, 3) Large Bus and 4) Truck. The VOC of truck types will be converted by weighted average of vehicle composition. The unit VOC cost by type of vehicles by vehicle speed is shown in **Table 8.3-3.**

TABLE 8.1.3-3 UNIT VOC BY FOUR (4) VEHICLE TYPES IN 2011

Peso/km/veh

Speed (km/hr)	Passenger Car	Jeepney	Bus	Truck
20	14.46	10.32	26.16	37.93
30	13.05	9.14	23.23	34.01
40	11.64	7.97	20.30	30.09
50	10.23	6.79	17.37	26.16
60	10.04	6.73	17.40	25.94
70	9.86	6.66	17.43	25.71
80	9.67	6.59	17.45	25.48
90	9.76	6.81	17.50	25.69
100	9.86	7.02	17.54	25.90

Source: DPWH, JICA Study Team

(b) Unit Travel Time Cost (TTC)

The Travel Time Cost (TTC) is normally calculated based on the average labor productivity in the Philippines. The basic costs for TTC by type of passenger were obtained also from the DPWH. The values are 2006 price level. In the derivation of the TTC, the average income, employment and the gross national product were used as the basis to calculate for the working time and non-working time per person-hour for representative vehicle type and thence estimate for the passenger time cost per person.

Basically, reduction in travel time is the main component in the derivation of the TTC saving. The annual savings was calculated as the difference in travel time between the base road network and with CLLEX road network. Travel time as estimated in the model is the result of the changes in traffic volume caused changes in the congestion level brought by diversion of part of traffic to a more convenient route in the road network.

The unit TTC of vehicles will also be corresponded to the four (4) vehicle types of estimated traffic volume such as 1) Passenger Car, 2) Jeepney, 3) Large Bus and 4) Truck. The TTC of truck types will be converted by weighted average of vehicle composition. The unit TTC cost by type of vehicles in year 2011 which were updated based on inflation rate, is shown in **Table 8.3-5.**

TABLE 8.1.3-4 UNIT TRAVEL TIME COST IN 2006

Peso/min/veh.

1. Motorcycle/ Tricycle	2. Passenger Car	3. Jeepney	4. Good Utility	5. Small Bus	6. Large Bus	7. Rigid Truck 2axle	8. Rigid Truck 3axle	9. Rigid Truck 4axle	10. Rigid Truck 5axle
1.23	5.97	6.52	2.25	10.86	24.44	0.87	1.27	1.77	1.77

Source: DPWH

TABLE 8.1.3-5 UNIT TRAVEL TIME COST IN 2011

Peso/min/veh.

Vehicle Type	2011
Passenger Car	7.18
Jeepney	7.83
Bus	29.36
Truck	1.33

Source: JICA Study Team

(2) Estimation of Economic Benefit (VOC and TTC Saving)

Based on the unit VOC by vehicle type by vehicle speed and the total vehicle-km, daily VOC saving by year is estimated. The daily TTC saving by year also is estimated based on the unit TTC by vehicle type and the total vehicle-hour. The economic benefit is shown in **Table 8.1.3-6**.

TABLE 8.1.3-6 ECONOMIC BENEFIT

Year	Economic Benefit (1,000 Peso/day)		
	VOC	TTC	Total
Phase-1 2-lane			
2017	955	4,772	5,727
2020	1,716	6,535	8,251
2030	2,113	9,594	11,707
Phase-1 4-lane			
2017	699	6,164	6,863
2020	1,305	7,509	8,814
2030	1,605	10,525	12,130
Phase-2 2-lane			
2017	1,007	3,138	4,145
2020	1,606	4,006	5,612
2030	2,407	5,193	7,600

Source: JICA Study Team

(3) Other Economic Benefits

With the increasing congestion of the existing road, the greater is the likelihood of the occurrence of the accidents due to conflicts between pedestrian and vehicle. It is anticipated that with the project, accidents happening on at-grade could be avoided. In this Study, however, benefit from possible reduction of road accident is not considered since there is no acceptable value assigned to traffic accidents in the country.

8.1.4 Results of Economic Analysis

(1) Economic Analysis of Phase-1

The performance at **Table 8.1.4-1** and **Table 8.1.4-2** of the project based on indicators of economic feasibility is:

CASE1-1: Initial Stage 2lane and widening 4-lane

EIRR	20.6%
B/C	1.50
NPV (Million Peso @ i = 15%)	3,522.5

CASE1-2: 4-lane Development

EIRR	19.4%
B/C	1.39
NPV (Million Peso @ i = 15%)	3093.4

The economic costs and benefits of the project generated a positive NPV and an EIRR that is higher than the government-prescribed hurdle rate (15%). These values indicate that the project is economically viable.

TABLE 8.1.4-1 COST-BENEFIT STREAM (CASE1-1: INITIAL STAGE 2-LANE AND WIDENING 4-LANE)

CLLEx Phase-1(2lane(2017-2025) 4lane(2026~))

Undiscounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	0.0		0.0				0.0
2	2012	84.7		84.7				-84.7
3	2013	494.8		494.8				-494.8
4	2014	1,532.0		1,532.0				-1,532.0
5	2015	3,949.6		3,949.6				-3,949.6
6	2016	3,933.0		3,933.0				-3,933.0
7	2017	688.6	54.6	766.2	174.5	871.0	1,045.5	279.3
8	2018	0.0	109.3	109.3	424.0	1,934.0	2,358.0	2,248.7
9	2019	0.0	109.3	109.3	515.0	2,148.0	2,663.0	2,553.7
10	2020	0.0	109.3	109.3	626.0	2,385.0	3,011.0	2,901.7
11	2021	0.0	351.3	351.3	640.0	2,479.0	3,119.0	2,767.7
12	2022	0.0	109.3	109.3	653.0	2,576.0	3,229.0	3,119.7
13	2023	130.7	109.3	270.5	667.0	2,676.0	3,343.0	3,072.5
14	2024	1,465.9	109.3	1,966.1	681.0	2,781.0	3,462.0	1,495.9
15	2025	1,466.6	109.3	2,015.8	695.0	2,890.0	3,585.0	1,569.2
16	2026	0.0	361.9	361.9	539.0	3,356.0	3,895.0	3,533.1
17	2027	0.0	123.4	123.4	551.0	3,472.0	4,023.0	3,899.6
18	2028	0.0	123.4	123.4	562.0	3,591.0	4,153.0	4,029.6
19	2029	0.0	123.4	123.4	574.0	3,714.0	4,288.0	4,164.6
20	2030	0.0	123.4	123.4	586.0	3,842.0	4,428.0	4,304.6
21	2031	0.0	444.1	444.1	598.0	3,974.0	4,572.0	4,127.9
22	2032	0.0	123.4	123.4	611.0	4,110.0	4,721.0	4,597.6
23	2033	0.0	123.4	123.4	623.0	4,251.0	4,874.0	4,750.6
24	2034	0.0	123.4	123.4	636.0	4,397.0	5,033.0	4,909.6
25	2035	0.0	123.4	123.4	650.0	4,548.0	5,198.0	5,074.6
26	2036	0.0	444.1	444.1	663.0	4,704.0	5,367.0	4,922.9
27	2037	0.0	123.4	123.4	677.0	4,866.0	5,543.0	5,419.6
28	2038	0.0	123.4	123.4	691.0	5,033.0	5,724.0	5,600.6
29	2039	0.0	123.4	123.4	706.0	5,206.0	5,912.0	5,788.6
30	2040	0.0	123.4	123.4	720.0	5,385.0	6,105.0	5,981.6
31	2041	0.0	444.1	444.1	736.0	5,570.0	6,306.0	5,861.9
32	2042	0.0	123.4	123.4	751.0	5,761.0	6,512.0	6,388.6
33	2043	0.0	123.4	123.4	767.0	5,959.0	6,726.0	6,602.6
34	2044	0.0	123.4	123.4	783.0	6,163.0	6,946.0	6,822.6
35	2045	0.0	123.4	123.4	799.0	6,375.0	7,174.0	7,050.6
36	2046	0.0	444.1	444.1	816.0	6,594.0	7,410.0	6,965.9
37	2047	-884.3		-884.3			0.0	884.3
Total		12,861.6	5,283.4	19,029.4	19,114.5	121,611.0	140,725.5	121,696.1

Discounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Discounted	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	1.00	0.0		0.0			0.0	0.0
2	2012	1.15	73.7		73.7			0.0	-73.7
3	2013	1.32	374.2		374.2			0.0	-374.2
4	2014	1.52	1,007.3		1,007.3			0.0	-1,007.3
5	2015	1.75	2,258.2		2,258.2			0.0	-2,258.2
6	2016	2.01	1,955.4		1,955.4			0.0	-1,955.4
7	2017	2.31	297.7	23.6	321.3	75.4	376.6	452.0	130.7
8	2018	2.66	0.0	41.1	41.1	159.4	727.1	886.5	845.4
9	2019	3.06	0.0	35.7	35.7	168.4	702.2	870.5	834.8
10	2020	3.52	0.0	31.1	31.1	177.9	678.0	855.9	824.8
11	2021	4.05	0.0	86.8	86.8	158.2	612.8	771.0	684.1
12	2022	4.65	0.0	23.5	23.5	140.4	553.7	694.1	670.6
13	2023	5.35	24.4	20.4	44.9	124.7	500.2	624.8	580.0
14	2024	6.15	238.2	17.8	256.0	110.7	452.0	562.7	306.7
15	2025	7.08	207.3	15.4	222.7	98.2	408.4	506.7	284.0
16	2026	8.14	0.0	44.5	44.5	66.2	412.4	478.7	434.2
17	2027	9.36	0.0	13.2	13.2	58.9	371.0	429.9	416.7
18	2028	10.76	0.0	11.5	11.5	52.2	333.7	385.9	374.5
19	2029	12.38	0.0	10.0	10.0	46.4	300.1	346.5	336.5
20	2030	14.23	0.0	8.7	8.7	41.2	270.0	311.1	302.5
21	2031	16.37	0.0	27.1	27.1	36.5	242.8	279.4	252.2
22	2032	18.82	0.0	6.6	6.6	32.5	218.4	250.8	244.3
23	2033	21.64	0.0	5.7	5.7	28.8	196.4	225.2	219.5
24	2034	24.89	0.0	5.0	5.0	25.6	176.6	202.2	197.2
25	2035	28.63	0.0	4.3	4.3	22.7	158.9	181.6	177.3
26	2036	32.92	0.0	13.5	13.5	20.1	142.9	163.0	149.5
27	2037	37.86	0.0	3.3	3.3	17.9	128.5	146.4	143.2
28	2038	43.54	0.0	2.8	2.8	15.9	115.6	131.5	128.6
29	2039	50.07	0.0	2.5	2.5	14.1	104.0	118.1	115.6
30	2040	57.58	0.0	2.1	2.1	12.5	93.5	106.0	103.9
31	2041	66.21	0.0	6.7	6.7	11.1	84.1	95.2	88.5
32	2042	76.14	0.0	1.6	1.6	9.9	75.7	85.5	83.9
33	2043	87.57	0.0	1.4	1.4	8.8	68.1	76.8	75.4
34	2044	100.70	0.0	1.2	1.2	7.8	61.2	69.0	67.8
35	2045	115.80	0.0	1.1	1.1	6.9	55.0	61.9	60.9
36	2046	133.18	0.0	3.3	3.3	6.1	49.5	55.6	52.3
37	2047	153.15	-5.8		-5.8			0.0	5.8
Total			6,430.6	471.5	6,902.1	1,755.3	8,669.3	10,424.6	3,522.5

Net Present Value (Million peso)	3,522.5
B/C Ratio	1.51
EIRR	20.6%

TABLE 8.1.4-2 COST-BENEFIT STREAM (CASE1-2: 4-LANE DEVELOPMENT)

CLLEx Phase-1(4lane)

Undiscounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	0.0		0.0				0.0
2	2012	88.6		88.6				-88.6
3	2013	498.7		498.7				-498.7
4	2014	1,894.2		1,894.2				-1,894.2
5	2015	5,028.5		5,028.5				-5,028.5
6	2016	5,011.9		5,011.9				-5,011.9
7	2017	690.5	61.7	775.3	127.5	1,125.0	1,252.5	477.2
8	2018	0.0	123.4	123.4	314.0	2,403.0	2,717.0	2,593.6
9	2019	0.0	123.4	123.4	387.0	2,566.0	2,953.0	2,829.6
10	2020	0.0	123.4	123.4	476.0	2,741.0	3,217.0	3,093.6
11	2021	0.0	444.1	444.1	486.0	2,835.0	3,321.0	2,876.9
12	2022	0.0	123.4	123.4	496.0	2,932.0	3,428.0	3,304.6
13	2023	0.0	123.4	123.4	507.0	3,033.0	3,540.0	3,416.6
14	2024	0.0	123.4	123.4	517.0	3,137.0	3,654.0	3,530.6
15	2025	0.0	123.4	123.4	528.0	3,245.0	3,773.0	3,649.6
16	2026	0.0	444.1	444.1	539.0	3,356.0	3,895.0	3,450.9
17	2027	0.0	123.4	123.4	551.0	3,472.0	4,023.0	3,899.6
18	2028	0.0	123.4	123.4	562.0	3,591.0	4,153.0	4,029.6
19	2029	0.0	123.4	123.4	574.0	3,714.0	4,288.0	4,164.6
20	2030	0.0	123.4	123.4	586.0	3,842.0	4,428.0	4,304.6
21	2031	0.0	444.1	444.1	598.0	3,974.0	4,572.0	4,127.9
22	2032	0.0	123.4	123.4	611.0	4,110.0	4,721.0	4,597.6
23	2033	0.0	123.4	123.4	623.0	4,251.0	4,874.0	4,750.6
24	2034	0.0	123.4	123.4	636.0	4,397.0	5,033.0	4,909.6
25	2035	0.0	123.4	123.4	650.0	4,548.0	5,198.0	5,074.6
26	2036	0.0	444.1	444.1	663.0	4,704.0	5,367.0	4,922.9
27	2037	0.0	123.4	123.4	677.0	4,866.0	5,543.0	5,419.6
28	2038	0.0	123.4	123.4	691.0	5,033.0	5,724.0	5,600.6
29	2039	0.0	123.4	123.4	706.0	5,206.0	5,912.0	5,788.6
30	2040	0.0	123.4	123.4	720.0	5,385.0	6,105.0	5,981.6
31	2041	0.0	444.1	444.1	736.0	5,570.0	6,306.0	5,861.9
32	2042	0.0	123.4	123.4	751.0	5,761.0	6,512.0	6,388.6
33	2043	0.0	123.4	123.4	767.0	5,959.0	6,726.0	6,602.6
34	2044	0.0	123.4	123.4	783.0	6,163.0	6,946.0	6,822.6
35	2045	0.0	123.4	123.4	799.0	6,375.0	7,174.0	7,050.6
36	2046	0.0	444.1	444.1	816.0	6,594.0	7,410.0	6,965.9
37	2047	-23.0		-23.0			0.0	23.0
Total		13,189.4	5,564.1	18,776.6	17,877.5	124,888.0	142,765.5	123,988.9

Discounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Discounted	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	1.00	0.0		0.0			0.0	0.0
2	2012	1.15	77.0		77.0			0.0	-77.0
3	2013	1.32	377.1		377.1			0.0	-377.1
4	2014	1.52	1,245.5		1,245.5			0.0	-1,245.5
5	2015	1.75	2,875.1		2,875.1			0.0	-2,875.1
6	2016	2.01	2,491.8		2,491.8			0.0	-2,491.8
7	2017	2.31	298.5	26.7	325.2	55.1	486.4	541.5	216.3
8	2018	2.66	0.0	46.4	46.4	118.0	903.4	1,021.4	975.0
9	2019	3.06	0.0	40.3	40.3	126.5	838.8	965.3	925.0
10	2020	3.52	0.0	35.1	35.1	135.3	779.2	914.5	879.4
11	2021	4.05	0.0	109.8	109.8	120.1	700.8	820.9	711.1
12	2022	4.65	0.0	26.5	26.5	106.6	630.2	736.8	710.3
13	2023	5.35	0.0	23.1	23.1	94.8	566.9	661.7	638.6
14	2024	6.15	0.0	20.1	20.1	84.0	509.9	593.9	573.8
15	2025	7.08	0.0	17.4	17.4	74.6	458.6	533.2	515.8
16	2026	8.14	0.0	54.6	54.6	66.2	412.4	478.7	424.1
17	2027	9.36	0.0	13.2	13.2	58.9	371.0	429.9	416.7
18	2028	10.76	0.0	11.5	11.5	52.2	333.7	385.9	374.5
19	2029	12.38	0.0	10.0	10.0	46.4	300.1	346.5	336.5
20	2030	14.23	0.0	8.7	8.7	41.2	270.0	311.1	302.5
21	2031	16.37	0.0	27.1	27.1	36.5	242.8	279.4	252.2
22	2032	18.82	0.0	6.6	6.6	32.5	218.4	250.8	244.3
23	2033	21.64	0.0	5.7	5.7	28.8	196.4	225.2	219.5
24	2034	24.89	0.0	5.0	5.0	25.6	176.6	202.2	197.2
25	2035	28.63	0.0	4.3	4.3	22.7	158.9	181.6	177.3
26	2036	32.92	0.0	13.5	13.5	20.1	142.9	163.0	149.5
27	2037	37.86	0.0	3.3	3.3	17.9	128.5	146.4	143.2
28	2038	43.54	0.0	2.8	2.8	15.9	115.6	131.5	128.6
29	2039	50.07	0.0	2.5	2.5	14.1	104.0	118.1	115.6
30	2040	57.58	0.0	2.1	2.1	12.5	93.5	106.0	103.9
31	2041	66.21	0.0	6.7	6.7	11.1	84.1	95.2	88.5
32	2042	76.14	0.0	1.6	1.6	9.9	75.7	85.5	83.9
33	2043	87.57	0.0	1.4	1.4	8.8	68.1	76.8	75.4
34	2044	100.70	0.0	1.2	1.2	7.8	61.2	69.0	67.8
35	2045	115.80	0.0	1.1	1.1	6.9	55.0	61.9	60.9
36	2046	133.18	0.0	3.3	3.3	6.1	49.5	55.6	52.3
37	2047	153.15	-0.2		-0.2			0.0	0.2
Total			7,364.9	531.4	7,896.3	1,457.1	9,532.6	10,989.7	3,093.4

Net Present Value (Million peso)	3,093.4
B/C Ratio	1.39
EIRR	19.4%

(2) Economic Analysis of Phase-2

Table 8.1.4-3 shows the economic analysis indicators by changing the opening year.
The economic costs and benefits of the project generated a positive NPV and an EIRR that is higher than the government-prescribed hurdle rate (15%). Based on this analysis, economically feasible year is 2021. It is recommended that Phase-2 section will be constructed after phase-1 constructions.

TABLE 8.1.4-3 ECONOMIC INDICATOR OF CLLEX (PHASE-2)

Opening Year	NPV (Million Pesos)	B/C Ratio	EIRR
2017	-959.4	0.88	13.5%
2018	-543.5	0.92	14.0%
2019	-242.5	0.96	14.5%
2020	-37.9	0.99	14.9%
2021	***84.1***	***1.02***	***15.2%***
2022	***175.0***	***1.04***	***15.6%***
2023	***242.5***	***1.07***	***15.9%***
2024	***287.2***	***1.09***	***16.3%***
2025	***315.2***	***1.12***	***16.6%***
2026	***329.9***	***1.14***	***17.0%***
2027	***334.0***	***1.17***	***17.3%***
2028	***331.8***	***1.19***	***17.7%***
2029	***321.0***	***1.22***	***18.0%***
2030	***305.5***	***1.24***	***18.4%***

Source: JICA Study Team

Table 8.1.4-4 shows the Cost Benefit Stream of Phase-2 in case opening year 2022 as sample case.

(3) Economic Analysis of Combination of Phase-1 and Phase-2

The performance at **Table 8.1.4-5** and **Table 8.1.4-6** of the project based on indicators of economic feasibility is:

CASE3-1: Phase-1(Initial Stage 2lane and widening 4-lane) and Phase-2

EIRR	18.0%
B/C	1.30
NPV (Million Peso @ i = 15%)	3,352.7

CASE3-2: Phase-1(4-lane Development) and Phase-2

EIRR	17.4%
B/C	1.24
NPV (Million Peso @ i = 15%)	2,923.7

To compare with case1 (case1-1 and case1-2), although economic indicators of case3 (case3-1 and case-3-2) became worse, the indicators of case3 are still higher than the government-prescribed hurdle rate (15%). These values indicate that the project is economically viable

TABLE 8.1.4-4 COST-BENEFIT STREAM (CASE 2: PHASE-2 OPENING YEAR 2022)

CLLEx Phase-2 (Opening Year 2022)

Undiscounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011			0.0			0.0	0.0
2	2012			0.0			0.0	0.0
3	2013			0.0			0.0	0.0
4	2014			0.0			0.0	0.0
5	2015			0.0			0.0	0.0
6	2016			0.0			0.0	0.0
7	2017			0.0			0.0	0.0
8	2018	952.5		952.5			0.0	-952.5
9	2019	2,785.5		2,785.5			0.0	-2,785.5
10	2020	4,734.2		4,734.2			0.0	-4,734.2
11	2021	4,734.2		4,734.2			0.0	-4,734.2
12	2022		127.5	127.5	635.6	1,540.1	2,175.7	2,048.2
13	2023		127.5	127.5	661.8	1,580.6	2,242.4	2,114.9
14	2024		127.5	127.5	689.2	1,622.1	2,311.3	2,183.8
15	2025		127.5	127.5	717.6	1,664.8	2,382.4	2,254.9
16	2026		427.4	427.4	747.3	1,708.6	2,455.8	2,028.4
17	2027		127.5	127.5	778.1	1,753.5	2,531.6	2,404.1
18	2028		127.5	127.5	810.3	1,799.6	2,609.8	2,482.3
19	2029		127.5	127.5	843.7	1,846.9	2,690.6	2,563.1
20	2030		127.5	127.5	878.6	1,895.4	2,774.0	2,646.5
21	2031		427.4	427.4	914.8	1,945.3	2,860.1	2,432.7
22	2032		127.5	127.5	952.6	1,996.4	2,949.0	2,821.5
23	2033		127.5	127.5	991.9	2,048.9	3,040.9	2,913.3
24	2034		127.5	127.5	1,032.9	2,102.8	3,135.7	3,008.2
25	2035		127.5	127.5	1,075.6	2,158.1	3,233.6	3,106.1
26	2036		427.4	427.4	1,120.0	2,214.8	3,334.8	2,907.4
27	2037		127.5	127.5	1,166.2	2,273.0	3,439.3	3,311.7
28	2038		127.5	127.5	1,214.4	2,332.8	3,547.2	3,419.7
29	2039		127.5	127.5	1,264.5	2,394.1	3,658.7	3,531.1
30	2040		127.5	127.5	1,316.7	2,457.1	3,773.8	3,646.3
31	2041		427.4	427.4	1,371.1	2,521.7	3,892.8	3,465.4
32	2042		127.5	127.5	1,427.7	2,588.0	4,015.7	3,888.2
33	2043		127.5	127.5	1,486.7	2,656.0	4,142.7	4,015.2
34	2044		127.5	127.5	1,548.1	2,725.8	4,273.9	4,146.4
35	2045		127.5	127.5	1,612.0	2,797.5	4,409.5	4,282.0
36	2046		427.4	427.4	1,678.6	2,871.1	4,549.6	4,122.2
37	2047	-1,762.3		-1,762.3			0.0	1,762.3
Total		11,444.1	4,687.3	16,131.5	26,936.0	53,494.9	80,430.9	64,299.5

Discounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Discounted	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	1.00			0.0			0.0	0.0
2	2012	1.15			0.0			0.0	0.0
3	2013	1.32			0.0			0.0	0.0
4	2014	1.52			0.0			0.0	0.0
5	2015	1.75			0.0			0.0	0.0
6	2016	2.01			0.0			0.0	0.0
7	2017	2.31	0.0		0.0			0.0	0.0
8	2018	2.66	358.1		358.1			0.0	-358.1
9	2019	3.06	910.6		910.6			0.0	-910.6
10	2020	3.52	1,345.8		1,345.8			0.0	-1,345.8
11	2021	4.05	1,170.2		1,170.2			0.0	-1,170.2
12	2022	4.65		27.4	27.4	136.6	331.0	467.6	440.2
13	2023	5.35		23.8	23.8	123.7	295.4	419.1	395.3
14	2024	6.15		20.7	20.7	112.0	263.6	375.7	354.9
15	2025	7.08		18.0	18.0	101.4	235.3	336.7	318.7
16	2026	8.14		52.5	52.5	91.8	210.0	301.8	249.3
17	2027	9.36		13.6	13.6	83.2	187.4	270.5	256.9
18	2028	10.76		11.8	11.8	75.3	167.2	242.5	230.7
19	2029	12.38		10.3	10.3	68.2	149.2	217.4	207.1
20	2030	14.23		9.0	9.0	61.7	133.2	194.9	186.0
21	2031	16.37		26.1	26.1	55.9	118.9	174.8	148.6
22	2032	18.82		6.8	6.8	50.6	106.1	156.7	149.9
23	2033	21.64		5.9	5.9	45.8	94.7	140.5	134.6
24	2034	24.89		5.1	5.1	41.5	84.5	126.0	120.9
25	2035	28.63		4.5	4.5	37.6	75.4	113.0	108.5
26	2036	32.92		13.0	13.0	34.0	67.3	101.3	88.3
27	2037	37.86		3.4	3.4	30.8	60.0	90.8	87.5
28	2038	43.54		2.9	2.9	27.9	53.6	81.5	78.5
29	2039	50.07		2.5	2.5	25.3	47.8	73.1	70.5
30	2040	57.58		2.2	2.2	22.9	42.7	65.5	63.3
31	2041	66.21		6.5	6.5	20.7	38.1	58.8	52.3
32	2042	76.14		1.7	1.7	18.8	34.0	52.7	51.1
33	2043	87.57		1.5	1.5	17.0	30.3	47.3	45.9
34	2044	100.70		1.3	1.3	15.4	27.1	42.4	41.2
35	2045	115.80		1.1	1.1	13.9	24.2	38.1	37.0
36	2046	133.18		3.2	3.2	12.6	21.6	34.2	31.0
37	2047	153.15	-11.5		-11.5			0.0	11.5
Total			3,773.1	274.8	4,048.0	1,324.5	2,898.4	4,223.0	175.0

Net Present Value (Million peso)	175.0
B/C Ratio	1.04
EIRR	15.6%

TABLE 8.1.4-5 COST-BENEFIT STREAM (CASE3-1: PHASE-1(INITIAL STAGE 2LANE AND WIDENING 4-LANE) AND PHASE-2)

Undiscounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	0.0		0.0				0.0
2	2012	84.7		84.7				-84.7
3	2013	494.8		494.8				-494.8
4	2014	1,532.0		1,532.0				-1,532.0
5	2015	3,949.6		3,949.6				-3,949.6
6	2016	4,222.9		4,222.9				-4,222.9
7	2017	1,369.5	54.6	1,469.8	174.5	871.0	1,045.5	-424.3
8	2018	2,098.7	109.3	2,348.0	424.0	1,934.0	2,358.0	10.0
9	2019	3,379.0	109.3	3,826.2	515.0	2,148.0	2,663.0	-1,163.2
10	2020	3,379.0	109.3	3,938.8	626.0	2,385.0	3,011.0	-927.8
11	2021	3,379.0	351.3	4,293.5	640.0	2,479.0	3,119.0	-1,174.5
12	2022	0.0	236.8	236.8	1,288.6	4,116.1	5,404.7	5,167.9
13	2023	130.7	236.8	398.0	1,328.8	4,256.6	5,585.4	5,187.4
14	2024	1,465.9	236.8	2,093.6	1,370.2	4,403.1	5,773.3	3,679.7
15	2025	1,466.6	236.8	2,143.3	1,412.6	4,554.8	5,967.4	3,824.1
16	2026	0.0	789.3	789.3	1,286.3	5,064.6	6,350.8	5,561.5
17	2027	0.0	250.9	250.9	1,329.1	5,225.5	6,554.6	6,303.7
18	2028	0.0	250.9	250.9	1,372.3	5,390.6	6,762.8	6,511.9
19	2029	0.0	250.9	250.9	1,417.7	5,560.9	6,978.6	6,727.7
20	2030	0.0	250.9	250.9	1,464.6	5,737.4	7,202.0	6,951.1
21	2031	0.0	871.5	871.5	1,512.8	5,919.3	7,432.1	6,560.6
22	2032	0.0	250.9	250.9	1,563.6	6,106.4	7,670.0	7,419.1
23	2033	0.0	250.9	250.9	1,614.9	6,299.9	7,914.9	7,664.0
24	2034	0.0	250.9	250.9	1,668.9	6,499.8	8,168.7	7,917.8
25	2035	0.0	250.9	250.9	1,725.6	6,706.1	8,431.6	8,180.7
26	2036	0.0	871.5	871.5	1,783.0	6,918.8	8,701.8	7,830.3
27	2037	0.0	250.9	250.9	1,843.2	7,139.0	8,982.3	8,731.4
28	2038	0.0	250.9	250.9	1,905.4	7,365.8	9,271.2	9,020.3
29	2039	0.0	250.9	250.9	1,970.5	7,600.1	9,570.7	9,319.8
30	2040	0.0	250.9	250.9	2,036.7	7,842.1	9,878.8	9,627.9
31	2041	0.0	871.5	871.5	2,107.1	8,091.7	10,198.8	9,327.3
32	2042	0.0	250.9	250.9	2,178.7	8,349.0	10,527.7	10,276.8
33	2043	0.0	250.9	250.9	2,253.7	8,615.0	10,868.7	10,617.8
34	2044	0.0	250.9	250.9	2,331.1	8,888.8	11,219.9	10,969.0
35	2045	0.0	250.9	250.9	2,411.0	9,172.5	11,583.5	11,332.6
36	2046	0.0	871.5	871.5	2,494.6	9,465.1	11,959.6	11,088.1
37	2047	-2,398.5		-2,398.5			0.0	2,398.5
Total		24,553.8	9,970.8	36,923.1	46,050.5	175,105.9	221,156.4	184,233.3

Discounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Discounted	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	1.00	0.0		0.0			0.0	0.0
2	2012	1.15	73.7		73.7			0.0	-73.7
3	2013	1.32	374.2		374.2			0.0	-374.2
4	2014	1.52	1,007.3		1,007.3			0.0	-1,007.3
5	2015	1.75	2,258.2		2,258.2			0.0	-2,258.2
6	2016	2.01	2,099.5		2,099.5			0.0	-2,099.5
7	2017	2.31	592.1	23.6	615.7	75.4	376.6	452.0	-163.7
8	2018	2.66	789.0	41.1	830.1	159.4	727.1	886.5	56.4
9	2019	3.06	1,104.6	35.7	1,140.3	168.4	702.2	870.5	-269.8
10	2020	3.52	960.5	31.1	991.6	177.9	678.0	855.9	-135.7
11	2021	4.05	835.2	86.8	922.1	158.2	612.8	771.0	-151.1
12	2022	4.65	0.0	50.9	50.9	277.0	884.7	1,161.7	1,110.8
13	2023	5.35	24.4	44.3	68.7	248.4	795.6	1,044.0	975.3
14	2024	6.15	238.2	38.5	276.7	222.7	715.6	938.3	661.6
15	2025	7.08	207.3	33.5	240.7	199.6	643.7	843.4	602.6
16	2026	8.14	0.0	97.0	97.0	158.1	622.4	780.5	683.5
17	2027	9.36	0.0	26.8	26.8	142.0	558.4	700.5	673.6
18	2028	10.76	0.0	23.3	23.3	127.5	500.9	628.4	605.1
19	2029	12.38	0.0	20.3	20.3	114.6	449.3	563.9	543.6
20	2030	14.23	0.0	17.6	17.6	102.9	403.1	506.1	488.4
21	2031	16.37	0.0	53.3	53.3	92.4	361.7	454.1	400.9
22	2032	18.82	0.0	13.3	13.3	83.1	324.4	407.5	394.2
23	2033	21.64	0.0	11.6	11.6	74.6	291.1	365.7	354.1
24	2034	24.89	0.0	10.1	10.1	67.0	261.1	328.2	318.1
25	2035	28.63	0.0	8.8	8.8	60.3	234.3	294.6	285.8
26	2036	32.92	0.0	26.5	26.5	54.2	210.2	264.3	237.9
27	2037	37.86	0.0	6.6	6.6	48.7	188.6	237.3	230.6
28	2038	43.54	0.0	5.8	5.8	43.8	169.2	213.0	207.2
29	2039	50.07	0.0	5.0	5.0	39.4	151.8	191.2	186.2
30	2040	57.58	0.0	4.4	4.4	35.4	136.2	171.6	167.2
31	2041	66.21	0.0	13.2	13.2	31.8	122.2	154.0	140.9
32	2042	76.14	0.0	3.3	3.3	28.6	109.6	138.3	135.0
33	2043	87.57	0.0	2.9	2.9	25.7	98.4	124.1	121.3
34	2044	100.70	0.0	2.5	2.5	23.1	88.3	111.4	108.9
35	2045	115.80	0.0	2.2	2.2	20.8	79.2	100.0	97.9
36	2046	133.18	0.0	6.5	6.5	18.7	71.1	89.8	83.3
37	2047	153.15	-15.7		-15.7			0.0	15.7
Total			10,548.5	746.3	11,294.8	3,079.8	11,567.8	14,647.6	3,352.7

Net Present Value (Million peso)	3,352.7
B/C Ratio	1.30
EIRR	18.0%

TABLE 8.1.4-6 COST-BENEFIT STREAM (CASE3-2: PHASE-1(4-LANE DEVELOPMENT) AND PHASE-2)

Undiscounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	0.0		0.0				0.0
2	2012	88.6		88.6				-88.6
3	2013	498.7		498.7				-498.7
4	2014	1,894.2		1,894.2				-1,894.2
5	2015	5,028.5		5,028.5				-5,028.5
6	2016	5,301.7		5,301.7				-5,301.7
7	2017	1,371.4	61.7	1,478.8	127.5	1,125.0	1,252.5	-226.3
8	2018	2,098.7	123.4	2,362.0	314.0	2,403.0	2,717.0	355.0
9	2019	3,379.0	123.4	3,840.3	387.0	2,566.0	2,953.0	-887.3
10	2020	3,379.0	123.4	3,952.9	476.0	2,741.0	3,217.0	-735.9
11	2021	3,379.0	444.1	4,386.2	486.0	2,835.0	3,321.0	-1,065.2
12	2022	0.0	250.9	250.9	1,131.6	4,472.1	5,603.7	5,352.8
13	2023	0.0	250.9	250.9	1,168.8	4,613.6	5,782.4	5,531.5
14	2024	0.0	250.9	250.9	1,206.2	4,759.1	5,965.3	5,714.4
15	2025	0.0	250.9	250.9	1,245.6	4,909.8	6,155.4	5,904.5
16	2026	0.0	871.5	871.5	1,286.3	5,064.6	6,350.8	5,479.3
17	2027	0.0	250.9	250.9	1,329.1	5,225.5	6,554.6	6,303.7
18	2028	0.0	250.9	250.9	1,372.3	5,390.6	6,762.8	6,511.9
19	2029	0.0	250.9	250.9	1,417.7	5,560.9	6,978.6	6,727.7
20	2030	0.0	250.9	250.9	1,464.6	5,737.4	7,202.0	6,951.1
21	2031	0.0	871.5	871.5	1,512.8	5,919.3	7,432.1	6,560.6
22	2032	0.0	250.9	250.9	1,563.6	6,106.4	7,670.0	7,419.1
23	2033	0.0	250.9	250.9	1,614.9	6,299.9	7,914.9	7,664.0
24	2034	0.0	250.9	250.9	1,668.9	6,499.8	8,168.7	7,917.8
25	2035	0.0	250.9	250.9	1,725.6	6,706.1	8,431.6	8,180.7
26	2036	0.0	871.5	871.5	1,783.0	6,918.8	8,701.8	7,830.3
27	2037	0.0	250.9	250.9	1,843.2	7,139.0	8,982.3	8,731.4
28	2038	0.0	250.9	250.9	1,905.4	7,365.8	9,271.2	9,020.3
29	2039	0.0	250.9	250.9	1,970.5	7,600.1	9,570.7	9,319.8
30	2040	0.0	250.9	250.9	2,036.7	7,842.1	9,878.8	9,627.9
31	2041	0.0	871.5	871.5	2,107.1	8,091.7	10,198.8	9,327.3
32	2042	0.0	250.9	250.9	2,178.7	8,349.0	10,527.7	10,276.8
33	2043	0.0	250.9	250.9	2,253.7	8,615.0	10,868.7	10,617.8
34	2044	0.0	250.9	250.9	2,331.1	8,888.8	11,219.9	10,969.0
35	2045	0.0	250.9	250.9	2,411.0	9,172.5	11,583.5	11,332.6
36	2046	0.0	871.5	871.5	2,494.6	9,465.1	11,959.6	11,088.1
37	2047	-1,537.2		-1,537.2			0.0	1,537.2
Total		24,881.7	10,251.5	36,670.4	44,813.5	178,382.9	223,196.4	186,526.1

Discounted Benefit Cost Stream Revenue

Million Peso

sq	Year	Discounted	Construction Cost	O &M	Cost Total	VOC Benefit	TTC Benefit	Benefit	Benefit - Cost
1	2011	1.00	0.0		0.0			0.0	0.0
2	2012	1.15	77.0		77.0			0.0	-77.0
3	2013	1.32	377.1		377.1			0.0	-377.1
4	2014	1.52	1,245.5		1,245.5			0.0	-1,245.5
5	2015	1.75	2,875.1		2,875.1			0.0	-2,875.1
6	2016	2.01	2,635.9		2,635.9			0.0	-2,635.9
7	2017	2.31	592.9	26.7	619.6	55.1	486.4	541.5	-78.1
8	2018	2.66	789.0	46.4	835.4	118.0	903.4	1,021.4	186.0
9	2019	3.06	1,104.6	40.3	1,144.9	126.5	838.8	965.3	-179.6
10	2020	3.52	960.5	35.1	995.6	135.3	779.2	914.5	-81.1
11	2021	4.05	835.2	109.8	945.0	120.1	700.8	820.9	-124.1
12	2022	4.65	0.0	53.9	53.9	243.2	961.2	1,204.5	1,150.5
13	2023	5.35	0.0	46.9	46.9	218.5	862.3	1,080.8	1,033.9
14	2024	6.15	0.0	40.8	40.8	196.0	773.5	969.5	928.8
15	2025	7.08	0.0	35.5	35.5	176.0	693.9	869.9	834.5
16	2026	8.14	0.0	107.1	107.1	158.1	622.4	780.5	673.4
17	2027	9.36	0.0	26.8	26.8	142.0	558.4	700.5	673.6
18	2028	10.76	0.0	23.3	23.3	127.5	500.9	628.4	605.1
19	2029	12.38	0.0	20.3	20.3	114.6	449.3	563.9	543.6
20	2030	14.23	0.0	17.6	17.6	102.9	403.1	506.1	488.4
21	2031	16.37	0.0	53.3	53.3	92.4	361.7	454.1	400.9
22	2032	18.82	0.0	13.3	13.3	83.1	324.4	407.5	394.2
23	2033	21.64	0.0	11.6	11.6	74.6	291.1	365.7	354.1
24	2034	24.89	0.0	10.1	10.1	67.0	261.1	328.2	318.1
25	2035	28.63	0.0	8.8	8.8	60.3	234.3	294.6	285.8
26	2036	32.92	0.0	26.5	26.5	54.2	210.2	264.3	237.9
27	2037	37.86	0.0	6.6	6.6	48.7	188.6	237.3	230.6
28	2038	43.54	0.0	5.8	5.8	43.8	169.2	213.0	207.2
29	2039	50.07	0.0	5.0	5.0	39.4	151.8	191.2	186.2
30	2040	57.58	0.0	4.4	4.4	35.4	136.2	171.6	167.2
31	2041	66.21	0.0	13.2	13.2	31.8	122.2	154.0	140.9
32	2042	76.14	0.0	3.3	3.3	28.6	109.6	138.3	135.0
33	2043	87.57	0.0	2.9	2.9	25.7	98.4	124.1	121.3
34	2044	100.70	0.0	2.5	2.5	23.1	88.3	111.4	108.9
35	2045	115.80	0.0	2.2	2.2	20.8	79.2	100.0	97.9
36	2046	133.18	0.0	6.5	6.5	18.7	71.1	89.8	83.3
37	2047	153.15	-10.0		-10.0			0.0	10.0
Total			11,482.8	806.2	12,289.0	2,781.7	12,431.0	15,212.7	2,923.7

Net Present Value (Million peso)	2,923.7
B/C Ratio	1.24
EIRR	17.4%

8.1.5 Project Sensitivity

The project sensitivity to identified risks is shown in **Table 8.1.5-1** and **Table 8.1.5-2.**

TABLE 8.1.5-1 PROJECT SENSITIVITY
(CASE 1-1: INITIAL 2-LANE, 4-LANE WIDENING)

	NPV (Million Pesos)	**B/C**	**EIRR**
Base Case	3522.5	1.50	20.6%
Cost plus 10%	2843.0	1.37	19.1%
Cost plus 20%	2196.6	1.27	17.9%
Benefit less 10%	2446.9	1.35	18.9%
Benefit less 20%	1404.4	1.20	17.2%
Cost plus 10%, Benefit less 10%	1800.5	1.24	17.6%
Cost plus 10%, Benefit less 20%	758.1	1.10	16.0%
Cost plus 20%, Benefit less 10%	1154.1	1.14	16.5%
Cost plus 20%, Benefit less 20%	111.7	1.01	15.0%

Source: JICA Study Team

TABLE 8.1.5-2 PROJECT SENSITIVITY (CASE 1-2: 4-LANE DEVELOPMENT)

	NPV (Million Pesos)	**B/C**	**EIRR**
Base Case	3093.4	1.39	19.4%
Cost plus 10%	2502.7	1.29	18.3%
Cost plus 20%	1911.9	1.20	17.3%
Benefit less 10%	2140.2	1.27	18.1%
Benefit less 20%	1186.9	1.15	16.8%
Cost plus 10%, Benefit less 10%	1549.4	1.18	17.1%
Cost plus 10%, Benefit less 20%	596.2	1.07	15.8%
Cost plus 20%, Benefit less 10%	958.6	1.10	16.2%
Cost plus 20%, Benefit less 20%	5.4	1.00	15.0%

Source: JICA Study Team

Results of Case1-1 and Case1-2 show that the project is able to hurdle the minimum acceptance criteria of EIRR = 15% and NPV = 0 in all case.

8.2 FINANCIAL EVALUATION

8.2.1 Procedure of Financial Analysis

The procedure of financial analysis is shown in **Figure 8.2-1**.

Firstly, the input data for financial analysis is settled. The toll tariff revenue for CLLEX Project is estimated as shown in chapter 4 as well as the project cost is estimated as shown in chapter 7. Since the PPP modality for CLLEX in this study is assumed to be lease scheme with Japanese ODA Loan as mentioned in the following section, some conditions for financial analysis are assumed based on terms and conditions of Japanese ODA Loan. Other conditions like financing by the Concessionaire are assumed based on the study for NAIAX Phase II Project.

In the next step, the financial viability of CLLEX is examined based on the estimation and the assumption.

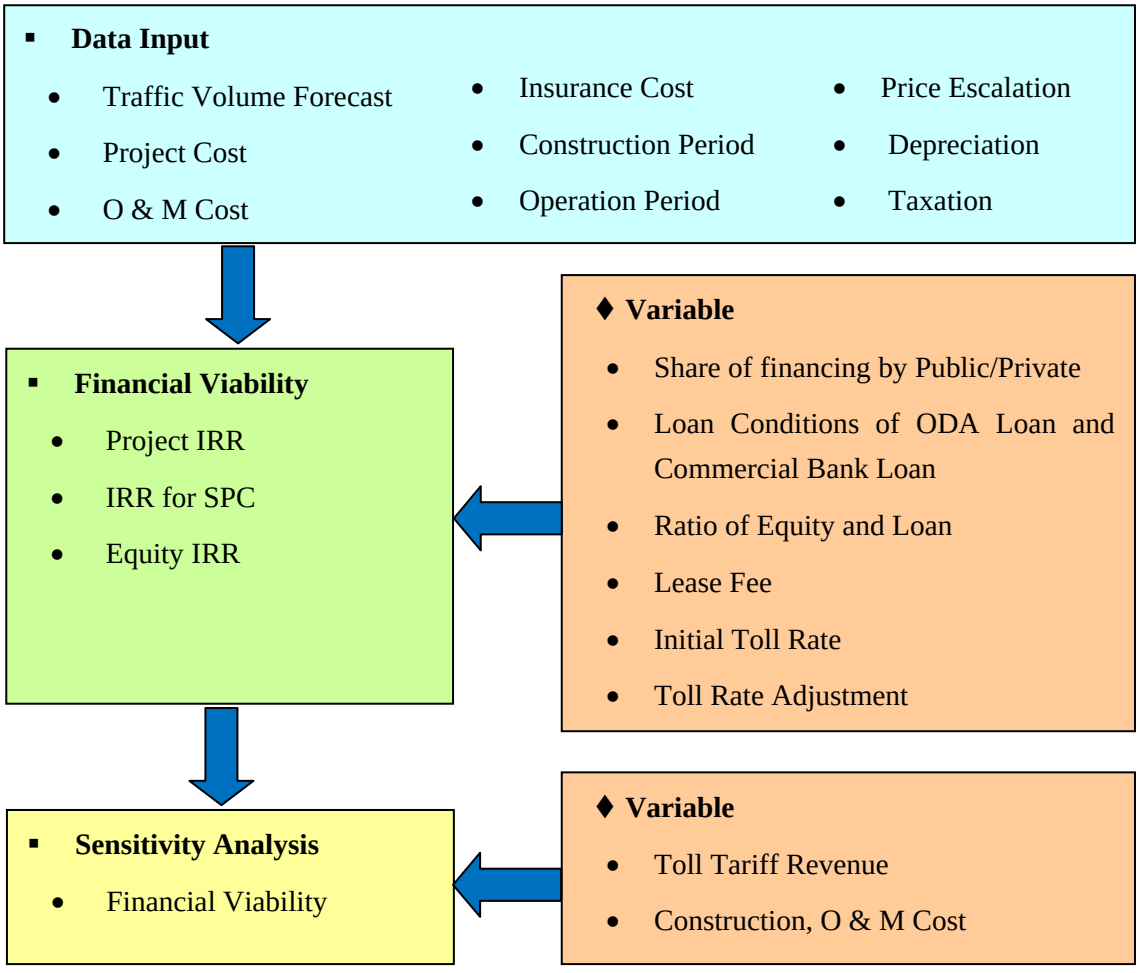


FIGURE 8.2-1 PROCEDURE OF FINANCIAL ANALYSIS FOR CLLEX

8.2.2 SELECTION OF PPP MODALITY

In this study, the adoption of Lease scheme with Japanese ODA Loan is assumed basically for CLLEX. The diagram on the assumed PPP modality is shown in **Figure 8.2-2**.

Under the PPP modality, the DPWH is assumed to be responsible for ROW acquisition, detailed design and construction of main civil work with Japanese ODA Loan and partial mobilization of the DPWH own budget. On the other hand, the Concessionaire is assumed to be responsible for partial construction including installation of Toll facilities as well as O&M during the Concession period.

In addition, the Concessionaire is assumed to be responsible for the payment of lease fee to the DPWH as well as the collection of toll tariff from the CLLEX users. The DPWH is assumed to receive lease fee from the Concessionaire as compensation for the amortization of the ODA Loan.

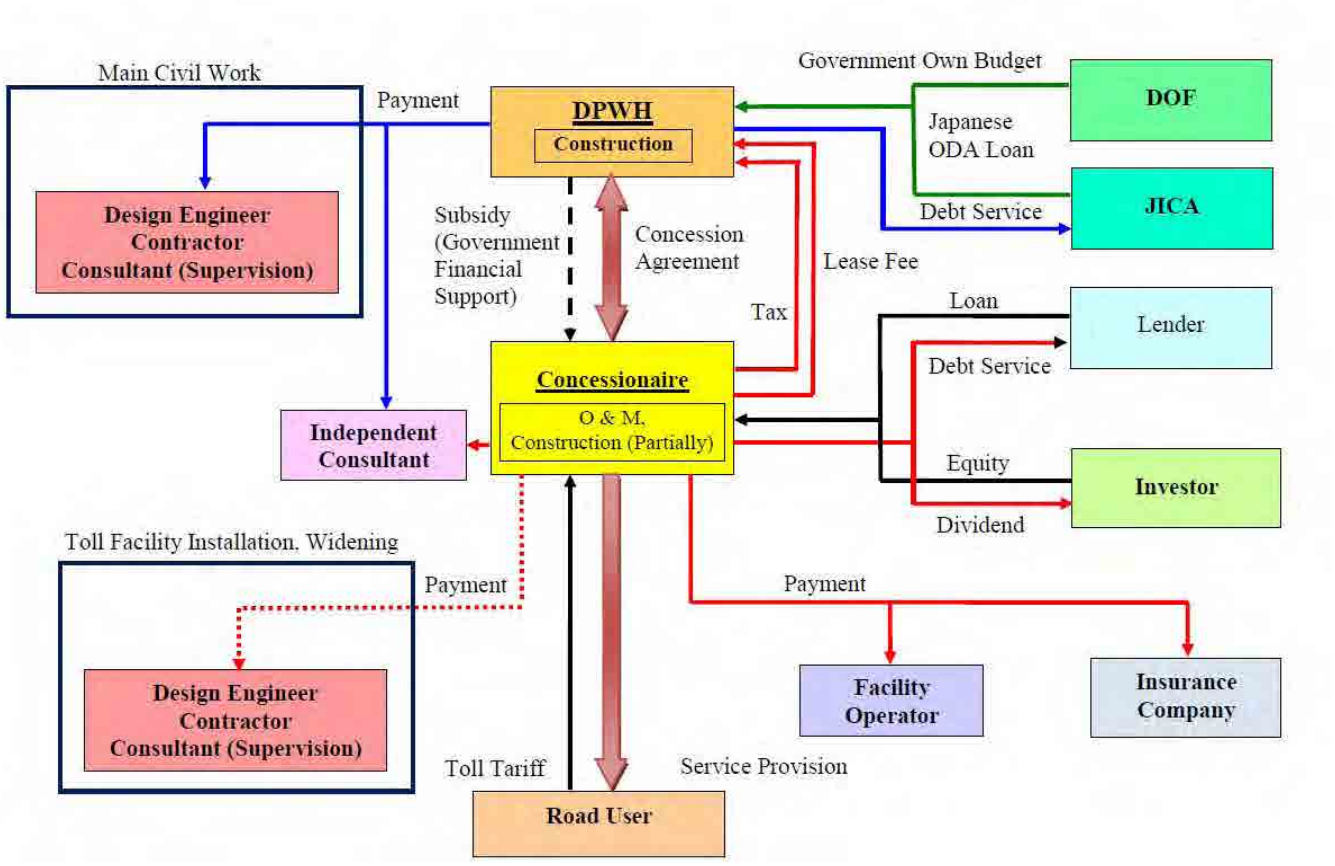


FIGURE 8.2-2 PPP MODALITY (LEASE) FOR CLLEX

In this study, 5 types of PPP modality for CLLEX shown in **Table 8.2-1** are assumed based on construction section and responsibility sharing of construction.

In the cases of Option 1 (Phase 1: 2-lane and Widening), the Concessionaire will bear the responsibility of widening of Phase 1. Therefore, the share of financing by private sector for construction under Option 1 is larger than Option 2.

Additionally, in the case of Phase 1&2 with Option 2, the PPP modality in which Phase 1 will be implemented under Lease Scheme and Phase 2 will be implemented under BTO with Government Financial Support is also studied.

TABLE 8.2-1 TYPE OF PPP MODALITY FOR FINANCIAL ANALYSIS OF CLLEX

Construction Section		PPP Modality	RESPONSIBILITY SHARING						
			ROW Acquisition & Project Administration	Construction of main civil work (including Finance)			Installation of Toll Facilities, O&M	Collection of Toll Tariff	Payment to Government
				Phase 1		Phase 2			
	Phase 1			2 lanes	Additional 2 lanes	2 lanes			
Phase 1 only	Option 1 (2-lane & Widening)	Lease (Widening by Private)	DPWH	DPWH with ODA	Private (Widening)		Private	Private	Private pays Lease Fee (as compensation for the amortization of ODA.)
	Option 2 (4-lane)	Lease		DPWH with ODA					
Phase 1 & Phase 2 (2-lane)	Option 1 (2-lane & Widening)	Lease (Widening by Private)		DPWH with ODA	Private (Widening)	DPWH with ODA			
	Option 2 (4-lane)	Lease		DPWH with ODA					
		Lease & BTO		DPWH with ODA		Private with GFS			

8.2.3 ASSUMPTIONS AND CONDITIONS FOR FINANCIAL ANALYSIS

(1) BASIC PARAMETERS

The basic parameters in the case of CLLEX Phase 1 are shown in **Table 8.2-2**.

TABLE 8.2-2 ASSUMPTIONS AND CONDITIONS OF FINANCIAL ANALYSIS OF CLLEX PHASE 1

Item			Assumptions and Conditions	
			Option 1 (2-lane & widening)	Option 2 (4-lane)
1. PPP Modality			Lease Scheme	
2. Base Year			2011	
3. Operation	Operation Period		34 years (From July 2017 to December 2050)	
	Opening year of 4-lane		January 2026	
4. Price Escalation	Foreign		1.6%	
	Local		3.8%	
5. Toll Rate	Initial Toll Rate in 2017		3.0 Pesos/vehicle*km (Class 1)	
	Toll Rate Adjustment		100% every 2 years (+7.6%)	
6. Financing				
(1) ODA Loan				
Signing L/A			February 2012	
Interest rate	Civil work		1.4%	
	Consultancy Service		0.01%	
Loan Repayment Period			30 years (From 2012 to 2042)	
Grace Period			10 years (From 2012 to 2022)	
Repayment Structure			Even annuity basis	
Commitment Charge			0.1% of Loan	
(2) Commercial Bank Loan				
Financing Closure	Toll Facility Installation		2016	
	Widening		2023	
Interest rate			10.49%	
Repayment Period			12 years	
Grace Period			3 years	
Repayment Structure			Even annuity basis	
Financing Charge			1.0% of Loan	
Short-term loan	Interest Rate		5% (In this study, it is assumed that short-term loan is mobilized to supplement negative cash flow.)	
	Repayment Period		1 year	
7. Depreciation	Methodology		Linear	
	Depreciation Period	Toll Facility Installation	34 years	
		Widening	25 years	
8. Taxation	Corporate Income Tax Rate		30%	
	~~Corporate Income Tax~~		~~7 years from the commencement of the~~	

Item		Assumptions and Conditions	
		Option 1 (2-lane & widening)	Option 2 (4-lane)
	Holiday	operation (in accordance with Executive Order No. 226, The Omnibus Investments Code of 1987)	
	Net Operating Loss Carry Over	The Net Operating Loss of the Concessionaire shall be carried over as a deduction from gross income for the next 3 taxable years.	
	Local Government Tax	3% of Gross Revenue	
	VAT	No	
	Property Tax	No	

The basic parameters in the case of CLLEX Phase 1&2 are shown in **Table 8.2-3**.

TABLE 8.2-3 ASSUMPTIONS AND CONDITIONS
OF FINANCIAL ANALYSIS OF CLLEX PHASE 1&2

Yellow: Difference from the case of Phase 1

Item			Assumptions and Conditions		
			Phase 1		Phase 2 (2-lane)
			Option 1 (2-lane & widening)	Option 2 (4-lane)	
1. PPP Modality			Lease Scheme		
2. Base Year			2011		
3. Operation	Operation Period		35 years (From July 2017 to December 2051)		
	Opening year of Phase 1 (4-lane)		January 2026		
	Opening year of Phase 2				January 2022
4. Price Escalation	Foreign		1.6%		
	Local		3.8%		
5. Toll Rate	Initial Toll Rate in 2017		3.0 Pesos/vehicle*km (Class 1)		
	Toll Rate Adjustment		100% every 2 years (+7.6%)		
6. Financing					
(1) ODA Loan					
Signing L/A			February 2012		December 2015
Interest rate	Civil work		1.4%		
	Consultancy Service		0.01%		
Loan Repayment Period			30 years (From 2012 to 2042)		30 years (From 2015 to 2045)
Grace Period			10 years (From 2012 to 2022)		10 years (From 2015 to 2025)
Repayment Structure			Even annuity basis		
Commitment Charge			0.1% of Loan		
(2) Commercial Bank Loan					
Financing Closure	Toll Facility Installation		2016		2021
	Widening		2023		
Interest rate			10.49%		
Repayment Period			12 years		
Grace Period			3 years		
Repayment Structure			Even annuity basis		
Financing Charge			1.0% of Loan		
Short-term loan	Interest Rate		5%		
	Repayment Period		1 year		
7. Depreciation	Methodology		Linear		
	Depreciation Period	Toll Facility Installation	35 years		30 years
		Widening	26 years		

Item		Assumptions and Conditions		
		Phase 1		Phase 2 (2-lane)
		Option 1 (2-lane & widening)	Option 2 (4-lane)	
8. Taxation	Corporate Income Tax Rate	30%		
	Corporate Income Tax Holiday	7 years from the commencement of the operation		
	Net Operating Loss Carry Over	The Net Operating Loss of the Concessionaire shall be carried over as a deduction from gross income for the next 3 taxable years.		
	Local Government Tax	3% of Gross Revenue		
	VAT	No		
	Property Tax	No		

The basis for the assumptions and conditions on major items is shown in **Table 8.2-4**.

TABLE 8.2-4 BASIS FOR ASSUMPTIONS AND CONDITIONS

Item		Basis for Assumptions and Conditions
Operation Period	Phase 1	It is assumed that the end of operation is **25 years later from the opening of widened 4-lane** under Option 1 in 2026.
	Phase 1 & 2	It is assumed that the end of operation is **30 years later from the opening of Phase 2** in 2022.
Price Escalation		Based on JICA's criteria for ODA Loan
ODA Loan		Based on terms and conditions for Japanese ODA Loan stipulated by JICA at present. It is assumed that the standard condition in general terms for Lower-Middle-Income Countries is eligible.
Commercial Bank Loan		Based on the study for NAIA Expressway Phase 2.
Short-term Loan		Based on the 1-year Treasury Bills in the Philippines.
Depreciation Period		It is assumed that there is no salvage value at the end of the Concession period. Because the Concessionaire has to transfer the facility to the government without compensation. That's why depreciation period in this study is the same as from the opening to the end of concession period.

(2) LEASE FEE

The assumptions for lease fee are shown in **Table 8.2-5**.

TABLE 8.2-5 ASSUMPTIONS FOR LEASE FEE

Item		Assumptions
Amount of Lease Fee		Lease fee will be paid to the DPWH by the Concessionaire to compensate repayment of ODA Loan. In this study, amount of the lease fee is assumed to be **equal to amount of principal and interest of ODA Loan** excluding Interest During Construction and Commitment Charge.
Annual Lease Fee	**Scenario 1: Constant**	Constant annual lease fee is paid.
	Scenario 2: ODA Loan Amortization basis	Annual lease fee is equal to annual amortization of ODA Loan.
	Scenario 3: Linear	Annual lease fee will increase by constant value every year.
Lease Fee Payment Period	**Scenario A : Repayment Period of ODA Loan basis**	From the opening to the end of repayment period of ODA Loan.
	Scenario B : Operation Period	From the opening to the end of Concession period.
Exchange Rate Risks		-10% decrease of current exchange rate(Yen/Pesos) (The value of amortization of ODA Loan in Pesos will be increase.) Based on the trend of exchange rate for the past 10 years.

The conceptual diagram of annual lease fee under each scenario on lease fee is shown in **Figure 8.2-3**.

The financial viability for the Concessionaire will be improved when the expense of the Concessionaire decreases during the initial operation stage. Therefore, the Scenario 3 and B, of which the annual lease fee during the initial operation stage is low, are favorable for the Concessionaire.

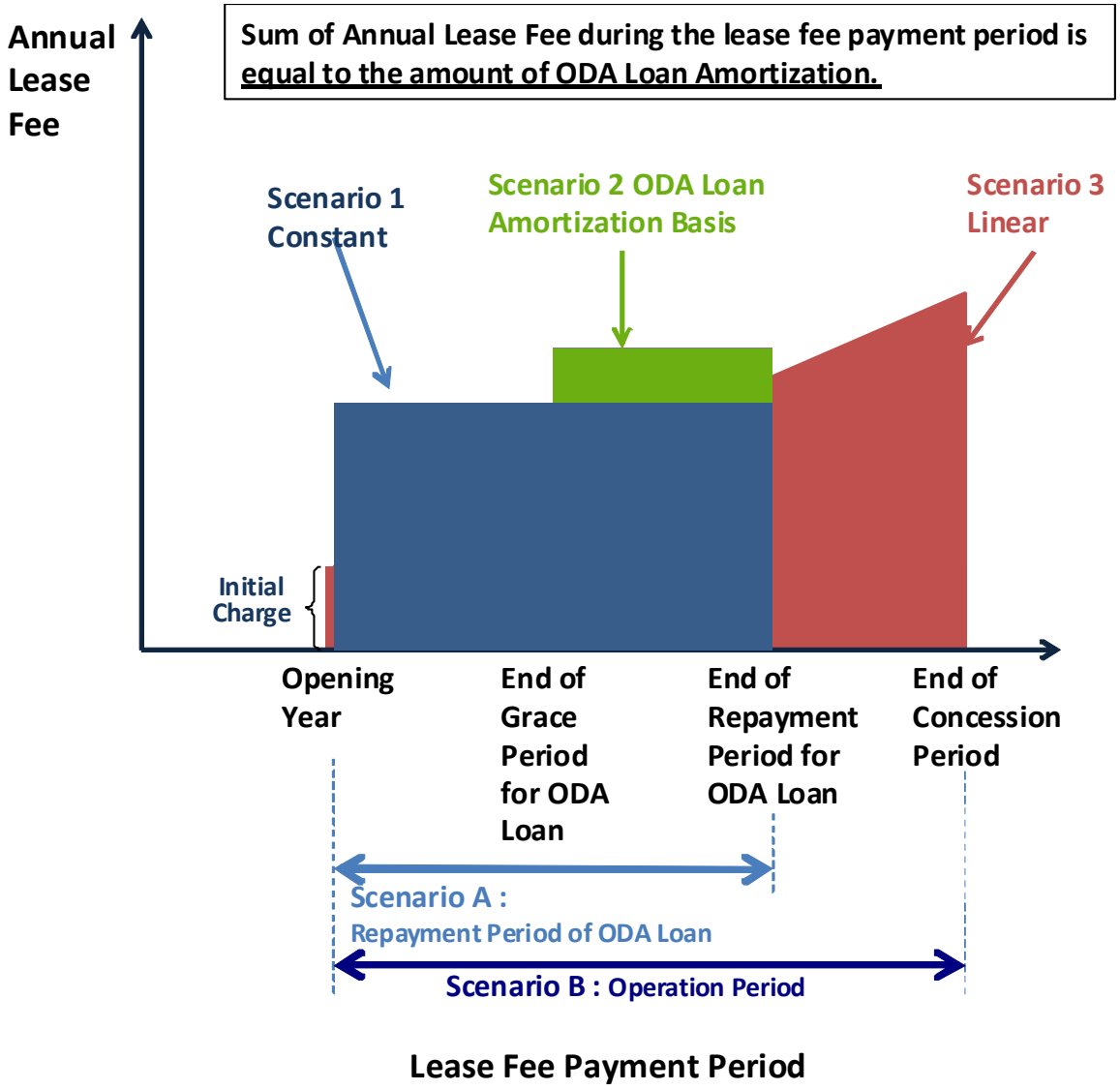


FIGURE 8.2-3 CONCEPTUAL DIAGRAM OF ANNUAL LEASE FEE

8.2.4 INDICATOR FOR FINANCIAL VIABILITY

(1) DEFINITION OF INDICATORS

The following 4 kinds of Internal Rate of Return (IRR) as shown below are set for the examination of financial viability of CLLEX.

Project IRR:	It is calculated with toll tariff revenue and the whole project cost including ROW acquisition etc actually funded by the government. It is the basic indicator for financial viability.
IRR for SPC:	It means an internal rate of return for private sector (SPC).
Equity IRR:	It means an internal rate of return against equity investments for the project. (It means an IRR for Equity investor.)
Government IRR:	It means an internal rate of return against government.

Each IRR is the rate which satisfies the following formula:

Project IRR

$$\sum \frac{R_i - I_i - C_i}{(1 + \text{Project IRR})^{\text{i}}} = 0$$

Whereby:

R_i : Revenue from Toll Tariff at year i

I_i ; Whole invested project costs at year i

C_i : Whole operating costs at year i

IRR for SPC

$$\sum \frac{R_i - I'_i - C'_i}{(1 + \text{IRR for SPC})^{\text{i}}} = 0$$

Whereby:

I'_i : Invested capital costs by SPC (the Concessionaire) at year i

C'_i : Operating costs paid by SPC at year I (including corporate income tax)

Equity IRR

$$\sum \frac{D_i - E_i}{(1 + \text{Equity IRR})^{\text{i}}} = 0$$

Whereby:

D_i : Dividend for investor at year i (= Ri - I'i - C"i)
* C"i is including loan amortization
E_i : Equity investment from investor

Government IRR

$$\sum \frac{R'_i - I''_i}{(1 + \text{Government IRR})^i} = 0$$

Whereby:

R'_i : Government Income at year i (including tax and lease fee)

I''_i : Invested capital costs by the Government and Government Financial Support at year i

(2) CRITERIA

WACC (Weighted Average Cost of Capital) is calculated from the weighted average of interest-bearing debt cost and equity cost, and represents financing cost for privates sector as criteria of Project IRR and IRR for SPC. Calculation formula of WACC is stated as below.

$$WACC_{\text{after tax}} = r(E) \times \frac{E}{(D+E)} + r(D) \times (1-t) \times \frac{D}{(D+E)}$$

Whereby:

$r(E)$: cost of Equity (Return on Equity)

$r(D)$: cost of debt (interest rate)

E : total value of equity

D : total value of debt

t : Corporate Income Tax Rate

WACC (after tax) is 9.64% in case of the conditions on the financing by private sector shown in **Table 8.2-6**. Hurdle rate (cost of Equity) to evaluate Equity IRR is assumed to be 15.0% in this study.

TABLE 8.2-6 CONDITIONS FOR CALCULATION OF WACC

Equity	Loan
-share of equity is 30% -cost of Equity (Return on Equity) is 15.0%	-share of loan is 70% -cost of debt (interest rate) is 10.49% -Corporate Income Tax Rate is 30%

WACC for Government as criteria of Government is calculated with the following formula.

$$\text{WACC for Government} = r(F) \times \frac{F}{(F+L)} + r(L) \times \frac{L}{(F+L)}$$

Whereby:

$r(F)$: cost of Funds by Government Own Budget

$r(L)$: cost of ODA Loan

F: total value of Funds by Government Own Budget

L: total value of ODA Loan

WACC for Government is 2.32% in case of the conditions on the financing by public sector shown in **Table 8.2-7**.

TABLE 8.2-7 CONDITIONS FOR CALCULATION OF WACC FOR GOVERNMENT

Funds by Government Own Budget	ODA Loan
-share of Funds is 15% -cost of Funds is 7.56% (Based on the average T-Bill rate for the period of 2000-2010.)	-share of ODA Loan is 85% (Civil work 90% and Consultancy service 10%) -cost of ODA Loan considered Exchange Risk is Civil Work: 1.56% Consultancy Service: 0.01% (-10% decrease of current exchange rate(Yen/Pesos))

The Criteria for financial analysis for CLLEX are shown in **Table 8.2-8**.

TABLE 8.2-8 CRITERIA OF FINANCIAL ANALYSIS FOR CLLEX

WACC (after tax)	9.64%
Hurdle Rate of Equity IRR	15.0%
WACC for Government	2.32%

8.2.5 RESULTS OF FINANCIAL ANALYSIS FOR CLLEX

The results of financial analysis for CLLEX are shown in **Table 8.2-9** and **8.2-10**.

The financial viability depends on the scenario of annual lease fee payment for CLLEX. In the case of Phase 1 with Option 1 (2-lane & Widening), the viability becomes feasible when the annual lease fee payment is based on Linear scenario without no initial charge, in which the annual lease fee for the first operation year is the lowest and it will become higher during the late period.

In the case of Phase 1 & 2 with Option 1, the government will bear the project cost for Phase 2 except toll facility installation. That's why the financial viability is feasible under Scenario 3 (Linear) even if the initial charge for Phase 2 is 15 million pesos.

In the case with Option 2, the share of the project cost shouldered by the Concessionaire will decrease although the Government IRR will decrease. That's why the financial viability is also feasible under Scenario 3 (Linear) even if the initial charge is higher than in the case of Option 1.

In the case of Phase 1 (Option 2) under Lease scheme and Phase 2 under BTO scheme with Government Financial Support (GFS), the Concessionaire has to bear the project cost for Phase 2 during initial stage, in which the toll revenue is still low. That's why the Equity IRR is negative even if the initial charge for Phase 1 is zero and the GFS of 50% is funded by the government.

TABLE 8.2-9 RESULTS OF FINANCIAL ANALYSIS FOR CLLEX (OPTION 1: PHASE 1(2-LANE) &WIDENING)

Yellow cell above **WACC: 9.64% (after Corporate Income Tax)**
Equity IRR Hurdle Rate: 15%
WACC for Government: 2.32%

Option 1

Case			Major item								Results				Year of becoming positive cash flow
			PPP Modality	Equity /Loan	GFS for Private Portion	Annual Lease Fee			Tax Exemption	Short-term Loan	Project IRR	IRR for SPC	Equity IRR	Government IRR	
						Scenario	Initial Charge (Unit: Million Pesos / year)	Payment Period							
1-1	Phase 1	Option 1 (2-lane& widening)	Lease (with ODA)	3:7	No	Scenario 1 Constant		Scenario A (ODA Loan Repayment Period) 25 yrs	No	No	**3.45%**	**6.00%**	**5.31%**	**4.27%**	
1-2									Yes	Yes	**3.51%**	**6.13%**	**7.01%**	**3.87%**	
1-3						Scenario 2 ODA Loan Amortization basis						**7.11%**	**8.83%**	**3.57%**	
1-4						Scenario 3 Linear	0	Scenario B (Operation Period) 34 yrs				**11.59%**	**17.22%**	**2.74%**	**2038**
1-5	Phase 1+2					Scenario 3 Linear	Phase 1&2: 15 (Based on Interest of ODA Loan)	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs	Yes	Yes	**3.52%**	**11.90%**	**14.09%**	**2.83%**	
1-6							Phase 1: 0 Phase 2: 15					**13.98%**	**20.96%**	**2.72%**	**2037**

Note: Tax Exemption includes Net Operating Loss Carry-Over & Tax Holiday.

TABLE 8.2-10 RESULTS OF FINANCIAL ANALYSIS FOR CLLEX (OPTION 2: PHASE 1(2-LANE) &WIDENING)

Yellow cell above **WACC : 9.64% (after Corporate Income Tax)**
Equity IRR Hurdle Rate: 15%
WACC for Government: 2.32%

Option 2

Case			Major item								Results				Year of becoming positive cash flow
			PPP Modality	Equity /Loan	GFS for Private Portion	Annual Lease Fee			Tax Exemption	Short-term Loan	Project IRR	IRR for SPC	Equity IRR	Government IRR	
						Scenario	Initial Charge (Unit: Million Pesos / year)	Payment Period							
2-1	Phase 1	Option 2 (4-lane)	Lease (with ODA)	3:7	No	Scenario 1 Constant		Scenario A (ODA Loan Repayment Period) 25 yrs	No	No	**3.48%**	**7.05%**	**6.86%**	**3.95%**	
2-2									Yes	Yes	**3.54%**	**7.19%**	**13.36%**	**3.62%**	
2-3						Scenario 2 ODA Loan Amortization basis			Yes	Yes		**9.41%**	**20.58%**	**3.34%**	
2-4										No		**9.41%**	**9.24%**	**3.48%**	
2-5						Scenario 3 Linear	15 (Based on Interest of ODA Loan)	Scenario B (Operation Period) 34 yrs	Yes	Yes		**17.46%**	**24.10%**	**2.73%**	**2030**
2-6										No		**17.46%**	**20.12%**	**2.74%**	
2-7	Phase 1+2					Scenario 3 Linear	15	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs	Yes	Yes	**3.65%**	**17.84%**	**23.68%**	**2.75%**	**2030**
2-8										No		**17.84%**	**21.49%**	**2.76%**	
2-9			Ph1: Lease Ph2: BTO		50%		0	Scenario B (Operation Period) Ph1: 35yrs	Yes	Yes		**9.97%**	**12.28%**	**2.25%**	

The annual lease fee under each scenario is shown as in **Figure 8.2-4** to **8.2-7**.

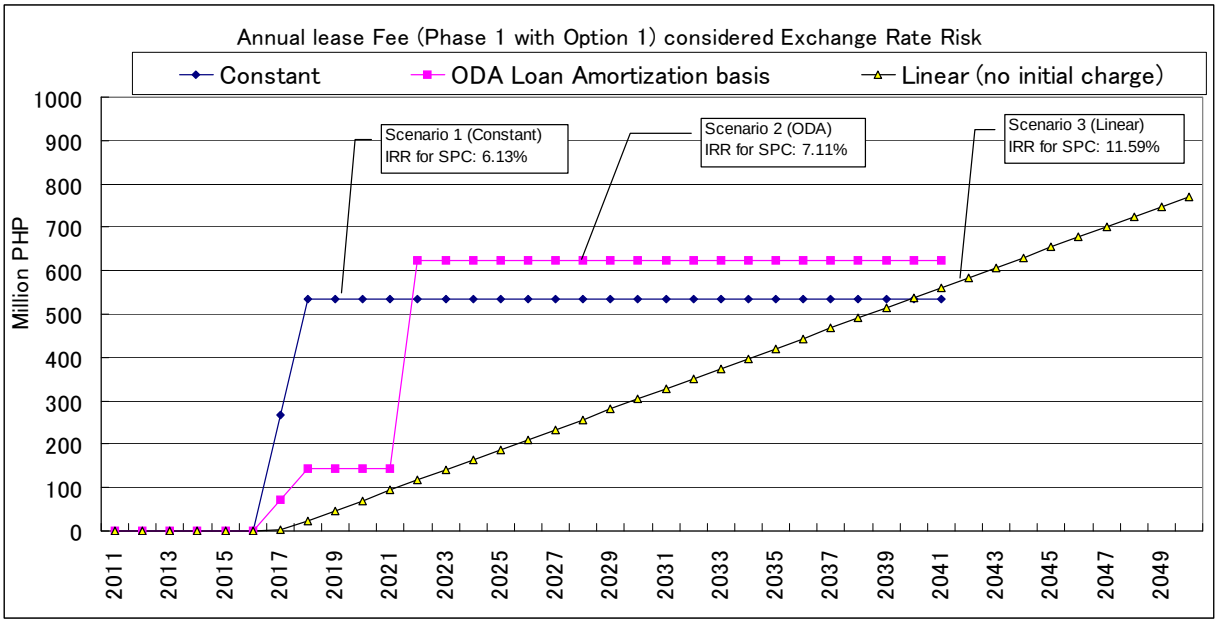


FIGURE 8.2-4 ANNUAL LEASE FEE FOR PHASE 1 (OPTION 1)

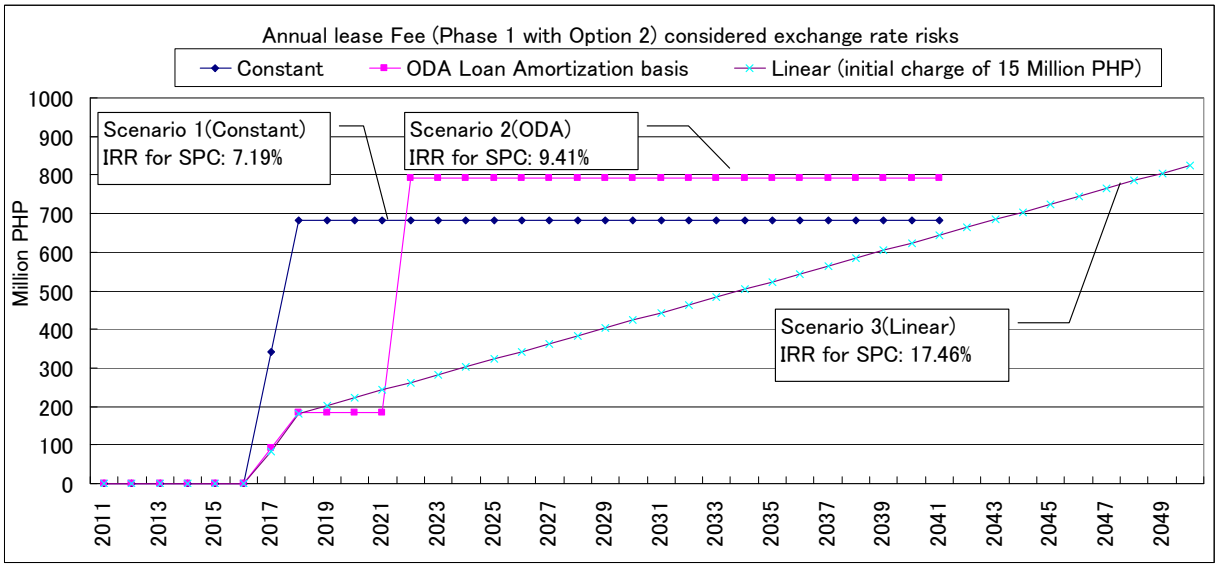


FIGURE 8.2-5 ANNUAL LEASE FEE FOR PHASE 1 (OPTION 2)

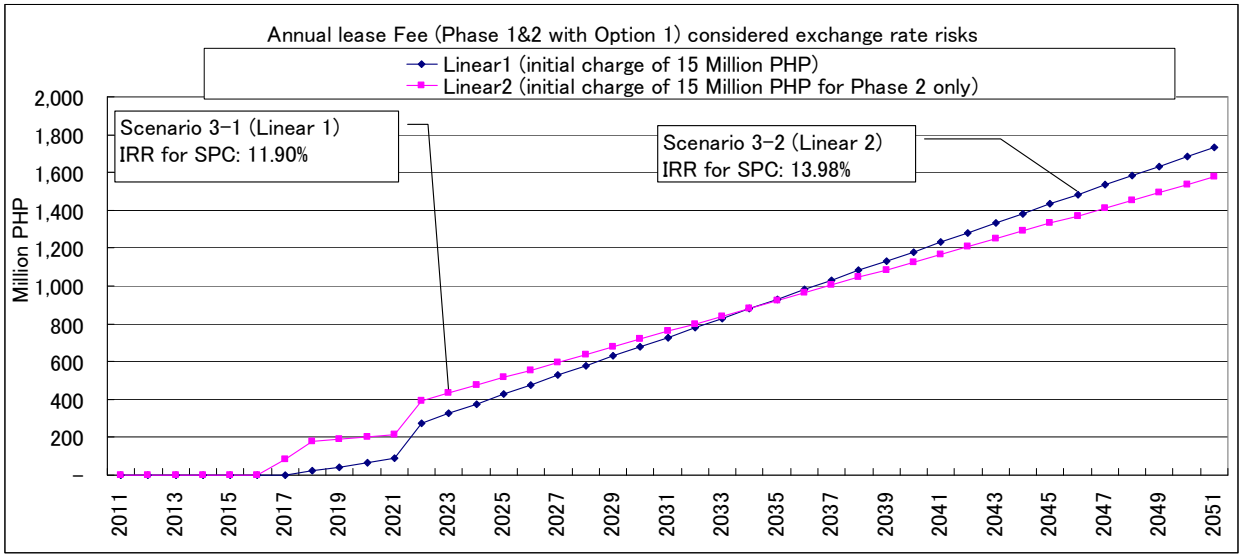


FIGURE 8.2-6 ANNUAL LEASE FEE FOR PHASE 1&2 (OPTION1)

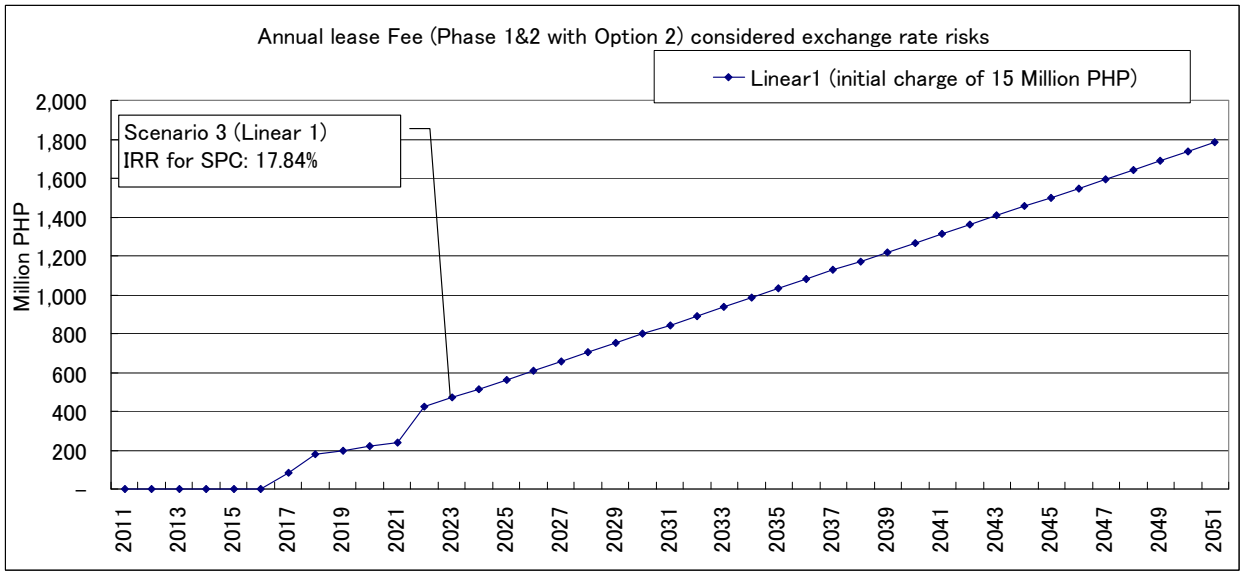


FIGURE 8.2-7 ANNUAL LEASE FEE FOR PHASE 1&2 (OPTION2)

The net income flows on each IRR in the cases which is financially viable are shown in **Figures 8.2-8** to **8.2-18**.

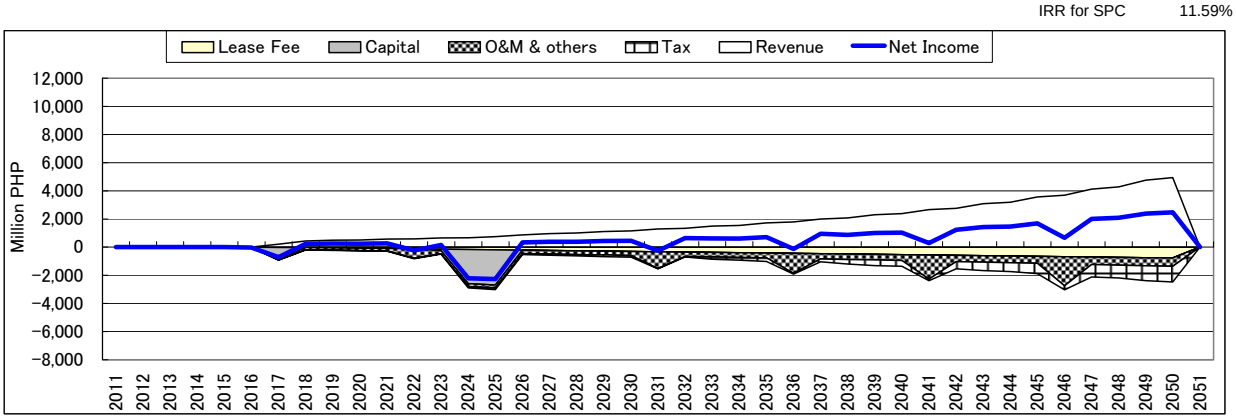


FIGURE 8.2-8 NET INCOME ON "IRR FOR SPC" FOR PHASE 1 (OP1) -CASE 1-4

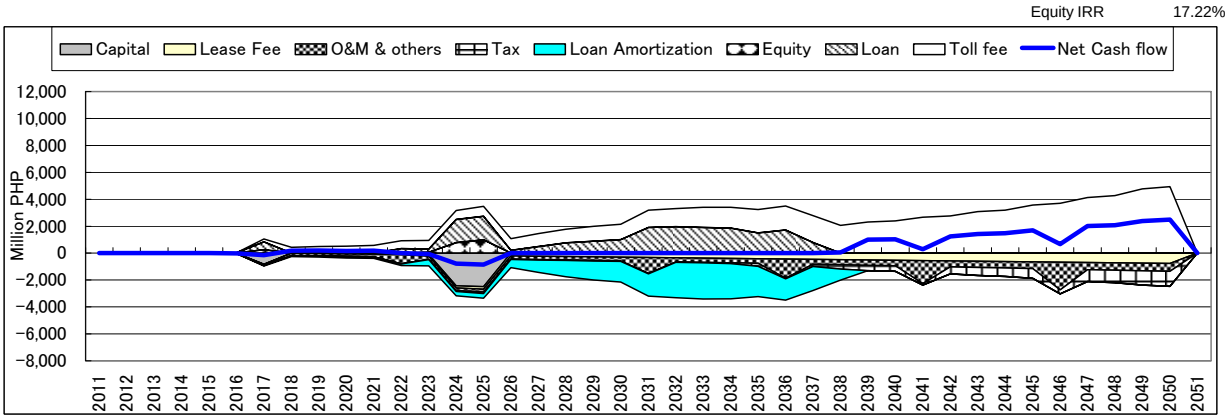


FIGURE 8.2-9 CASH FLOW ON "EQUITY IRR" FOR PHASE 1 (OP1) -CASE 1-4

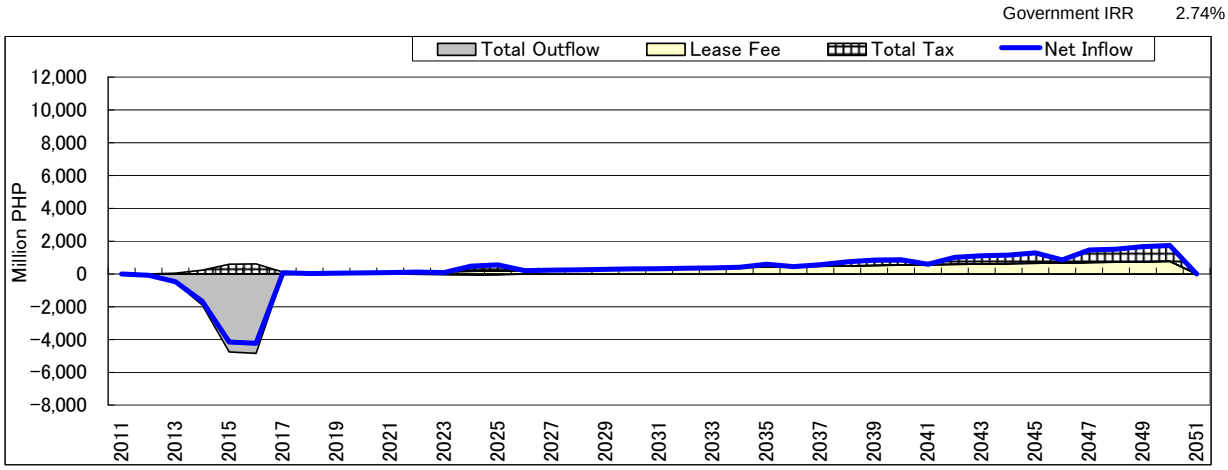


FIGURE 8.2-10 NET INCOME ON "GOVERNMENT IRR" FOR PHASE 1 (OP1) -CASE 1-4

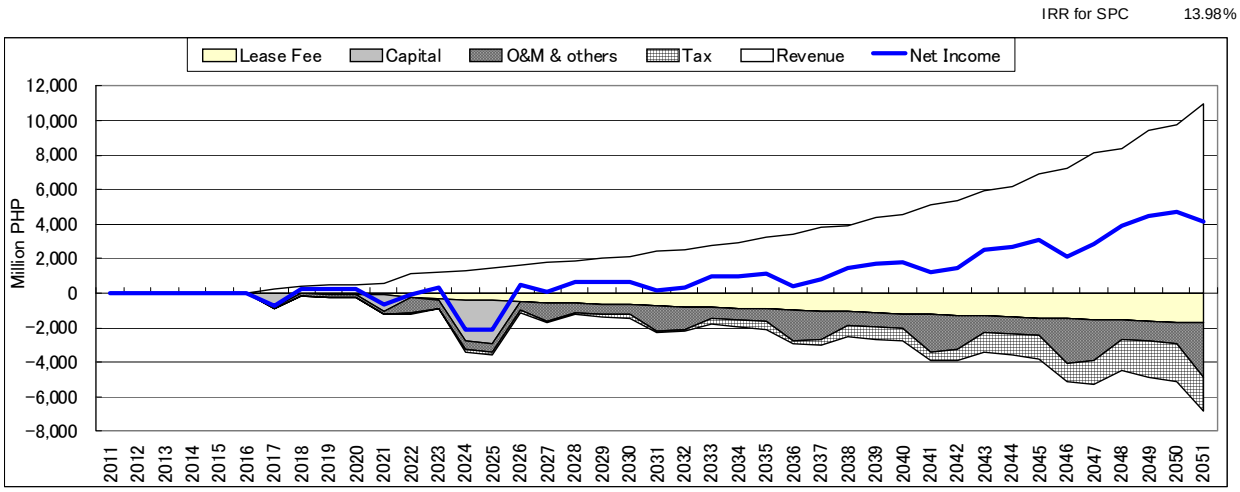


FIGURE 8.2-11 NET INCOME ON "IRR FOR SPC" FOR PHASE 1&2 (OP1) -CASE 1-6

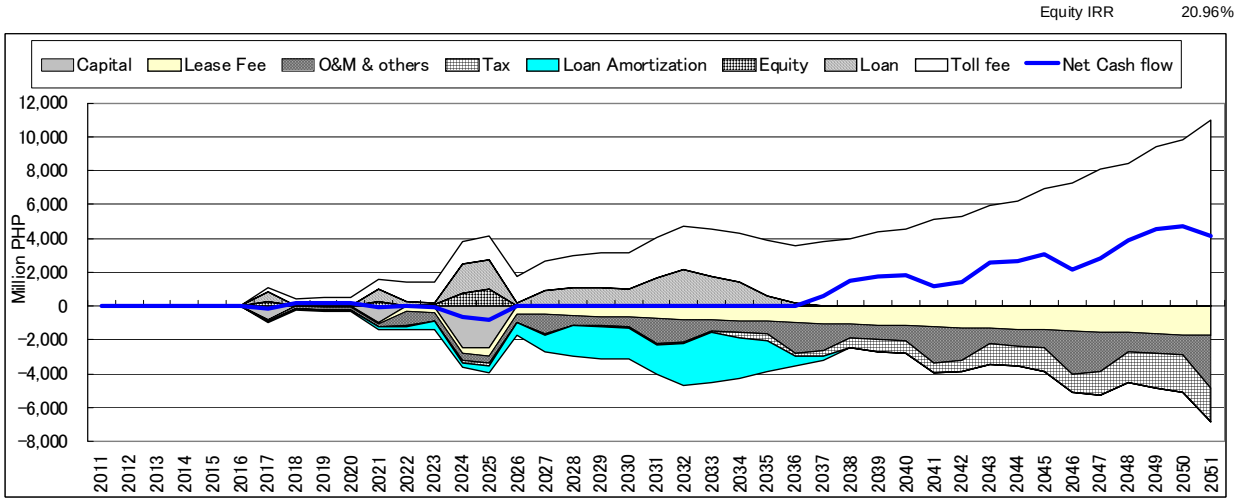


FIGURE 8.2-12 CASH FLOW ON "EQUITY IRR" FOR PHASE 1&2 (OP1) -CASE 1-6

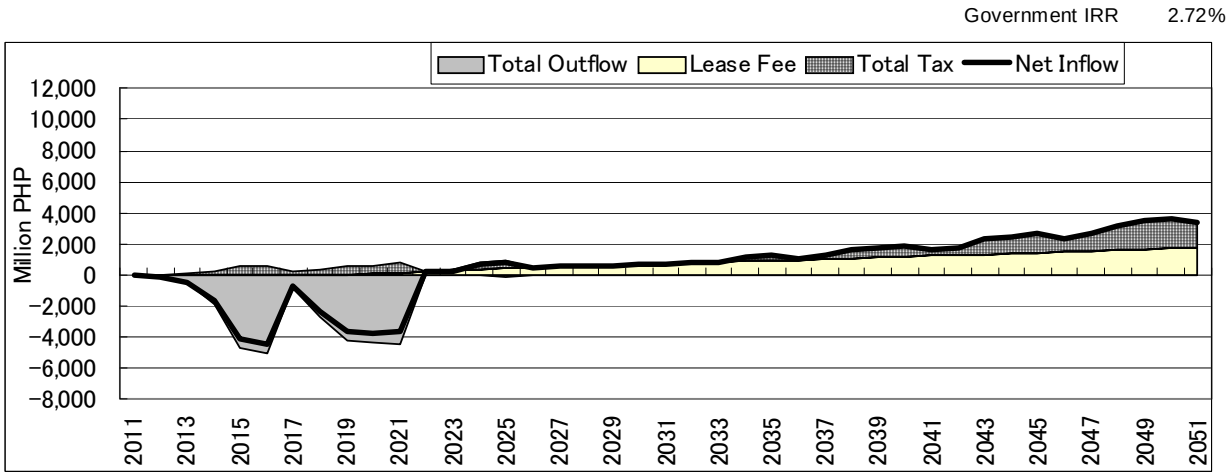


FIGURE 8.2-13 NET INCOME ON "GOVERNMENT IRR" FOR PHASE 1&2 (OP1) -CASE 1-6

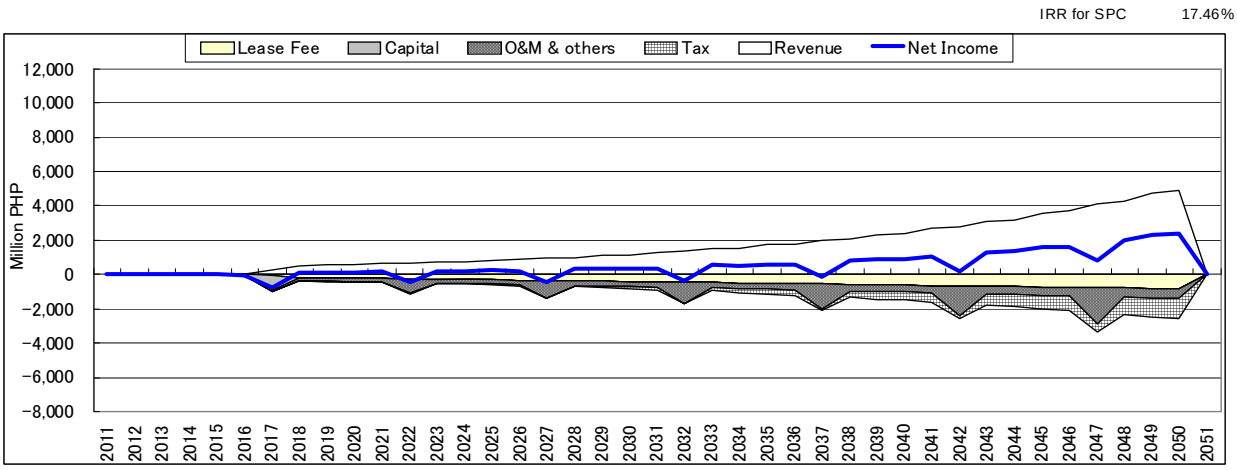


FIGURE 8.2-14 NET INCOME ON "IRR FOR SPC" FOR PHASE 1 (OP2) -CASE 2-5

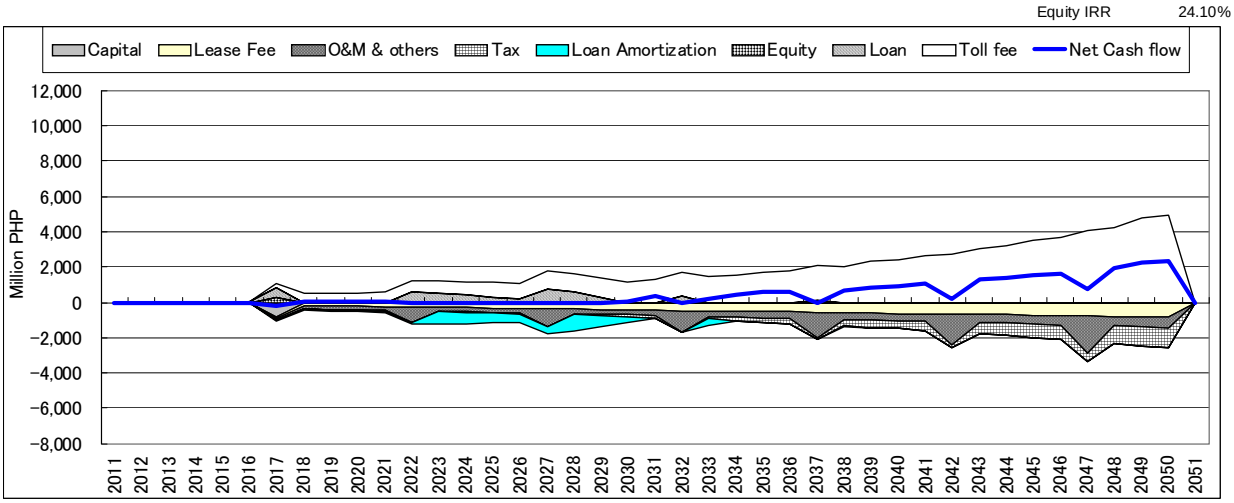


FIGURE 8.2-15 CASH FLOW ON "EQUITY IRR" FOR PHASE 1 (OP2) -CASE 2-5

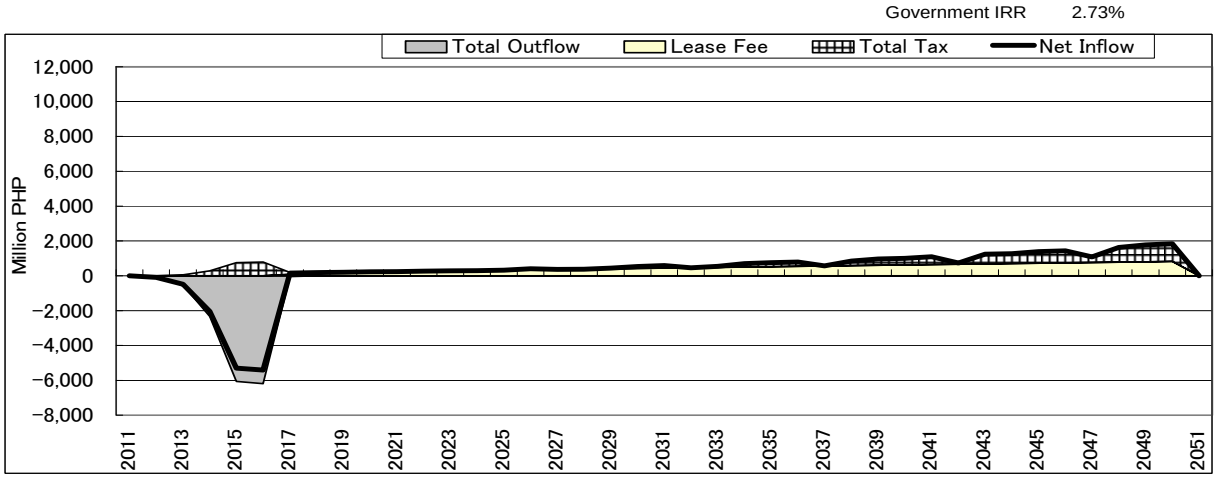


FIGURE 8.2-16 NET INCOME ON "GOVERNMENT IRR" FOR PHASE 1 (OP2)-CASE 2-5

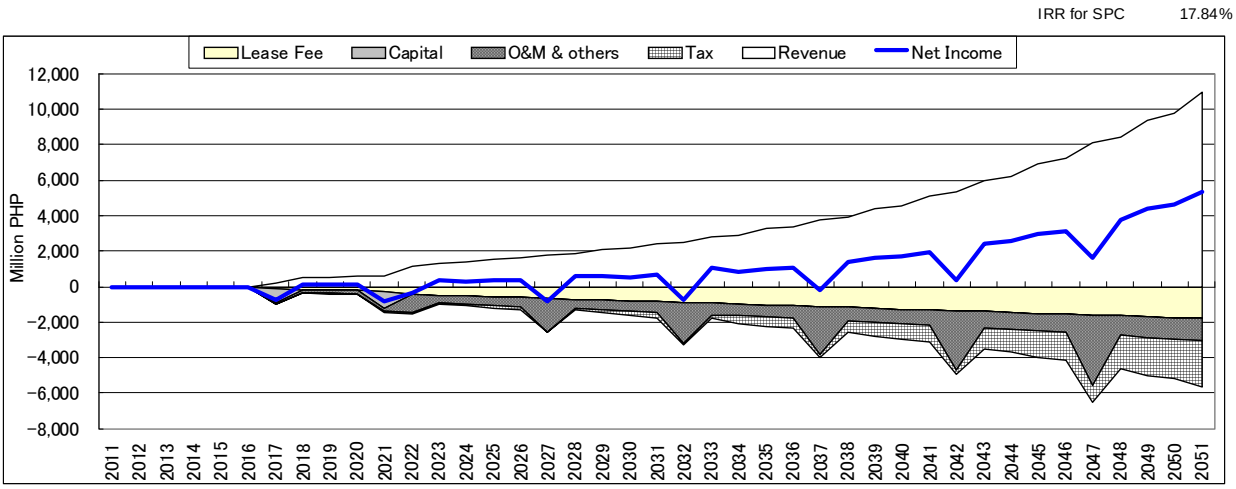


FIGURE 8.2-17 NET INCOME ON "IRR FOR SPC" FOR PHASE 1&2 (OP2) -CASE 2-7

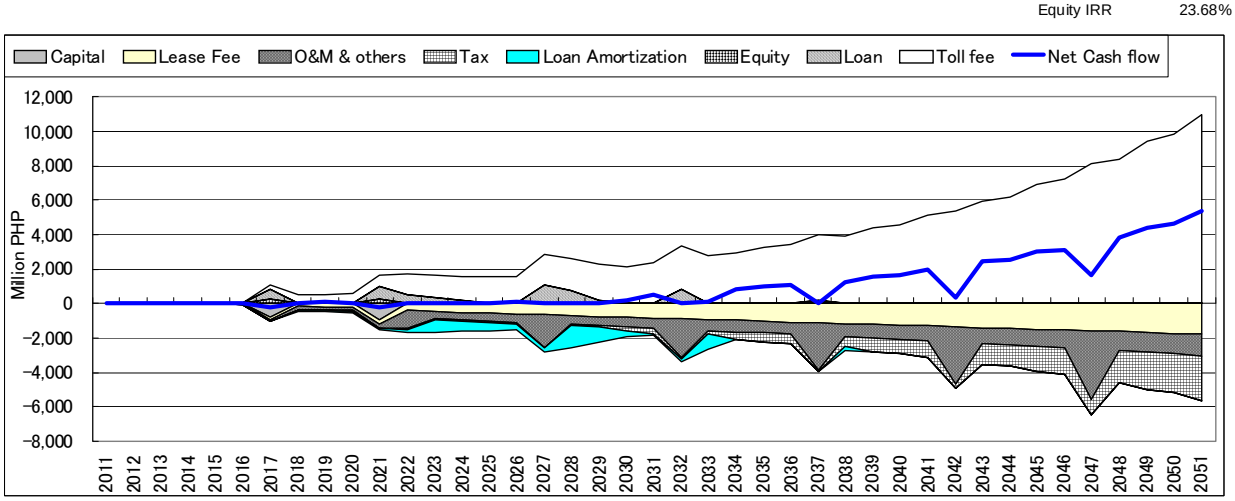


FIGURE 8.2-18 CASH FLOW ON "EQUITY IRR" FOR PHASE 1&2 (OP2) -CASE 2-7

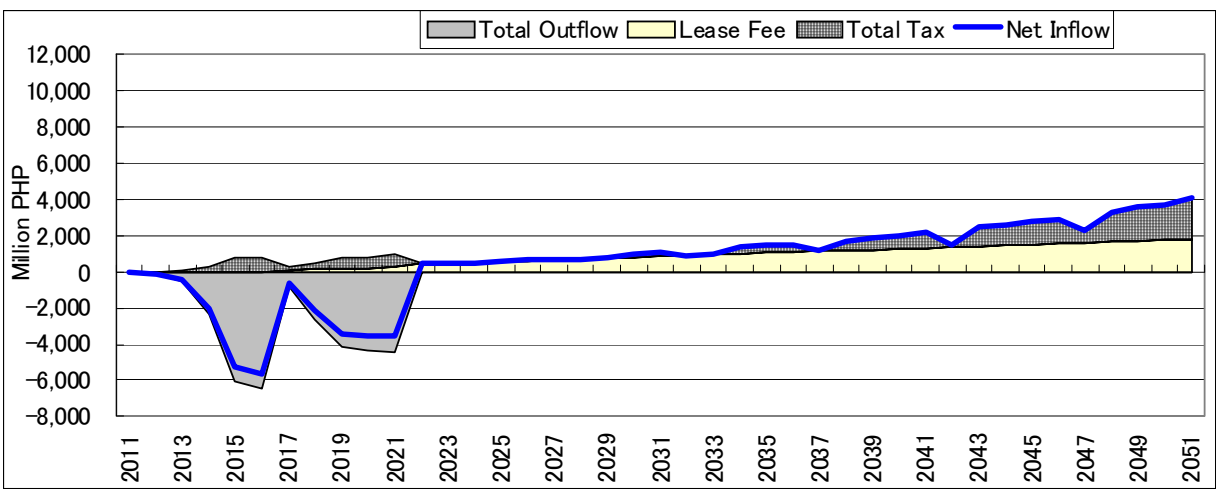


FIGURE 8.2-19 NET INCOME ON "GOVERNMENT IRR" FOR PHASE 1&2 (OP2) -CASE 2-7

8.2.6 SENSITIVITY ANALYSIS FOR THE REVENUE AND PROJECT COST (CIVIL WORKS COST AND O&M COST)

The sensitivity of financial viability is studied for the cases shown in **Table 8.2-11** which is financially viable in the base case.

TABLE 8.2-11 SELECTED CASES FOR SENSITIVITY ANALYSIS

Case			Annual Lease Fee		
			Scenario	Initial Charge (Unit: Million Pesos / year)	Payment Period
1-4	Phase 1	Option 1 (2-lane& widening)	Scenario 3 Linear	0	Scenario B (Operation Period) 34 yrs
1-6	Phase 1&2		Scenario 3 Linear	Phase 1: 0 Phase 2: 15	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs
2-5	Phase 1	Option 2 (4-lane)	Scenario 3 Linear	15 (Based on Interest of ODA Loan)	Scenario B (Operation Period) 34 yrs
2-7	Phase 1+2		Scenario 3 Linear	15	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs

The cases of sensitivity analysis of IRR for SPC, Equity IRR and Government IRR on the revenue and project cost (civil works cost and O&M cost) are shown in **Table 8.2-12**.

TABLE 8.2-12 CASE FOR SENSITIVITY ANALYSIS ON THE REVENUE AND PROJECT COST

Case I	- Revenue from toll tariff -10%
Case II	- Civil works cost and O&M cost +10%
Case III	- Revenue from toll tariff -10%, - Civil works cost and O&M cost +10%

Results of the above cases are shown in **Table 8.2-13**. In the case of Phase 1 with Option 1 (2-lane&widening), in which the share of construction cost financed by the Concessionaire is the highest, the financial viability becomes negative even if only the revenue is – 10%. In the other cases the financial viability also becomes negative when the revenue is – 10% and the project cost is + 10%.

TABLE 8.2-13 THE RESULTS OF IRR SENSITVITY ANALYSIS
FOR THE REVENUE AND PROJECT COST (CIVIL WORKS COST AND O&M COST)

Yellow; IRR for SPC over WACC (after tax) of 9.64%,
Equity IRR over 15%,
Government IRR over WACC for Government of 2.32%

Case			Annual Lease Fee			Sensitivity Analysis		IRR for SPC		Equity IRR		Government IRR	
			Scenario	Initial Charge (Unit: Million Pesos / year)	Payment Period	Revenue	Civil works & O&M Cost						
1-4	Phase 1	Option 1 (2-lane& widening)	Scenario 3 Linear	0	Scenario B (Operation Period) 34 yrs	0%	0%	11.59%		17.22%		2.74%	
						-10%	0%	9.00%	-2.59%	10.61%	-6.61%	2.39%	-0.35%
						0%	10%	9.38%	-2.21%	11.31%	-5.91%	2.48%	-0.25%
						-10%	10%	7.12%	-4.47%	7.18%	-10.04%	2.11%	-0.63%
1-6	Phase 1&2		Scenario 3 Linear	Phase 1: 0 Phase 2: 15	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs	0%	0%	13.98%		20.96%		2.72%	
						-10%	0%	10.95%	-3.03%	13.83%	-7.14%	2.34%	-0.38%
						0%	10%	11.48%	-2.50%	14.77%	-6.19%	2.44%	-0.28%
						-10%	10%	8.85%	-5.13%	10.50%	-10.47%	2.09%	-0.62%
2-5	Phase 1	Option 2 (4-lane)	Scenario 3 Linear	15 (Based on Interest of ODA Loan)	Scenario B (Operation Period) 34 yrs	0%	0%	17.46%		24.10%		2.73%	
						-10%	0%	13.15%	-4.31%	16.67%	-7.43%	2.40%	-0.33%
						0%	10%	14.23%	-3.23%	18.29%	-5.81%	2.46%	-0.27%
						-10%	10%	10.41%	-7.04%	13.77%	-10.32%	2.14%	-0.59%
2-7	Phase 1+2		Scenario 3 Linear	15	Scenario B (Operation Period) Ph1: 35yrs Ph2: 30yrs	0%	0%	17.84%		23.68%		2.75%	
						-10%	0%	13.96%	-3.89%	17.34%	-6.34%	2.41%	-0.34%
						0%	10%	14.92%	-2.92%	18.73%	-4.95%	2.48%	-0.27%
						-10%	10%	11.28%	-6.56%	14.64%	-9.04%	2.16%	-0.59%

CHAPTER 9
ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

9.1 DESCRIPTION OF THE PROJECT

9.1.1 Background and Purpose

The proposed Central Luzon Link Expressway or CLLEX (Phase-1) has an extension of 30.7 kilometer, 4-lane, access-controlled expressway that is designed to provide a faster and safer connection between Regions 3 and Metro Manila. The project also aims to improve access to the 'food baskets' of Central Luzon (or Region III), and to boost the developmental of the areas traversed.

The CLLEX Project aims in meeting the following specific objectives:

- Provide a free-flowing alternative route for the heavily-congested Pan-Philippine Highway (PPH) serving the provinces of Bulacan, and Nueva Ecija;
- Provide a linkage between the existing Subic-Clark-Tarlac Expressway (SCTEX) and PPH to strengthen the lateral (or east-west) linkage in Region III.
- Provide a highway of international standards access controlled facility.

9.1.2 Necessity of the Project

1) Traffic Congestion on Pan Philippine Highway

Eastern areas of Region III and whole Region II are served by Pan Philippine Highway, which passes through urban areas at 5-10 km interval. Urban sections of Pan Philippine Highway suffer chronic traffic congestions due to sharp increase of local traffic such as jeepneys and tricycles, and travel speed becomes less than 20 km/hr.

With the completion of SCTEX, some traffic of long distance trips, such as between Metro Manila and Cabanatuan City or Region II, are already diverting to the route of NLEX-SCTEX-Tarlac-Sta. Rosa Road from Pan Philippine Highway. When Tarlac-Sta. Rosa Road is replaced by CLLEX, more traffic will be diverted to this route from Pan Philippine Highway, thus traffic congestion of Pan Philippine Highway will be mitigated.

2) Need of Strengthening of Lateral (East-West) Road Network

Figure 9.1.2-1 shows the distribution of population in Region III and road network. For

north-south direction, traffic is served by NLEX-SCTEX-TPLEX, Manila North Road and Pan Philippine Highway along which major urban centers are distributed. However, road network in the east-west direction is still weak and needs to be strengthened, thereby socio-economic inter-action in that direction is stimulated and overall socio-economic activities will be activated for socio-economic development of the Region and the country as a whole.

3) Need to Develop Regional Growth Pole Cities

Overconcentration of socio-economic activities in Metro Manila has been one of the critical issues of the country. To mitigate such conditions, Regional Growth Pole Cities must be developed, so that socio-economic activities of Metro Manila can be shared with such Regional Growth Pole Cities as Tarlac City and Cabanatuan City.

Tarlac has a special economic zone where there are metalworking plants and feed processing plants. Cabanatuan has processing plants of feed and foods using crops harvested in surrounding area. Municipality of Aliaga is now developing the Trading Center where CLLEX interchange is connected and has also a plan to develop an agro-industrial zone near the boundary with Cabanatuan City. It is expected that CLLEX project will contribute to developing these industries. There are some tourist attractions such as Camp Pangatian, General Luna Statue and Marker in Cabanatuan City. The number of tourists is expected to increase and tourism might be revitalized by CLLEX.

4) Need to Develop Impoverish Area

Pacific Ocean Coastal area in Region III is one of the impoverished areas of the country. Cabanatuan City is the base city (or hub city) for the development of Pacific Ocean Coastal area. If accessibility to Cabanatuan City is improved, the impact will be extended to Pacific Ocean Coastal area (see **Figure 9.1.2-2**).

5) Need to Develop Integrated Multi-modal Logistics/Transport System

In order to achieve faster, safer, more cost effective and reliable logistics/transport system, an expressway network development in the Region is vitally needed.

The approach sections of Rio Chico River Bridge along Tarlac-Sta. Rosa Road which is currently important to provide transport services in the east-west direction is often flooded and traffic is interrupted. More reliable transport facility is needed.

6) Need to Develop Emergency and Disaster Response Road

Emergency and disaster response road is necessary in order to move services and supplies to where they are needed in the event of major disasters and calamities. Within the project area, Tarlac-Sta. Rosa Road is currently the only access that connects the cities of Tarlac and Cabanatuan, however during the heavy rains; this link road becomes impassable for several days due to high level of flood. This concern becomes significant as a number of big typhoons pass through the area every year. As this happens, rescue and relief operations to adjoining municipalities are sometimes delayed until flood water recedes to manageable level. Since CLLEX will be constructed as an embankment type with high standard features, it will play the role of the much needed emergency and disaster response road.

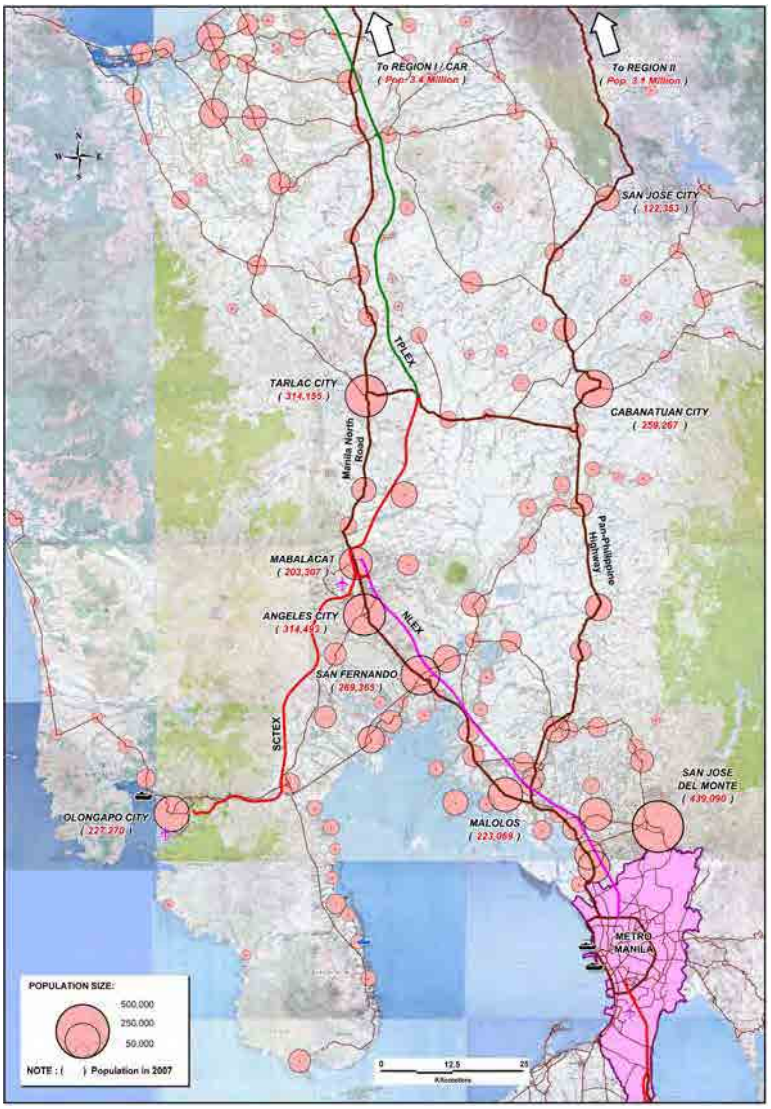
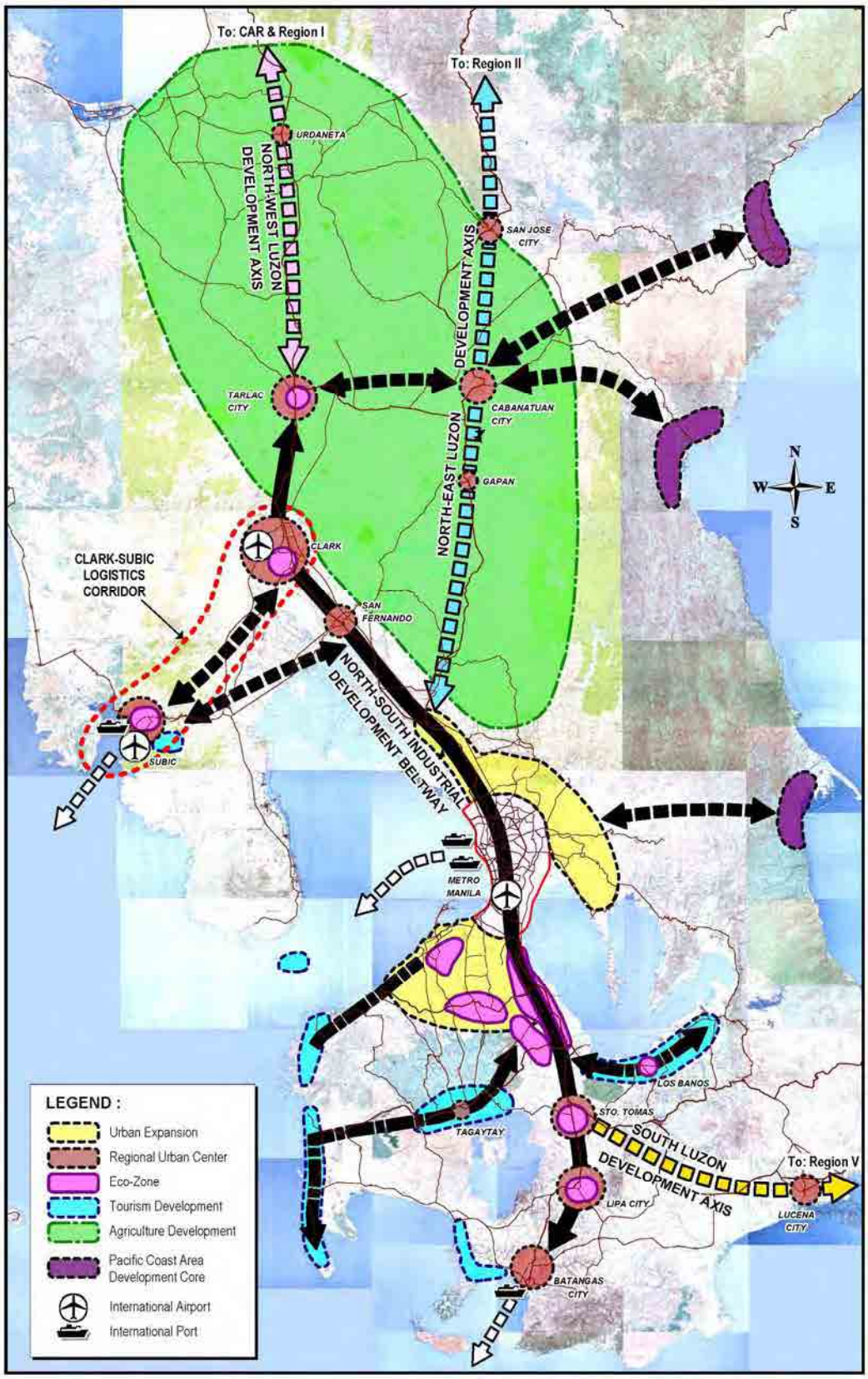


FIGURE 9.1.2-1 DISTRIBUTION OF POPULATION IN REGION III AND ROAD NETWORK



Source: HSH Development Master Plan, JICA, 2010

FIGURE 9.1.2-2 DEVELOPMENT STRATEGY:

200KM RADIUS SPHEREOF METRO MANILA

9.1.3 Project Component

The proposed CLLEX is to be constructed in the provinces of Tarlac and Nueva Ecija, which are part of Region III. The starting point of the expressway is at Tarlac City (about 125km. from Manila), and ends at Cabanatuan City (CLLEX Phase I). The proposed Project has a ROW of 60 meters in width, and a length of 30.7 kilometers.

TABLE 9.1.3-1 PROJECT PROFILE

Project Name	Central Luzon Link Expressway (CLLEX) Project : PHASE 1
Project Proponent	Department of Public Works and Highways (DPWH)
Project Contents	Expressway construction through La Paz, Aliaga and Cabanatuan City including 7 bridges.
Road Length	30.7km
Number of Lane	4-lane
ROW (width)	60m
Number of I/C	5
Total Cost (Peso)	Php 13,457 Million (in 2011 Prices)

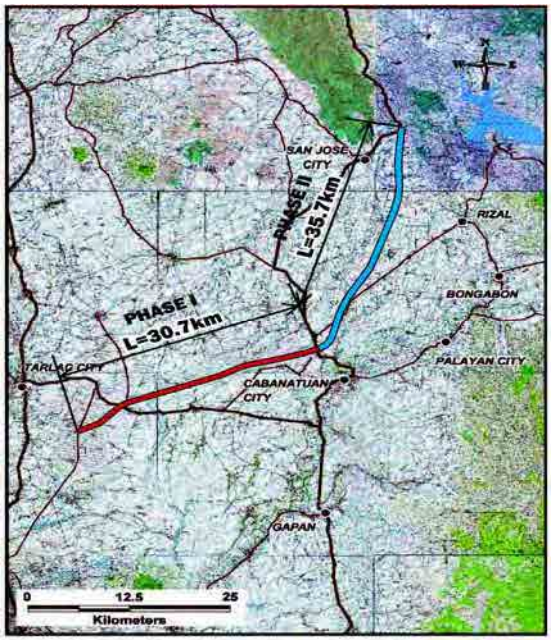


FIGURE 9.1.3-1 PROPOSED PROJECT AREA

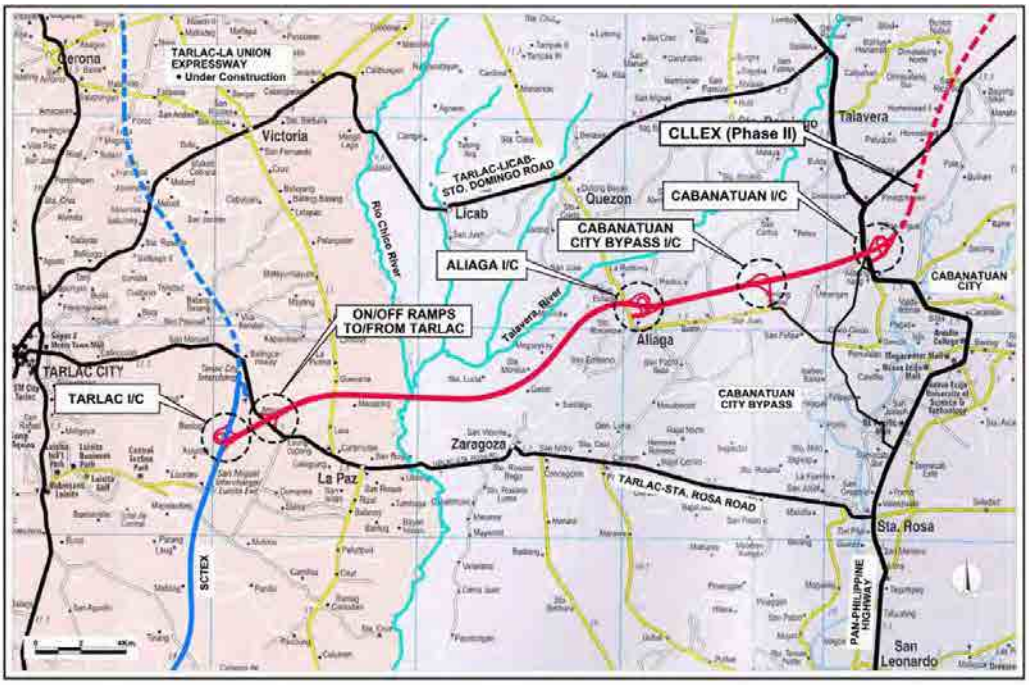


FIGURE 9.1.3-2 ROUTE OF PROPOSED ROAD

9.1.4 Project Rational

1) Philippine Development Plan (2011 – 2016)

Philippine Development Plan (PDP), 2011-2016 was announced in 2011. Development policies of infrastructure are as follows;

DEVELOPMENT POLICIES OF INFRASTRUCTURE

"**Accelerating Infrastructure Development"**

(1) To optimize resources and investment
- Improve project preparation, development and implementation
- Synchronize planning and budgeting
- Coordinate and integrate infrastructure initiative

(2) To attract investments in infrastructure
- Improve the institutional and regulatory environment of the infrastructure sector
- Encourage PPPs

(3) To foster transparency and accountability in infrastructure development
- Encourage stakeholder participation

(4) To adopt to climate change and mitigate the impacts of natural disasters
- Institutionalize Climate Change Act (CCA) and Disaster Risk Reduction Management (DRRM)

(5) To provide productive employment opportunities
- Adopt a labor-intensive scheme where applicable.

With regards to the transport sector, issues and challenges are established as follows;

TRANSPORT SECTOR ISSUES AND CHALLENGES

(a) Assessment and Issues
- Lack of integrated and coordinated transport network
- Overlapping and conflicting functions of transport and other concerned agencies
- Transport safety and security concerns

(b) Strategic Plan and Focus
- Adopt a comprehensive long-term National Transport Policy (NTP)
- Develop strategic transport infrastructure assets
  - −Prioritize asset preservation
  - −Provide access to major and strategic tourism destinations and production areas
  - −Promote environmentally sustainable and people-oriented transport

(c) Develop an Integrated Multi-modal Logistics and Transport System
- Identify and develop strategic logistics corridors based on a National Logistics Master Plan
- Improve Roll-on/roll-off ship (RORO) terminal system
- Explore ASEAN connectivity through sea linkages

(d) Separate the Regulatory and Operation Functions of Transport and Other Concerned Agencies. To address the overlapping and conflicting functions of transport and other concerned agencies.

(e) Comply with Safety and Security Standards. To ensure transport safety and standards.

(f) Provide Linkages to Bring Communities into the Mainstream of Progress and Development. To promote conflict-affected and highly impoverished areas.

2) Road Development Goals

Public Investment Program (PIP) (2011 - 2016) was formulated by DPWH in 2011. Goals were set as follows;

DEVELOPMENT GOALS UNDER PIP

1. Provide safe environment through quality infrastructure facilities;
2. Increase mobility and total connectivity of people through quality infrastructure resulting to improved quality of life;
3. Strengthen national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
4. Facilitate the decongestion of Metro Manila via a transport logistics system that would ensure efficient linkages between its business centers and nearby provinces;
5. Implement more Public-Private Partnership (PPP) projects for much needed infrastructure

and level playing field for investment;
6. Study the mechanism for longer maintenance period for roads and bridges; and
7. Generate more transport infrastructure with minimal budget cover or contingent liabilities.

Strategic focuses were set as follows;

STRATEGIC FOCUS

- Implement activities in the following order of priorities:
  a. Maintenance or asset preservation – to preserve existing roads in good condition
  b. Rehabilitation – to restore damaged roads to their original designed condition
  c. Improvement – to upgrade road features so that they efficiently meet traffic demands; and
  d. New Construction
- Prioritize upgrading of the national road network, as to quality and safety standards
- Prioritize national roads to address traffic congestion and safety in urban centers and designated strategic tourism destinations
- Completion of on-going bridges along national roads
- Develop more Public-Private Partnership (PPP) projects for much needed infrastructure and level playing field for investments
- Study the mechanism for a longer maintenance period (5 – 10 years) in road and bridges construction contract provision
- Prioritize flood control projects in major and principal river basins to address climate change based on master plan and adopting new technologies in flood control and slope management
- Prioritize adequate flood control and upgraded drainage design standards and facilities in flood-disaster prone areas to mitigate loss of river and damage to properties
- Promote innovative technology such as geo-textiles and coco-netting in slope protection and soil erosion control
- Promote retarding basin and rain water harvesting for non-domestic use
- Prioritize water supply in designated strategic tourist destinations/centers

3) Master Plan on High Standard Highway Network

The study of master plan on High Standard Highway (HSH) Network Development was conducted in Year 2010. **Figure 9.1.4-1** shows the proposed HSH network in Metro Manila and 200 km sphere. Based on this master plan, Public Investment Program (2011-2016) for expressway projects was formulated.

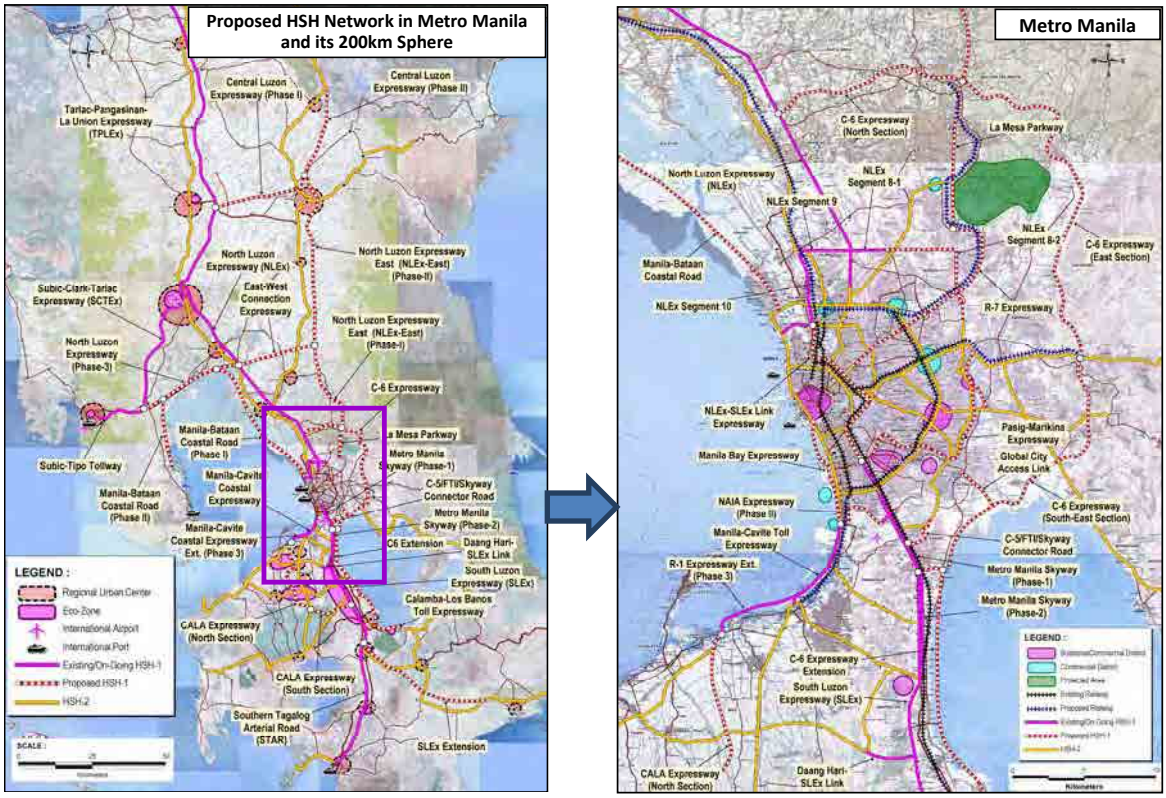


FIGURE 9.1.4-1 PROPOSED HSH NETWORK

Source: The Study of Master plan on High Standard Highway Network Development, 2010, JICA

CLLEX is one of the 1st priority projects in this Master plan shown in **Table 9.1.4-1**.

TABLE 9.1.4-1 PROPOSED HSH PROJECTS PRIORITY

	Name of HSH	Length (km)	Cost (billion pesos)
1st Priority Group	NLEx–SLEx Link Expressway	13.4	31.14
	CALA Expressway	41.8	19.67
	C-5/FTI/SKYWAY Connector Rd.	3.0	4.76
	NAIA Expressway (Phase 2)	4.9	12.18
	C-6 Expressway/Global City Link	66.5	54.29
	Central Luzon Expressway(CLLEX)	63.9	29.23
	SLEx Extension (to Lucena)	47.8	16.45
	Calamba-Los Banos Expressway	15.5	5.23
	Sub-total	256.8	172.95
2nd Priority Group	R-7 Expressway	16.1	25.81
	NLEX East / La Mesa Parkway	103.0	38.94
	Manila – Bataan Coastal Road	70.3	72.94
	NLEX (Phase 3)	36.2	28.42
	East-West Con. Expressway	26.6	16.48
	C-6 Extension	43.6	18.61
	Manila Bay Expressway	8.0	46.54
	Pasig Marikina Expressway	15.7	49.58
	Sub-total	319.5	297.32
TOTAL		576.3	470.27

Source: The Study of Master plan on High Standard Highway Network Development, 2010, JICA

4) Alignment with Agriculture Policy

Negative Impact on Rice Production

CLLEX (Phase I) passes through a vast agricultural land of the Provinces of Tarlac and Nueva Ecija and requires taking 201.1 hectares of land, most of which are agricultural land. Impact of this land taking by the Project is as shown in **Table 9.1.4-2**.

TABLE 9.1.4-2 IMPACT ON AGRICULTURE BY CLLEX

	Unit	Tarlac Province	Nueva Ecija Province	Total
Rice Area Harvested	Ha.	133,424	299,844	433,268
– Irrigated	Ha.	124,353	261,034	385,387
– Rain fed	Ha.	9,071	38,810	47,881
Production	MT	562,180	1,374,173	1,936,35
– Irrigated	MT	527,609	1,275,979	1,803,588
– Rain fed	MT	34,571	98,194	132,765
Yield/Ha.				
– Total	MT/Ha.	4.21	4.58	4.47
– Irrigated	MT/Ha.	4.24	4.89	4.68
– Rain fed	MT/Ha.	3.81	2.53	2.77
Impact of Land Taking by CLLEX		• Land to be taken by CLLEX = 201.1 Ha. – Share to Rice Field = 0.05% (or Reduction of Rice Area = 0.05%) • Estimated Reduction of Rice Production – 201.1 Ha. X 4.89 MT/Ha = 983.4 MT – Reduction Rate = 0.05%		

It is estimated that about 200 ha. of rice field land will be taken by the Project and the loss of Production is about 983 MT which is about 0.05% of total production of Provinces of Tarlac and Nueva Ecija.

Policy direction on the agriculture development vs. transport infrastructure development is being consulted with the Department of Agriculture (DOA) by DPWH.

9.2 PHILIPPINES' LEGAL / POLICY FRAMEWORK ON ENVIRONMENTAL AND SOCIAL CONSIDERATION

9.2.1 Governing Laws and Regulations

Environmental related laws in the Philippines are composed of under the Presidential Decree (PD) No.1151 as environmental policy and PD No. 1152 as environmental regulation in relation to the national policy and regulation (**Table 9.2.1-1**).

TABLE 9.2.1-1 THE GOVERNED LAW ON ENVIRONMENTAL RELATED LAWS

Governed Law and Decree	Remarks
Presidential Decree (PD)No.1151	Environmental policy
Presidential Code (PD)No. 1152	Environmental regulation

Major environmental laws are made for natural resources, protection of wild life and bio-diversity, forest resources, mining, coastal and marine, ambient air, water quality, waste and disposal, land use and resettlement, conservation of historical and cultural assets, environmental assessment, and national integrated protected area system. Major environmental related laws and decrees are summarized in the table below.

TABLE 9.2.1-2 LIST OF ENVIRONMENTAL RELATED LAWS AND DECREE

Category	Law, Decree, Act	Remarks
Natural resources	Constitution Article 12. Clause 2.	Investigation of natural resources, development use
	Presidential Decree (PD) No.1198	Protection of natural environment
Protection of wild life, bio-diversity	Republic Decree No. 826	Preservation of Natural parks and establishment of wildlife protection committee
	Republic Decree No. 1086 (1954)	Prohibition of capture of Mindoro buffalo (Tamaraw)
	Republic Decree No.6147	Preservation of Monkey Eating Eagle
	Statement No. 2141	Preservation of wilderness region
	Administrative order No.243(1970)	Prohibition of slaughter for buffalo
Forest resources	Presidential Decree (PD) No.209	Encourage of common forest project
	Presidential Decree (PD) No. 277	Encourage of report on offender against forest law
	Presidential Decree (PD) No. 278	Procedural regulation on development application for forest resources and forest land development use
	Presidential Decree (PD) No. 331 (1973)	Sustainable forest development
	Presidential Decree (PD) No. 389	Regulation on forest recovery

Category	Law, Decree, Act	Remarks
	Presidential Decree (PD) No. 705 (1975)	Amendment of regulation on forest recovery
	Presidential Decree (PD) No. 865	Export of lumber (selective deforestation)
	Presidential Decree (PD) No. 953	Request of forestation
	Presidential Decree (PD) No. 1153	Decree of forestation
	DNR DecreeNo.78(1987)	Regulation on permission range for felling and collection of oak, other hard wood
	DNR Decree No.79 (1987)	Establishment of foundation of forest regeneration
	DNR memorandum No.8 (1986)	Full prohibition of log export
	Notification No. 818	Diminution of forest
	Forest development bureau circular No. 13 (1986)	Full prohibition of land possession within mangrove area, river area, preservation area, wilderness area, National park, wildlife reserve, experimental forest and etc.
Mining	Presidential Decree (PD) No.1251	Prospect mining
	Presidential Decree (PD) No.463 (1974)	Mining resource development Decree
	Presidential Decree (PD) No.1189 (1979)	Land use of ex-mining site for compensation of the land owner
Coastal, marine	Presidential Decree (PD) No.600 (1974)	Prevention of marine pollution
	Presidential Decree (PD) No. 602 (1974)	Establishment for oil pollution management center
	Presidential Decree (PD) No. 979	Prevention of ocean pollution
Ambient air	Republic law No. 3931	Establishment of National air, water pollution control committee , definition of pollution and penalty
	Presidential Decree (PD) No.1181	Air pollution regulation on incidence origin of travelling
	Presidential Decree (PD) No.1160	Barangay captain Community leader on implementation of law on prevention of public nuisance
	Circulation No. 247	Appointment of highway patrol guard
	Circulation No 551	Equipment of prevention devices of motor vehicles
Water quality	Republic law No.4850	Establishment of Laguna Lake development Bureau
	Republic law No.3931	Establishment of National committee for ambient air pollution management
	Presidential Decree (PD) No.600	Establishment of Philippine coastal guard, measure for marine pollution
	Presidential Decree (PD) No.1252	Establishment of foundation for treatment of mining discharge water
	Presidential Decree (PD) No.602	Establishment of National oil pollution management center
	Republic law No.274	Pasig river pollution measures
	Republic law No. 361	Establishment of Pasig river development council
	Circulation No.712	Discharge water regulation for Manila bay and Laguna lake
	DENR Decree No. 34	Classification of water and use
	DENR Decree No. 35	Regulation on discharge water for Industrial and urban drainage

Category	Law, Decree, Act	Remarks
Waste disposal	Presidential Decree (PD) No. 825 (1975)	Penalty regulation on illegal dump of disposal, dirt and other wastes
	Presidential Decree (PD) No. 826 (1975)	Regulation on treatment responsibility of solid and liquid wastes by local government
	Presidential Decree (PD) No.1152 (1977)	Regulation on treatment method and treatment management for wastes
	Republic Act (RA) 6969 (1990)	An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations thereof , and for their Purposes
	DAO 36 Series of 2004 (DAO 04-36)	DAO 04-36 is a procedural manual of DAO 92-29, a comprehensive documentation on the legal and technical requirements of hazardous waste management
	DAO 98-50	Adopting the Landfill Site Identification and Screening Criteria for Municipal Solid Waste Disposal Facilities
	DAO 98-49	Technical Guidelines for Municipal Solid Waste Management
	RA 9003	Ecological and Solid Waste Management Act
	DAO 01-34	Implementing Rules and Regulations (IRR) of RA 9003
	AO 93-90	Creating a Project Management Office on Solid Waste Management (PTWFM) under the Presidential Task Force on Waste Management
Land use, resettlement	Constitution Article 13	Establishment of human protective committee and their responsibility
	DPWH Decree No.65	Land use procedure for public project and expressway project
	DPWH Decree No.120 (1988)	Compensation of private land for DPWH project
	DPWH Decree No.234 (1990)	Amendment of compensation of private land for DPWH project
	Revised administrative code No. 64	Competence of house of justice on private land acquisition by the government
	DPWH Decree No.65 (1983)	Guideline for land use and right of way
	Presidential Decree (PD)No. 1517	Designation of reserve area at reorganization of urban land use
	Senate article No. 328	Decree of temporally prohibition for removal of displaced persons
	Republic Act 7279 (Urban Development and Housing Act of 1992)	An act to provide doe a comprehensive and continuing urban development and housing program, establish the mechanism for its implementation, and for other purpose; Procedure for removal of habituated peoples
Land Acquisition	Republic Act 6389 (1971): The Agricultural Land Reform Code,	The agricultural lessee shall be entitled to disturbance compensation equivalent to five times the average of the gross harvests on his landholding during the last five preceding calendar years
	Executive Order (1985)	Providing the procedures and guidelines for the expeditions acquisition by the government of private real properties or rights thereon for infrastructure and other government development projects
	Republic Act 8974 (2000)	An act to facilitate the acquisition of right-of-way, site or location for national government infrastructure project and for other purposes

Category	Law, Decree, Act	Remarks
Human rights	Executive Order NO.153 (2002);	Instituting the national drive to suppress and eradicate professional squatting and squatting syndicates; Amending E.O.178 (1999) and E.O. 128 (1993)
	Indigenous People's Rights Act (IPRA) of 1997	sets the conditions, requirements, and safeguards for plans, programs and projects affecting Indigenous Peoples (IPs)
	NCIP Administrative Order No. 1, Series of 2006	the procedure for obtaining the "Free and Prior Informed Consent" (FPIC) for affected communities
Conservation of historical , cultural assets	Republic Decree No. 4365	Responsibility of National historic committee on authorization , restoration and maintenance for historical assets
	Republic Decree No.4346	Responsibility of protection and propulsion of maintenance for cultural assets within National museum
Environmental assessment	Presidential Decree (PD) No. 1586	Environmental assessment system and administrative organization
	Presidential Proclamation No. 2146	3 Industrial sectors with large environmental impacts and 12 environmentally critical regions
National integrated protected area system	National integrated protected area system act (1992)	Review of National integrated protected area

Source: Countries' environmental information maintenance study report; the Philippines (JICA), 1997 et al

The government of Philippine has been ratified international treaties, agreements, and protocols in relation to environmental and social consideration which are listed below.

- Washington Treaty: Convention on the international trade in endangered species of wild flora and fauna (1981)
- International tropical timber agreement (1983)
- United Nations convention on the law of the sea (1984)
- World heritage convention concerning the protection of the world cultural and natural heritage (1985)
- Montreal Protocol on substances that deplete the Ozone layer (1991)
- Vienna convention for the protection of the ozone layer (1991)
- Convention on biological diversity (1993)
- Basel convention on the control of trans-boundary movement of hazardous wastes and their disposal (1993)
- Ramsar convention on wetlands of international importance, especially as waterfowl habitat (1994)
- Framework convention on climate change (1994)
- Kyoto protocol (1998)
- Cartagena protocol on bio-safety to the convention on biological diversity (2000)
- Stockholm convention on persistent organic pollutants (2001)

9.2.2 Philippines Environmental Impact Statement System (PEISS)

In the Philippines, all private or public projects or activities which are envisaged to potentially have a negative impact on the environment are subject to environmental impact assessment (EIA) by Philippine Environmental Impact Statement System (PEISS). EIA is the preliminary analysis of the potential impacts of the project on the environment. Aware of the possible negative effects of the implementation of industrial and other activities, the Philippine government has instituted measures to encourage the use of EIA as a planning and decision making tool.

PEISS is a set of laws, regulations, administrative orders and guidelines concerned with Environmental Impact Assessment (EIA). The following are some of the most important of these laws and guidelines:

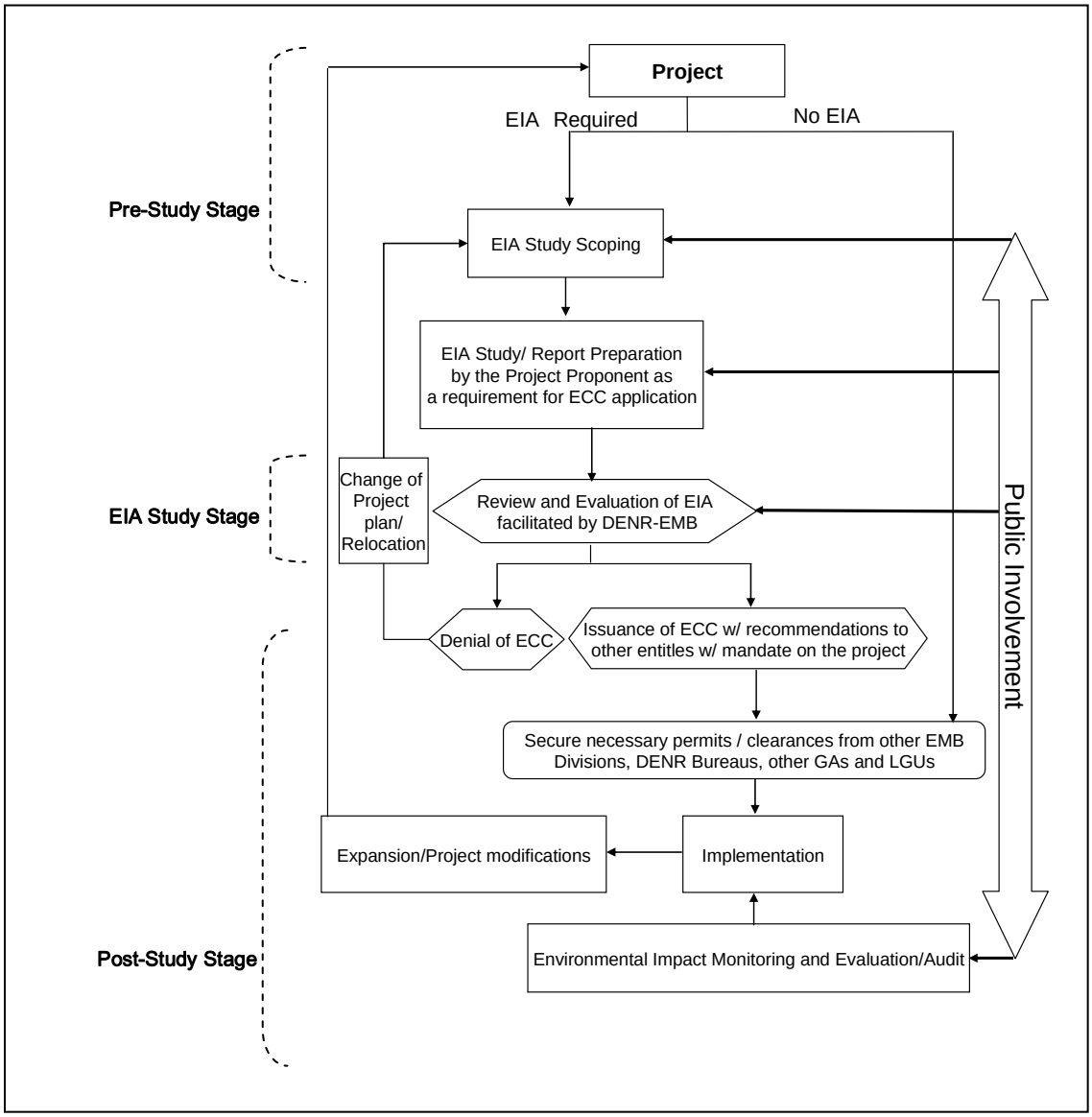
Environmental Impact Statement System (EISS), Presidential Decree No. 1586 (1978): An act establishing and centralizing the Environmental Impact Statement (EIS) System under the National Environmental Protection Council (NEPC), which merged with the National Pollution Control Commission (NPCC) in June 1987 to become the Environmental Management Bureau (EMB).

Presidential Proclamation No. 2146 (1981) and No. 803 (1996): It proclaims Environmentally Critical Projects (ECPs) to have significant impact on the quality of environment and Environmentally Critical Areas (ECAs) as environmentally fragile areas within the scope of the EIS System.

DAO 96-37 revised to become DAO 92-21 Devolved responsibility for EIS to the EMB-Regional Office and further strengthened the PEISS. Placed emphasis on promoting maximum public participation in EIA process to validate the social acceptability of the Project.

DENR Administrative Order No. 30 Series of 2003 (DAO 03-30), Revised Procedural Manual (2007): Provides for implementation of rules and regulations of Presidential Decree No. 1586, establishing PEISS. Also, provided detailed definitions of technical terms and detailed information regarding procedures, related laws and regulations.

The procedures of EIA can be grouped into; the following stages (as shown in the following diagram): (1) pre-study stage (screening and scoping), (2) EIA study stage and (3) post-study stage (review, decision-making and monitoring).



Source: Revised Procedural Manual for DENR Administrative Order No. 30 Series of 2003 (DAO 03-30) (2007)

FIGURE 9.2.2-1 EIA PROCESS FLOW

9.2.3 Involuntary Resettlement and Land Acquisitions

9.2.3.1 Republic Act 8974 and Its Implementation (IRR)

In November 2000, another law was passed by the Philippine congress to avoid delays in the implementation of development projects due to ROW acquisition-related problems. Republic Act 8974, otherwise known as "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 assessment of the value of the land subject of negotiated sale or expropriation proceedings, namely:

- The classification and use for which the property is suited shall be based "on the approved land use plan and/or zoning ordinance, if any, of the city concerned";
- 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;
- The reasonable disturbance compensation for the removal and/or demolition of certain improvement on the land and for the value of improvements thereon;
- The development costs for improving the land (this shall be based on the records and estimates of the City or Municipal Assessor concerned);
- The value declared by the owners (as shown in their latest Tax Declaration Certificates or Sworn Statements);
- The current price of similar lands in the vicinity (This shall be based on the records on the Deeds of Sale in the Office of the Register of Deeds Concerned); and
- Such facts and events as to enable the affected property owners to have sufficient funds to acquire similarly-situated lands of approximate area as those required from them by the government, and thereby rehabilitate themselves as early as possible.

Another feature of R.A. 8974's IRR that makes ROW acquisition more acceptable to property owners is Section 10 which prescribes valuation of affected improvements and/or structures to be computed based on replacement cost method. The replacement cost of improvements/structures 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 cost associated with the acquisition and installation in place of the affected improvement/structures".

Compared to the previous statues, valuation of land and improvements using this legislation is by far the most equitable and practical. Adherence to these provisions would also close the gap

between Philippine legislation and compliance to WB O.P. 4.12 smaller.

Shown below are other important and applicable provisions of the IRR:

- Section 4 states that any Implementing Agency which requires acquisition of ROW for its projects may explore donation as the first option;
- Sets 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;
- Provides for the engagement of government financing institutions or private appraisers as an option to undertake appraisal of the land and/or improvements/structures, to determine its fair market value (if PAFs refused the first two offers);
- Tasked the National Housing Authority (NHA) to establish and develop informal settlers (squatter) relocation sites, including provision of adequate utilities and services

9.2.3.2 Executive Order 152 (2002)

- Designated the Presidential commission for the Urban Poor (PCUP) as the sole clearing house for the conduct of demolition and eviction activities involving the homeless and underprivileged citizens.
- Mandated the PCUP to ensure strict compliance to the requirements of just and humane demolition and eviction under the UDHA of 1992 and the implementing Rules and Regulations of Section 28.

9.2.3.3 DPWH Department Order No. 5, Series of 2003

- Created 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-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 (note that this includes ROW acquisition);
- 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 of foreign funded, that will require ROW acquisitions, using a standardized compensation package;
- Determination of Affected Persons (AP) and improvements shall be based on the cut-off date,

which is the start of the census of APs and tagging for improvements; and

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

9.2.3.4 Land Acquisition, Resettlement, Rehabilitation, and Indigenous Peoples (LARRIP) Policy, 3rd Edition, (2007)

- The Land Acquisition Plan and Resettlement Action Plan (LAPRAP) document shall describe the project, expected impacts and mitigation measures, socio-economic profile of the 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 socio-economic 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; and
- 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.

9.2.3.5 Executive Order 708 (2008)

EO 708 (2008) has been devolved the clearing house functions of the PCUP to the respective cities and municipalities in whose territorial jurisdiction the proposed demolition and eviction activities of government agencies are to be undertaken.

9.2.3.6 Civil Code of the Philippines, Chapter 3, Prescription of Actions, Article 1141

This Article specifies the prescription of thirty (30) years for real actions over immovable objects. All lands which shall have been used by the public as a highway, airport, etc. for a period of thirty (30) years or more, shall be a highway, airport, etc. with the same force and effect as if it had been duly laid out and recorded as a highway, airport, etc. in the cadastral map.

9.2.3.7 DPWH Department Order No. 187 (Series of 2002)

DO 187 requires all offices to include the cost of ROW acquisition, informal settler (squatter) relocation, and the development of a resettlement site in the total construction cost of any proposed projects.

9.2.3.8 Republic Act 7160 (1991): "Local Government Code"

RA 7160 allows the local government units (LGU) to exercise the power of eminent domain for public use. The law also empowers the concerned LGU to open or close roads within its territorial jurisdiction.

9.2.3.9 Republic Act 8371: "Indigenous People's Rights Act" (IPRA Law)

A "certification precondition" (consent) is required from affected indigenous peoples before any land taking and/or relocation from their ancestral domain by the project. The process will be closely followed by representatives of the National Commission on Indigenous Peoples (NCIP). The IPRA together with the "Free and Prior Informed Consent" (FPIC) guidelines of 2006, will serve as the guiding framework on addressing IP issues.

9.2.3.10 Republic Act 7279 (Urban Development and Housing Act of 1992) and its IRR

Section 5 of the Act, and Sections 3.1 and 6.6 of its Annex (Guidelines for the inventory and identification of Lands and Sites for Socialized Housing) states that lands or portions thereof, set aside by government offices, facilities, and other installations, whether owned by the National Government, its agencies and instrumentalities, including government-owned and controlled corporations, or by the Local Governments Units, but which have not been used for the purpose for which they have been reserved or set aside for the past 10 years from the effective of the Act (i.e. as of 2002) shall be covered. As such, these areas, when identified as suitable for socialized housing, shall immediately be transferred to the NHA, subject to the approval of the President of the Philippines, or by the LGU concerned, as the case may be, for proper disposition with the Act;

- Section 8 of the Act and its Annex "A" mandated all local government units in coordination with the NHA HLURB, NAMRIA, and the DENR land Management Bureau (LMB) to identify lands for socialized housing and resettlement areas for the immediate and future needs of the underprivileged and homeless in the urban areas;
- Section 6.3 of the Act's Annex sets the following criteria to be used for evaluating the suitability of sites for socialized housing:
- To the extent feasible, socialized housing and resettlement projects shall be located in new areas where employment opportunities are available;
- Priority shall be given to areas where basic services and facilities are already existing or where they can be introduced within a short time;
- Transportation costs to work places and other services should be affordable considering

that the target beneficiaries are the homeless and underprivileged;

- The site shall not require excessive leveling, cutting and filling. Sites requiring excessive engineering works shall be avoided. Likewise, sites on steep slopes and/or week soil foundation shall not be considered;
- Environmentally critical areas like those that are flood prone or earthquake zones or areas near rivers and canal shall be avoided;
- Compatibility with existing zoning; and
- Financial feasibility and viability where land valuation offer is low; and
- Tenurial status.
- Section 16 of the Act provides the eligibility criteria for program beneficiaries as follows:
- Must be a Filipino citizen;
- Must be an underprivileged and homeless citizen i.e. as defined in Section 3 of the same Act, refers to beneficiaries of the Act and to individuals or families residing in urban and urbanizing areas whose income or combined household income falls within the poverty threshold as defined by the NEDA and who do not own housing facilities, including those who live in makeshift dwelling units and do not enjoy security of tenure;
- Must not own any other real property whether in the urban or rural area; and
- Must not be a professional squatter or a member of squatting syndicates.
- Section 28 of the Act stipulates that eviction or demolition as a practice shall be discouraged; however it may be allowed under the following conditions;
- When persons or entities 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 projects with available funding are about to be implemented; or
- When there is a court order for eviction and demolition.
- In the execution of the above Section 28, the following shall be mandatory:
- Notice upon the affected persons or entities at least thirty (30) days prior to date of eviction and demolition;
- Adequate consultations on the matter of resettlement with the duly designated representatives of the families to be resettled and the affected communities in the areas where they are to be relocated;
- Presence of local government officials or their representatives during eviction or demolitions;
- Proper identification of all persons taking part in the demolition;
- Execution of eviction or demolition only during regular office hours from Mondays to Fridays and during good weather unless the affected families consent otherwise;

- No use of heavy equipment for demolition except for structures that are permanent and others of concrete materials;
- Proper uniforms for members of the Philippine National Police who shall occupy the first line of law enforcement and observe proper disturbance control procedures; and
- Adequate relocation, whether temporary or permanent; provided however, that in cases of eviction and demolition pursuant to a court order involving underprivileged and homeless citizens, relocation shall be undertaken by the LGU concerned and the NHA with assistance of other government agencies within 45 days from service of notice of final judgment by the court, after which period the said order shall be executed; provided further that should relocation not be possible within the said period, financial assistance in the amount equivalent to the prevailing minimum daily wage multiplied by 60 days shall be extended to the affected families by the LGU concerned.

9.3 RESPONSIBLE ORGANIZATIONS

9.3.1 Proponent of the Project

The proponent of the Project is the Department of Public Works and Highways (DPWH).

After a long process of evolution by virtue of Executive Order No. 124, dated January 30, 1987, the Department of Public Works and Highways (DPWH) was organized with five (5) bureaus, six (6) services, sixteen (16) regional offices, twenty-four (24) project management offices, sixteen (16) regional equipment services and one-hundred eighteen (118) district engineering offices. Organization chart of DPWH is shown in **Figure 9.3.1-1**.

PMO-PJHL: This Office is the project implementing office in DPWH. It is tasked to prepare bidding documents; participate in negotiations and finalization of bid contracts; and monitor/supervise the implementation of Japan ODA projects. This office oversees, administers, supervises and coordinates all construction and prosecution activities in the expressway project. The organizational and functional charts are shown in **Figure 9.3.1-2,** and **9.3.1-3** respectively.

Planning Service (PS): This Service is assigned to formulate policies, plans and programs for the development of the national road network, which includes expressways; conduct/review FS of road/expressway projects; prepare PPP proposals for ODA financing; maintain a national road database; and prepare multi-year and annual budgets for the construction (including right-of-way and engineering) and maintenance of national roads.

PMO-Feasibility Studies: This office is assigned to conduct/supervise FS of major foreign-assisted and locally-funded road and expressway projects; and assist the PS and PMO-PJHL in preparing project proposals for ODA financing.

Bureau of Design (BOD): This Bureau is mandated to set engineering design standards; conduct/supervise/review/approve engineering surveys, designs and construction plans of roads/ expressways, including specifications, quantity estimates and tender documents for roads and expressways.

Environmental and Social Services Office (ESSO) and **PMO-Infrastructure Right-of-Way and Resettlement (PMO-IROWR)** are responsible on social and environmental consideration and relocation respectively. Detail of these functions is discussed in the next section. Organization chart of ESSO and its function is shown in **Figure 9.3.1-4** and **Table 9.3.1-1**, respectively. Organization chart and function of PMO-IROWR is shown in **Figure 9.3.1-5**, and **Table 9.3.1-2**.

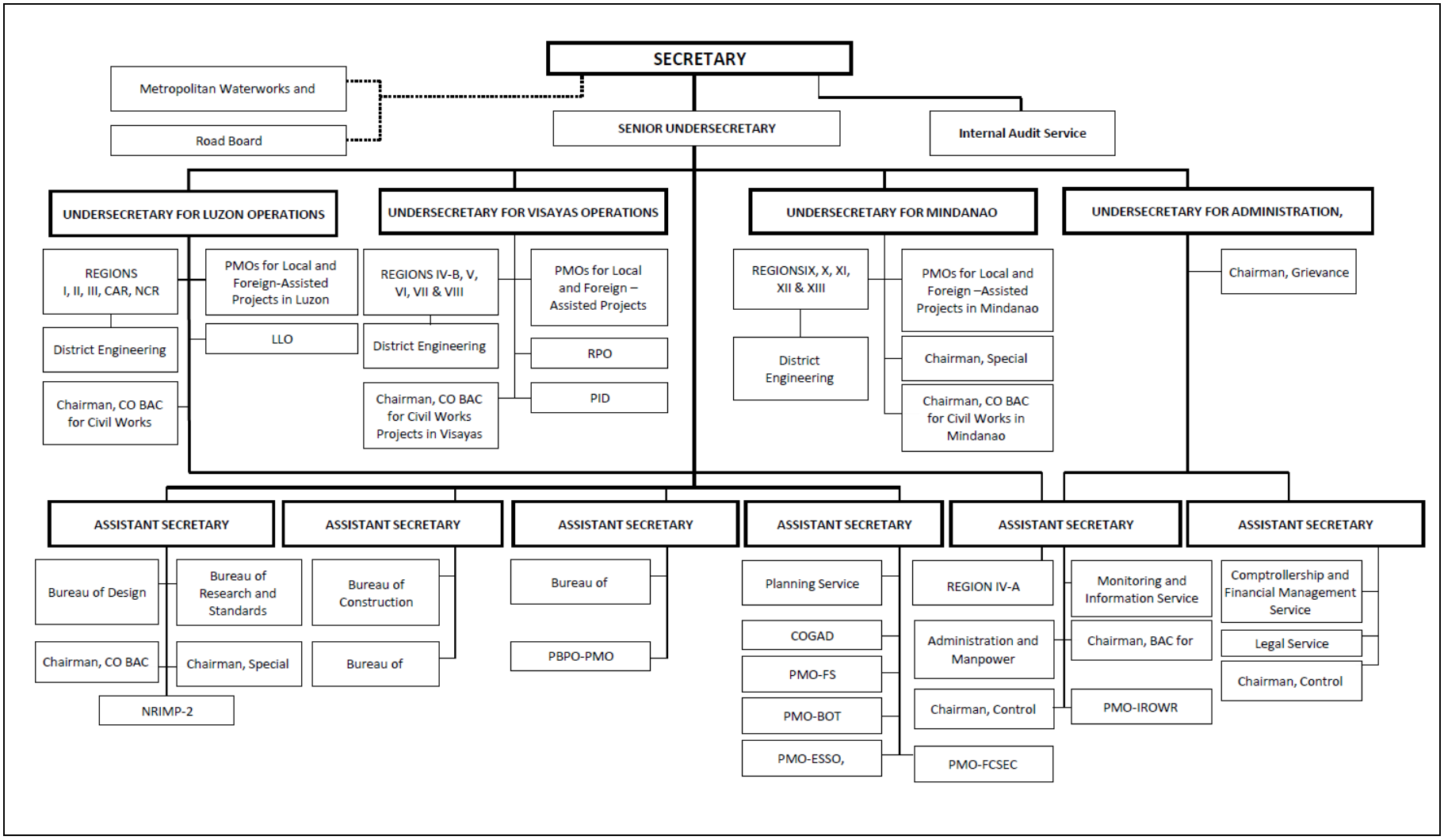


FIGURE 9.3.1-1 DPWH ORGANOGRAM

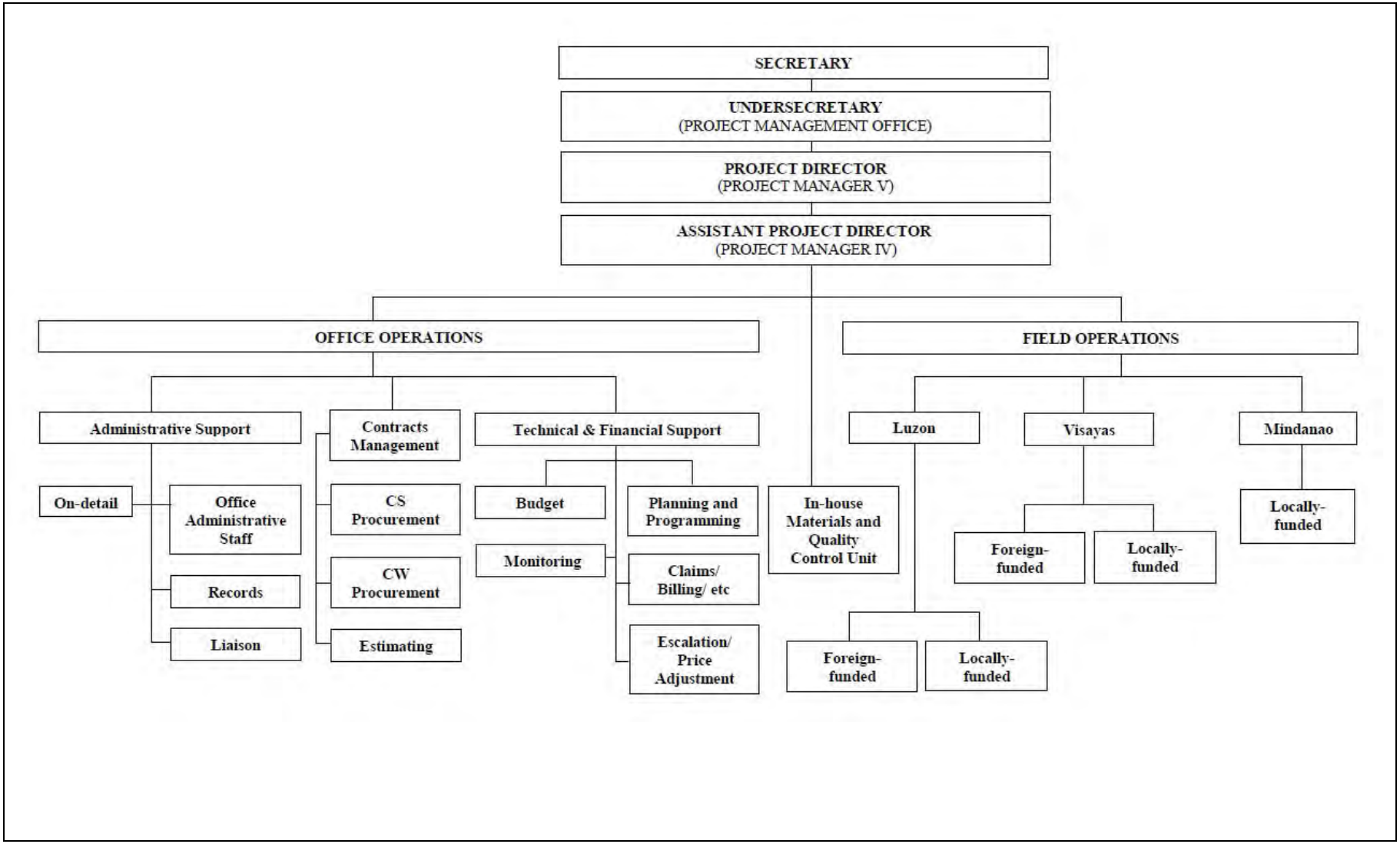


FIGURE 9.3.1-2 ORGANIZATION CHART OF PMO-PJHL

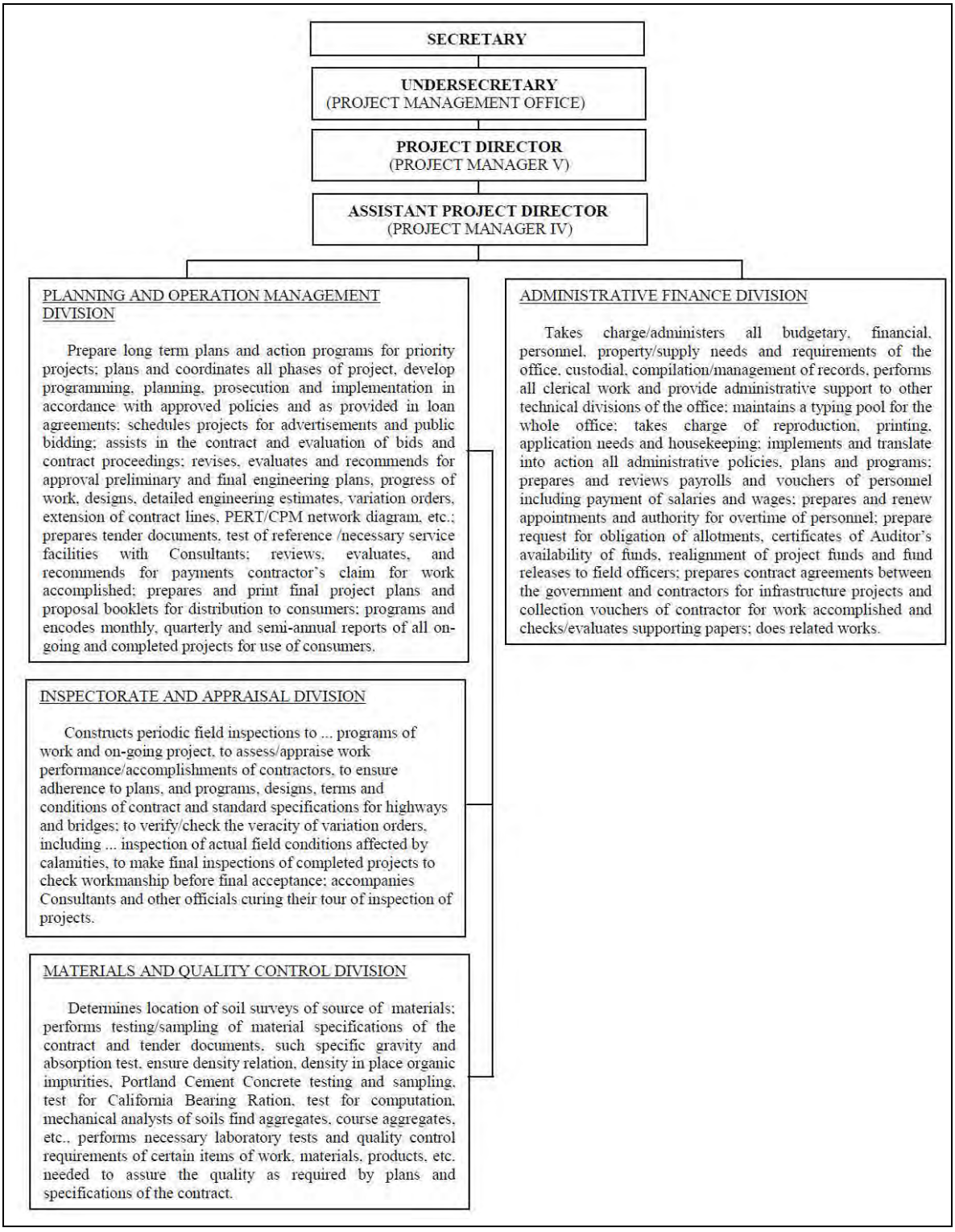


FIGURE 9.3.1-3 FUNCTIONAL CHART OF PMO-PJHL

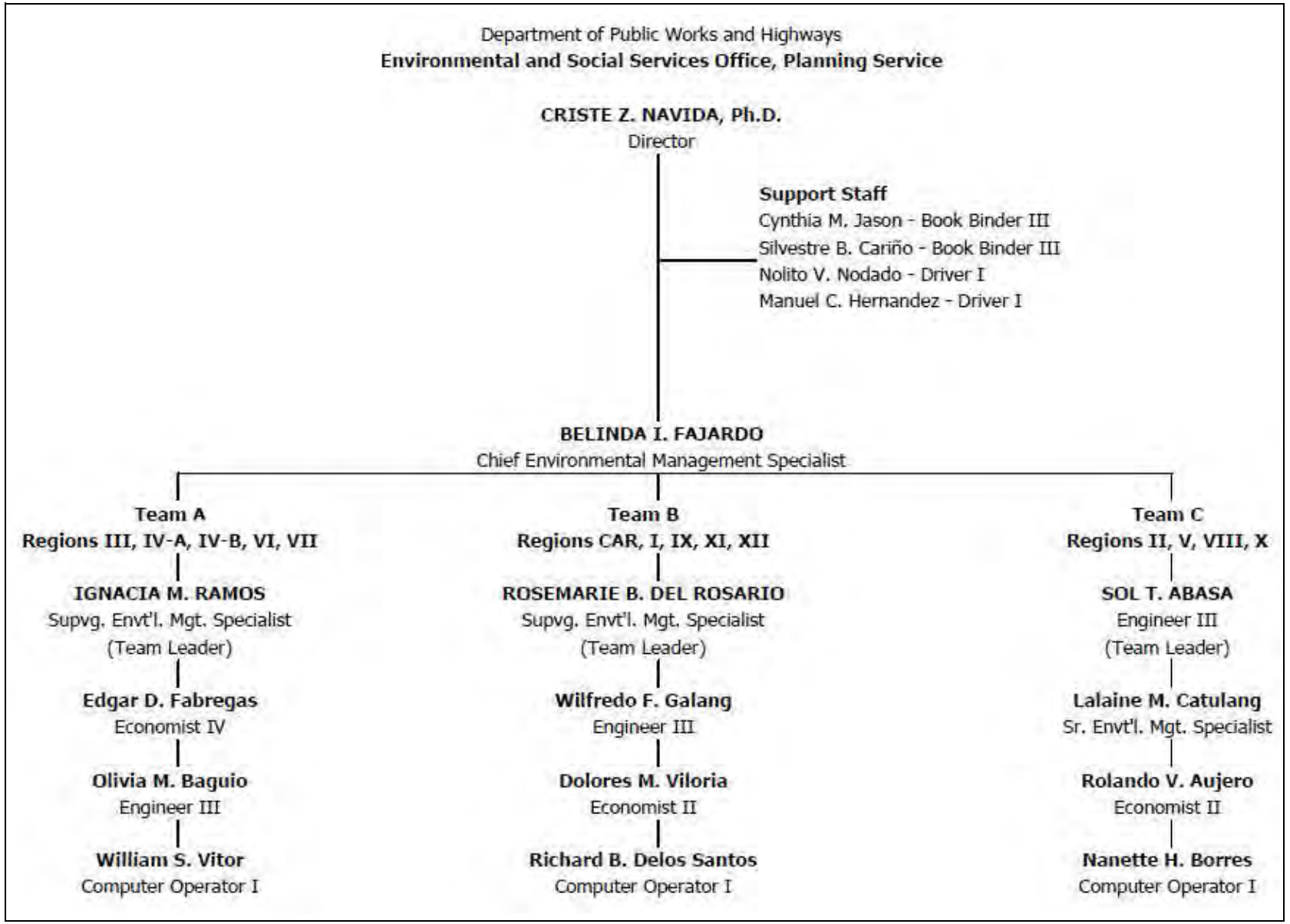
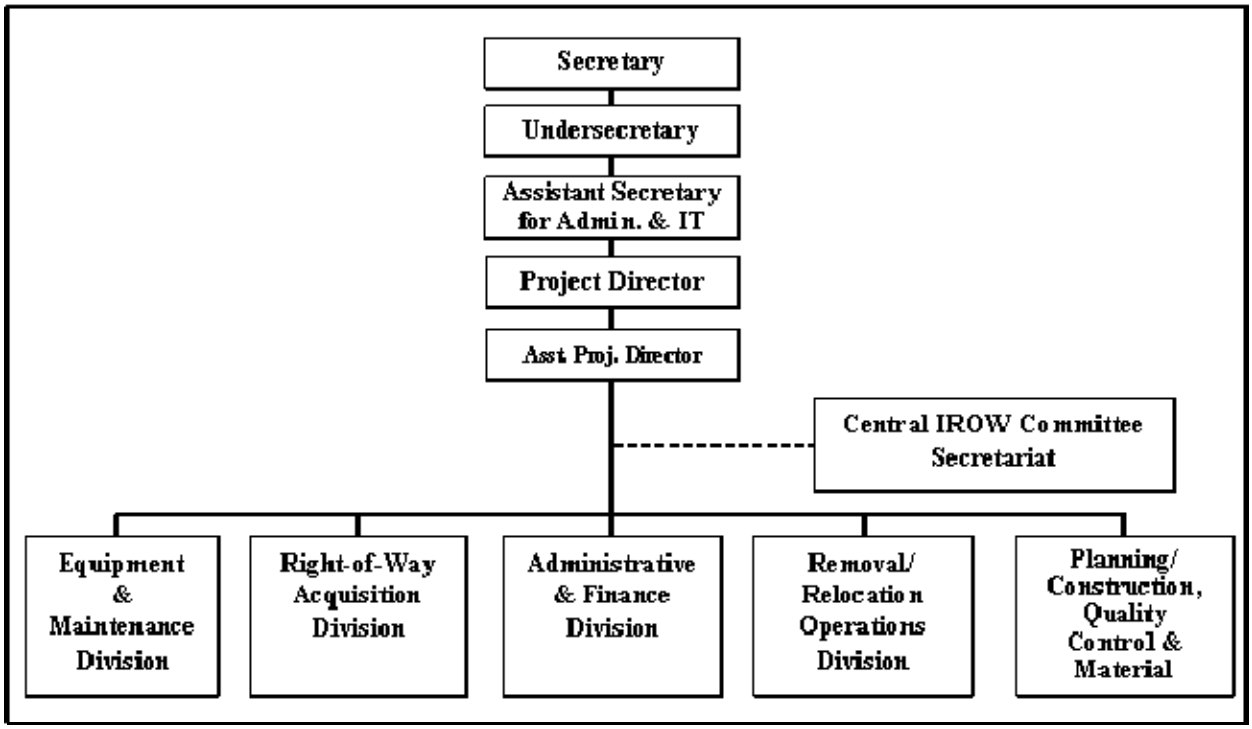


FIGURE 9.3.1-4 ORGANIZATION CHART OF ESSO

TABLE 9.3.1-1 FUNCTION OF ESSO

- Conduct assessments for environmental, social impact and land acquisition;
- Prepare relevant report such as Initial Environment Examination (IEE), Environmental Impact Statement (EIS), Environmental Management Plans (EMP), Resettlement Action Plan (RAP) and other necessary documents;
- Facilitate consultation and information dissemination to project affected persons and other relevant stakeholders;
- Conduct environmental monitoring; Monitoring RAP implementation and conduct post implementation evaluation;
- Provide guidance to regional and district level DPWH staff and local authorities in carrying out the above studies, preparation of documents and RAP implementation;
- Providing training at regional, district and local level for consultation/participation, RAP implementation, environmental management planning, environmental monitoring, EIA tools and other new techniques;
- Maintain and update the existing data bank and Geographical Information System (GIS); and
- Coordinate environmental concerns with other DPWH offices, Government Agencies, Local Government Units and Non-Government Organizations.

Per Department Order Number 220, Series of 1999; as amended by Department Order Number 58, Series of 2004.



Source: DPWH-ESSO

FIGURE 9.3.1-5 ORGANIZATION CHART OF PMO-IROWR

TABLE 9.3.1-2 FUNCTION OF PMO-IROWR

- Prepare the Action Plan and monitor the process of implementation of the new Infrastructure Right of Way (IROW) process;
- Continue with the existing functions of PMO-Action Office for Resettlement of Squatter Families (PMO-AORSF) and PMO-Manggahan Floodway;
- Assist all Implementing Office (IO) in the implementation of the improved ROW policies, processes, and procedures;
- Supervise the improved ROW process in all IO;
- Coordinate with the BIR, Appraisal Committees, and other appropriate agencies for upgrading of valuations;
- Coordinate with appropriate government agencies and the private sector, particularly the utility companies, among others, to ensure the successful implementation of the improved ROW process;
- Consolidate and validate the monthly ROW monitoring reports for submission to the Secretary;
- Consolidate and validate the summaries of payment made by the IO and submit a report to the Secretary;
- Prepare other guidelines needed to clarify issues that may arise from the implementation of the improved process;
- Implement the computerization of ROW Management System once it has been developed or purchased;
- Ensure the proper record keeping of all relevant documents and the archiving of titles with the National Archives;
- Prepare Quarterly Reports for submission to the Secretary; and
- Perform other duties as may be assigned by the Secretary.

Per Department Order Number 5, Series of 2003, the functions and responsibilities of PMO-IROW.

9.3.2 EIA and ECC

The Project is required of EIA and to secure ECC.

Review and supervision of PEISS are conducted by the Environmental Management Bureau (EMB) and the Department of Environment and Natural Resources (DENR). The respective organization charts of DENR and EMB are shown below.

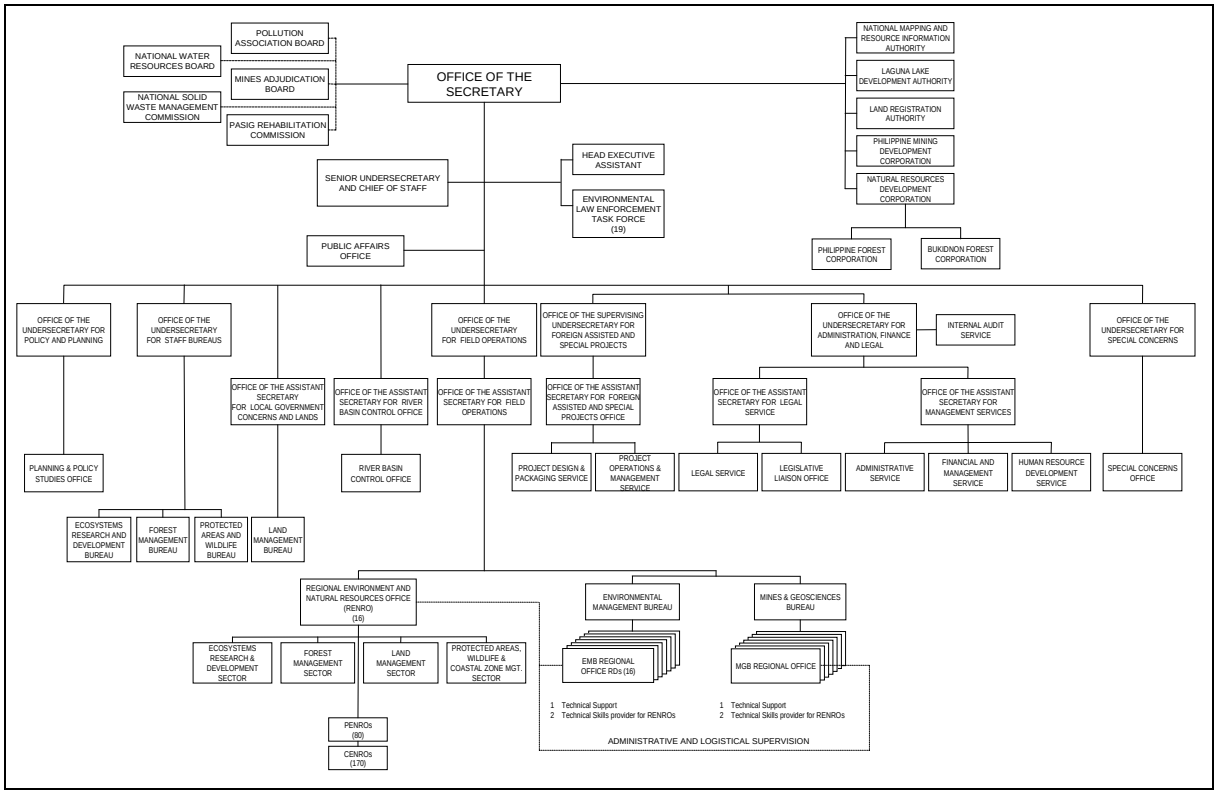


FIGURE 9.3.2-1 DENR ORGANOGRAM

DENR is the government entity which is designated to handle issues related to the following five tasks as described in pertinent legislation:

1. Assure the availability and sustainability of the country's natural resources through judicious use and systematic restoration or replacement, whenever possible;

2. Increase the productivity of natural resources in order to meet the demands for forest, mineral, and land resources of a growing population;

3. Enhance the contribution of natural resources for achieving national economic and social development;

4. Promote equitable access to natural resources by the different sectors of the population; and

5. Conserve specific terrestrial and marine areas representative of the Philippine natural and cultural heritage for present and future generations.

Under the framework of PEISS, EMB is responsible for the issuance of decision making documents such as Environmental Compliance Certificate (ECC), Certificate of Non-Coverage

(CNC) and Denial Letter. Also, EMB Regional Offices in respective regions are primarily responsible for the supervision of development projects and conducting consultation related to such projects.

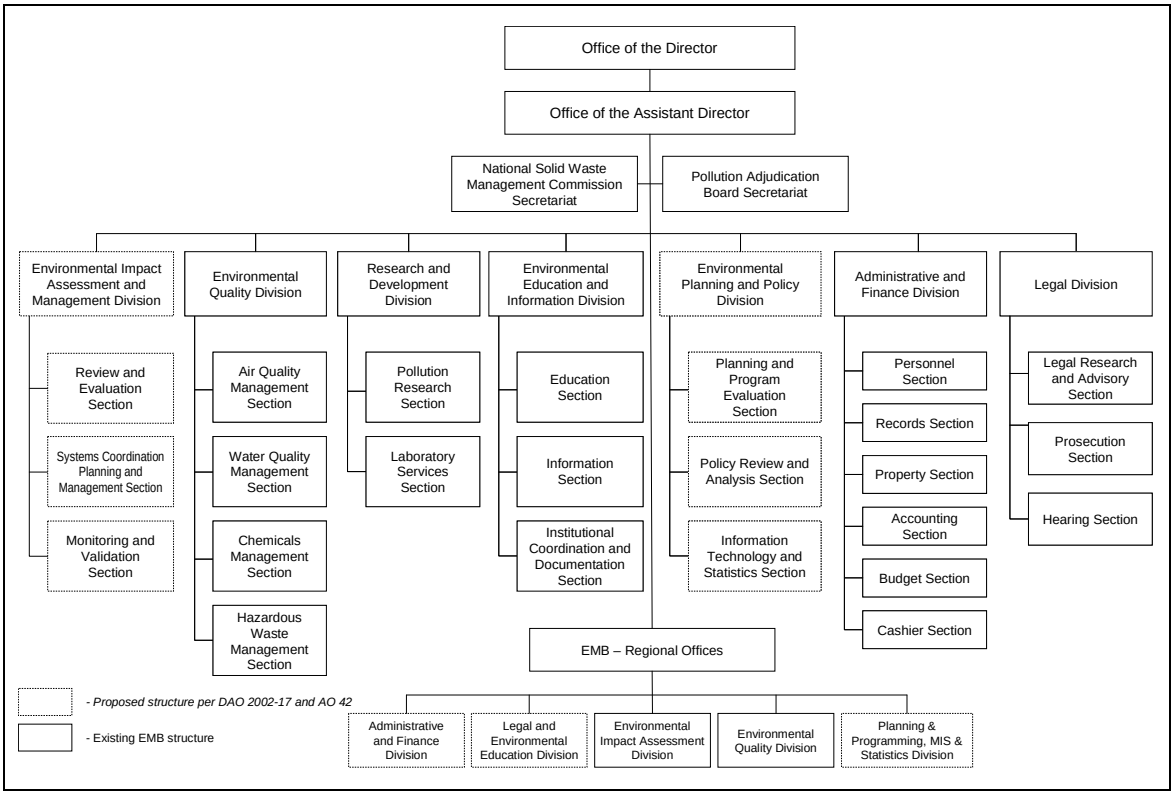


FIGURE 9.3.2-2 DENR-EMB ORGANOGRAM

9.3.2.1 EIA Proponent

The proponent agency of this Project is the Department of Public Works and Highways (DPWH). The DPWH has the responsibility for preparation and submission of the PEISS. Project Management Office–F/S (PMO-F/S) is responsible for feasibility studies and prepares the PEISS. Once the project execution starts, PMOs, such as PMO-BOT, PMO-PJHL for Yen Loan Projects, PMO-IBRD for IBRD Projects, etc. have responsibilities for implementation of environmental and social considerations such as land acquisition and resettlement in cooperation with local government units. The Environmental Social Services Office (ESSO), is responsible for supporting and supervising preparation of PEISS. Environmental and Social Services Office (ESSO) is involved in preliminary planning activities related to Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Rapid Social Assessment, Resettlement Action Plan (RAP); conduct public consultations on expressway projects; conduct Information, Education and Communication (IEC) on environment-related concerns; and compliance and effects monitoring of ECC conditions and Environmental Management Plan (EMP).

9.3.2.2 Environmental Compliance Certificate (ECC)

A certificate issued to which the Proponent conforms with, after DENR-EMB explains the *ECC conditions*. The ECC is signed by the Proponent to signify full responsibility over implementation of specified measures which are necessary to comply with existing environmental regulations.

1) Decision Timeline

Decisions of applications are made within the prescribed timelines within the control of DENR. Otherwise, the application shall be deemed automatically approved, with the issuance of the approval document within five (5) working days from the time the prescribed period lapsed.

2) Validity and Expiry

Once a project is implemented, the ECC remains valid and active for the lifetime of the project. ECC conditions and commitments are permanently relieved from compliance only upon validation of the EMB of the successful implementation of the Abandonment/ Rehabilitation/ Decommissioning Plan.

The ECC automatically expires if a project has not been implemented within five (5) years from ECC issuance, or if the ECC was not requested for extension within three (3) months from the expiration of its validity

3) Amendment of ECC for Minor Change Only

Amendment of ECC can be processed for minor alternation of the project only due to:

- Typographical error
- Extension of deadlines for submittal of post-ECC requirements
- Extension of ECC validity
- Change in company name/ ownership
- Decrease in land/project area or production capacity

Other amendments deemed “minor” at the discretion of the EMB CO/RO Director.

The following steps are taken to process the request of amendment.

- Within three (3) days from ECC issuance (for projects not started) OR at any time during project implementation, the Proponent prepares and submits to the ECC-endorsing DENR-EMB Office a LETTER-REQUEST for ECC amendment, including data, information, reports or documents to substantiate the requested revisions
- The ECC-endorsing EMB office assigns a Case Handler to evaluate the request
- ECC-endorsing Authority decides on the Letter-Request, based on Case Handler recommendation.

Maximum Processing Time for Issuance of Decision is 7 workdays for both central and regional offices of EMB.

9.3.2.3 Certificate of Non-Coverage (CNC)

Certifies that based on the submitted Project Description report, the project is NOT covered by the EIS System and is not required to secure an ECC. The CNC advises the Proponent on coverage to other requirements by other DENR offices, LGUs, or other government agencies.

9.3.2.4 Denial Letter

Contains the explanation for the disapproval of the application and guidance on how the application can be improved to a level of acceptability in the next EIA process. Denial is based on unsatisfactory evaluation by the EIARC (EIA Review Committee) or EMB of the Proponent's submitted Additional Information (AI) at the end of the review process.

9.3.3 Involuntary Resettlement and Land Acquisitions

The provision of resettlement site shall be the responsibility of the local government units (LGUs) concerned, with assistance from the concerned government agencies tasked with providing housing.

DPWH-PMO-Infrastructure Right-of-Way and Resettlement (PMO-IROWR) is tasked to consult with LGUs, local communities, project affected persons, and the designer/contractor for expressway projects; coordinate with the Presidential Commission for the Urban Poor (PCUP) and the National Housing Authority (NHA) on the relocation of squatter families; conduct census and tagging of affected lots and improvements; coordinate with the Bureau of Internal Revenue or BIR (for zonal valuation), Registry of Deeds (for titles), Assessor's Office, and Department of Agrarian Reform or DAR (for land conversion); coordinate and negotiate with affected property owners on the sale of their properties; coordinate with the Office of the Solicitor General (OSG) for filing of expropriation proceedings; and effect payment of affected properties.

To streamline acquisition of needed R-O-W and at the same time be compliant with international (WB, ADB, JICA) policies on involuntary resettlement together with the DPWH's own

resettlement policy, roles, responsibilities, and efforts of key players and major stakeholders must be well coordinated. In order to achieve this, it is strongly recommended that, a Lead Inter-Agency Committee (LIAC) be organized.

The LIAC will help ensure that a common direction is being followed to achieve the ultimate goal of providing a service infrastructure that will spark development in Mega Manila. Provided below is a list of said key players and major stakeholders and their corresponding responsibilities.

9.4 JICA GUIDELINES AND PHILIPPINES' SOCIAL AND ENVIRONMENTAL CONSIDERATION

9.4.1 Compliance with JICA Guidelines

9.4.1.1 EIA Report Outlines

Outlines of EIA reports for JICA and the Philippines are compared in **Table 9.4.1-1**. EIA report (EIS in the Philippines). Legal/Policy Frame work is not stated in EIS while social development, emergency response policy and guidelines, and abandonment/decommissioning/rehabilitation policies and guidelines sections are included in JICA's EIA outline. Since EMB suggested to send an official letter requesting amendment of existing ECC and the said letter should show differences or changes made, thus a new set of EIS is not required by Philippine government, it is sufficient to satisfy JICA guidelines' requirement for this Study's purpose.

TABLE 9.4.1-1 COMPARISON OF EIA REPORT OUTLINES

Category	LATEST DENR/EMB OUTLINE	JICA OUTLINE
Executive Summary	Executive Summary	Executive Summary
	Project Fact Sheet	Significant findings
	Process Documentation	Recommendations
	Summary of Baseline Conditions	
Legal/Policy Framework	(Legal/policy framework is not required under the latest EMB EIA outline).	Legal/Policy Framework
Project Description	Project Description	Project Description
	Project Location and Area	Project location map including areas affected Description of project in terms of its geographical, ecological and temporal context.
	Environment Study Area Map	
	Geographic coordinates of Project Site	
	Rationale for selection of primary & secondary impact areas.	
	Project Rationale	
	Project Alternatives	
	Project Components	
	Major Components	
	Other Supporting Facilities	Off-site investments (i.e. access roads, pipelines, power plants, housing, raw materials, etc.)
	Pollution control devices and facilities these are serving	

Category	LATEST DENR/EMB OUTLINE	JICA OUTLINE
	Footprint of proposed project layout	
	Process/Technology Options	
	Production Process/ construction method	
	Power generation and water supply system	
	Waste Management System	
	Project Size	
	Total project size	
	Annual Production rate & working days/hrs if process industry	
	Development plan, Description of Project Phases and Corresponding Time frame.	
	Pre-construction	
	Construction	
	Operations & Maintenance	
	Abandonment	
	Manpower	
	Manpower requirements	
	Expertise/skills required	
	Nature & Estimated number of positions for men/women/ethnic minorities	
	Indicative Project Investment Cost	
Baseline Data	Discussed in Project Description and Analysis of Environmental Impact section	Baseline Data
		Description and Assessment of environmental study area in terms of:
		Physical conditions
		Biological conditions
		Socio-economic conditions
		Cumulative impact (takes into account impact with other projects in the area not related to the project.
		Citation of information sources
Environmental Impacts and Mitigation Measures	Analysis of Environmental Impacts	Environmental Impacts
	Land	Prediction and Assessment of the project's likely:
	Land Use and Classification	Positive Impacts
	Discussion on inconsistencies and possible conflicts of project with existing land use zoning ordinance	Negative Impacts
	Discussion on potential change due to project implementation	Identifies Mitigation Measures for negative environmental impacts including those that cannot be mitigated.
	Geology/ Geomorphology	
	Discussion on Projected change as a result of project implementation which includes:	Explores possible enhancement measures for positive impacts
	Change in surface topography	Identified and quantified the extent and quantity of available data, essential data gaps, and uncertainties associated with predictions
	Change in subsurface/ underground geomorphology	
	Inducement of subsidence/ collapse	
	Inducement of landslides or other hazards.	
		Essential gaps;
		Uncertainties with predictions
		Specifies topics that do not require further attention
	Pedology	All the environmentally and socially concerned elements are discussed in the previous Baseline data section
	Analyze project impact and provide mitigation measures for:	
	Erodability Potential	
	Bank Stability	

Category	LATEST DENR/EMB OUTLINE	JICA OUTLINE
	Change in Soil Quantity/fertility	
	Terrestrial Biology	
	Analyze project impact and provide management measures for the following:	
	Vegetation removal and loss of habitat	
	Threat to existence of important species	
	Threat to abundance, frequency and distribution of important species.	
	Hindrance to wildlife species	
	Water	
	Hydrology/Hydrogeology	
	Analyze project's impact and provide management measures for:	
	Change in drainage morphology	
	Change in stream, lake water depth	
	Reduction in stream volumetric flow	
	Inducement of flooding	
	Water resources use and completion	
	Reduction/depletion of groundwater flow	
	Oceanography	
	Analyze project's impact and provide a management measure for:	
	Change in circulation pattern	
	Change in stream, lake water depth	
	Change in bathymetry	
	Water Quality	
	Identify specific source of pollution load	
	Discuss assimilative capacity of receiving water body	
	Include as part of Environmental Management Plan and Monitoring Plan.	
	Sampling Map	
	Freshwater or Marine Ecology	
	Identify source of threat to ecology and discuss assimilative capacity of receiving ecosystem	
	Threat to abundance, frequency and distribution of species	
	Loss of important species	
	Loss of habitat	
	Air	
	Meteorology/Climatology	
	Discuss project's possible effect on local climate	
	Discuss project's contribution to global greenhouse gas	
	Air Quality & Noise	
	Identified specific source of pollution load	
	Discussion on Assimilative capacity considering ambient air quality/noise levels in the area.	
	People	
	Discussion on Project Displaced Persons	
	Discussion on migration patterns resulting from project implementation	
	Discussion on IPs and culture/ lifestyle	
	Discussion on public health issues relating to project implementation	
	Discussion on benefits of local people from the project.	
	Discussion on project impact on deliver of basic service to local people and resource completion in the area.	

Category	LATEST DENR/EMB OUTLINE	JICA OUTLINE
	Discussion on project impact on local traffic conditions.	
	Institutional Arrangements (accountable persons/ office) for project.	
	Discussion on involuntary resettlement impacts such as:	
	Identify affected properties	
	Relocation of Displaced Persons	
	Devaluation of affected properties	
Analysis of Alternatives	Discussed in Project Description section	Analysis of Alternatives
		Comparison of alternatives to the proposed project including the "No Project" scenario in terms of:
		Potential environmental impacts
		Mitigation measures
		Cost (capital & recurring)
		Suitability
		Institutional, training and monitoring requirements
		Economic and Financial feasibility
		Basis for selection of project alignment
		Justification for recommended emission level and approaches to pollution prevention and abatement
Risk Assessment	Environment and Ecological Risk Assessment	Discussed in Environmental Impacts and Mitigation Measures section
	Identify and provide management measures for:	
	Chronic risks	
	Acute risks/ Worst case scenario	
Environmental Management Plan	Impact Management Plan	Environmental Management Plan
Public Participation	Social Development Plan and IEC	Consultation
Social Development Plan	Discussed in Environmental Management Plan	Not required
Environmental Monitoring	Environmental Compliance Monitoring	Discussed in Environmental Management Plan
Emergency Response Plan	Emergency Response Policy and Generic Guidelines	Not required
Abandonment/ Decommissioning	Abandonment / Decommissioning/ Rehabilitation Policies and Generic Guidelines	Not required
Institutional Arrangements for Project Implementation	Institutional Plan for EMP Implementation	Discussed in environmental Impacts and Mitigation Measure section

9.4.1.2 Resettlement Action Plan (RAP) Outlines

Since both countries follow the World Bank Safeguard Policy, OP 4.12-Annex A, there is no difference in the outline of Resettlement Action Plan. A typical RAP outline is shown in **Table 9.4.1-2.**

TABLE 9.4.1-2 RAP OUTLINE

Description of the project
Potential impacts
Objectives
Socioeconomic studies
Legal framework
Eligibility
Valuation of and compensation for losses
Resettlement measures
Site selection, site preparation, and relocation
Housing, infrastructure, and social services
Environmental protection and management
Integration with host populations
Community participation
Grievance procedures
Organizational responsibilities
Implementation schedule
Costs and budget
Monitoring and evaluation

9.4.2 Means to Bridge the Gaps

9.4.2.1 Supplementary Study

EIS (2010) is reviewed in comparison with JICA's requirements and for the new set of Scoping Matrix. Detail of the Scoping matrix and supplementary study is discussed in following sections (Section 9.4.3). Supplementary studies on social and environmental elements, which are anticipated to be affected by the CLLEX alignment and design proposed in this Study Project, were carried out.

9.4.2.2 Resettlement and Land Acquisition Policy Framework

Since DPWH's resettlement policy has been improved to satisfy World Bank's OP4.12, which is also JICA's requirement, employing the policy frame work is appropriate for the Project. (*Land Acquisition, Resettlement, Rehabilitation, and Indigenous Peoples (LARRIP) Policy, 3rd Edition, (2007)*). If it is found necessary, DPWH-ESSO will have to amend the LARRIP to meet a specific needs and characteristic of CLLEX (Phase I) Project. **Table 9.4.2-1** shows analysis of and means to fill the gap. Detailed Relocation Policy for CLEEX (Phase 1) is discussed in Section 9.6.1

TABLE 9.4.2-1 SUMMARY OF GAP ANALYSIS ON RELOCATION POLICY

JICA Guidelines	Laws and Guidelines of the Philippines	Gap relative to JICA GL	Project Policy
Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy, 2007 (LARRIP), (=WB OP4.12)	None	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	LARRIP	None	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)
People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	LARRIP	None	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL
Compensation must be based on the full replacement cost as much as possible. (JICA GL)	LARRIP	None	Compensation must be based on the full replacement cost.
Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	DO#5 (2003): unless ROW is purchased project notice of award to contractor cannot be issued, i.e. all kind of compensation is paid before project is commenced	None	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)
For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	LARRIP	None	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)
In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	LARRIP	None	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)
When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	LARRIP	None	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)
Appropriate participation of affected people must be promoted in planning, implementation, and	LARRIP	None	Appropriate participation of affected people must be promoted in planning, implementation, and

JICA Guidelines	Laws and Guidelines of the Philippines	Gap relative to JICA GL	Project Policy
monitoring of resettlement action plans. (JICA GL)			monitoring of resettlement action plans. (JICA GL)
Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	LARRIP	None	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)
Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP 4.12 Para. 6)	LARRIP states the cut-off date as the date of commencement of the census. Resettlement project conducted by LGUs nationwide notifies to public the last day of the census work, and use the date as the cut-off date, so that no eligible PAFs are left uncounted.	None	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. The cut-off date for this RAP is the date of commencement of the census. For those who are eligible for compensation but absent during the census work shall be encouraged to communicate with barangay captains and to attend community consultation meetings to be validated by DPWH.
Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	Professional Squatters (as defined by Republic Act 7279) applies to persons who have previously been awarded home lots or housing units by the government but who sold, leased or transferred the same to settle illegally in the same place or in another urban area, and non bona fide occupants and intruders of lands reserved for socialized housing. Squatting Syndicates (as defined by Republic Act 7279) refers to groups of persons who are engaged in the business of squatter housing for profit or gain. Those persons are ineligible for structure compensation, relocation, and rehabilitation/ inconvenience/	Professional Squatters and Squatting Syndicates are not eligible for compensation. They may salvage the structure materials by themselves if demolition is carried out by him/herself.	All affected people (except professional squatters) will be eligible for compensation and rehabilitation assistance, regardless of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives of JICA Guidelines. However, those who have previously been awarded home lots or housing units by the government but who sold, leased or transferred the same to settle illegally in the same place or in another urban area, and non bona fide occupants and intruders of lands reserved for socialized housing will not be eligible for compensation.

JICA Guidelines	Laws and Guidelines of the Philippines	Gap relative to JICA GL	Project Policy
	income-loss assistance in case their structures are to be demolished in resettlement project according to Republic Act 7279. This definition excludes individuals or groups who simply rent land and housing from professional squatters or squatting syndicates.		
Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP 4.12 Para. 11)	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. (LARRIP)	None	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (In this project, no PAFs are farmers, agricultural lesser, or fishers.)
Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4. 12, para.6)	* Income Loss. For loss of business/income, the PAF will be entitled to an income rehabilitation assistance to be based on the latest copy of the PAFs' Tax record for 3 months, or not to exceed P 15,000 for severely affected structures. *Inconvenience Allowance The amount of P 10,000 shall be given to PAFs with severely affected structures, which require relocation and new construction. *Rehabilitation assistance Skills training and other development activities equivalent to P 15,000 per family will be provided in coordination with other government agencies, if the present means of livelihood is no longer viable and the PAF will have to engage in a new income activity. *Transportation allowance or assistance. If relocating, PAFs to be provided free transportation. Also, informal settlers in urban centers who opt to go	Upper limit of cash disturbance compensation is limited to Php15,000 according to Philippine laws. The amount of planned Financial assistance and eligibility are explained in the community consultation, Only objection given to the Study Team was to change alignment and not to cause loss of farming lands.	The Commission of Audit (COA) and DPWH of Philippine government must amend Departmental Order to pay more than Php15,000 of disturbance and other compensation. DPWH will target all PAFs for Livelihood Rehabilitation Assistance. DPWH will conduct quarterly monitoring about the change of living standard of the PAFs before and after the resettlement. When the PAF are found that their living standard worsen, or whose present means of livelihood became not-viable, DPWH, in coordination with other appropriate institutions, will provide assistances, such as skills and livelihood trainings

JICA Guidelines	Laws and Guidelines of the Philippines	Gap relative to JICA GL	Project Policy
	back to their place of origin in the province or be shifted to government relocation sites will be provided free transportation. (LARRIP (April, 2007, p. 18, 19)		
Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP 4.12 Para. 8)	LARRIP	None	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP 4.12 Para. 8)

Source: JICA Guidelines for Environmental and Social Considerations (2010), World Bank Operational Policy 4.12 (2001), Land Acquisition, Department of Public Works and Highways Resettlement, Rehabilitation and Indigenous Peoples' Policy (2007), Republic of the Philippines

9.4.3 Review of Existing Documents

9.4.3.1 Environmental Impact Statement/EIS (2010)

1) Overview

(i) Executive Summary

Executive Summary of EIS (2010) is composed of the following topics:

- Project Background
- Project Location
- Project Components
- Impact Assessment
- Summary of Environmental Impacts
- Environmental Management and Monitoring Plan

(ii) Scoping

Table 9.4.3-1 summarizes the identified environmental impacts that may be created based on the proposed Project's different activities. The most affected sector and the significance of each impact are also marked to determine the following:

TABLE 9.4.3-1 SCOPING MATRIX (EIS 2010)

Activities	Aspects	Environmental Impacts	Parameter Most Affected	Significance of Impact			
				+/-	D/In	L/S	R/I
A. Pre-construction/Construction							
A1. Implementation of major civil and construction activities along the proposed highway alignment	Earth-movement and other civil works	Modification of existing terrain	Land	-	D	L	I
		Depletion of land and soil resources	Land	-	D	L	I
		Increased erosion	Land	-	D	S	R
		Loss of soil nutrients	Land	-	D	L	I
		Generation of solid wastes	Land	-	D	S	R
		Dust propagation and migration	Air	-	D	S	R
		Restriction or alteration of stream flows	Water	-	D	S	R
		Storm water run-off	Water	-	In	S	R
		Siltation and increased water turbidity	Water	-	D	S	R
		Disturbance/ displacement of flora and fauna	Flora Fauna	-	D	S	R
		Modification and destruction of terrestrial habitats	Flora Fauna	-	D	S	I
		Possible traffic congestion	People	-	D	S	R
	Use of heavy equipment	Ground vibration	Land	-	D	S	R
		Generation of hazardous wastes (i.e. used oil)	Land	-	D	S	R
		Increase in air emission levels	Air People	-	D	S	R
		Increase in noise levels	Air People	-	D	S	R
		Increased risks to occupational safety	People	-	D	S	R
	Influx of heavy equipment and construction personnel	Generation of solid wastes	Land	-	D	S	R
		Generation of wastewater	Water	-	D	S	R
		Introduction of non-endemic flora and fauna species	Flora Fauna	-	In	S	R
		Traffic congestion	People	-	D	S	R
		Resource competition	People	-	In	S	R
		Non-assimilation of diverse culture	People	-	In	S	R
A1. Implementation of major civil and construction activities along the proposed highway alignment	Influx of heavy equipment and construction personnel	Disturbances on peace and order	People	-	In	S	R
		Generation of employment	People	+	D	S	R
		Creation of additional sources of income and livelihood	People	+	D	S	R
		Increase in basic social services	People	+	In	S	R
		Improvement in housing and utilities	People	+	In	S	R
		Elevation of women's welfare	People	+	In	S	R
A2. Implementation of Right-of-Way (ROW)	Clearing of obstacles for the highway alignment	Reduction of agricultural lands	Land	-	D	L	I
		Restriction of faunal movement and road kill	Fauna	-	D	S	I
		Displacement on human settlements	People	-	D	L	I
		Disturbance of livelihood	People	-	D	L	R
		Restriction on human movement	People	-	D	L	R

Activities	Aspects	Environmental Impacts	Parameter Most Affected	Significance of Impact			
				+/-	D/In	L/S	R/I
B. Operation							
B1. Expressway operation	Passing of vehicles	Increase in air emission levels	Air	-	In	L	R
		Increase in noise levels	Air	-	In	L	R
		Restriction of faunal movement and road kill	Fauna	-	D	L	I
		Increased risks to occupational safety	People	-	D	S	R
	Collection of toll fees	Generation of employment	People	+	D	L	R
		Creation of additional sources of income and livelihood	People	+	D	L	R
		Additional revenues for the local government	People	+	D	L	R
		Increase in basic social services	People	+	In	L	R
		Improvement in housing and utilities	People	+	In	L	R
		Elevation of women's welfare	People	+	In	L	R
	Improved transportation services	Improved human welfare	People	+	In	L	R
		Increased road safety	People	+	D	L	R
		Increase in property values	People	+	In	L	R
B1. Expressway operation *(cont'd.)*	Road/drainage maintenance	Generation of solid wastes	Land	-	D	L	R
		Generation of hazardous wastes	Land	-	D	S	R
		Storm water run-off	Water	-	In	L	R
		Generation of wastewater	Water	-	D	L	R
C. Abandonment							
C1. Closure or decommissioning	Stoppage of operations	Disturbance of livelihood	People	-	D	L	R
		Restriction on human movement	People	-	D	L	R
		Loss of employment	People	-	D	L	R
		Traffic congestion	People	-	D	L	R
	Demobilization of facilities	Generation of solid wastes	Land	-	D	S	R
		Generation of hazardous wastes	Land	-	D	S	R
		Generation of wastewater	Water	-	D	S	R
		Traffic congestion	People	-	D	L	R
Legend for Significant of Impacts +/-: Positive impact/negative impact, D/In: Direct/Indirect, L/S: Long term/Short term, R/I: Reversible/ Irreversible							

Source：*Feasibility Study for the Proposed Central Luzon Expressway (2010)*

2) Project Site Status

- **Land**

The environmental impacts on land will be more evident during the Construction phase of the proposed CLLEX. Most of the identified/perceived impacts will negatively affect the existing land/soil quality of the area for a long time/permanent basis, while the remaining impacts (i.e. erosion, ground vibration, generation of solid and hazardous wastes) will be temporary which can be mitigated through enhancement procedures.

- **Air**

  Impacts on ambient air and noise will be more evident during the Construction phase of the proposed Project. Most of the identified impacts will affect the ambient air and noise quality of the Project area for a short period and will be localized only.

- **Water**

  The environmental impacts on surface water quality of affected area will be more noticeable during the Construction phase of the proposed CLLEX, but will be lesser in extent during the Operation. These perceived/identified impacts will negatively affect the existing spots but will be temporary and localized, and can be minimized through mitigating measures.

- **Biological/Terrestrial Environment**

  The impacts on the biological/terrestrial environment will be a combination of temporary and permanent impacts. During the Construction phase of the proposed CLLEX, the following activities such as: clearing works, earth moving for land preparation, road construction, and the improvement of access and service roads intended for various Project will result to displacement of trees and plants. This may result to the disturbance of native faunal species, change (modification and destruction) of terrestrial habitats, and an impending loss of plant associations and their associated fauna. For the Operations phase, restriction of faunal movement may affect the Project vicinity due to the alteration of the affected terrestrial habitats. However, it is also during this phase that some positive impacts will be generated once the project proponent implements the various biodiversity activities (i.e. re-planting, establishment of nurseries, etc.).

- **People**

  The proposed Project will not adversely affect the employment, livelihood and income of the residents; on the contrary, the proposed Project may even provide income opportunities from the time of construction until operations. For those who will be directly affected and whose houses would need to be removed once the ROW clearing operations commenced, their concern would be addressed by giving a just compensation and through resettlement adjustment that would be included in the social development plan. In terms of traffic flow for transporting heavy equipment and laborers, the area is located along the Bypass road and

when necessary, this could be closed without affecting the ingress and egress of traffic and would not impede normal community life or social inter-actions within the direct impact areas, more so in the indirect impact areas.

3) ECC

Based on the EIS prepared in February 2010, ECC has been issued for both Phase I and II in March 2010. However, an alignment and location of Inter changes (I/C) have been changed. Based on the suggestion of EMB, PMO-FS of DPWH submitted a letter of request to amend awarded ECC to the EMB on August 10, 2011. Response from EMB is not made yet, as of this report writing.

TABLE 9.4.3-2 SUMMARY OF ECC (2010)

Environmental Compliance Certificate (ECC)	
Date of Issue	30th March, 2010
Permit Agency	Department of Environment and Natural Resources, Environmental Management Bureau (DENR-EMB) Visayas Avenue, Diiiman, Quezon City 1116
Implementing Agency	Department of Public Works and Highways-Project Management Office/Feasibility Study (DPWH-PMO/FS)
ECC approved by	EMB Director Juan Miguel T. Cuna
Project approved by	DENR Secretary Haracio C. Ramos
Reference No.	CO-1001-0003
Project Name	Central Luzon Link Expressway (CLLEX) Project
Project Site	Tarlac province: La Paz Nueva Ecija province: Aliaga, Talavera, Llanera, Cabanatuan city, San Jose
Project Contents	Total Length：64 km (Phase I：28 km、Phase II：36 km)
	Highway that keep 60m of ROW for construction through La Paz, Aliaga, Talavera, Llanera, Cabanatuan city, San Jose
	Phase I : Highway including 11 bridges Phase II: Highway including 6 bridges
Swearing	Subscribed on 12th April 2010
	Signature by Director of DPWH-PMO/FS: Faustino D. Sta. Maria
Legal Basis Issued under Presidential Decree No. 586, DAO No. 2003-30 **Conditions (Annex A)**	
ENVIRONMENTAL MANAGEMENT All commitments, mitigating measures and monitoring requirements, especially those contained in the Environmental Management and Monitoring Plans (EMMP's) in the Environmental Impact Statement (EIS), including all its modifications and additional information as approved by the environment throughout the project implementation, including the following: Implement a Waste Management Program for proper handling, collection and disposal of solid wastes; Implement a dust control system along the construction site to suppress the ambient suspended particulate matters generated by the construction activities; Construction and installation of drainage structures such as ditches, culverts and pipe drains to divert surface and run-off water; and Implementation of a Social Development Program, including employment priority for local residents within the direct impact areas;	

GENERAL CONDITIONS

The project operations shall conform with the provisions of RA 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990), RA 9003 (Act Providing for an Ecological Solid Waste Management Program), RA 9275 (Philippine Clean Water Act of 2004), and RA 8749 (Philippine Clean Air Act of 1999);

Establishment of an Environmental Unit (EU) to effectively handle, implement, and manage all environmental-related aspects of the project. Proof of establishment of the EU shall be submitted to EMB. The EU shall also have the following responsibilities:

a. Implement the approved Environmental Management and Monitoring Program; and

b. Monitor actual impacts vis-à-vis the predicted impacts on human/social and physical environmental management measures in the EIS;

The proponent shall ensure that all relevant conditions of this Certificate are properly complied with by its commissioned contractors/sub-contractors during all project phases;

The proponent shall ensure that Contractor's All Risk Insurance (CARI) is provided to cover expenses for the indemnification/compensation of damage to life and property that may be caused by the implementation of the project facilities related to the prevention of possible negative impact;

To supplement CARI, a Quick Response Fund (QRF) shall also be set up by the proponent to be used for emergency repairs/restoration of critical damage infrastructure facilities after calamity in order to restore mobility and ensure safety in the affected areas;

RESTRICTIONS

No other activities should be undertaken other than what was stipulated in the EIS document. Expansion of the project/construction of other structures or any change in the activity beyond those stated in the EIA document shall be subject to new Environmental Impact Assessment requirements.

Project Assessment Planning Tool (Annex B)	
A. RECOMMENDATIONS TO CONSERNED GONERNMENT AGENCIES	
1. Compliance with the following:	RESPONSIBLE AGENCY
a) Sanitation Code of the Philippines;	DOH
b) Labor Code of the Philippines including occupational safety and health standards;	DOLE-BWC
c) Building Code of the Philippines for building structures and drainage system;	Municipal Planning and Development Office/LGU
d) Republic Act No. 8974 (An Act to facilitate the Municipal Planning acquisition of right-of-way of way, site or and Development location for National Government Infrastructure Projects and for other purposes), if necessary.	DPWH/Proponent
2. Provision of adequate storm drainage canal, concrete culverts, and other flood control measures to prevent silt-laden runoff discharging the water bodies	Provincial/Municipal Engineering Office
3. Coordination with the LGU's concerned on the implementation of the Solid Waste Management Program shall be coordinated with concerned LGU.	LGU/DENR
4. Provide resettlement/location program for the displaced informal settlers in accordance with the provisions of RA 7279 (An Act to provide for comprehensive and continuing urban development and housing program, establish the mechanism for its implementation, and for other purposes), if necessary	NHA/LGU
5. Compliance with FMB-DENR Tree Cutting Permit Requirements	DENR-EMB
B. ENVIRONMENTAL PLANNING RECOMMENDATIONS FOR THE PROPONENT	
6. Implement an employment prioritization scheme for hiring of qualified local residents within the affected areas.	
7. Design and undertake an effective continuing Information, Education and Communication (IEC) Program throughout the pre-construction, construction and operational phases of the project especially on the Traffic Management Plan to be implemented.	
8. First aid facilities and services for staff and employees need to be made available on-site during construction and operation of the project.	

9.4.4 Identification of Means to Bridge the Gap

Table 9.4.4-1 summarizes information gap between the existing EIS (2010) and JICA's requirement.

TABLE 9.4.4-1 INFORMATION TO GATHER IN THIS STUDY

	Environmental Item	Data / Information to obtain
Permits and Explanation	(1) EIA and Environmental Permits	Information about the Certificate for Cutting Tree - Procedure (since submit application until issue certificate) - Required Documents - Related Agencies
	(2) Explanation to the Local Stakeholders	- SH meeting schedule - Meeting Minutes
Pollution and Natural Hazardous Control	(1) Air Quality	Data of TSP/SPM, NO_2, SO_2
	(2) Water Quality	Data of BOD, SS, TC
	(3) Wastes	Information about waste disposal site near Project area. - Dimension, capacity
	(4) Noise and Vibration	Numerical Data Literature value for vibration
	(5) Traffic Jam	Traffic Survey
	(6) Flood	Historical data of Flood in project site.
Natural Environment	(1) Protected Areas	NIPAS (National Integrated Protected Areas System) NPAA (National Protected Areas for Agriculture)
	(2) Ecosystem	NIPAS - Important species at Project Site(Flora and Fauna)
	(3) Global Warming	Traffic Volume Prediction
	(4) Ground Water	Information about Ground Water - Ground water level - Type of Soil
Social Environment	(1) Resettlement	-Social and economic survey on PAPs -Land acquisition in agricultural setting, agri-farming area -Ag and development policy alignment -Compensation scheme
	(2) Living and Livelihood	The result of household interview /social survey
	(3) Heritage	Result of Social Economic survey
	(4) Landscape	Result of Social Economic survey
	(5) Ethnic Minorities and Indigenous Peoples	Any marginalized peoples
	(6) Working Conditions	Information about the Labor Law and Related Regulation - Safety Consideration to prevent accident - Control hazardous material - Establishment of safety and health planning
	(7)Water Usage	Water right of irrigation water that might be disturbed by the Project
	(8) Accident	Traffic volume prediction

Source: JICA Study Team (2011)

9.4.5 Revised Scope of EIS; Scoping Matrix According to JICA Guidelines

Although EIS for this project has already been finished in 2010's Study, additional survey such as Interview with Project Affected Persons (PAPs[1]) and topography for revised Phase I alignment are required because of change in the alignment. A scoping matrix is prepared altering the result of previous EIS taking into account JICA's environmental and social considerations guidelines of 2010 and WB O.P. 4.01. Annex B.

TABLE 9.4.5-1 REVISED SCOPING MATRIX

	Item	Evaluation				Description
		Construction		Operation		
		+	-	+	-	
1	Involuntary Resettlement	D	A	D	D	According to the latest road alignment plan, 67 HHs (334 people) are the PAPs. RAP should be draw up based on the discussion between agencies and PAPs. Also it should be consider the alignment that will be minimized affected people as much as possible will be designed.
2	Local Economy such as Employment	C	B	C	C	Negative impact to farmers who lose their farming land is expected. . Additionally, division of farmland by new road might cause declining in the agricultural productivity. On the other hand, the demand for labor to the construction and related work is expected to be increased, which further stimulates local economy. .
3	Land Use	D	B	C	D	Large scale of farmland will be lost, and change to road. It is likely that land along the new road and around I/C will be changed to market place / shopping mall, or developed to residential area after construction.
	Utilization of Local Resources	D	B	D	D	During the construction, short term shortage of local resources such as commodity, food, drinking water and electricity might be anticipated if surge of large number of workers/labors comes from outside of the community.
	Farm Land	D	A	D	B	Almost 201 ha of farmland will be lost by this project. In exchange to the express way, At the same time, agricultural activities will not continue anymore due to land acquisition.

[1] Project Affected Persons (PAPs): Means any person or persons, household, firm, private or public institution that, on account of changes resulting from the Project, will have its (i) standard of living adversely affected; (ii) right, title or interest in any house, land (including residential, commercial, agricultural, forest, salt mining and/or grazing land), water resources or any other moveable or fixed assets acquired, possessed, restricted or otherwise adversely affected, in full or in part, permanently or temporarily; and/or (iii) business, occupation, place of work or residence or habitat adversely affected, with or without displacement. In the case of a household, the term AP includes all members residing under one roof and operating as a single economic unit, who are adversely affected by the project or any of its components.
Project Affected Family (PAFs): A family consisting of PAPs, his/her spouse, sons, unmarried daughters, daughters-in law, brothers or unmarried sisters, father, mother and other legally adopted members residing with him/her and dependent on him/her for their livelihood.

	Item	Evaluation				Description
		Construction		Operation		
		+	-	+	-	
4*	Social Institution, Social Infrastructure and Local Decision-making	D	B	B	D	There are some universities and hospitals in Tarlac, Aliaga and Cabanatuan cities. During the construction, it will be difficult to access to those social institutions due to the increasing of vehicles for construction. On the other hand, it may be convenience to access to those institutions.
5*	Poor	C	B	B	D	It is likely that employment opportunities will increase during construction stage. Additionally, it may occur that increasing of that opportunities will be expected to continue due to arising of economic activities along road and around I/C.
	Indigenous People	D	D	D	D	So far it has not been confirmed that indigenous people live in project site.
6*	Misdistribution of Benefit and Damage	D	D	C	C	Misdistribution of benefit and damage by construction of roads will not likely occur. But impact is unknown at present stage.
7*	Cultural Heritage	D	D	D	D	Cultural and historical heritage does not exist at project site. There are churches (as functional building of religious institution, not a cultural monument) around area, her role is to proclaim and explain every aspect of moral order. Likewise, explains and promote the various components of a just social order though the church social teaching. Negative impact such as resettlement of church is not expected.
8*	Local Conflict of Interests	D	C	D	C	Depend on the location of new I/C, minor disputes between barangay might occur.
9*	Water Usage and Water Rights	D	B	D	C	By damming river and cutting irrigation canals for the road construction, some farmers and people might have problem with or even lose access to water source.
10*	Sanitation	D	B	D	D	Sanitary condition around construction site is likely to become unfavorable due to generation of waste and human waste during the construction.
11*	Risk, HIV/AIDS, Infectious disease	D	B	D	D	Possible infectious diseases are likely to increase during construction due to increase of construction workers.
12*	Accident	D	B	D	B	Accidents involving construction works, vehicles and machineries can be anticipated. Risk of traffic accidents is likely to increase due to growth of construction vehicles and heavily machines during construction and operation.
13	Topography and Geographical Feature	D	D	D	D	The proposed project will not include large scale change of topography and geographical features.
14	Soil Erosion	D	B	D	D	During the construction stage, erosion is likely to occur by the rain.

	Item	Evaluation				Description
		Construction		Operation		
		+	-	+	-	
15	Groundwater	D	B	D	D	Groundwater table at project site is between GL-0.5mand GL-4.3m deep. . Groundwater level might temporarily be dropped during construction as a result of cutting off of recharge source such as surface water flow. However, the aquifer level would recover soon after restrictions to surface water is removed.
16	Hydrology	D	B	D	D	Because the planned road runs through a large watershed the rice paddies and rivers located within might be affected by manipulating surface and groundwater flows during construction. However, the negative effect to hydrology is most likely to be temporal and limited.
17	Flora, Fauna and Biodiversity	D	B	D	B	During construction, Cutting down trees near the road construction site is expected, and that will affect the ecology of plants and animals. After construction the ecological recovery can be expected by green plantations activities. However, restriction of faunal movement and increase in road kills are expected.
18 *	Natural Reserve, Protected area	D	D	D	D	There are no Natural Reserved area in accordance with DENR‘s NIPAS in the project site.
19 *	Landscape	D	D	D	C	Some impact is expected during the construction temporary, but it will be minimized by mitigations.
20 *	Global Warming	D	B	D	B	Extent of impact is unknown at present stage. However, CO_2 emission is likely to increase during construction due to usage of diesel engine for vehicles, machineries and generators. After the completion of the express way amount of CO_2 is expected to increase as number of vehicles travel through CLLEX increases.
21 *	Air Pollution	D	B	D	B	Atmospheric pollutant is likely to increase during construction and operation due to increase of traffic, and usage of vehicles, machineries and generators. So baseline survey is necessary at present stage.
22 *	Water Pollution	D	B	D	B	During the construction and operation stage, excavated soil, surface water and oil from vehicles and machineries may pollute the nearby rivers. Baseline survey is necessary at present stage.
23 *	Soil Contamination	D	B	D	C	During the construction, excavated soil, surface water and oil from vehicles and machineries may pollute the ground.
24 *	Waste	D	B	D	D	Construction debris and excavated soil are generated during the construction. Human waste will be generated from workers during construction and operation.
25 *	Noise and Vibration	D	B	D	C	Noise and vibration occurred from machineries and /or vehicles used for construction works are expected. Baseline survey is necessary at present stage.
26 *	Ground Subsidence	D	D	D	D	Ground subsidence caused by long-term effect of vibration and stress to the express way by traffic is less likely happen according to soil compression test result.

	Item	Evaluation				Description
		Construction		Operation		
		+	-	+	-	
27 *	Offensive Odor	D	B	D	D	Possible offensive odor might be generated from construction vehicles and portable toilets for workers during construction.
28 *	Bottom sediment	D	D	D	C	There are least possibilities of bottom sediment deterioration due to inflow of contaminants and soil from construction site.
29 *	Traffic Congestion	D	B	C	D	During the construction, traffic jam may occur at towns due to usage of existing roads for construction work purpose. Additionally during the construction of I/C, traffic jam will be expected because of the roadblock.
30 *	Flood	D	C	D	C	Drainage function of soil will be impacted due to excavation works during the construction. Project site is located in a major watershed and prone to frequent floods. Elevated express way might dam up surface runoff and precipitation which might attribute to localized flood after construction is over. It is necessary to install an adequate drainage system.

Remarks;
+: Positive, -: Negative
A: Serious impact is expected, B: Some impact is expected, C: Extent of impact is unknown. (Examination is needed. Impact may become clear as study progresses. D: No impact is expected, IEE or EIA is not necessary.

Note: These concerned items with * are not included in the EIS (2010) but recommended in JICA's ESC Guidelines.

Source: JICA Study Team (2011)

9.4.5.1 ECC

Amendment of existing ECC obtained in 2010 can be amended to certify the road alignment and design proposed in this Study. A Letter of Request of Amendment has been prepared and submitted to EMB on August 10, 2011 by PMO-FS of DPWH. As of August 2011 approval of amendment is still on the process to be granted.

9.4.5.2 RAP

Since the PAPs are more than 200 peoples for new alignment/affected area, a full scaled RAP is necessary. Detail on RAP is stated in Section 9.6.

9.4.5.3 Tree Cutting Permit

In accordance with volume and owners of trees to be removed from CLLEX alignment, Tree Cutting Permit must be obtained from Department of Environment and Natural Resource (DENR).

The timber rights provided by existing laws, rules and regulations are as follows:

Private Land Timber Permit

The Private Land Timber Permit (PLTP) is a permit issued to landowners for the cutting, gathering and utilization of naturally grown trees in private lands. This is granted to any person, association or corporation who is an owner of private land covered by either administrative or judicial titles such as Free Patents, Homestead and Sales Patents and Torrens Titles obtained under Land Registration Act No. 496 or Commonwealth Act 141 (the Public Land Act), or by Certificates of Land Ownership Award (CLOA) covering certified A&D lands issued to farmer-beneficiaries of the Comprehensive Agrarian Reform Program under RA 6657 (Comprehensive Agrarian Reform Law).

All cutting permit applications shall be issued by the DENR Regional Executive Director (RED) for volumes not exceeding 50 cubic meters and by the DENR Secretary for volumes exceeding 50 cubic meters.

Special Private Land Timber Permit

he Special Private Land Timber Permit (SPLTP) is a permit issued to a landowner specifically for the cutting, gathering and utilization of premium hardwood species, both planted and naturally grown. The qualification requirements for grantees are similar with those for the PLTP.

All cutting permit applications shall be issued by the DENR RED for volumes not exceeding 10 cubic meters and by the DENR Secretary for volumes in excess of 10 cubic meters.

Special Tree Cutting Permit

The Special Tree Cutting Permit (STCP) is a permit for the purpose of tree cutting/pruning/ thinning/ sanitation and other silvicultural treatments in reforestation areas, cutting of trees affected by development projects or cutting of naturally grown trees along banks of creeks, rivers or streams for public safety.

Procedure to Get Tree Cutting Permit

- The Implementing Office (PMO-PJHL) will request to the DENR, through the Community Environmental and Natural Resources Office (CENRO) of DENR, the issuance of Tree Cutting Permit.

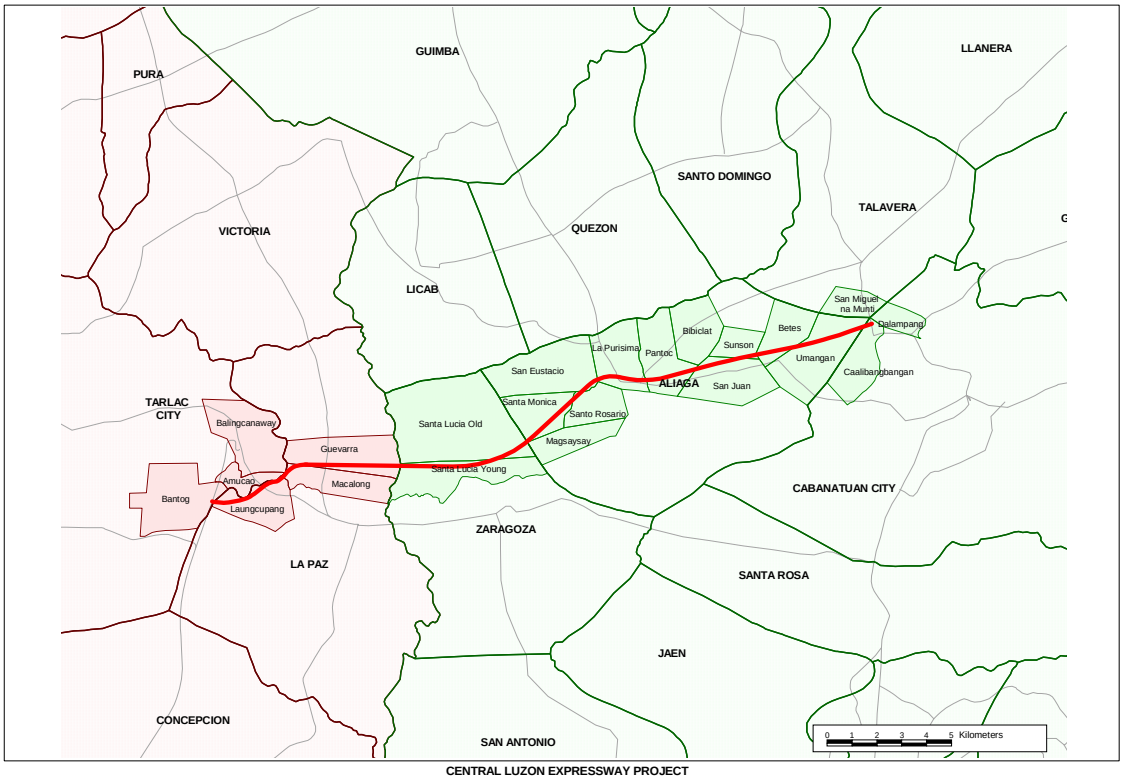
- The CENRO, in coordination with the Implementing Office, will conduct a joint inventory of the affected trees.
- The Inventory Report prepared by CENRO, together with other required documents will be submitted to the DENR-Provincial Environmental and Natural Resources Office (PENRO) for review/evaluation and recommendation to the DENR-Forest Management Bureau (DENR-FMB).
- The DENR-FMB after review/evaluation of the Inventory Report submits to the DENR-Regional Executive Director, who will recommend favorably the approval and issuance of the Tree Cutting Permit by the DENR-Secretary.

9.5 ENVIRONMENTAL IMPACT ASSESSMENT

9.5.1 EIA Study Area

Primarily affected areas are identified as barangays where the expressway cut across. Secondarily affected areas are defined as the cities that contain primarily affected areas. These barangays and cities are subject for social and environmental impact survey.

Affected area of a map with barangays boundary lines is shown in **Figure 9.5.1-1.**



Source: JICA Study Team (2011)

FIGURE 9.5.1-1 PROJECT AFFECTED AREA / BARANGAYS

TABLE 9.5.1-1 LIST OF DIRECT IMPACT AREAS (PHASE-1 SECTION ONLY)

Original Alignment[1)]		**Revised Alignment[2)]**	
Municipality/City	**Affected Barangay**	**Municipality/City**	**Affected Barangay**
Tarlac Province		**Tarlac Province**	
Tarlac City	Balincanaway	Tarlac City	Balincanaway ***Bantog*** ***Amucao***
La Paz	Guevarra La Purisima	La Paz	Guevarra ***Laungoupang*** ***Macalong***
		Zaragoza	***Santa Lucia Old*** ***Santa Lucia Young***
Nueva Ecija		**Nueva Ecija**	
Licab	Aquino		
Aliaga	Sta. Monica Poblacion West IV Poblacion East II Umangan Poblacion East I Santa Rosario	Aliaga	Sta. Monica Santa Rosario Umangan ***San Eustacio*** ***Magsaysay*** ***La Purishima*** ***Pantoc*** ***Bibiclat*** ***Sunson*** ***San Juan*** ***Betes***
Cabanatuan City	Buliran Dalampang Mayapyap Sur	Cabanatuan City	Dalampang ***Caalibangbangan***

Note: [1)] Feasibility Study for the Proposed Central Luzon Expressway Jan.2010 EIS

[2)] *JICA Study Team (2011)*

9.5.2 State of Environment (Baseline Data)

Current state of natural and social environments are studied based on existing credited data and statistics, government reports, direct measurement, interview, and visual observation.

9.5.2.1 Biological

1) Flora and Fauna (Ref. F/S 2010)

(i) Seasonal Variation of Flora and Fauna in Project Area

Unlike other countries which have four (4) seasons and as such would normally undergo flock of migratory birds and hibernation among some mammals, as well as falling of leaves of trees (except evergreens) during winter, the Philippines has two (2) pronounced seasons, i.e. the wet (rainy) and dry. During these seasons variation in flora are only in terms of changes in color of leaves from lush green (wet season) to yellow or brown (dry season). Since specific fauna lives on unique foods originated from specific flora, it can be said that the fauna also shows no significant seasonal variations except seasonal visit of some migrant species.

TABLE 9.5.2-1 OVERVIEW OF FLORA OBSERVED IN CLLEX ALIGNMENT (2009, OCTOBER)

Location	GPS Coordinates	Findings
SCTEx Tarlac Exit; located at the last SCTEX Exit at Tarlac City. The intersection is nearby and is very busy to the flow of traffic.	15°28'24.33"N 120°40'53.74"E	Vegetation composed of mixture of grasses, herbs, shrubs and few small trees. Carabao grass was present in all five (5)locations obtaining as high as 85-90% plant cover values mostly especially here.
Guevara, La Paz, Tarlac; located in a rice field parallel to the highway.	15°29'1.11"N 120°42'31.50"E	Vegetation composed of mixture of grasses, herbs, shrubs and few small trees; dominated by Bermuda grass followed by carabao grass, itchgrass and commelina.
Aliaga Municipal Health Center, Nueva Ecija; located in a rice field parallel to the highway near the Municipal Health Center.	15°30'14.90"N 120°50'17.50"E	Vegetation composed of mixture of grasses, herbs, shrubs and few small trees; wild eggplant dominated the quadrant sampling followed by carabao grass and Bermuda grass.
Talavera-Cabanatuan City Boundary; located in a rice field parallel to a barangay road with a few houses nearby.	15°31'48.64"N 120°56'2.64"E	Vegetation composed of mixture of grasses, herbs, shrubs and few small trees; both carabao grass and Bermuda grass shared equal dominance.
Brgy. Dimasalang Norte, Talavera, Nueva Ecija; located in a rice field parallel to the highway.	15°36'4.93"N 120°58'3.59"E	Vegetation composed of mixture of grasses, herbs, shrubs and few small trees; the total dominance of Axonopus or Carabao grass among all the surveyed sections.

Source: F/S, 2010

(ii) Flora

According to the field study having been done during the F/S in October 2009, grass weed species which include, carabao grass, Bermuda grass, itchgrass, commelina, tridax, wild eggplant, cogon, and cyperus were the most dominant agro-ecosystem species.

The present condition of the existing ecosystems in CLLEX area is characterized by relatively 'very low' to 'low' species diversity and an impaired rates of ecological functioning due primarily to a lot of human interventions and disturbances as a result of the various land and farming activities. The proposed Project's site and its surrounding areas represent a region of 'low' ecological significance or importance in terms species diversity. Reconnaissance survey indicates that species composition, distribution, and density are considered very low since the site is a highly disturbed agro-ecosystem dominated by food crops and their associated weeds.

Most common such species are as follows: Palay (Oryza sativa), kangkong (Ipomoea aquatica), banana (Musa sapientum), talahib (Saccharum spontaneum), guinea grass (Panicum maximum), milkweed (Euphornia hirta), carabao grass (Axonopus compressus), broomweed (Sida acuta), Bermuda grass (Cynodon dactylon), yardgrass (Eleusine indica), purplenutsedge (Cyperus rotundus), wild sunflower (Tridax procumbens), wandering jew (Commelina benghalensis), cogon (Imperata cylindrica) suab-kabayo (Hyptis suaveolens), desmodium (Desmodium procumbens), and few woody shrubs such as some herbs and vines like sitao (Vigna sesquepedalis), eggplant (Solanum melongena), makahiya (Mimosa pudica), mikania (Mikania cordata), verbena (Stachytarpheta jamaicensis), hagonoy (Chromolaena odorata), synedrella (Synedrella nodiflora) and a few coconut trees (Cocos nucifera).

Commonly observed fruit and lumber wood trees are as follows: Ipil-ipil (Leucaena leucocephala), mango (Mangifera indica), guava (Psidium guajava), santol (Sandoericumkoetjape), kaimito (Chrysophyllum cainito), langka (Artocarpus heterophylla), kamansi (Artocarpus altilis), narra (Pterocarpus indicus), yemane (Gmelina arborea), aratiles (Muntigia calabura), Ilang-ilang (Canamga odorata), and kawayang-tinik (Bambusa blumeana).

Most of grasses, shrubs and herbs species that were found at some portions of the vicinity of the proposed Project site were common and have no significant ecological or commercial value. The plant species encountered are common, ordinary and widespread in distribution and abundance in other comparable and related ecosystems all over the Philippines. Considered as indicator plant species, the observed occurrence of lush growth of pure stands in patches of Chromolaena odorata, Mikania cordata, and Synedrella nodiflora indicate that the CLLAX alignment area is highly disturbed ecosystem, most especially by rampant and uncontrolled human intervention.

In short, both qualitative and quantitative vegetation analyses revealed that there are no rare, threatened and endangered plants species present in the project site. Also, seasonal (dry and wet) differences are not anticipated.

(iii) Fauna

From the 51 species surveyed, 17 are birds, 15 are mammals, 9 are insects, 8 are reptiles, and 2 are amphibians. Endemicity of wildlife is moderately high with an approximate value of 78 percents. Most common faunal species encountered, sighted or surveyed during the investigation were mostly birds. The following are further observations taken from the vicinity:

- According to interviews with local residents of the community there were probably around seventeen (17) species of birds. The birds present in the area can be classified as either residents or visitors. The resident birds are those, which live their entire life in the area. Large numbers of the birds that are not native in the area (and in the country in general) are mostly regular winter migrants, that is, they come to the Philippines at the onset of the cold season in the northern parts of Asia and return in the summer months when they breed;
- There are eight (8) reptilian species such as pythons, common snake, turtle, bubuli, bayawak, monitor lizard and the common house lizard. Some of these reptiles are caught by local poachers and hunters and consumed as exotic foods;
- The wild mammalian group is represented by seven (7) species including bats and various kinds of rats;
- There are two (2) species of amphibians encountered i.e. the marine toad and the estuarine frog;
- The domesticated animals raised by the local community include cattle, cats, dogs, chickens, goats, carabaos, horses and pigs; and
- Insect species commonly associated with the area like bees, ants, grasshoppers, butterflies, dragonflies, wasps, mosquitoes, spiders and the common housefly were also observed.

TABLE 9.5.2-2 NUMBERS OF FAUNA SPECIES OBSERVED IN CLLEX ALIGNMENT (2009, OCTOBER)

Wildlife Group	Endemic	Resident	Introduced	Migrant	TOTAL
Amphibians	2	-	-	-	2
Reptiles	8	-	-	-	8
Birds	10	4	-	3	17
Mammals	11	-	4	-	15
Insects	9	-	-	-	-
Total	**40 (78.43 %)**	**4 (7.84%)**	**4 (7.84%)**	**3 (5.88%)**	**51**

Source: F/S, 2010

All animals recorded in the proposed Project's vicinity are either common throughout the Philippines or in the island of Luzon. In short, it can be concluded that there are no rare, threatened and endangered endemic species of wildlife in the area based on the field survey of F/S in 2010.

9.5.2.2 Ambient Air Quality

In order to determine and quantify the level of the air pollutants such as: NOx, SOx, TSP, and noise at the present (2009) conditions, an ambient air sampling was conducted along the various selected points of the proposed CLLEX. The results will be the basis in assessing the probable impacts of these airborne pollutants to the receiving environment, especially to human health.

There are five (5) sampling points selected considering various conditions that exist in the project area (i.e., urban areas, medium-density populated areas, and least busy and sparsely populated areas). Three (3) stations where selected in Tarlac and two (2) stations in Nueva Ecija. The sampling methods and equipment used are compliant with the National Ambient Air Quality Standards (NAAQS). Following table shows the location of the ambient air and noise sampling stations for the proposed CLLEX.

Based on the results, shown in **Table 9.5.2-4**, the NO_2, SO_2 and TSP levels in all sampling stations 'passed' within the acceptable limits of the DENR Standards. Sampling points are shown in **Figure 9.5.2-1**.

TABLE 9.5.2-3 AIR QUALITY (DRY SEASON): OCTOBER 2009

Location		Time of Sampling	TSP (μg/Ncm)	SO_2 (μg/Ncm)	NO_2 (μg/Ncm)
CLLEX Phase I	SCTEX Tarlac Exit	6:20～ 7:20	15.4	< 0.5	2.8
		17:50～18:50	5.2	1.0	2.4
	Guevara, La Paz, Tarlac	7:15～ 8:15	31.1	< 0.5	6.6
		16:30～17:30	5.2	< 0.5	3.2
	Aliaga Municipal Health Center, Nueva Ecija	9:30～10:30	31.4	< 0.5	5.4
		14:00～15:00	< 1.7	< 0.5	2.2
	Talavera-Cabanatuan City Boundary	10:50～11:50	55.3	< 0.5	7.9
		12:20～13:20	31.4	< 0.5	6.4
DENR Standard(1 hour sampling period)			300	340	260

Source：*Feasibility Study for the Proposed Central Luzon Expressway (2010)*

TABLE 9.5.2-4 AIR QUALITY (WET SEASON): JULY 2011

Station No.		Time/Date	Concentration in ug/Ncm		
			TSP	SO_2	NO_2
A1	SCTEX Area	0934-1034H/22Jul2011	68	10	5
		1810-1910H/21Jul2011	47	11	6
A2	Laungcupang Area	0830-0930H/20Jul2011	136	19	10
		1641-1741H/20Jul2011	194	20	8
A3	Guevarra Area	0905-1005H/20Jul2011	164	21	7
		1630-1730H/20Jul2011	211	24	6
A4	Aliaga Area	0805-0905H/21Jul2011	85	15	3
		1546-1646H/21Jul2011	106	17	2
A5	Maharlika Highway	0716-0816H/22Jul2011	299	30	11
		1340-1440H/21Jul2011	247	27	10
DENR Standard		1-hour sampling period	300	340	260

Source: JICA Study Team (2011)

It was observed that the present 1-hour ambient ground level concentration of total suspended particulates (TSP) ranges from 47 to 299 μg/Ncm. The DENR standard of 300 μg/Ncm was not exceeded in all five sampling station. The station A5 (Maharlika) recorded the highest TSP level in the selected sampling station for both morning and afternoon sampling of 299 and 247 ug/Ncm, respectively.

For the gaseous pollutants, sulfur dioxide (SO_2) and nitrogen dioxide (NO_2), shows the concentrations level ranging from 10 to 30 μg/Ncm for SO_2 and from 2 to 11 μg/Ncm for NO_2 for the 1-hour time averaging sampling. Station A5 (Maharlika) recorded the highest measured gaseous pollutant concentration for SO_2 and NO_2 for a 1-hour time average measurement for both morning and afternoon period. The 1-hr sampling observed concentration is way below the limit set by DENR standard. These values are well within DENR ambient standards of 340 μg/Ncm for SO_2 and 260 μg/Ncm for NO_2 for 1-hr sampling.

SAMPLING STATIONS, July 2011 STUDY

Location of Ambient Air and Noise Quality Sampling Stations

Sampling Stations	Locations	GPS Coordinates	Remarks
A1	Near SCTEX Tarlac Toligate (Located at the agricultural farm of Mr. Jamin David)	15° 28' 28.70" N 120° 40' 41.70" E	Observed volume of traffic was significant at the SCTEX about 150 meters away from the sampling station, with trucks, busses and private cars were observed during air sampling.
A2	Laungcupang Area (Located along Sta Rosa - Tarlac Rd at left side of Eastbound lane of Bgy Laungcupang, La Paz, Tarlac)	15° 29' 35.20" N 120° 41' 29.10" E	Observed volume of transport traffic was significant with trucks, busses and private cars were observed during air sampling.
A3	Guevarra Area (Located along La Paz - Victoria Rd at right side of Northbound lane near Bgy Guevarra, La Paz, Tarlac)	15° 28' 28.40" N 120° 43' 02.60" E	Observed volume of transport traffic was significant with trucks, busses and private cars were observed during air sampling.
A4	Aliaga Area (Located along Guimba - Aliaga Rd at left side of Northbound lane near Aliaga Trading Center in Bgy Sto Rosario, Aliaga, N.E.)	15° 31' 11.30" N 120° 49' 44.70" E	Observed volume of transport traffic was significant mostly light vehicles and private cars were observed during air sampling.
A5	Maharlika Highway (Located at top of earth mound near the Iglesia ni Cristo Church adjacent Cabanatuan-Talavera boundary marker)	15° 31' 39.40" N 120° 56' 03.80" E	Observed volume of transport traffic was significant with trucks, busses and private cars were observed during air sampling.

Location of Surface Water Sampling Stations

Sampling Stations	Locations	GPS Coordinates	Remarks
W1	San Miguel na Munti, Talavera, Nueva Ecija	15° 32' 18.70" N 120° 55' 36.90" E	San Miguel na Munti Creek
W2	Umangan, Aliaga, Nueva Ecija	15° 31' 42.40" N 120° 55' 36.90" E	San Miguel na Munti Creek
W3	Biblicat, Aliaga, Nueva Ecija	15° 33' 01.90" N 120° 52' 02.7" E	Talavera River
W4	Pantoc, Aliaga, Nueva Ecija	15° 31' 58.00" N 120° 50' 40.20" E	Talavera River
W5	Poblacion East 1, Aliaga, Nueva Ecija	15° 30' 38.90" N 120° 50' 54.30" E	Pantoc Creek
W6	Sta Lucia Old, Zaragosa, Nueva Ecija	15° 28' 37.90" N 120° 44' 51.30" E	Rio Chico River
W7	Rio Chico Bridge, La Paz, Tarlac	15° 26' 53.10" N 120° 44' 57.50" E	Rio Chico River

SAMPLING STATIONS, OCTOBER 2009 STUDY

Location of Ambient Air and Noise Quality Sampling Stations

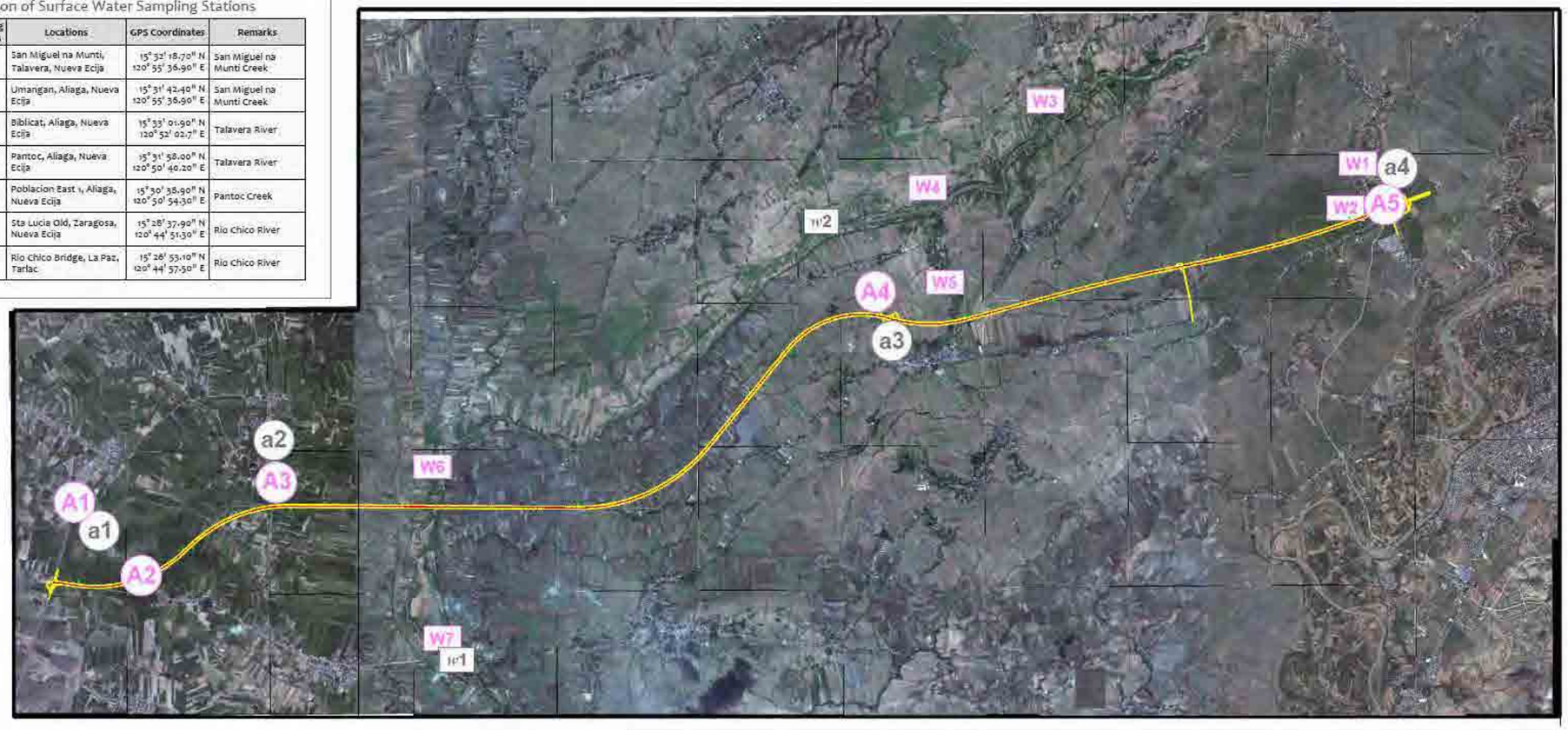
Sampling Stations	Locations	GPS Coordinates	Remarks
a1	SCTEX Tarlac Exit	15° 28' 24.33" N 120° 40' 53.74" E	Located in a busy national road, with rice fields in both sides.
a2	Guevarra, La Paz, Tarlac	15° 29' 01.11" N 120° 42' 31.50" E	Located in a non-busy national road, with rice fields in both sides.
a3	Aliaga Municipal Health Center, Nueva Ecija	15° 30' 14.90" N 120° 50' 17.50" E	Located in a non-busy national road, with rice fields in both sides.
a4	Talavera-Cabanatuan City Boundary	15° 31' 48.64" N 120° 56' 02.84" E	Located in a very busy national highway, with built-up areas and rice fields in both sides.

Notes: Sampling Stations A5 is located 8km NE of Cabanatuan IC (Talavera, NE)
Sampling Stations A6 is located 20km NE of Cabanatuan IC (San Jose City)

Location of Surface Water Quality Sampling Stations

Sampling Stations	Locations	GPS Coordinates	Remarks
w1	Rio Chico de la Pampanga	15° 26' 38.49" N 120° 45' 05.33" E	Located at La Paz and downstream portion of Talavera River, Km. 13-14 of CLLEX.
w2	Talavera	15° 31' 28.50" N 120° 49' 30.86"E	Located at Aliaga and upstream portion of Talavera River, Km. 13-14 of CLLEX.

Notes: Sampling Stations W3 and W4 are located 8km NE of Cabanatuan IC (Talavera, NE)
Sampling Stations W5 and W6 are located 20km NE of Cabanatuan IC (San Jose City)



LEGEND	OCT. 2009	JUL. 2011
Location of Ambient Air and Noise Quality Sampling Stations	a	A
Location of Surface Water Quality Sampling Stations	w1	W1

Source：*JICA Study Team (2011)*

FIGURE 9.5.2-1 WATER, AIR, AND NOISE SAMPLING STATIONS

Air Quality Modeling

Air quality modeling was conducted. The model uses an hourly meteorological data to define the plume behavior, transport and diffusion for individual area sources and receptor combination for the input meteorological data and calculates short term 24-hours averages.

The model used is Industrial Source Complex Short Term 3 (ISCST3) that is based on a straight-line, steady-state Gaussian plume equation. The model emission sources are categorized into four basic types of sources, point, volume, area and open pit sources. The volume and area source option can be used to simulate line sources.

In this study, roadway is considered as an area source of road length of 100 meters long and the roadway width of 20 meters wide as one area source for each road section. Traffic volume forecasted to year 2016, 2020, 2025 and 2030 were used to determine the expected emission level for the 3 pollutant parameters such as Nitrogen Oxides (NO_2), Particulate Matter 10 (PM10) and Sulfur Dioxide (SO_2). The 2008 road transport emission factors from by United Kingdom (UK) - National Atmospheric Emission Inventory (NAEI) Programme was used in the study using speed coefficient by Euro vehicles given in TRL database Emission factors.

The concentration values are the result of the ISCST3 air pollution model, considering the wind speed and direction, temperature, and other meteorological data used as input in the model. Two wind regimes (season) are used to simulate the ground level concentration for northeast (NE) and southwest (SW) season. Emission data in the model are based on the traffic volume utilizing the emission factor of the pollutants.

The Emission Factor used for NO_2, PM10 and SO_2 based on a motorway or expressway driving (80 km/hr average speed) was summarized in **Table 9.5.2-5** below:

TABLE 9.5.2-5 UK - ROAD TRANSPORT EMISSION FACTORS: 2008 NAEI

	Diesel Car	Petrol Car	Buses	Rigid Trucks
NO_2, g/km	0.425	0.534	6.219	4.455
PM10, g/km	0.005	0.031	0.083	0.077
SO_2, g/km	0.003	0.001	0.004	0.003

Source: National Atmospheric Emission Inventory (NAEI), UK

Above emission factors are based on hot exhaust emission. These are the tailpipe emissions in g/km from a vehicle with its engine warmed up to its normal operating conditions.

Table 9.5.2-6 shows the forecast annual average daily traffic (AADT) for year 2016, 2020, 2025 and 2030. Based on the forecasted traffic, it is assumed that the light vehicle is 50% diesel and 50% gasoline (petrol) fueled cars. For the heavy vehicles, it is also assumed that the 50% are buses and 50% are rigid trucks.

TABLE 9.5.2-6 ANNUAL AVERAGE DAILY TRAFFIC FORECAST FOR 2016, 2020, 2025 AND 2030

Traffic Forecast	Vehicle Type	
	Light Vehicle	Bus + Heavy Vehicle
2016	5700	4811
2020	7758	6519
2025	10330	8655
2030	13192	11059

Source : *JICA Study Team (2011)*

The corresponding computed emission rates in gram per second per square meter (g/s-m^2) based on annual average daily traffic volume and the UK-NAEI emission factors are shown in **Table 9.5.2-7** as follows:

TABLE 9.5.2-7 COMPUTED TOTAL EMISSION RATES PER AREA

	Year 2016	Year 2020	Year 2025	Year 2030
NO_2, g/s- m^2	0.006575	0.008916	0.011838	0.015125
PM10, g/s- m^2	0.000113	0.000153	0.000203	0.000260
SO2, g/s- m^2	0.000007	0.000009	0.000012	0.000015

Source : *JICA Study Team (2011)*

The road sections considered in modeling are shown below:

Section 1 0+000 to 6+500 La Paz, Tarlac

Section 2 15+500 to 25+500 Aliaga, Nueva Ecija

Section 3 26+500 to 30+100 Cabanatuan, Nueva Ecija

The summary of maximum predicted ground level concentration (GLC) in ug/m3 using the ISCST3 air quality model for each section with the following traffic forecast are shown in **Table 9.5.2-8** to **Table 9.5.2-10**.

For **Table 9.5.2-9**, this will be TSP concentration instead of PM10 since the baseline ambient measurement is for TSP (since finer particulates such as PM10 can be collected from ambient with the TSP)

Based on Angeles (Clark) Meteorological station data, South West (SW) wind occurred in the morning and North East (NE) wind in the afternoon on July 20, 2011 and variable wind on July 21 and 22. Study Team used to add baseline concentration sampled in the morning period to SW predicted GLC and sampled on the afternoon period to NE predicted GLC.

TABLE 9.5.2-8 MAXIMUM GLC FOR NITROGEN DIOXIDE (NO_2)

Unit: µg/Ncm

Year	Section 1 – La Paz 0+000 to 6+500		Section 2 – Aliaga 15+500 to 25+500		Section3 – Cabanatuan 26+500 to 30+100		DENR Standard
	NE	SW	NE	SW	NE	SW	
2016	8.0837	10.0409	2.0768	3.0405	10.2186	11.1355	260
2020	8.1134	10.0555	2.1042	3.0549	10.2965	11.1837	
2025	8.1506	10.0737	2.1383	3.0729	10.3936	11.2439	
2030	8.1925	10.0942	2.1767	3.0931	10.5029	11.3116	

Source : *JICA Study Team (2011)*

TABLE 9.5.2-9 MAXIMUM GLC FOR PARTICULATE MATTER 10 (PM10)

Unit: µg/Ncm

Year	Section 1 – La Paz 0+000 to 6+500		Section 2 – Aliaga 15+500 to 25+500		Section3 – Cabanatuan 26+500 to 30+100		DENR Standard
	NE	SW	NE	SW	NE	SW	
2016	194.0014	136.0007	106.0013	85.0007	247.0038	299.0023	300 (TSP)
2020	194.0019	136.0010	106.0018	85.0009	247.0051	299.0032	
2025	194.0026	136.0013	106.0024	85.0013	247.0068	299.0042	
2030	194.0033	136.0016	106.0030	85.0016	247.0086	299.0054	

Source : *JICA Study Team (2011)*

TABLE 9.5.2-10 MAXIMUM GLC FOR SULFUR DIOXIDE (SO_2)

Unit: µg/Ncm

Year	Section 1 – La Paz 0+000 to 6+500		Section 2 – Aliaga 15+500 to 25+500		Section3 – Cabanatuan 26+500 to 30+100		DENR Standard
	NE	SW	NE	SW	NE	SW	
2016	20.00009	19.00004	15.00008	17.00004	27.00023	30.00014	340
2020	20.00012	19.00006	15.00011	17.00006	27.00030	30.00019	
2025	20.00015	19.00007	15.00014	17.00007	27.00039	30.00025	
2030	20.00019	19.00009	15.00018	17.00009	27.00049	30.00031	

Source：*JICA Study Team (2011)*

TABLE 9.5.2-11 AIR QUALITY PREDICTED AREA RELATED TO BASELINE SURVEY STATION

Predicted Area, CLLEx Section		Base line Survey Station
Section 1 – La Paz	0+000 to 6+500	A2 - Laungcupang Area
Section 2 – Aliaga	15+500 to 25+500	A4 – Aliaga Area
Section3 – Cabanatuan	26+500 to 30+100	A5 – Maharlika Highway

Source：*JICA Study Team (2011)*

9.5.2.3 Global Warming

The project will contribute to solve increase of traffic volume and traffic congestion in future, while increase of CO_2 will affect global warming impact due to traffic volume increase.

During the Construction Period: Implementation of the project will be required about 2 years of schedule. Numbers of construction vehicles and equipment will be scheduled in operation activities. And it will be predicted approximately 59,584 tons of CO_2 generated during construction. As mitigation measures the Government concerned may consider to encourage tree plantation with corporation by DENR where available open spaces in Central Luzon region.

TABLE 9.5.2-12 PREDICTED CO_2 EMISSION CAUSED BY THE CONSTRUCTION

Equipment	Capacity	Fuel	Unit	Total Quantity	Fuel consumption rate (l/kWh)	Fuel consumption per hour (l/hr)	Total operation hour	Total fuel con-sumption (l)	Unit of fuel (kgCO2/l)	Total CO2 emission (tonCO2)-1	Total volume	Unit of CO2	Total CO2 emission (tonCO2)-2
Dump truck	11t	Diesel	run km	10,959,416.7	0.05	12	365,314	219,188	2.62	574.3	-	-	-
Wheel Loder	1.53m3	Diesel	hr	47,045.1	0.153	33	47,045.1	237,531	2.62	622.3	-	-	-
Motor Grader 14G	3m/200HP	Diesel	hr	2,970.7	0.108	9.2	2,970.7	2,952	2.62	7.7	-	-	-
Vibratory Roller	11t, 125 Hp	Diesel	hr	2,852.1	0.152	16	2,852.1	6,936	2.62	18.2	-	-	-
Tired Roller	12.6t	Diesel	hr	2,852.1	0.1	7.1	2,852.1	2,025	2.62	5.3	-	-	-
Hydraulic Excavator	1.0m3	Diesel	hr	123,599.4	0.175	29	123,599.4	627,267	2.62	1,643.4	-	-	-
Backhoe	0.6m3	Diesel	hr	177,806.1	0.175	18	177,806.1	560,089	2.62	1,467.4	-	-	-
Vibratory Plate Compactor	7 Hp	Diesel	hr	412,944.1	0.125	16	412,944.1	825,888	2.62	2,163.8			
Track Crane	160 ton, 300Hp	Diesel	hr	1,251.0	0.44	47	1,251.0	25,871	2.62	67.8			
Crawler Crane	60T/275Hp	Diesel	hr	17,533.1	0.089	23	17,533.1	35,890	2.62	94.0	-	-	-
Drill Rig for Pile	CWV Model TRM35/31	Diesel	hr	18,702.0	0.436	48	18,702.0	391,395	2.62	1,025.5			
											-	-	-
Concrete transit Mixer	5m3	Diesel	run km	143,755.1	0.059	13	4,792	3,675	2.62	9.6	-	-	-
Concrete Pump	60yd3	Diesel	hr	4,791.8	0.41	60	4,791.8	117,879	2.62	308.8	-	-	-
(Concrete Plant)	40m3/hr	Diesel	hr	3,593.9	-	-	3,593.9	-	-	-			
Concrete											143,755 (m3)	311.3 kgCO2/m3	44,750.9
Track Mounted Crane	21-25t, 200Hp	Diesel	run km	30,159.3	0.044	7.1	1,005	314	2.62	0.8			
Concrete Vibrator	Gasoline type	Gasoline	hr	115,004.1	0.54	0.27	115,004.1	16,768	2.36	39.6			
Semi Trailer	20 ton	Diesel	run km	4,170.0	0.075	18	139	188	2.62	0.5			
Asphalt Paver	4.7 m, 112 Hp	Diesel	hr	3,034.2	0.152	4.1	3,034.2	1,891	2.62	5.0	-	-	-
Asphalt Distributor	5t	Diesel	hr	5,466.6	0.09	7.4	5,466.6	3,641	2.62	9.5	-	-	-
(Asphalt Plant)	60t/hr		hr	2,870.0	-	-		-	-	-			
Asphalt											163,997 (ton)	0.04114 kg/CO2/kg	6,746.8
Lane Marker	8 ton Track	Diesel	run km	329,553.0	0.19	4.2	10,985	8,766	2.62	23.0	-	-	-
Sub-total emission of CO2 (ton)										**8,086.6**			**51,497.8**
Total emission of CO2 (ton)													**59,584.4**

Source：JICA Study Team (2011)

O/M period after the construction: CO_2 emission from traffic vehicles at the project vicinity area in target year. Traffic demand forecast in the project area.

Table 9.5.2-13 shows the comparison CO_2 emission of with and without project case in the target years. The CO_2 emission of with project case will decrease by 16,810 ton/year compared with the without project case in year 2017.

TABLE 9.5.2-13 COMPARISON OF WITH AND WITHOUT PROJECT IN TARGET YEARS

Target Year	Without Project (ton/year)	With Project (ton/year)	W - W/O (ton/year)
2017	3,170,355	3,153,545	-16,810
2020	3,572,855	3,551,782	-21,073
2030	4,479,900	4,445,245	-34,654

Source: JICA Study Team (2011)

CO_2 emission per vehicle type per traveling speed (g-CO_2/km. vehicle): CO_2 emission volume is depends on traveling vehicle speed, the predictive calculation was applied by the vehicles and circular table of evaluation for road policy of Ministry of land, transport and tourism, Japan. The CO_2 emission per km per vehicle was applied 2 type vehicle in accordance with different level of traveling speed. **Table 9.5.2-14** shows CO_2 emission g-/km. vehicle.

TABLE 9.5.2-14 CO_2 EMISSION (g-CO_2/km. vehicle)

km/hr	10	20	25	30	35	40	45	50	55	60	65	70	75	80
Small vehicle	342	229	204	186	172	161	152	146	141	138	137	137	139	142
Large vehicle	1515	1133	1042	963	894	836	788	750	723	706	700	705	719	744

Source: Circular table of evaluation for road policy. MTLT Japan

9.5.2.4 Ambient Noise Quality

Noise level measured in 2009 and in 2011 is summarized in **Table 9.5.2-15** and **Table 9.5.2-16**, respectively.

The average noise levels for the five sampling stations ranged from 48.8 to 70.9 dB(A) during daytime per period of 1-hr air sampling measurement. The morning/evening period noise levels ranges from 49.8 to 65.7 dBA while the nighttime period noise levels ranged from 53.7 to 62.3 dBA as shown in **Table 9.5.2-16**. The four stations (A2, A3, A4 and A5) are located adjacent to road network 5-10 meters from road edges while station A1 is located about 150 meters from SCTEX expressway. All stations (A1, A2, A3, A4 and A5) did not pass "the noise level", especially three stations (A2, A3 and A5) exceed all the time period categories.

TABLE 9.5.2-15 NOISE LEVEL (DRY SEASON): OCTOBER 2009

Location		Time	Noise Level (dBA)	DENR Standard (dBA)
CLLEX Phase I	SCTEX Tarlac Exit	7:20	79	Morning (60)
		19:00	71	Evening (60)
	Guevara, La Paz, Tarlac	8:20	69	Morning (50)
		17:32	71	Daytime (55)
	Aliaga Municipal Health Center, Nueva Ecija	10:23	58	Daytime (50)
		15:05	57	Daytime (50)

Source：*Feasibility Study for the Proposed Central Luzon Expressway (2010)*

Note: ▭ exceeds DENR Standard

TABLE 9.5.2-16 NOISE LEVEL (WET SEASON): JULY 2011

Sampling Station	Location	Period	Time/Date	Average Noise Level (dBA)	DENR	Area
A1	Near SCTEX located at Mr. Jamin David Residence and agricultural farm	Morning/Evening	0821H 7/22	49.8	50	Residential/ Rice Field Class A
		Daytime	1105H 7/22	48.8	60	
		Nighttime	2228H 7/21	54.7	45	
A2	Along the Sta Rosa-Tarlac Road in Brgy Laungcupang La Paz Tarlac	Morning/Evening	0754H 7/20	65.7	50	Residential/ Rice Filed Class A
		Daytime	1212H 7/20	65.1	60	
		Nighttime	0024H 7/21	53.7	45	
A3	Along La Paz-Victoria Road in Brgy Guevarra La Paz Tarlac	Morning/Evening	1837H 7/20	61.2	50	Residential/ Rice Filed Class A
		Daytime	1037H 7/20	61.0	60	
		Nighttime	2236H 7/20	55.7	45	
A4	Along Guimba-Aliaga Road in Brgy Sto Rosario Aliaga Nuve Ecija	Morning/Evening	0822H 7/21	63.2	60	Commercial Class B
		Daytime	1621H 7/21	59.6	65	
		Nighttime	0021H 7/22	56.3	55	
A5	Along Maharlika Highway at the Cabanatuan-Talavera Boundary near the Iglesia Ni Kristo Church	Morning/Evening	0603H 7/22	65.2	60	Commercial Class B
		Daytime	1305H 7/21	70.9	65	
		Nighttime	0145H 7/22	62.3	55	

Source: JICA Study Team (2011)

▭ Note: exceeds DENR Standard

Noise Modeling

Noise modeling was conducted using the available maps and site investigations. An inventory of the structures located within 1000 meters from the expressway alignment areas had been made. It is estimated that about 9 school buildings, 4 churches/chapels and about 19 clustered residential areas are located within the study area. **Table 9.5.2-17** contains the inventory of sensitive

receptors and its approximate location. **Table 9.5.2-18** shows the residential areas exposed to expressway alignment. **Figure 9.5.2-2** illustrates the location map of noise predicted points.

The noise levels were calculated based on the NMPB-Routes-96 Method (SETRA-CERU-LCPC-CSTB).

TABLE 9.5.2-17 SENSITIVE RECEPTORS (CHURCHES & SCHOOLS) ALONG THE CLLEX ALIGNMENT

	Sensitive Receptor Along Expressway Alignment	Station Position and Location of Receptor from Alignment	Expressway Road Elevation (m)	Ground Elevation (m)	Source to Receptor Reference Distance (m)
	Churches:				
C1	Iglesia Ni Kristo	30+300 North	40.590	32.629	50
C2	Iglesia Ni Kristo	29+200 South	34.110	31.656	260
C3	First Church of God	28+900 South	35.010	31.427	280
C4	Bucot Chapel	23+700 South	29.749	23.474	250
	Schools:				
S1	Umangan Elem School	28+900 South	34.110	31.656	280
S2	Umangan Day Care Center and Barangay Hall	28+860 South	35.130	31.039	280
S3	Dona Elena (Bibiclat) Elem School	22+000 North	23.355	21.491	480
S4	Aliaga High School	20+800 South	26.859	21.666	800
S5	Regina Children Institute	20+700 South	25.759	21.008	350
S6	Sto Rosario Elem School	19+500 South	28.519	20.063	750
S7	Magsaysay Elem School	17+000 South	22.737	18.202	1000
S8	Sta Monica Elem School	14+900 North	20.607	16.611	300
S9	Macalong Elem School	5+500 South	21.422	15.740	700
S10	Guevarra Elem School	5+000 North	24.491	16.249	450
S11	Amucao Elem School	1+000 North	25.150	21.530	1200

Source: JICA Study Team (2011)

TABLE 9.5.2-18 CLUSTERED RESIDENTIAL RECEPTORS ALONG THE CLLEX ALIGNMENT

	Residential Receptor Along Expressway Alignment	Station Position and Location of Receptor from Alignment	Expressway Road Average Elevation (m)	Ground Average Elevation (m)	Source to Receptor Reference Distance (m)
	Clustered Residential:				
R1	Amucao	1+100 to 1+500 North	24.3	20.7	480
R2	Laungcupang	1+800 to 3+000 South	26.4	20.2	650
R3	Guevarra	4+700 to 5+400 North	23.7	16.2	180
R4	Macalong	4+900 to 5+000 South	24.4	16.5	220
R5	Macalong	5+500 to 5+700 South	20.7	15.5	600
R6	Bibiclat	11+000 to 11+500 North	20.6	14.8	600
R7	Sta Monica	14+000 to 15+400 North	20.3	16.4	160
R8	San Eutascio	15+800 to 16+800 North	20.5	17.6	380
R9	Sto Rosario	19+100 to 19+500 South	27.1	20.3	100
R10	Aliaga Poblacion	20+000 to 20+400 South	23.7	20.8	350
R11	Aliaga Poblacion	20+600 to 20+900 South	26.3	21.5	160
R12	Aliaga Poblacion	21+000 to 21+100 South	28.8	20.0	80
R13	Pantoc	21+600 to 21+700 North	26.1	21.6	250
R14	Bibiclat	21+900 to 22+200 North	23.9	21.5	400
R15	Bucot	23+400 to 23+500 South	27.6	23.4	120
R16	Bucot	23+600 to 23+900 South	29.7	23.5	250
R17	Bactog, San Juan De Dios	24+100 to 25+400 South	30.9	24.3	500
R18	Umangan	29+800 to 29+960 North	38.7	32.0	20
R19	Umangan	28+00 to 29+000 South	33.5	29.7	250
R20	Umangan	29+100 to 29+800 South	34.6	31.8	200
R21	Umangan	29+900 to 29+960 South	39.2	32.8	25

Source: JICA Study Team (2011)

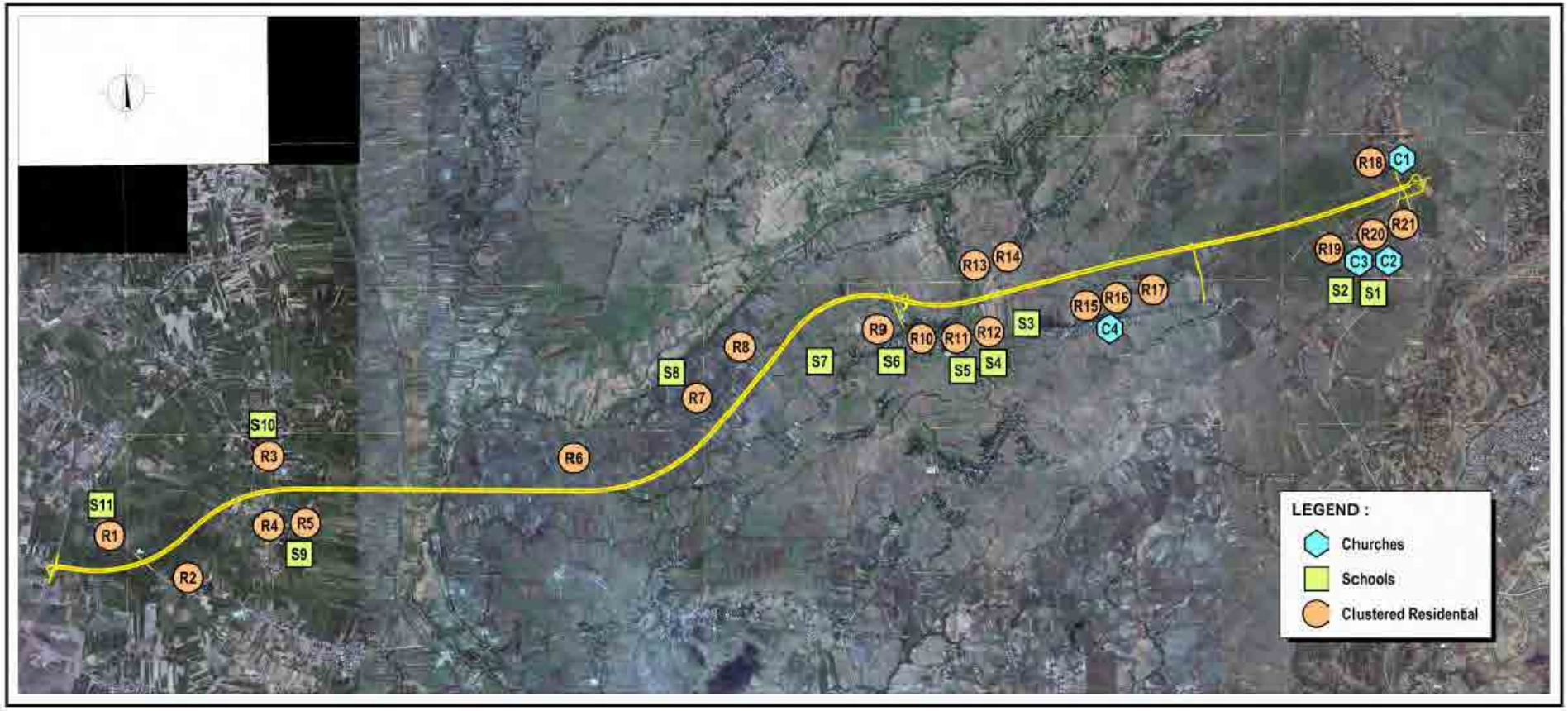


FIGURE 9.5.2-2 NOISE PREDICTED STATION MAP

Result of Noise Modeling

The Sensitive Redecorators (Church and Schools)

The resulting noise levels that reach the sensitive receptors areas yield levels that are mostly non-compliant to Philippine noise standard for nighttime and daytime, all the maximum noise levels during the daytime and nighttime exceeds the maximum threshold at 50 dB(A) and 40 dB(A) respectively. The maximum noise level station is Iglesia ni Cristo in Cabanatuan City (C1, 30+300 North) which is expected to be generated 70.3 dBA during daytime and 66.7 dBA during nighttime in year 2018 (see **Table 9.5.2-19**). This station will be necessary to install noise barrier.

The Clustered Residential

For residential areas, the resulting noise levels forecasted on year 2018 ranges from 57.2 to 74.5 dBA during daytime period and from 54.1 to 71.0 dBA for nighttime period (see **Table 9.5.2-21**). The allowable limit for a residential areas Class B category, the daytime limit is 65dBA and nighttime limit is 55 dBA.

The higher noise level stations are shown as follows:

- R9 Sto Rosario 19+100 to 19+500 South
- R12 Aliaga Poblacion 21+000 to 21+100 South
- R18 Umangan 29+800 to 29+960 North
- R21 Umangan 29+900 to 29+960 South

These stations will be necessary to install noise barriers.

Table 9.5.2-23 shows the noise reduction from noise barriers height as reference.

TABLE 9.5.2-19 PREDICTED NOISE LEVEL AT SENSITIVE RECEPTORS FOR YEAR 2018 TRAFFIC FORECAST

	Sensitive Receptor along CLLEX alignment	Alignment Location	2018Predicted Noise dB(A)		Resultant Noise with 2m High Noise Barriers d B(A)	
			Daytime	Nighttime	Daytime	Nighttime
	Churches:					
C1	Iglesia ni Cristo	30+300 North	70.3	66.7	60.2	56.6
C2	Iglesia ni Cristo	29+200 South	62.0	58.4	51.9	48.3
C3	First Church of God	28+900 South	61.6	58.0	51.5	47.9
C4	Bucot Chapel	23+700 South	62.2	58.6	52.1	48.5
	Schools:					
S1	Umangan Elementary School	28+900 South	61.6	58.0	51.5	47.9
S2	Umangan Day Care Center and Barangay Hall	28+860 South	61.6	58.0	51.5	47.9
S3	Dona Elena (Bibiclat) Elementary School	22+000 South	58.8	55.2	48.7	45.1
S4	Aliaga High School	20+800 South	56.1	52.6	46.0	42.5
S5	Regina Children Institute	20+700 South	60.4	56.9	50.3	46.8
S6	Sto Rosario Elementary	19+500 South	56.5	52.9	46.4	42.8
S7	Magsaysay Elementary School	17+000 South	55.0	51.4	44.9	41.3
S8	Sta Monica Elementary School	14+900 North	61.2	57.7	51.1	47.6
S9	Macalong Elementary School	5+500 South	56.8	53.3	46.7	43.2
S10	Guevarra Elementary School	5+000 North	59.1	55.6	49.0	45.5
S11	Amucao Elementary School	1+000 North	54.0	50.5	43.9	40.4
	DENR Standard		**50**	**40**	**50**	**40**

Note: All above locations are located more than 100m away from CLLEX except C1 (Iglesia ni Cristo in Cabanatuan City), thus installation of noise barriers is not recommended.

Source : *JICA Study Team (2011)*

TABLE 9.5.2-20 PREDICTED NOISE LEVEL AT SENSITIVE RECEPTORS FOR YEAR 2020 TRAFFIC FORECAST

	Sensitive Receptor along CLLEX alignment	Alignment Location	2020 Predicted Noise dB(A)		Resultant Noise with 2m High Noise Barriers d B(A)	
			Daytime	Nighttime	Daytime	Nighttime
	Churches:					
C1	Iglesia ni Cristo	30+300 North	70.9	67.4	60.8	57.3
C2	Iglesia ni Cristo	29+200 South	62.6	59	52.5	48.9
C3	First Church of God	28+900 South	62.2	58.6	52.1	48.5
C4	Bucot Chapel	23+700 South	62.8	59.2	52.7	49.1
	Schools:					
S1	Umangan Elementary School	28+900 South	62.2	58.6	52.1	48.5
S2	Umangan Day Care Center and Barangay Hall	28+860 South	62.2	58.6	52.1	48.5
S3	Dona Elena (Bibiclat) Elementary School	22+000 South	59.4	55.9	49.3	45.8
S4	Aliaga High School	20+800 South	56.7	53.2	46.6	43.1
S5	Regina Children Institute	20+700 South	61.0	57.5	50.9	47.4
S6	Sto Rosario Elementary	19+500 South	57.1	53.5	47.0	43.4
S7	Magsaysay Elementary School	17+000 South	55.6	52.0	45.5	41.9
S8	Sta Monica Elementary School	14+900 North	61.8	58.3	51.7	48.2
S9	Macalong Elementary School	5+500 South	57.4	53.9	47.3	43.8
S10	Guevarra Elementary School	5+000 North	59.7	56.2	49.6	46.1
S11	Amucao Elementary School	1+000 North	54.6	51.1	44.5	41.0
	DENR Standard		**50**	**40**	**50**	**40**

Note: All above locations are located more than 100m away from CLLEX except C1 (Iglesia ni Cristo in Cabanatuan City), thus installation of noise barriers is not recommended.

Source : *JICA Study Team (2011)*

TABLE 9.5.2-21 PREDICTED NOISE LEVEL AT CLUSTERED RESIDENTIAL FOR YEAR 2018 TRAFFIC FORECAST

	Residential Receptor along CLLEX Alignment	Alignment Location	2018 Predicted Noise dB(A)		Resultant Noise with 2m High Noise Barriers dB(A)	
			Daytime	Nighttime	Daytime	Nighttime
	Clustered Residential:					
R1	Amucao	1+100 to 1+500 North	58.8	55.2	48.7	45.1
R2	Laungcupang	1+800 to 3+000 South	57.2	53.6	47.1	43.5
R3	Guevarra	4+700 to 5+400 North	63.8	60.3	53.7	50.2
R4	Macalong	4+900 to 5+000 South	62.8	59.3	52.7	49.2
R5	Macalong	5+500 to 5+700 South	57.6	54.1	47.5	44.0
R6	Bibiclat	11+000 to 11+500 North	57.6	54.1	47.5	44.0
R7	Sta. Monica	14+000 to 15+400 North	64.5	60.9	54.4	50.8
R8	San Eustacio	15+800 to 16+800 North	60.0	56.4	49.9	46.3
R9	Sto Rosario	19+100 to 19+500 South	66.9	63.3	56.8	53.2
R10	Aliaga Poblacion	20+000 to 20+400 South	60.4	56.9	50.3	46.8
R11	Aliaga Poblacion	20+600 to 20+900 South	64.5	60.9	54.4	50.8
R12	Aliaga Poblacion	21+000 to 21+100 South	68.0	64.4	57.9	54.3
R13	Pantoc	21+600 to 21+700 North	62.2	58.6	52.1	48.5
R14	Bibiclat	21+900 to 22+200 North	59.7	56.2	49.6	46.1
R15	Bucot	23+400 to 23+500 South	65.9	62.4	55.8	52.3
R16	Bucot	23+600 to 23+900 South	62.2	58.6	52.1	48.5
R17	Bactog, San Juan de Dios	24+100 to 25+400 South	58.6	55.0	48.5	44.9
R18	Umangan	29+800 to 29+960 North	74.5	71.0	64.4	60.9
R19	Umangan	28+000 to 29+000 South	62.2	58.6	52.1	48.5
R20	Umangan	29+100 to 29+800 South	63.3	59.7	53.2	49.6
R21	Umangan	29+900 to 29+960 South	73.6	70.0	63.5	59.9
	DENR Standard		**65**	**55**	**65**	**55**

Note: See **Table 9.5.2-22** for locations of toll barriers installation.

Source : *JICA Study Team (2011)*

TABLE 9.5.2-22 PREDICTED NOISE LEVEL AT CLUSTERED RESIDENTIAL FOR YEAR 2020 TRAFFIC FORECAST

	Residential Receptor along CLLEX Alignment	Alignment Location	2018 Predicted Noise dB(A)		Resultant Noise with 2m High Noise Barriers dB(A)		Recommended Section for Noise Barrier
			Daytime	Nighttime	Daytime	Nighttime	
	Clustered Residential:						
R1	Amucao	1+100 to 500 North	59.4	55.9	49.3	45.8	-
R2	Laungcupang	1+800 to 3+000 South	57.8	54.3	47.7	44.2	-
R3	Guevarra	4+700 to 5+400 North	64.5	60.9	54.4	50.8	-
R4	Macalong	5+900 to 5+000 South	63.4	59.9	53.3	49.8	-
R5	Macalong	5+500 to 5+700 South	58.2	54.7	58.1	44.6	-
R6	Bibiclat	11+000 to 11+500 North	58.2	54.7	48.1	44.6	-
R7	Sta. Monica	14+000 to 15+400 North	65.1	61.5	55.0	51.4	-
R8	San Eustacio	15+800 to 16+800 North	60.6	57.1	50.5	47.0	-
R9	Sto. Rosario	19+100 to 19+500 South	67.5	63.9	57.4	53.8	L = 400 m
R10	Aliaga Poblacion	20+000 to 20+400 South	61.0	57.5	50.9	47.4	-
R11	Aliaga Poblacion	20+600 to 20+900 South	65.1	61.5	55.0	51.4	-
R12	Aliaga Poblacion	21+000 to 21+100 South	68.6	65.0	58.5	54.9	L = 100 m
R13	Pantoc	21+600 to 21+700 North	62.8	59.2	52.7	49.1	-
R14	Bibiclat	21+900 to 22+200 North	60.3	56.8	50.2	46.7	-
R15	Bucot	23+400 to 23+500 South	66.5	63.0	56.4	52.9	-
R16	Bucot	23+600 to 23+900 South	62.8	59.2	52.7	49.1	-
R17	Bactog, San Juan de Dios	24+100 to 25+400 South	59.2	55.6	49.1	45.5	-
R18	Umangan	29+800 to 29+960 North	75.2	71.6	65.1	61.5	L = 160 m
R19	Umangan	28+000 to 29+000 South	62.8	59.2	52.7	49.1	-
R20	Umangan	29+100 to 29+800 South	63.9	60.4	53.8	50.3	-
R21	Umangan	29+900 to 29+960 South	74.2	70.7	64.1	60.6	L = 60 m
	DENR Standard		65.0	55.0	65.0	55.0	
						Total	**L = 720 m**

Note: Noise barrier is recommended for the residential area which is located within 100 m from the CLLEX.

Source : *JICA Study Team (2011)*

TABLE 9.5.2-23 NOISE REDUCTION RESULTING FROM NOISE BARRIER HEIGHT

Screen Height (m)	Noise Reduction by Pure Diffraction Δ_{diff}, dB(A)
1	6.2
2	10.1
3	12.9
4	14.8
5	16.3

9.5.2.5 Surface Water Quality

There are two (2) major rivers, namely Rio Chico River and Talavera River. Both rivers and its tributaries pass through quite flat area in terrain and overflow the existing banks during heavy rains. In 2009, water quality was examined at 2 stations within CLLEX Phase I Section and results are shown in **Table 9.5.2-24**.

TABLE 9.5.2-24 WATER QUALITY IN THE PROJECT AREA (DRY SEASON): OCTOBER 2009

Sampling Station	BOD (mg/L)	Remark	TSS (mg/L)	Remark	Total Coliforms (MPN/100 mL)	Remark
Rio Chico dela Pampanga River	27.0	×	664	×	54×10^3	×
Talavera River	72.0	×	672	×	35×10^3	×
DENR Standard	7		Not more than 30 mg/L increase		5×10^3	

Note: ×Exceeding the Standard, ○ Below the standard
BOD : Biological Oxygen Demand
TSS : Total Suspended Solids
TC : Total Coliforms

Source : *Feasibility Study for the Proposed Central Luzon Expressway (2010)*

In July 2011, water qualities were examined under this study and the results are summarized in **Table 9.5.2-25**.

The results of the water quality test show that most of the water quality parameter tested have exceeded the standards set for class C as per DAO 90-34 in dry season. Whereas in wet season, TC of most rivers, TSS of many rivers have already exceeded the DENR Standard. The observed BOD values in dry season exceed 7 mg/l which indicates gross pollution load to the rivers. The possible sources include household wastes and the agro-industrial activities (i.e. primarily piggeries, poultry farming) in the area. Gross contamination of sewage is also manifested by the observed elevated total coliform levels. The siltation upstream manifested by the observed elevated suspended solids in some sampling points. These may be brought about by urban development and existing quarry upstream.

TABLE 9.5.2-25 LOCATION OF SURFACE WATER QUALITY SAMPLING STATIONS, JULY 2011

STA NO.	Water Sampling Location			Water Sample No.	Date/ Time Taken	Physical Water Quality Data (Field)			TC (MPN 100ML)	Conductivity @25°C (µS/cm)	DO (mg/L)	BOD (mg/L)	TSS (mg/L)
	BARANGAY /MUNICIPALITY	GEOGRAPHICAL COORDINATES	WATER BODY NAME			TURBIDITY	TEMP	pH					
1.0	San Miguel Na Munti, Talavera, Nueva Ecija	N 15º 32' 18.7" E 120º 55' 36.9"	San Miguel Na Munti Creek	CLLEX-T-1	9:45 AM 07/21/2011	Cloudy with plant residue;	28	7.8	22 x 10^3	397	<2.0	6	10
2.0	Umangan, Aliaga, Nueva Ecija	N 15º 31' 42.4" E 120º 55' 35.0"	San Miguel Na Munti Creek	CLLEX-U-2	10:20 AM 7/21/2011	slightly clear	29	7.5	35 x 10^3	291	<2.0	3	8.0
3.0	Bibiclat, Aliaga, Nueva Ecija	N 15º 33' 01.9 E 120° 52' 02.7"	Talavera River	CLLEX-3	11:30 AM 7/21/2011	murky	29	8.1	3.3 x 10^3	290	8.1	8	145
4.0	Pantoc, Aliaga, Nueva Ecija	N 15º 31' 58.0" E 120º 50' 40.2"	Talavera River	CLLEX-P-4	12:05PM 7/21/2011	murky	30	8.2	11 x 10^3	283	6.9	4	115
5.0	Poblacion East 1, Aliaga, Nueva Ecija	N 15º 30' 38.9" E 120º 50' 54.3"	Pantoc Creek	CLLEX-5	12:35 PM 7/21/2011	cloudy	30	6.9	3.3 x 10^3	325	4.3	2	17
6.0	Sta. Lucia Old, Zaragoza, Nueva Ecija	N 15º 28' 37.9 " E 120º 44' 51.3"	Rio Chico River	CLLEX-STO-6	2:30 PM 7/21/2011	murky	31	7.9	7 x 10^3	291	7.7	6	117
7.0	Rio Chico Bridge, La Paz, Tarlac	N 15º 26' 53.1" E 120º 44' 57.5"	Rio Chico River	CLLEX-T-7	3:30 PM 7/21/2011	murky	31	7.2	13 x 10^3	292	6.3	6	162
DENR Standard									**5 x 10^3**			**7**	Not more than 30 mg/L increase

Note: ☐ exceeds DENR Standard.

Source: JICA Study Team (2011)

9.5.2.6 Climate

The prevailing climate in the project area is 'Type I' based on Philippine Atmospheric and Geophysical and Astronomical Services Administration's (PAGASA) Corona's Classification System. The Type I classification has dry season from December to May, and wet for the rest of the year.

Nueva Ecija also has an average relative humidity of 87% while temperature ranges from 21.5°C to 35.7°C. The recorded average mean amount of rainfall for the year is 1597.1 mm, with highest amount of 4,304 mm during the month of August (Nueva Ecija Provincial Profile, 2008).

Tarlac belongs to 'Type I' climate, and it experiences rainfall during the southwest monsoon period from June to November, which is the wet season. November to May is the dry season. The hottest part of the year is March to May and sometimes extends up to June. The heaviest rains come in July to November with August being the wettest month of the year.

The nearest synoptic meteorological station in the proposed CLLEX is located in Cabanatuan City, Nueva Ecija. The city and its surrounding area receive an annual rainfall of about 1,904.3 mm. Moreover, Cabanatuan City has the potential to receive 376.60 mm within 24 hours. With this information and underlying topography, the area is susceptible to flooding during extreme events of rainfall. The rainy season concurs with the Southwest Monsoon during the months of June to September. The highest monthly precipitation amount of 381.9 mm was recorded in August. This month registered the longest number of rainy days with 23. The dry season is experienced from November to April, with the lowest rainfall of 8.4mm in January (SJBPEIS, 2002). The area is also prone to typhoons, with an average of 1 to 2 major storms hitting the area per year. These typhoons could potentially bring extensive wind and rain hazards (i.e. landslides, flooding) in the local area. The principal air streams that are significantly affecting the study area are the Northeast Monsoon, Southwest Monsoon, and the North Pacific Trades. The Northeast Monsoon predominates from October to May. The Southwest Monsoon on the other hand prevails from June to September. The North Pacific Trades is the southern portion of the North Pacific anti-cyclone. This air stream, which passed over a vast expanse of the North Pacific Ocean and is extremely warm, is generally dominant over the entire Philippines in April and early May. It commonly arrives in the country from an easterly direction but may come from any direction from northeast to southeast.

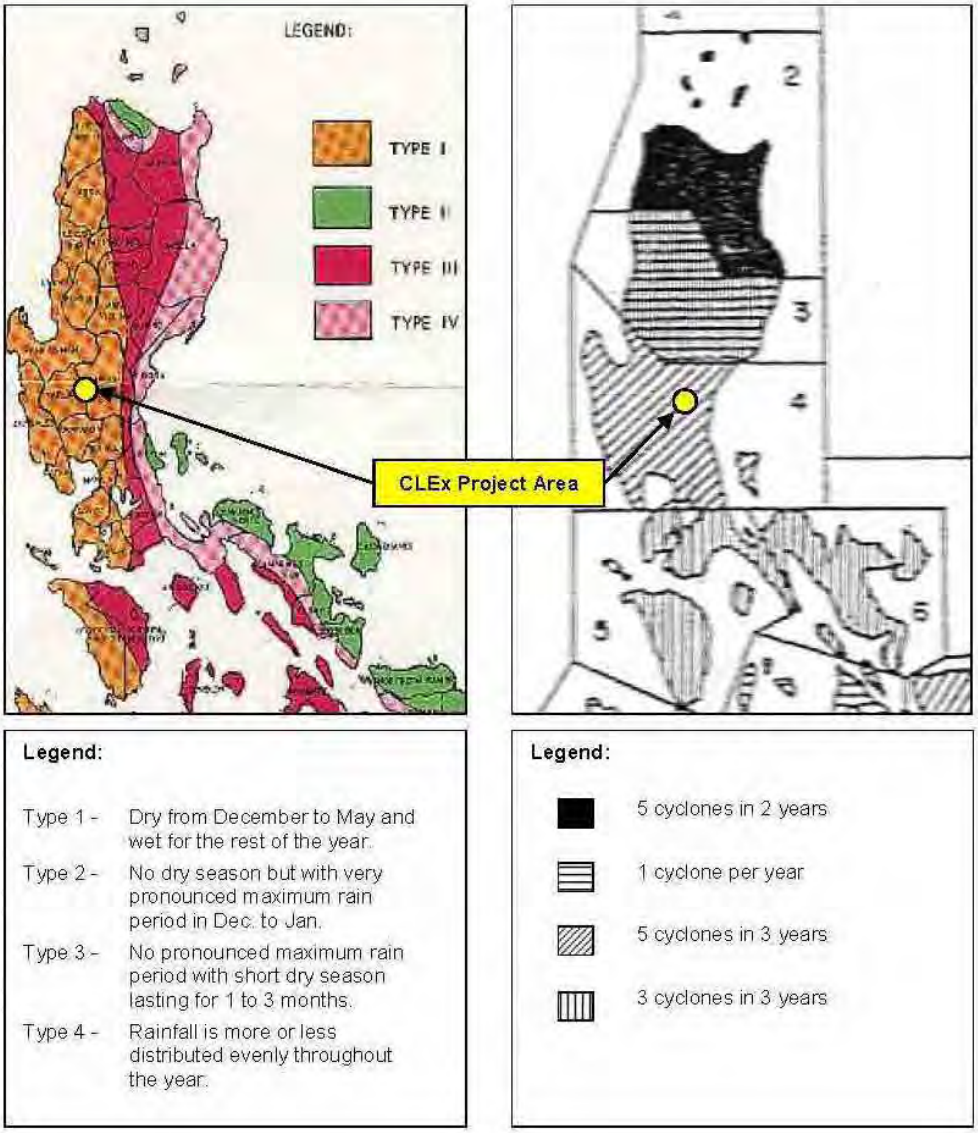


FIGURE 9.5.2-3 CLIMATOLOGICAL MAP

9.5.2.7 Surface Water

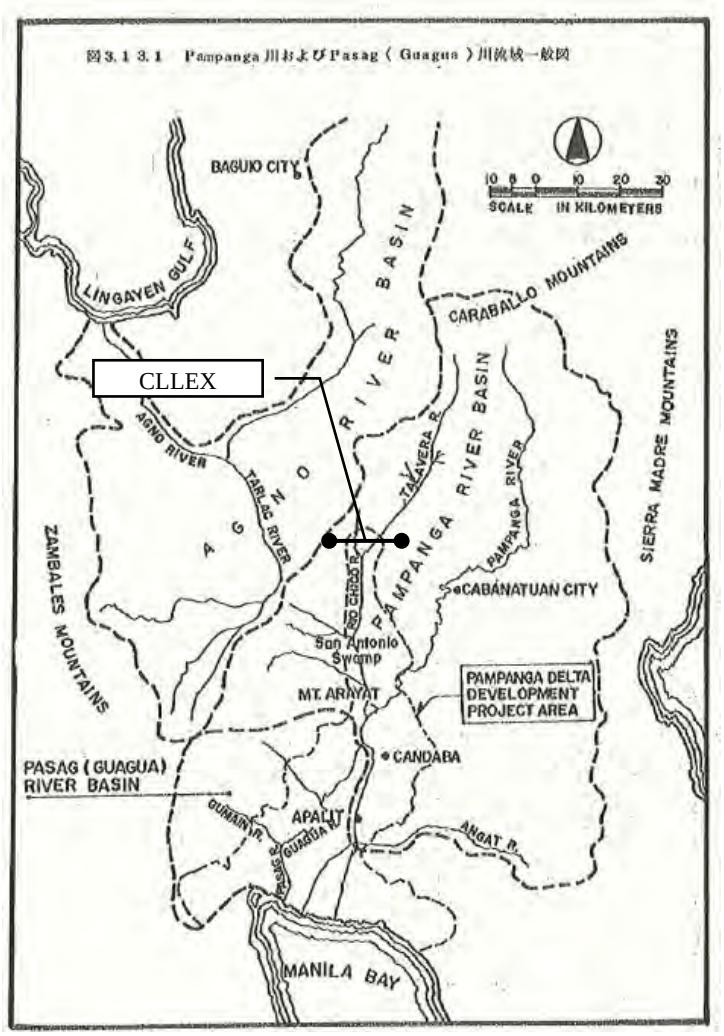
Pampanga River

The Pampanga River exhibits a meandering feature where the active channel has a regular sinuous pattern. The channel is confined within a meander belt, a complex zone of active and abandoned channels. The meandering characteristics of the river reflect very low slope of the terrain.

The flow dynamics of the Pampanga River is similar to that of the Talavera River. However, the flow in the Pampanga River is more complex compared to that of the Talavera River, based on

the number of shifting of the channel within the meander belt. Also, the Pampanga River has a more complex bend shapes that are associated with complex distribution pattern of both depth and velocity. As a result, the channel as a whole shows a traverse migration of flow while depositing sediment by lateral accretion.

The erodibility of the channel bank is influenced by the nature of the bank material. As observed from the terrace scarps, the meander belt is underlain by a sequence of poorly compacted and loosely consolidated soil composed of silty fine sand overlying loose sandy gravel with lenses of loosed coarse to medium sand. During flood period, where water level rises above the normal flow level, the unconsolidated sediments are in direct contact with floodwater flowing at a high velocity that results either to undercutting or scouring of material that leads to erosion.



Source: JICA 1982

FIGURE 9.5.2-4 PAMPANGA RIVER BASIN

Most vulnerable segments are the lower and middle terraces within the meander belt. The rate of extent of erosion rate varies. On a river section in Bagong Sikat, upstream of the proposed alignment, a 25m-wide segment of the middle terrace was eroded in a single flood event in 1998. Other river segments have also been subjected to erosion during annual flood events.

Talavera River

The present course of the Talavera River segment within the alignment corridor is “geologically recent”, a result of an avulsion from an original southerly direction to that of its present course.

The banks of the present Talavera River are marked by 3 channel terraces indicating that the main channel had undergone 2 episodes of readjustments since its avulsion. The terrace edges are marked with near vertical escarpments, with height of 2 meters at the upper terrace to 1.5 meters at the lower terrace towards the main channel. Also evident is the upper terraces at the southern bank have wider lateral extent as compared to those in the northern bank. The lower and middle terraces at the northern bank on the other hand, have a constricted lateral configuration.

Exposed along the bank is a sequence of poorly compacted and loosely consolidated soil composed of silty fine sand overlying loose sandy gravel on top of a gravelly clay horizon. The contact of the soil materials with gravel is about 2m above the normal water level.

Bank sections that are directly affected by peak channel flows are more vulnerable more especially those on the channel bend. The flow in a meander bend is helicoidal with a component of surface flows towards the outer bank and the bottom flow towards the outer bank and the bottom flow towards the inner bank. As a result of the flow pattern, the outer concave bank is the site of erosion and the inner convex bank is the site of deposition, the channel as a whole migrating transversely to the flow to deposit sediment by lateral accretion.

Rio Chico River

Tarlac province is bounded by two (2) principal rivers; Tarlac River and Rio Chico River which are both heavily silted. Tarlac River aggradation problem is attributed to the heavy transport of lahar due to Mt.Pinatubo eruption while Rio Chico has narrow/limited river cross section with meandering flow and serves as the catch basin of waterways from Talavera-Aliaga, Zaragoza, Cabanatuan, Guimba, LIcab and Sto.Domingo and the eastern towns of Tarlac, outfall to Sacobia- Bamban-Paura River and Quitangil River.

Rio Chico River is one of the tribunal of Pampanga River which is located upper part of Pampanga River Basin. The Rio Chico River and Talavera River confluent in La Paz and flow to San Antonio Swamp before meet to Pampanga River.

TABLE 9.5.2-26 CHARACTERISTICS OF RIO CHICO AND PAMPANGA RIVER

	Rio Chico River	Pampanga River
Catchment Area	1700km2	7700km2
River Slope	1/3,500	1/10,000 – 1/8,000
Discharge (50years)	2,400 (at Zaragoza) 3,700(at San Antonio)	4,350 (at Cabiao)
Discharge (100 years)	2,800(at Zaragoza) 4,400(at San Antonio)	4,900 (at Cabiao)

Source: JICA 1982

9.5.2.8 Precipitation and Flood

Intensities of precipitation for Cabanatuan City and for Munoz in Nueva Ecija Province are predicted based on historical data (**Table 9.5.2-27, 9.5.2-28**).

TABLE 9.5.2-27 RAINFALL INTENSITY-DURATION FREQUENCY CABANATUAN CITY (MM)

Return Period	5	10	15	20	30	45	60	80	100	120	150	3	6	12	24
Yrs.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	hrs.	hrs.	hrs.	hrs.
2	12.10	18.80	24.10	28.60	36.60	45.00	50.70	57.00	62.30	66.10	70.80	75.10	92.60	108.90	127.90
5	17.5	26.90	34.30	40.50	52.40	65.00	74.60	83.30	90.50	95.60	101.60	108.70	137.80	162.60	194.50
10	21.10	32.20	41.10	48.40	62.80	73.80	90.50	100.70	109.10	115.10	121.90	131.00	167.70	198.10	238.60
15	23.10	35.30	44.90	52.90	68.70	85.80	99.40	110.50	119.60	126.10	133.40	143.50	184.50	218.10	263.40
20	24.50	37.40	47.60	56.00	72.80	91.00	105.70	117.40	127.00	133.80	141.50	152.30	196.30	232.20	280.80
25	25.60	39.00	49.70	58.50	76.00	95.10	110.50	122.70	132.70	139.70	147.70	159.10	205.40	243.00	294.30
50	28.90	44.00	56.00	65.90	85.70	107.50	125.40	139.00	150.10	158.00	166.80	180.00	233.40	276.30	335.60
100	32.20	49.00	62.30	73.30	95.40	119.80	140.10	155.20	167.50	176.10	185.70	200.70	261.20	309.30	376.60

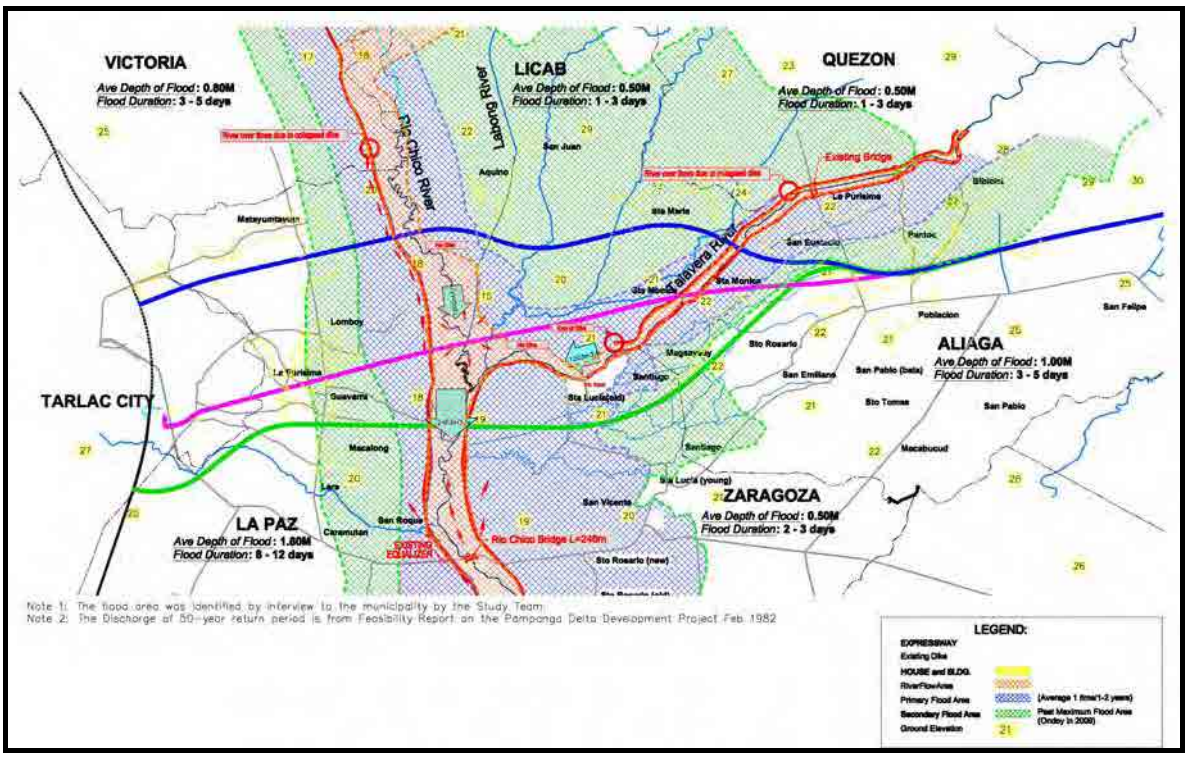
Prepared by:
The HYDROMETEOROLOGICAL INVESTIGATIONS and SPECIAL STUDIES SECTION
Flood Forecasting Branch, PAGASA

TABLE 9.5.2-28 RAINFALL INTENSITY-DURATION FREQUENCY FOR MUNOZ, NUEVA ECIJA (MM)

Return Period	60	3	6	12	24
Yrs.	min.	hrs.	hrs.	hrs.	hrs.
2	58.80	66.30	78.70	89.00	105.40
5	67.10	82.60	98.80	125.60	144.70
10	75.30	93.30	112.10	149.90	170.70
20	83.10	103.70	124.80	173.20	195.70
25	85.60	107.00	128.80	180.50	203.60
50	93.20	117.10	141.30	203.30	228.00
100	100.80	127.10	153.60	225.90	252.30

Prepared by:
The HYDROMETEOROLOGICAL INVESTIGATIONS and SPECIAL STUDIES SECTION
Flood Forecasting Branch, PAGASA

The preferred alignment was plotted on the topographic maps. Eighteen (18) natural waterways were identified along the alignment. The catchment areas for each water way were delineated. A catchment area is defined as the limits of the topographic divide which is the line that separates water flow between basins. Other hydrologic parameters such as length of waterway and difference of elevation are identified.



Source: JICA Study Team (2011)

FIGURE 9.5.2-5 FLOOD PRONE AREA IN CLLEX ALIGNMENTS

9.5.2.9 Topography

Tarlac

The topographic features of the Tarlac are described as the following: 'extensive level plain' (consisting recent alluvial deposits of sand, silt, and small amount of clay) in the northern and eastern parts of the province; and 'hilly and mountainous' in the western and northwestern parts of the province. The western and northwestern parts consist of hills and mountains comprise the eastern sides of the Zambales mountain range. There are three (3) prominent mountains in this range, namely, Dome Peak (1,389 masl), Iba Mountain (1,605 masl) and Sawtooth Mountain (1,806 masl). These mountains and the surrounding areas then consist of volcanic rocks of basalts and andesites. The andesites are mostly porphyrtic. The hills and foothills which are deforested areas are underlain by unconsolidated tuffaceous rock materials. In badly eroded areas, the tuffaceous material is exposed, while in the lower areas the tuffaceous rock is covered to a depth of 2 to 3 meters thick with soil from the upper elevation.

Nueva Ecija

The topographic features of Nueva Ecija are described as the following: 'low-lying' alluvial plains in the western, central, and southwestern parts of the province; and 'rolling-up lands and

mountainous' in the northern, western, and southeastern parts of the province. The mountainous northern portion is part of the "Central Knot" of Luzon, of Caraballo Sur Mountains, while the mountainous eastern and southeastern portions are parts of Sierra Madre Range.

Geologically, the plain of the Nueva Ecija consists of recent alluvial deposits of various materials. The depths of these deposits vary in many places according to the elevation of the area. The absence of gravel, cobble-stones, and pebbled in the substratum shows that these deposits were made by slow-moving streams. The mountains in the northern part consist of Tertiary undifferentiated rocks, while those on the eastern sides consist of Tertiary and later effusive rocks of rhyolites, decites, and basalts. The foothills on the western flank of Sierra Madre Range consist of narrow strips of volcanic tuff material, sandstone, shales and limestones.

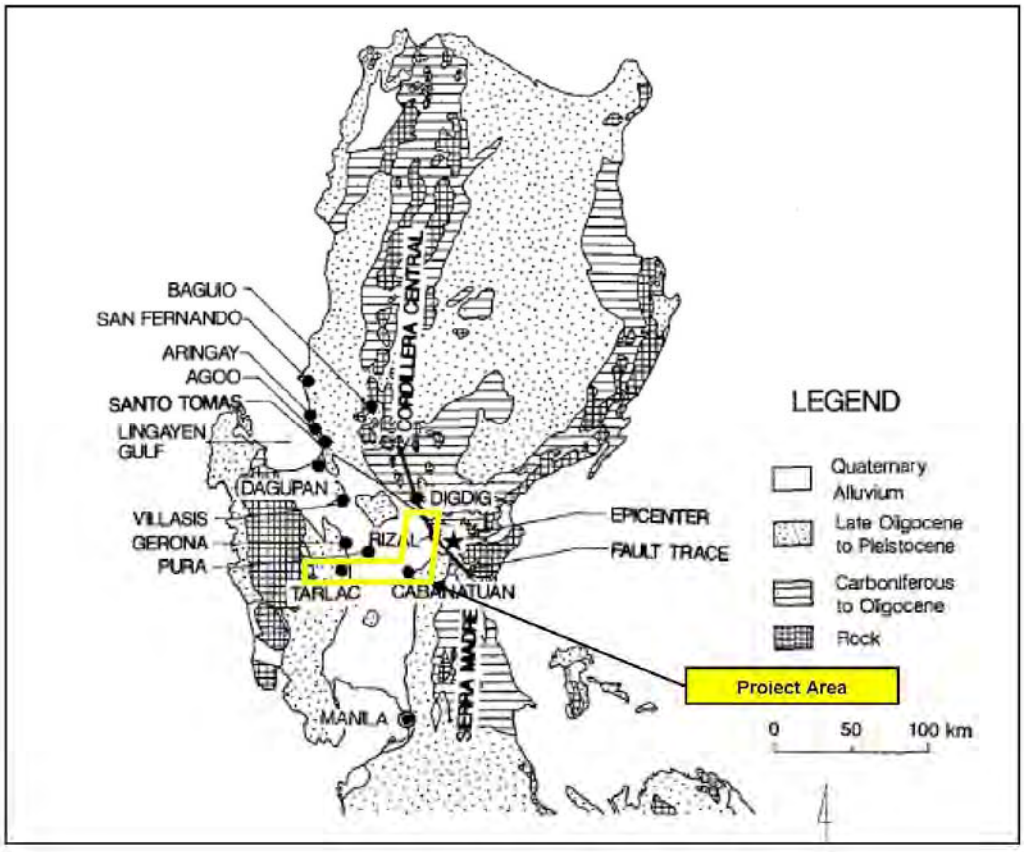
The rock formations in the province are represented by time rock units ranging in age from Pre-Cretaceous (Basement Complex which is the oldest) to Quaternary. The basement complex and the Cretaceous-Paleogene Rock Formations constitute the dominant rocks that underlie the mountainous areas of the province. The rocks are intruded by diorite, probably of more than one kind, syenite, gabbro, and other intrusive phrases or offshoots.

Along the alignment in Phase 1 of CLLEX, area is either in paddy field, firm land or river/canal/road. Existing ground gradient is almost flat in Phase 1 (average gradient is 0.06%).

The main geomorphologic feature in the region between the Gulf of Lingayen and Manila, where the provinces of Tarlac and Nueva Ecija are included, is called the Central Plains. The lithology of the northern Central Plains is predominantly an alluvium deposit formed by the Agno River that is fed by a large number of tributaries. Agno River exhibits a braided channel pattern which then transforms into a southwest-directed meandering river as it crosses the Central Luzon Plain. Meanwhile, the most dominant lithology in the Project area are the Late Oligocene to Pleistocene and quaternary alluvium deposited by the Agno River. The following are three main stratigraphic units in this region:

- Caraballo Formation
- Pantabangan Formation
- Guadalupe Formation

Additionally, based on the succeeding maps, majority of the lands upon which CLLEX Phases 1 will traverses lands classified as 'quaternary alluvium deposits'.



Source: Tokimatsu et al, 1992

FIGURE 9.5.2-6 GEOLOGICAL MAP

9.5.2.10 Solid Wastes

Around the country, three LGUs have established operating sanitary landfills and one is Clark Sanitary Landfill in Capas, Tarlac. Region III where Central Luzon lies has six (6) "controlled" disposal sites and one (1) sanitary land fill. Although the statistic indicates there is no open dumping site in the Region III, the Study Team observed an open dumping site in the Project area. The World Bank's study predicted that Central Luzon generates 1.32 Million tons annually in 2010 (see **Table 9.5.2-30)**

FIGURE 9.5.2-7
OPEN DUMPING SITE

TABLE 9.5.2-29 SOLID WASTE COLLECTION FACILITY (2007)

Region	Existing Open Dumpsites	Open Dumpsites for Conversion to Controlled Disposal Facilities	Existing Controlled Disposal Facilities	Proposed Controlled Disposal Facilities	Sanitary Landfill (SLF)	Proposed SLF
NCR	11		4			
I	29	15	2	5		
II	10	1	2	5		
III			6		1	
IV-A	89		16		1	7
IV-B	21		2			
V	10			3		
VI	15		1		1	2
VII	7				1	
VIII	22			8		
IX	21	6				13
X	25			1		1
XI	37					1
CARAGA	83	3	3	9		
CAR	24					4
TOTAL	404	25	36	31	4	28

TABLE 9.5.2-30 AMOUNT OF SOLID WASTE GENERATED (2007)

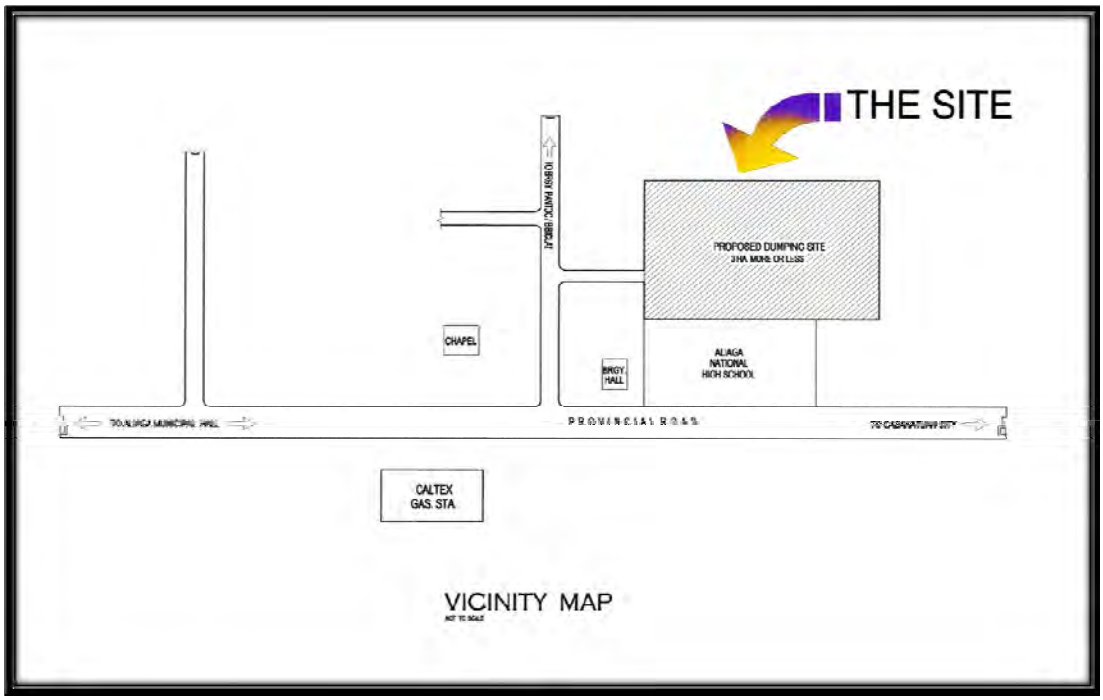
	2000		2010	
	Million Tons/ Year	% of Total	Million Tons/ Year	% of Total
Metro Manila (National Capital Region)	2.45	23.0	3.14	22.3
Cordillera AR	0.17	1.6	0.21	1.5
Ilocos	0.50	4.7	0.63	4.5
Cagayan Valley	0.32	3.0	0.40	2.8
Central Luzon	0.96	9.0	1.32	9.4
Southern Tagalog	1.42	13.3	2.11	15.1
Bicol	0.54	5.1	0.65	4.6
Western Visayas	0.82	7.7	1.00	7.1
Central Visayas	0.74	7.0	1.01	7.2
Eastern Visayas	0.43	4.0	0.51	3.6
Western Mindanao	0.40	3.8	0.53	3.8
Northern Mindanao	0.37	3.4	0.47	3.4
Southern Mindanao	0.70	6.6	0.97	6.9
Central Mindanao	0.33	3.1	0.41	2.9
ARMM	0.26	2.5	0.39	2.7
Caraga	0.26	2.4	0.31	2.2
National	10.67	100	14.05	100

Source: World Bank. *Philippines Environmental Monitor 2001.*

Source: Report of the APO Survey on Solid-Waste Management 2004–05, Asian Productivity Organization (2007)

Various types of solid wastes are expected to be generated at the project construction site. With the number of workers to be deployed, considerable amount of garbage is expected to be generated. Construction spoils that will be generated also need to be disposed of in accordance with ECC.

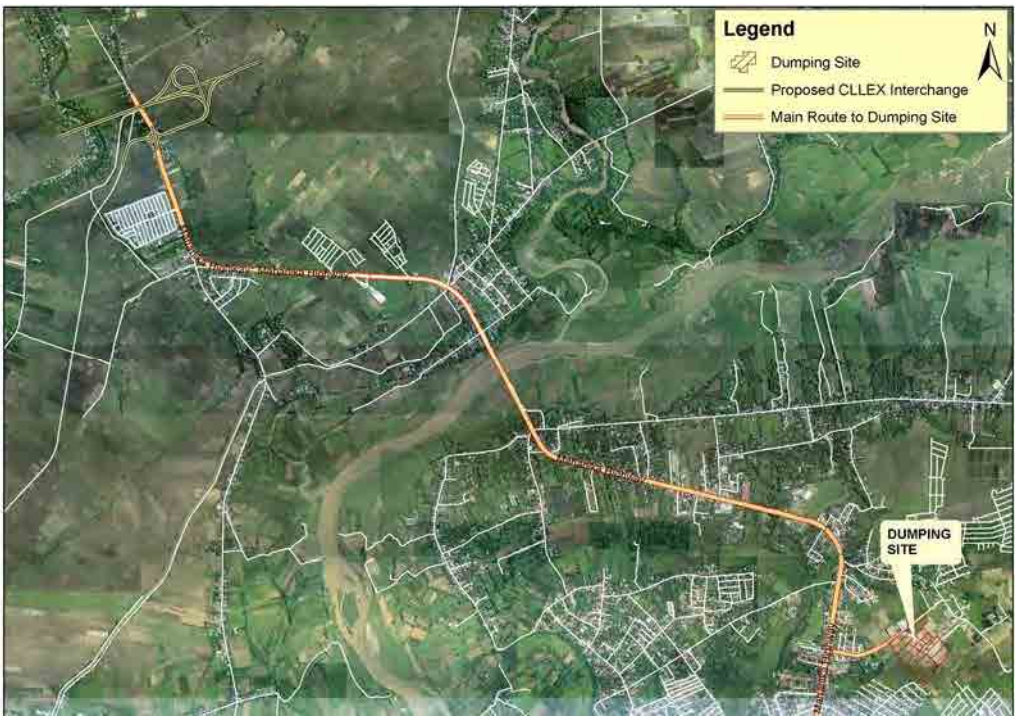
Disposal Sites for Excavated Earth Material



Proposed Dumping Site for Unsuitable Soils
Location: Brgy. Poblacion East II, Aliaga, Nueva Ecija

Land Area: Approximately 3 Hectares
Owner: Municipal Government of Aliaga

ALIAGA



Cabanatuan City

Source: JICA Study Team (2011)

Construction spoils (excavated earth material/soil) are allowed to be disposed of in two locations offered by municipality of Aliaga and Cabanatuan City.

9.5.2.11 Demography

The province of Tarlac is the fourth largest population in Central Luzon with a population of 1,068,783 and annual growth rate of 2.32 (2000-2007). As of year 2007, the total population of the province is 1,243,499. The province consists of 17 municipalities and 1 city. There is 1 area will be affected by the proposed project: the municipality of La Paz.

The province of Nueva Ecija, meanwhile, is the third largest populated area in Central Luzon with a population of 1,659,883 (just behind Bulacan and Pampanga). As of year 2007, the population increased to 1,843,853, with an average annual growth rate (2000 - 2007) at 1.46%. The province consists of 27 municipalities and 5 cities. There are four areas that will be affected by the proposed Project: the municipalities of Licab, Aliaga, Zaragoza and the cities of Cabanatuan.

TABLE 9.5.2-31 PROFILE OF TARGET PROVINCES AND BARANGAYS

Province	Municipality	Present Demographic Profile (as of 2007)			
		No. of Barangays	Population	No. of HH	Population Density (no. of persons/km2)
Tarlac	La Paz	21	61,324	11,778	536
Nueva Ecija	Aliaga (2007)	26	61,270	12,522	680
	Cabanatuan City (2010)	90	276,638	56,599	1,438
	Zaragoza (2007)	19	40,335	8,682	530
TOTAL		153	439,567	89,581	

Source: National Statistic Office Homepage (http://www.census.gov.ph/) 2007

Gender

In Tarlac, there are more males (541,571) than females (527,212), resulting in a sex ratio of 103 males for every 100 females. Similar to the national pattern, the provincial sex ratio declines in the older age groups.

Efficient and improved road access (urban, rural, and inter-urban) benefits the whole of the community to increase the opportunities for trading and other economic activities, providing better links to health and education facilities, improving farm to market roads to the extended family and relations, improving employment opportunities, and providing better social and entertainment facilities (more applicable to urban roads). Benefits, however, to women may vary from men and children stakeholders.

Indigenous People

Based on ocular survey in 2010, and even on the focus group discussions, there are no indigenous people's communities (IP's) or even individuals in the area that would be directly or indirectly affected by the CLLEX project. Therefore, there is no need to make any mitigation program or resettlement plan to address anything related to Indigenous peoples' concern

9.5.2.12 Economy

1) Regional Economy

GRDP of Region III is 1,177 billion pesos in 2008 accounting for 8.30 percent of GDP which is the third in height in the country. Economic growth from 2007 through 2008 is 3.84%, and for the GRDP per capita production is 12,049 pesos.

Primary Industries (Agriculture, Fisheries and Forestry) have accounted for 24.46% of the GRDP Region III in 2008, have increased from 1.03% in 2007. Economic growth rates of GRDP from 2007 through 2008 are 2.97% of this sector. Secondary industries in the region (mining, quarrying, manufacturing, construction, electricity production, gas and water), which accounted for 35.59% of the GRDP of the Region III of 2008, have increased by 1.05% in 2007. Economic growth rates of GRDP from 2007 through 2008 are 5.11% of this sector. Tertiary industries are transportation, trade, economic, public and private real estate projects. Which accounted for 39.95% of the Region III GRDP of 2008, has become the largest industry in this region. Economic growth rates of GRDP from 2007 through 2008 are 3.25% of this sector.

Region III is the area of tourism development is greatly expected. It has growth potential by carrying out promotional activities of existing tourism resources as well. To do so aggressive promotion of tourism facilities and tourism services may be considered to implement such conduct tours and fairs. The area has scenic mountains, historic monuments, churches, and attractions such as museums and nature. In 2007, tourists to the Central Luzon are 419,640 people, 67.31% of them from domestic area, then 32.69% is from abroad.

TABLE 9.5.2-32 GRDP IN 2008

	GRDP (thousands peso)	whole country (%)	GRDP per capita (peso)
Region III (Central Luzon)	117,723,788	8.30	12,049
CAR	30,956,667	2.18	19,043
Region I (Ilocos)	41,230,157	2.91	8,289
Region II (Cagayan Valley)	27,684,066	1.95	8,518
NCR	468,382,396	33.01	41,624
All Philippine	1,418,952,296	-	15,686

Source: National Statistic Office, 2009

TABLE 9.5.2-33 GRDP AND ECONOMIC GROWTH RATE BY SECTOR

	GRDP (thousands peso)	Rate of GRDP (%)	Economic Growth Rate (2007-2008)
Primary Industry	28,795,239	24.46	2.97
Secondary Industry	41,897,896	35.59	5.11
Third Industry	47,030,653	39.95	3.25
TOTAL	117,723,788	100	3.84

Source: National Statistic Office, 2009

The economy of Tarlac is predominantly classified as agricultural. The principal crops of the province are rice, sugarcane, corn, and coconut, vegetables such as garlic, onion, and eggplant, and fruits such as mango, banana, and calamansi. The province has also numerous rice mills and sugar processing plants to compliment the agriculture sector. In fact, Tarlac is one of the top (second to Negros) producers of sugar in the Philippines. Aquaculture is limited to fishponds because the province is landlocked. Tilapia is the main breed of fish that is catered in most fishponds. Meanwhile, the province's western frontier with Zambales provides timber and logging products, and mineral (iron and manganese) ore mining. Other industries that are located in Tarlac are fertilizer producers, ceramic manufacturing, and food novelties trading. Nueva Ecija is one of the top producers of agricultural products in the country, which often named as the "Rice Granary of the Philippines." Its principal crop is mainly rice but corn and onion are also produced in huge quantities. Other major crops are onion, mango, calamansi (calamondin orange), banana, garlic, and vegetables. The town of Bongabon at the eastern part of the province and its neighboring Laur and Rizal municipalities are the major producers of onion and garlic, as such Bongabon is called the "onion capital of the country". There are also many poultry farms in a number of towns, most notably, the Lorenzo poultry farms in San Isidro which is one of the largest in the country. Duck raising and egg production is also an important livelihood. Fishponds are unevenly distributed throughout the province but the largest concentrations are in San Antonio, Santa Rosa, and Cuyapo.

2) Local Economy

Majority or 50.4% of the households sourced their income primarily from farming. While the remaining 38.8% and 10.7% earn their income from employment and commerce respectively. Majority or 49.3%of the respondents does not have any other (secondary) sources of income, while 8.6% of the respondents secondary income comes from small scale businesses such as "sari-sari" store. Income from employment constituted 16.1% of the secondary income source.
Around 58.5% of the households earn below Php 43,588 annually, while some 4.0% earn between Php 43,588 to Php 69,192 per annum. There are also approximately 37.5% that earn more than P 69,192.

9.5.2.13 Land Use

Central Luzon Region: Central Luzon region shares steady rate of more or less 6% of national farming area in the Philippines last 50 years. Of which about 0.52 million ha are used to produce crops. In last 20 years permanent meadows and pastures have disappeared and the forest land has been gone since 1960s.

Tarlac: The province of Tarlac is the fourth largest province in Central Luzon with an approximate total land area of 305,340 hectares. It is predominantly composed of agricultural areas (i.e. plantations, farms and fishponds), and at the same time, the major sector in the province. La Paz is the area that will be affected by the proposed CLLEX in Tarlac province. In terms of land use, La Paz also exhibit large areas dedicated to agriculture. Approximately 8.3 kilometers in La Paz will be traversed by the proposed Project. As a result, 50 hectares for La Paz will be allocated for the implementation of the proposed Project's ROW.

Nueva Ecija: The province of Nueva Ecija is the largest province in Central Luzon with an approximate total land area of 533,015 hectares (Nueva Ecija ENS profile, 2009). Similar to Tarlac, Nueva Ecija also has vast land areas dedicated for agricultural use such as farmlands and fishponds, which are the top sectors in the province.

Two (2) municipalities: Zaragosa, and Aliaga,; and one (1) city: Cabanatuan will be directly affected by the proposed CLLEX.

In terms of land use, all the municipalities and cities affect by the Project dedicate most of their land use for agricultural use. Approximately 5.3 kilometers in Zaragosa, 15.4 kilometers in Aliaga, 1.7 kilometers in Cabanatuan City will be traversed by the proposed Project. As a result, 32 hectares for Zaragosa, 93 hectares for Aliaga, and 10 hectares for Cabanatuan City will be allocated for the implementation of the proposed Project's ROW.

TABLE 9.5.2-34 FARMING AREAS

(hectares)	PHILIPPINES					Central Luzon				
	1960	1971	1980	1991	2002	1960	1971	1980	1991	2002
ALL Classes	7,772,485	8,493,735	9,725,155	9,974,871	9,670,793	565,728	564,921	526,750	632,493	552,104
Temporary Crops	3,784,619	3,891,982	4,365,200	5,332,770	4,815,938	461,232	462,135	451,136	505,156	410,973
Permanent Crops	1,798,606	2,532,166	3,489,000	4,172,540	4,225,393	18,996	20,924	26,323	90,990	100,194
Permanent Meadows/ Pastures	380,024	690,988	530,000	130,943	129,278	41,869	43,684	17,389	5,966	5,801
Forest	581,712	433,707	336,500	70,144	73,865	12,040	7,398	6,682	3,241	3,360
Lying Idle	1,115,953	752,272	838,600	154,187	119,641	24,954	17,916	18,441	14,605	4,790
All Other Lands	114,571	192,621	165,900	114,288	268,542	6,637	12,864	6,777	12,533	23,620
Not Reported	0	0	0	0	38,136	0	0	0	0	3,366

Source: National Statistic office IN http://countrystat.bas.gov.ph, Bureau of Agricultural Statistic (2010)

Land Tenure

The respondents from Caalibangbangan, Cabanatuan City was given permission to stay by the landowners. Dwellers at Barangay Umangan, Aliaga are children of the original EP Holder. Majority or 68.7% of the respondents are land owners, however, most respondents will not have any available land for them to relocate, transfer, or farm if they are moved or relocated.

TABLE 9.5.2-35 LAND USE PROFILE OF TARLAC AND NUEVA ECIJA PROVINCES

Land Use	Tarlac		Nueva Ecija			
	La Paz		Cabanatuan		Aliaga	
	ha	%	ha	%	ha	%
Agriculture	10,999	95.90	11,188.17	58.19	6,953.62	67.75
Residential	404	3.52	7,240.57	37.66	3,309.38	32.25
Commercial			27.96	0.14		
Industrial			18.58	0.10		
Educational			78.93	0.41		
Recreational	-	-	160.42	0.83		
Bodies of Water	27	0.24	-	-		
Open Areas	-	-	-	-		
Others	39	0.34	514	2.67		
TOTAL	11,470	100	19,228.63	100	10,263.0	100

9.5.2.14 Heritage/ Historical Sites and Tourist Destination

According to the Department of Tourism of Philippines, there are four major heritage sites in Nueva Ecija province and nine in Tarlac province. These heritage sites are mostly historical sites are mostly historical sites, war memorial sites, and scenic views. Several resort area and tourist destinations are located in both ends of CLLEX as well. However, these are located off the CLLEX alignment and not affected by the highway. On the other hand, CLLEX acts as a connector road of these tourists' destinations located along existing highways and would promote provincial tourism.

1) Heritage Sites

NUEVA ECIJA

Name	Location	Description
Camp Pangatian	Cabanatuan City	The shrine now honors the brave rescue of 512 allied prisoners of war by Filipino guerrillas led by the late Governor Eduardo L. Joson.. The camp is a popular tourist destination area for veterans of World War II and their families who visit our country under the Reunion of Peace Program.
General Luna Statue and Marker	Cabanatuan City	A statue of General Luna astride a horse stands at the plaza of Cabanatuan City in front of the Cathedral. Gen. Luna was assassinated in the city which subsequently adopted him.
Mt. Olivete	Bongabong	Pilgrims of the Adarnista Spiritual Community built their churches on a hilltop which can be reached through a hundred step stairs carved in stone. An outdoor overnight stay promises a firefly-lit night, enchanting its visitors and in the morning, one wakes to cascading waterfalls whose view adds to its lush sceneries. Olivete is most famous for its medicinal springs where pilgrims bathing and drinking are an everyday sight and every visitor is most welcomed.
Barrio Labi	Bongabong	Located in the town of Bongabong, along the national highway going to Baler, Quezon, this is the death place of Mrs. Aurora Aragon Quezon, the wife of the late Pres. Manuel Luis Quezon.

TARLAC

Name	Location	Description
Sto. Domingo Death March Marker	Capas	The site where about 60,000 Filipino soldiers cramped like sardines in closed box-cars were unloaded to start the second phase of the tragic Death March which was about 1.5 km. north from Capas town proper. Even from the "disembarkation" point, more than 30,000 of these defenders of democracy perished from the inhuman treatment they were subjected to during the trip from Abucay arid Mariveles, Bataan to San Fernando, Pampanga.
Capas Death March Monument	Capas	This monument is a historical marker of the infamous concentration where nearly 30,000 Filipino and American soldiers who participated in the Death March perished in 1942. It depicts the endurance and heroism of valiant soldier defenders three kilometers from the town proper along the highway.
Camp O'Donnell		A name that rings a familiar if sad chord in the hearts of World War II veterans and orphans. O'Donnell is a sentimental must in the itinerary of History. A

Name	Location	Description
		Concentration camp and subsequently serving as burial grounds for thousands of Filipino soldiers who perished during the last World War II. The site was the ultimate destination of the infamous Death March.
Tarlac Provincial Capitol and Maria Cristina Park	Tarlac	An imposing historical landmark in the province is the seat of the provincial government, the Capitol Building. Constructed atop a hill, it commands a panoramic view of the town of Tarlac and its surrounding environs. Right in front of the building itself are ornamental plants abloom during most of the year. The construction of this edifice work was initiated by Governor Manuel de Leon in 1906 and it was completed under the governorship of the late Hon. Jose Espinosa in 1909. True to the vision of its founders, the CAPITOL today is a must in the provincial travel itinerary of domestic and foreign institutes.
Camiling Church	Camiling	The Catholic Convent of Camiling was the death place of General Pedro Pedroche and its men in the hands of Francisco Makabulos and his revolutionary troops in order of General Luna on charges of rebellion.
Maria Clara Museum	Camiling	Two great sons of Camiling who have proven their statesmanship, diplomacy and legal brilliance are Carlos P. Romulo and Cesar Bengson.
Other sites: Japanese Memorial Park (Sta. Ignacia), Kumpil ng Bayan/Alimudin Festival (Paniqui), Carlos P. Romulo Memorial Library (Tarlac)		

2) Tourist Destination

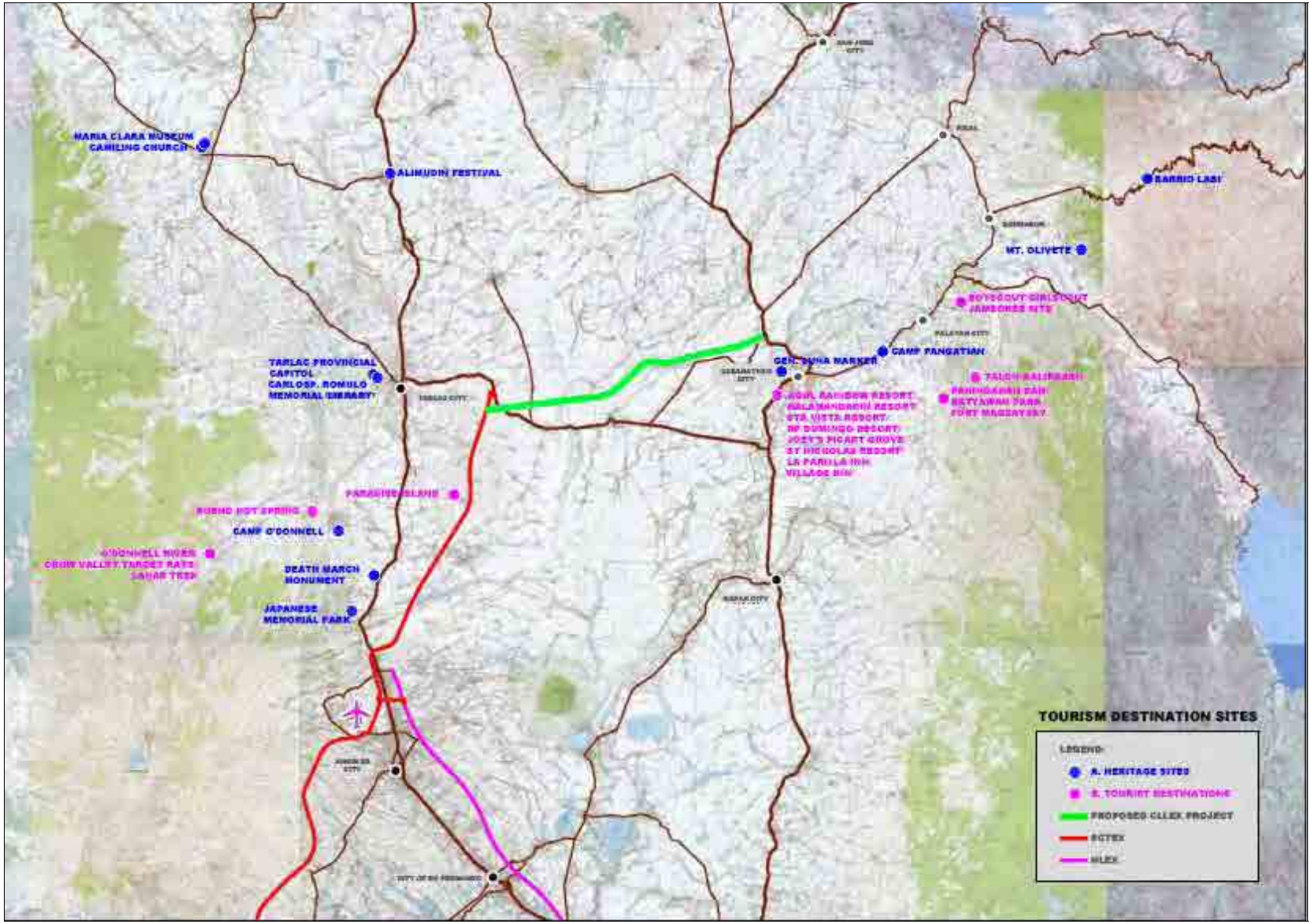
NUEVA ECIJA

Talon Kalikasan	Palayan City	A natural water falls from the springs of Sierra Madre mountains just about a kilometer from the Aetas resettlement.
BSP Jamboree Site	Palayan City	The largest jamboree site in Central Luzon where the national jamboree was held in 1968 dubbed as the "Jamboree of Experience and History".
GSP Josefa Llanes Escoda Campsite	Palayan City	A 12-hectare camping and jamboree site for GSP.
Batyawan Park	Palayan Fort Magsaysay	A garden park with open amphitheater and a grotto. A rest area for military personnel located in a natural lake within the camp
Other sites in Cabanatuan: Pahingahan Darn, Agul Rainbow Resort, Kalamandarin Resort, Sta. Vista Resort, RP Domingo Resort, Joey's Picart Grove, St. Nicholas Resort, La Parilla Inn, Village Inn, Manria Hotel		

TARLAC

Bueno Hot Spring	Capas	A rich source of tourism revenue once fully developed is the Bueno Hot Springs of Capas located within the reservation area of the former Clark Air Base. The terrain is mountainous and the place can be reached only by trail. The natural geography around rolling terrain traversed by the newly built Capas-Botolan Road and a full view of the reservation makes the place truly attractive to both domestic and foreign tourists. Since this phase is part of the large tract of hectares to be turned over the Philippine Government, the opportunity is ripe for either government or private sector to develop the place.
Paradise Island	Concepcion	A veritable paradise true to its name "Paradise Island" is all of half a hectare in the middle of a five-hectare man-made lake in Hacienda Tinang, Concepcion, Tarlac. The place can be reached in two ways: thru the Murcia-VOA route or thru the CAT in San Miguel (Concepcion via Tinang road). To reach the island itself is by boat. The lake is teeming with catfish, mudfish and flapia in addition to Japanese carp. Fishing is allowed anywhere in the lake. All kinds of fruit trees abound in the island such as Tahiti lime (an aromatic version of the local calamansi), mangoes, atis, lychees, champoy, coconut and figs. To make it more colorful are all kinds of flowering plants. The thick foliage in the area is the natural sanctuary of bords and wild ducks. However, hunting is not allowed in order not to deplete the supply.
Other sites: O'Donnel River (Capas), Crow Valley Target Rays(Capas), Malasa Water, Falls(Bamban), Lahar Trek (Capas)		

Source: "Final Report for the Tourism Master Plan for Region III (Central Luzon)", 1998. Department of Tourism; Engineering and Development Corporation of the Philippines (EDCOP)



Source: JICA Study Team (2011)

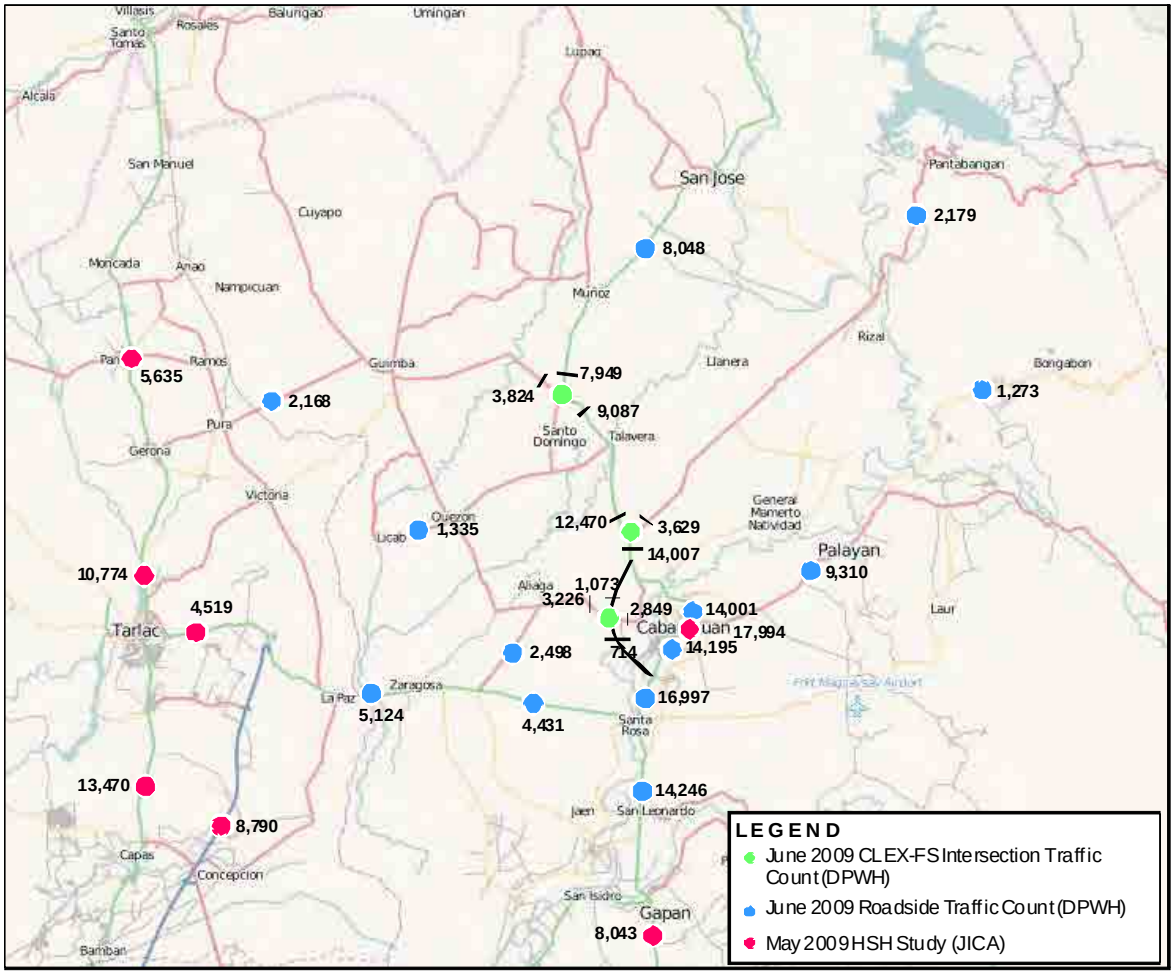
FIGURE 9.5.2-8 HERITAGE SITES AND OTHER TOURIST DESTINATION

9.5.2.15 Traffic Condition

To get to the city from Tarlac to Cabanatuan, there are 2 popular roads called “Tarlac - Sta. Rosa road” and “Tarlac - Licab – Sto. Domingo”, and these are located parallel to the CLLEX. Currently, the Philippine-Japan Friendship Highway (Pan Philippine Highway: PPH) occurred because of traffic congestion in, Tarlac – Sta. Rosa becomes the main access road to Cabanatuan City and the surrounding municipalities of Metro Manila roads.

Heavily-traveled road in the study area is PPH carrying, 14,000 to 17,000 vehicles per day, then 4,000-5,000 per day of Tarlac - Sta. Rosa Road, then, 1,300 per day of Tarlac - Licab - Sto. Domingo Road.

Regarding the type of vehicle, the amount of truck occupied almost 20%, above all, the amount of large truck reaches around 40%.



Note: June 2009 - Feasibility Study for the Proposed Central Luzon Expressway (JICA)

FIGURE 9.5.2-9 TRAFFIC ON ROAD NETWORK

9.5.2.16 Protected Area

National Integrated Protected Areas System (NIPAS)

Republic Act 7586 otherwise known as the National Integrated Protected Areas System (NIPAS) Act of 1992 provides the legal framework for the establishment and management of protected areas in the Philippines. Initial components of NIPAS proposed for establishment under NIPAS for Region 3 are eight (8) national parks, one (1) bird sanctuary, and fourteen (14) Watershed Forests Reserves. (**Table 9.5.2.36** and **Figure 9.5.2-10**)

TABLE 9.5.2-36 LIST OF INITIAL COMPONENTS OF NIPAS PROPOSED FOR ESTABLISHMENT UNDER NIPAS

LIST OF INITIAL COMPONENTS OF NIPAS PROPOSED FOR ESTABLISHMENT under NIPAS

NAME OF PROTECTED AREA	LOCATION	LEGISLATION	DATE	AREA (HA.)	REMARKS
REGION 3	23			219,887.960	
National Parks (8)				*37,101.250*	
1. Minalungao NP	Gapan and Gen. Tinio, Nueva Ecija	R.A. 5100	6/11/1967	2,018.000	
2. Biak-na-Bato NP	San Miguel and Doña Remedios Trinidad, Bulacan	Proc. 223 Proc. 2204 Proc. 84 Proc. 401	11/16/1937 6/5/1992 3/9/1967 4/11/1988	(2,117.000) (330.306) (2,117.000) 658.850	
3. Capas Death March Monument	Capas, Tarlac	R.A. 826	6/14/1952	1.540	
4. Mt. Arayat NP	Arayat and Magalang, Pampanga	Proc. 594 Proc. 203	6/27/1933 9/16/1937	(3,714.030) 3,715.230	
5. Bataan NP	Hermosa, Orani, Samal, Abucay, Pilar Balanga, Bagac and Morong, Bataan	Proc. 24 Proc. 25 Proc. 1956 Proc. 192	12/1/1945 4/18/1966 3/25/1980 11/27/1987	(31,000.000) (29,853.000) (23,853.000) 23,688.000	
6. Roosevelt NP	Hermosa & Dinalupihan, Bataan	Proc. 567 Proc. 567	3/30/1933 12/17/1965	(1,485.000) 1,334.590	Proclaimed as *Roosevelt Protected Landscape* (Proc. 273 dtd April 23, 2000)
7. Olongapo Naval Base Perimeter	Olongapo City, Zambales	Proc. 478	10/22/1968	9.040	For disestablishment
8. Aurora Memorial Park (Bongabon-Baler NP)	Bongabon, Nueva Ecija and Baler, Quezon	Proc. 220 Proc. 744 Proc. 130	11/11/1937 8/11/1941 5/19/1949	(2,356.000) 5,676.000 5,676.000	

NAME OF PROTECTED AREA	LOCATION	LEGISLATION	DATE	AREA (HA.)	REMARKS
Game Refuge and Bird Sanctuary (1)				*12.350*	
1. Lake Malimanga Bird and Fish Sanctuary	Candelaria, Zambales	Proc. 1949	3/14/1980	12.350	
Watershed Forest Reserve (14)				*182,874.360*	
1. Watershed Purposes of Manveles (Palanas)	Manveles, Bataan	E.O. 20	2/25/2019	325.000	
2. Olongapo WFR	Olongapo, Zambales	Proc. 238 Proc. 66	4/30/1964 3/20/1987	7,060.000 6,335.000	
3. Angat Watershed and Forest Range (Pilot)	Norzagaray, San Jose, Bulacan & Montalban, Nueva Vizcaya	Proc. 391	4/30/1968	8,600.000	
4. Talavera Watershed Reservation	Sta. Fe, Nueva Vizcaya, Carranglan Lupao, San Jose, Pantabangan Nueva Ecija	Proc. 350	12/12/1938	37,156.000	
5. Pantabangan-Carranglan Watershed Reservation	Pantabanga, Carranglan, Nueva Ecija	Proc. 561	5/21/1969	84,500.000	
6. Doña Remedios/General Tinio Watershed	Doña Remedios, Bulacan, Gen. Tinio Nueva Ecija	Proc. 230	3/23/1988	20,760.000	
7. Calabgan WFR	Casiguran, Aurora	Proc. 915	6/1/1992	4,803.000	
8. Dipaculao WFR	Dipaculao, Aurora	Proc. 116	6/10/1987	1,786.000	
9. Dinadiawan River WFR	Dipaculao, Aurora	Proc. 918	6/9/1992	3,387.000	Proclaimed as *Dinadiawan River Protected Landscape* (Proc. 278 dtd April 23, 2000)
10. Amro River WFR	Casiguran and Dilasag, Aurora	Proc. 633	8/28/1990	6,470.000	Proclaimed as *Amro River Protected Landscape* (Proc. 274 dtd April 23, 2000)
11. Talaytay River WFR	Dinalungan, Aurora	Proc. 670	12/3/1990	3,527.870	Proclaimed as *Talaytay Protected Landscape* (Proc. 283 dtd April 23, 2000.)
12. Simbahan-Talagas River WFR	Dinalungan, Aurora	Proc. 905	5/22/1992	2,266.490	Proclaimed as *Simbahan-Talagas Protected Landscape* (Proc. 267 dtd April 23, 2000)
13. Dibalo-Pingit-Zabali-Malayat WFR	Baler, San Luis, Aurora	Proc. 908	5/25/1992	4,528.000	
14. Aurora Watershed Forest Reserve	Baler, Quezon	Proc. 34	2/4/1936	430.000	

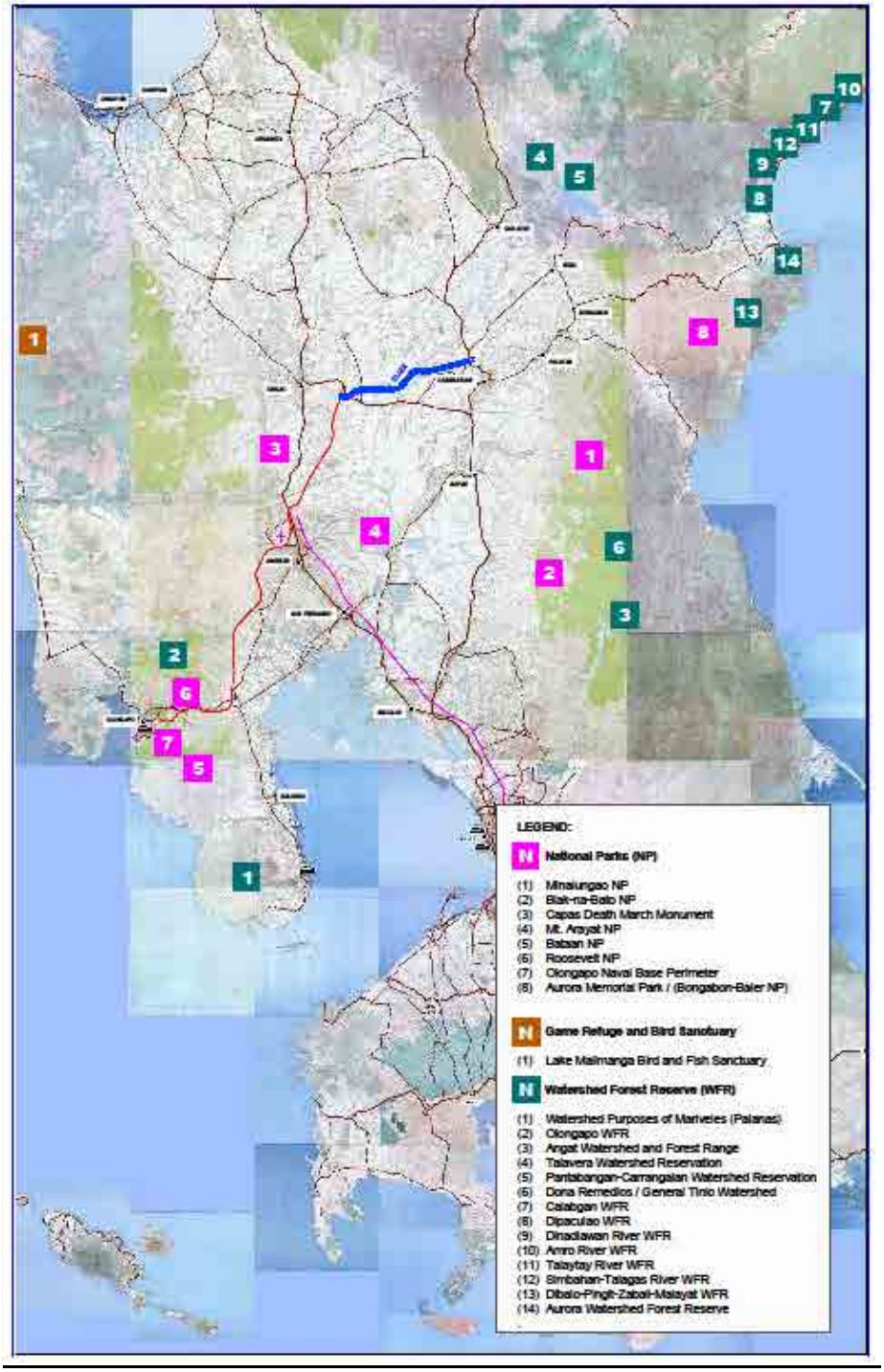


FIGURE 9.5.2-10 PROTECTED AREA

Network of Protected Areas for Agriculture (NPAA)

The Network of Protected Areas for agriculture ensures the food security particularly rice. However, according to the Department of Agriculture in the provinces of Tarlac and Nueva Ecija, there is no declared NPAA in the area of Proposed CLLEX Phase I Project.

9.5.2.17 Agriculture

Central Luzon contains the largest plain in the country and produces most of the country's rice supply, earning itself the nickname "Rice Bowl of the Philippines". The Department of Agriculture estimated rice production in 2010 for the provinces of Tarlac and Nueva Ecija is presented in **Table 9.5.2-37.**

TABLE 9.5.2-37 ESTIMATED PRODUCTION IN 2010, AREA HARVESTED AND YIELD PER HECTARE, BY FARM TYPE

	Tarlac	Nueva Ecija
Production (MT)	562,180	1,374,173
Irrigated	527,609	1,275,979
Rainfed	34,571	98,194
Upland	-	-
Area Harvested (Ha)	133,424	299,844
Irrigated	124,353	261,034
Rainfed	9,071	38,810
Upland	-	-
Yield/Hectare (MT)	4.21	4.58
Irrigated	4.24	4.89
Rainfed	3.81	2.53

Source: Bureau of Agricultural Statistics, Department of Agriculture

Nueva Ecija is one of the top producers of agricultural products in the country. Its principal crops are mainly rice but corn and onion are also produced in quantity. The province is often referred to as the “Rice Granary of the Philippines.” Other major crops are onion, mango, calamansi (calamondin orange), banana, garlic, and vegetables. The town of Bongabon at the eastern part of the province at the foot of the Sierra Madre Mountains and its neighboring Laur and Rizal are the major producers of onion and garlic. Bongabon is called the "onion capital of the country".

The economy of Tarlac is dominantly agricultural. Principal crops are rice and sugarcane. Other major crops are corn and coconut; vegetables such as eggplant, garlic, and onion; and fruit trees like mango, banana, and calamansi. It is among the biggest producers of Rice and Sugarcane notably grown in Hacienda Luisita in Barangay San Miguel, Tarlac City which is owned by the Cojuangco Family.

9.5.2.18 Social Institutions and Infrastructures

(i) Education and Schools

The Province of Tarlac has a total of 490 public elementary schools in which there are 150,840 elementary students are enrolled. These students are taught by 3,621 public elementary school teachers. Complementing the elementary schools are 83 private sector elementary schools, which have a combined enrolment of 10,825 pupils. There are 489 teachers in these private elementary schools.

In the secondary level, there are 57 public high schools, including technical/vocational high schools. There are 62,048 students enrolled in these secondary schools, taught by 1,464 teachers. In the private sector are 51 high schools with a total enrolment of 20,375. The total number of private secondary school teachers is 656.

Higher education in the province is provided by public and private universities and colleges offering academic, technical and vocational courses. Among the state tertiary institutions, Tarlac State University (TSU) is considered the premier school, and has the highest number of enrollees, while Tarlac College of Agriculture (TCA) in Camiling is the only specialty institution that offers agricultural courses. The student enrolment in these state colleges alone reaches more than 13,000.

There are three colleges in the province that offer medical courses: Central Luzon Doctors Hospital Education Institution in Tarlac City, OLRA College Foundation in San Manuel, and the St. Luke College Foundation in San Isidro, Tarlac City. There are 23 tertiary schools in the private sector with a combined enrolment of more than 10,000.

For the province of Nueva Ecija, its literacy rate is high, with an average rating of 94%. Based on the data from Department of Education for Calendar Year 2008, the enrollees increased by 29% or 58, 537 elementary students and 17% or 33,622 high school students compared to 2007 enrollees.

In Cabanatuan City, 63 schools, from grade to high schools, three universities and five other higher education institutions locate.

(ii) Health Care and Medical Facility

In Tarlac province, the health and medical care is delivered by a network of hospitals, rural health units (RHUs), barangay health stations (BHS), voluntary units and workers, and non-government

organizations distributed throughout the province. Patients from San Clemente, Sta. Ignacia, and Mayantoc that require tertiary services in the public sector are referred to Camiling District Hospital, while clients from Bamban, Capas, and Concepcion are referred to Concepcion District Hospital. The rest of the population is referred to Tarlac Provincial Hospital and other secondary hospitals in Tarlac City.

There are five (5) government hospitals in the province with a total bed capacity of 355, the biggest of which is Tarlac Provincial Hospital, located some 500 meters south of the provincial capitol building. Tarlac Provincial Hospital has a total bed capacity of 200 and has the following services: general medicine, surgery, pediatrics, obstetrics-gynecology, and nurse training and education. Complementing the government hospitals are 14 private hospitals with a total bed capacity of 707 (PDPFP-Tarlac Province, 2009).

For Nueva Ecija province, there are five (5) government hospitals where the largest is the Dr. Paulino J. Garcia Memorial Research and Medical Center Provincial Hospital in Cabanatuan City with a total bed capcity of 450 beds. There is also a provincial hospital, the Eduardo L. Joson Memorial Hospital, with a capacity of 100 beds. The province has also 61 health centers ("RHUs") that are staffed with 162 personnel.

(iii) Religions and Worship Places

According to National Census of 2000, majority of the Filipino (80.9% of national population) are Roman Catholic. Others are as follows: Muslim 5%, Evangelical Christian 2.8%, Iglesia ni Cristo Christian 2.3%, Aglipayan Christian 2%, other Christian 4.5%, other religion 1.8%, unspecified 0.6%, and none (atheist) 0.1%.

According to interview survey to directly affected area in CLLEX, following numbers of believers for different kinds of religions were found: Roman Catholics are the majority at 82.1%. About 5.8% are members of Iglesia ni Kristo while Baptist and Born Again composed of 6.7% and 5.3% respectively.

There are ten major churches along sides of 10km-stretch of Pan-Philippine Highway, in the south and north of the proposed Cabanatuan Interchange Change: Valdefuente Catholic Church in Cabanatuan City, Evangelical Methodist Church, San Lorenzo Ruiz Parish Church, Baranggay Dinarayat Catholic Chapel, Kingdom Hall of Jehovah's Witnesses, La Torre Catholic Chapel, Wesleyan Methodist Church and 2 Iglesia ni Cristo Churches in Talavera, and San Miguel na Munti Chapel in Aliaga.

9.5.2.19 Safety of Working Conditions

In addition to the ECC and pertinent regulations enforced by the DENR-EMB, the contractor shall also comply with existing relevant laws and regulations on environmental management.

EXISTING RELEVANT LAWS AND REGULATIONS ON ENVIRONMENTAL MANAGEMENT FOR CONTRACTORS

P.D. 1151, P.D. 1152, P.D. 1586, R.A. 6969, R.A. 8749, R.A. 9003, R.A. 9275, E.O. 1035, P.D. 1818

Construction Contractor's Environmental Program (CCEP) shall be prepared, submitted, and executed by an awarded contractor of CLLEX project. At least the following elements must be stated in a CCEP report. In Section VIII of this CCEP proper environmental training is planed and provided to all construction workers so that work environment can be kept safe and sound by improving workers' skills, knowledge, and awareness. In Section XI, emergency responses are laid out and prompt and proper actions are to be taken in case of an emergency situation arises at and around a construction site.

TABLE 9.5.2-38 AN EXAMPLE OF CCEP'S TABLE OF CONTENT

I. PROJECT BACKGROUND
A. Introduction
B. Corporate Data
C. Project Location
D. Technical Description
II. OBJECTIVES
III. ENVIRONMENTAL RESPONSIBILITY
IV. LEGISLATIVE REQUIREMENTS
V. APPROVALS, LICENSES AND PERMITS
VI. ENVIRONMENTAL IMPACTS AND CORRECTIVE/PREVENTIVE CONTROL
A. Physical and Ecological Aspects
B. Socio-economic Aspects
VII. COMMUNICATION AND GRIEVANCE REDRESS
VIII. ENVIRONMENTAL TRAINING
IX. ENVIRONMENTAL PERFORMANCE MONITORING
X. REPORTING PROCEDURES
XI. EMERGENCY RESPONSE PROCEDURES
XII. REVIEW OF CCEP

9.5.3 Analysis of Alternatives

The following alternatives were studied.

1) Expressway Alignment

Three (3) alternatives were studied focusing on the most appropriate alignment selection at the flood-prone area;

Alternative-1: 2010 FS Alignment
Alternative-2: Passing at Downstream of Confluence Point
Alternative-3: Passing at Upper stream of Confluence Point

Evaluation of alternative alignments is shown in **Figure 9.5.3-1.** Alternative-2 was recommended due to the following;

- The most preferred alignment for traffic between Manila side and Cabanatuan City which is dominant traffic on CLLEX.
- The alignment passes through the area where there are banks on both sides of the river; therefore water course is controlled and stable. Flood water overflows the banks, thus enough bridge length needs to be provided.
- Number of affected houses is the least.
- Construction cost is least, although it is almost the same as Alternative-3.
- Alternative-1 passes through the confluent points of two rivers, not appropriate for the alignment to pass.
- From the view point of river crossing location, Alternative-3 is also appropriate, however, from the view points of traffic efficiency, Alternative-3 is not recommended.

An alternative alignment between Aliaga and Cabanatuan City, particularly where to end Phase I at Cabanatuan City was pre-screened. Possible alternative alignment is to end Phase I at south of Cabanatuan City, however this screened out due to the following reasons;

Pan Philippine Highway is terribly congested in Cabanatuan City. To reduce traffic congestion in Cabanatuan City, through traffic coming from the north of Cabanatuan City including from Region II should be captured before they enter into Cabanatuan City urban area. Thus, CLLEX Phase I should end at the northern trip of Cabanatuan City.

If CLLEX ends at the southern side of Cabanatuan City, it has to cross the big river of Pampanga River two times, and needs two long bridges, one(1) is about 600 m bridge in Phase I and another is about 1,000 m bridge in Phase II.

2) Interchange Alternatives

Aliaga: There are 3 Alternatives as shown **Figure 9.5.3-2** Considering the construction cost and accessibility, Alternative-2 is recommended, although 2 houses are need to relocate in case of Alternative-2.

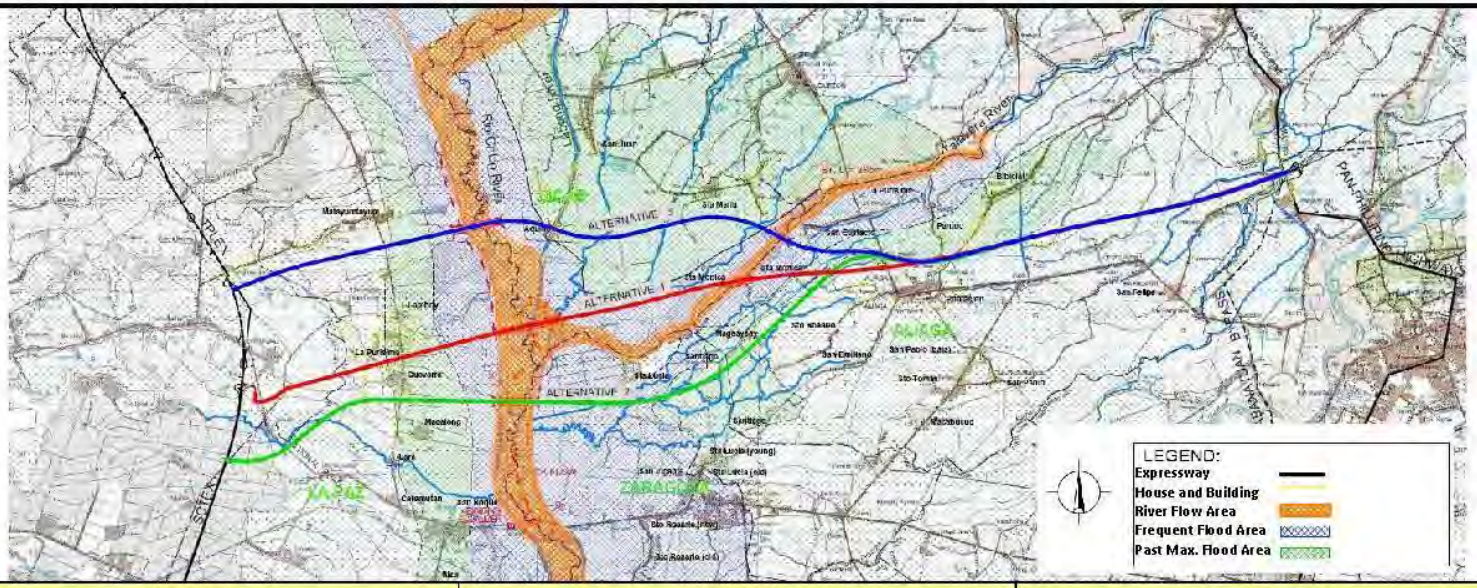
Alternative-2 is the cheapest, minimum land take of agri-land and good accessibility to Aliaga Trading Center and Bus Terminal. The owners of the affected two (2) houses are the same owners of the Aliaga Trading Center and the Bus Terminal. According to the Aliaga Municipality opinion, it is easy to negotiate with owners because the project will contribute to the Trading Center's business.

Aliaga IC area has no wetland and there is no difference among alternatives regarding to natural environment influence.

The municipal government of Aliaga also selected Alternative-2.

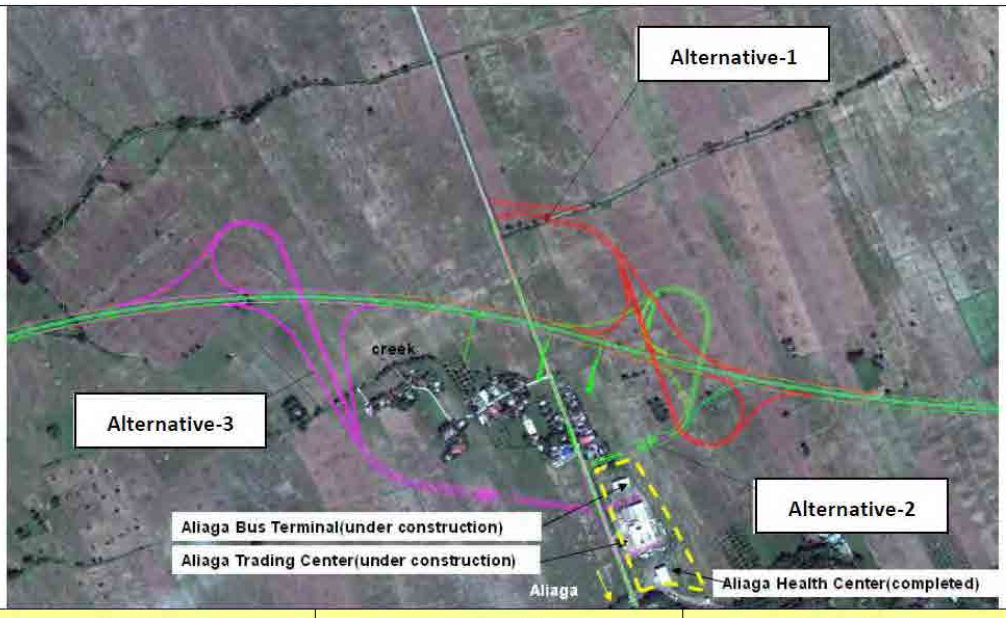
Cabanatuan: There are 2 Alternatives as shown **Figure 9.5.3-3**. Considering the Land acquisition, construction cost and accessibility, Alternative-2 is recommended.

The City Government of Cabanatuan also selected Alternative-2.

Plan							
	Alternative 1			Alternative 2		Alternative 3	
Concept	2010 FS Alignment (Passing at Confluence Point of 2 rivers)			Passing at Downstream of Confluence Point		Passing at Upper stream of Confluence Point of 2 rivers (crossing 2 rivers independently)	
Road length	28.23km (1.00)			30.31km (1.06) (+1.84km)		28.48km (1.01) (+0.25km)	
Bridge length over Rio Chico / Talavera Rivers	3,000m (2 Bridges)			1,500m (1 Bridge)		1,740m (2 Bridges)	
Equalizing zone for Flood Area (Section with Box Culverts)	6,584m			3,720m		2930m	
Length passing flood area: Max. Flood Area / Frequent Flood Area	Max. in the past:11,950m, Frequent: 9,580m			Max. in the past: 9,220m, Frequent: 5,220m		Max. in the past: 13,190m, Frequent: 4,670m	
Construction Cost + ROW Cost = Total (not including IC)	Const. Cost = 13.97 B, ROW = 0.48 B, Total = 14.45 B			Const. Cost = 11.21 B, ROW = 0.52 B, Total = 11.73 B		Const. Cost = 11.31 B, ROW = 0.49 B, Total = 11.80 B	
Number of Affected Houses/Structure	56			28		33	
Appropriateness of CLLEX Location at River / Flood Area Crossing	X	• CLLEX passes near confluence point of Rio Chico River and Talavera River, thus passes through the worst condition area. • Requires longest bridge length. • Passes through longest frequent flood area, thus requires longest equalizing zone.	△	• CLLEX crosses the downstream side of confluent point of Rio Chico River and Talavera River. • Although required bridge length is longer than Alternative-3, but shorter than Alternative-1. • Passes through shorter frequent flood area than Alternative-1, but longer than Alternative-3. • Located within the range of back flow from Rio Chico Bridge along Tarlac – Sta. Rosa Road.	○	• CLLEX crosses two rivers independently. • Required bridge length is shorter than Alternative-1, but longer than Alternative-2. • Passes through shortest frequent flood area, thus the best location from the viewpoint of river/flood area crossing.
Expressways Connectivity and Transport Efficiency	X	• SCTEx and CLLEx is not directly connected but made via intersection with national road thus continuity of an expressway is poor. • Connection from Cabanatuan to Manila is bad.	○	• SCTEx and CLLEx is directly connected. • Best transport efficiency.	X	• TPLEx and CLLEx is directly connected. • Manila-Cabanatuan connection is the longest in distance.
Social Environmental Impact	X	• Highest number of houses/structure affected. • Community is divided by CLLEX at La Paz.	○	• Least number of houses/structures affected.	△	• Second highest number of houses/structures affected.
Natural Environmental Impact	○	• Land take of agri-land smallest.	△	• Land take of agri-land highest.	○	• Land take of agri-land smallest.
Constructability	X	• Passes through the longest frequent flood area, thus construction work is seriously affected by floods. • Highest construction cost.	○	• Passes through the second longest frequent flood area. • Lowest construction cost.	○	• Passes through the shortest frequent flood area. • Lowest construction cost.
Rank	3		1	**Recommended.**	2	

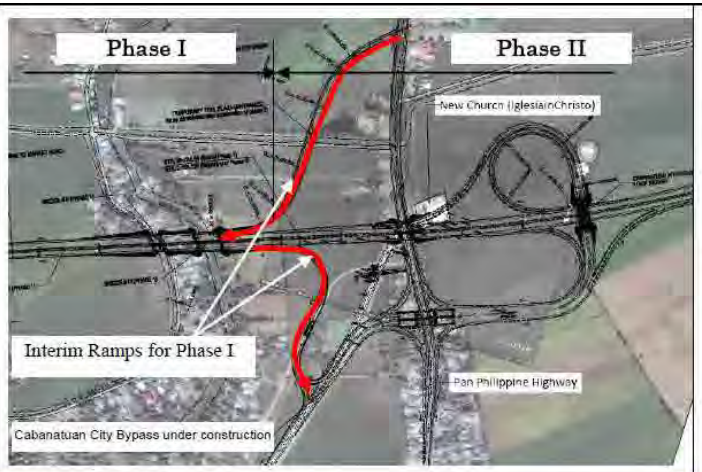
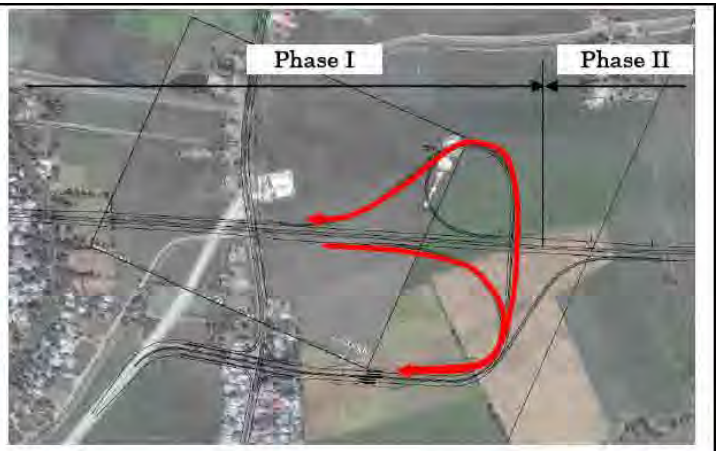
Source: JICA Study Team (2011)

FIGURE 9.5.3-1 MONITOR IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES EVALUATION OF ALTERNATIVE ALIGNMENT

Plan						
	Alternative 1		**Alternative 2**		**Alternative 3**	
Concept	Indirect connection with Aliaga Trading Center		Direct connection with Aliaga Trading Center		Direct connection with Aliaga Trading Center	
Ramp length	1.581m		1.204m		2.081m	
Relocation	0		2 houses		0	
Construction Cost	△	Middle	○	Least	X	Highest
Social Environment	○	No relocation	△	2 houses of relocation	○	No relocation
Natural Environment	△	Medium land take of Agri-land.	○	Smallest land take of Agri-land.	X	Largest land take of Agri-land.
Accessibility to Aliaga Trading Center and Bus Terminal	X	Poor	○	Good	○	Good
Cost in Million Pesos	△	Civil Work 176 ROW 19 Total 194	○	Civil Work 145 ROW 18 Total 163	X	Civil Work 217 ROW 25 Total 241
Rank	2		**1**	**Recommended**	3	

Source: JICA Study Team (2011)

FIGURE 9.5.3-2 ALIAGA INTERCHANGE ALTERNATIVES

Plan					
	Alternative 1			**Alternative 2**	
Concept	• Recommended by FS 2010 • To construct interim ramp for Phase I and to construct trumpet type of IC for Phase II • To demolish interim ramp when extension of Phase II is implemented.			• To construct trumpet type of IC with stage development. Two ramps (in red color) is constructed at the initial stage. Remaining two ramps (in black color) is constructed when Phase II is implemented.	
Road Length (Main)	+0m			+200m	
Ramp Length (Phase I)	820m			1,413m	
Relocation	Phase I: 3 houses, Phase II : 12 houses (including new church)			Phase I: 12 houses, Phase II: 0 house	
Social Environment	X	• Relocation of a new church is practically impossible. • Relocation of 3 houses along interim ramps during Phase 1 becomes useless (unnecessary relocation is required).		○	• Unnecessary relocation can be avoided.
Natural Environment	△	• Land acquired for the interim ramps during Phase I becomes useless during Phase II. (Unnecessary land take of agri-land.)		○	• Unnecessary ROW acquisition can be avoided.
Traffic flow of expressway and ordinal road	△	• Phase I: 2 at-grade intersection required. Traffic flow is disturbed at these intersections. • Phase II: 1 at-grade intersection required.		○	• Phase I and II: 1 at-grade intersection. Traffic is less disturbed than Alternative-I.
Phase I Construction Cost in Million Pesos	X	• Civil Work 116 • ROW 16 • Total 132	This investment will be wasted when Phase II is implemented	○	• Civil Work 148 • ROW 53 • Total 201
Rank	2			1	Recommended

Source: JICA Study Team (2011)

FIGURE 9.5.3-3 CABANATUAN I/C ALTERNATIVES

9.5.4 Prediction / Assessment and Mitigation of the Impacts

Impact to natural and social environment for directly affected area and its PAPs are predicted and magnitude of the impact is assessed based on the Study.

9.5.4.1 Pre-Construction and Construction Phase

Assessment results and mitigation measures are shown in **Table 9.5.4-1.**

TABLE 9.5.4-1 PRE-CONSTRUCTION AND CONSTRUCTION PHASE

	Item	Assessment	Mitigation
1	Involuntary Resettlement	A total of 64 structures (i.e. residential houses) with 67 households (or 337 people) will be affected. All of them except 1 household (5 people) are informal settlers. One household is tenant. A total of about 505 farm land lots (or 201 ha.) will be affected. About 95.6% are land owners, about 1.3% are tenants, About 3.1% are free occupants with permit of land owners. Number of people whose farm lands affected are estimated at about 2,133.	• To prepare Final RAP with full consensus with PAPS, and inventories of land and other assets. • To provide relocation sites for PAPs to be relocated. • To provide just (or fair) compensation, relocation sites, and other supports that are stated in LARRIPP/WB OP 4.12.
2	Local Economy such as Employment	(+) Demands for labor to the construction and related work are expected to be increased temporarily, which further stimulates local economy. (-) Shops and small businesses locating on CLLEX I/C construction sites will have to be relocated.	• To assure priority employment of PAPs during construction. Construction contract between DPWH and the selected contractor shall specify this condition. • To provide just (or fair) income loss compensation and rehabilitation assistance.
3	Land Use	About 201 ha of lands, almost all of which are palay (rice) field will be lost and change to CLLEX. These lots along the new road and around the interchanges might be converted to market places / shopping malls, or residential uses.	• Respective LGUs shall amend city/municipality Land Use Plan and Zoning Ordinance to control unorderly urban development along CLLEX and to restrict conversion of farm land to other land use purposes, and strictly enforce amended zoning ordinance.
	Utilization of Local Resources	Project site is located in abundant sand/gravel resources, construction of pavement and bridges/other structure can utilize these resources.	• Detailed design shall adopt construction methods which utilize available local resources. • Construction contract

	Item	Assessment	Mitigation
			between DPWH and the selected contractor shall specify maximum utilization of available local resources.
	Farm Land	About 201 ha of farmland will be lost by this project in exchange to the expressway. Negative impact to farmers is expected in a form of loss of lands. Division of farmlands by CLLEX might cause inconvenience to access their cultivating lands.	• To provide just (or fair) compensation, replacement of land when feasible and other supports such as disturbance compensation and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12. • Detailed design shall be undertaken focusing on maintaining of existing irrigation system and existing farm roads to assure accessibility to farm lands. • Detailed design shall be undertaken to provide accessibility between the lands divided by CLLEX by providing enough box-culverts.
4*	Social Institution, and Local Decision-making	No concern regarding Social Institution and Local Decision-making system were raised by PAPs.	• Although no concern was raised by PAPs, DPWH shall continue to dialogue with social institution and local decision-making bodies.
	Social Infrastructure	There are some universities and hospitals in Tarlac, Aliaga and Cabanatuan. During the construction, it might create difficulty in access to those social infrastructure due to the increasing in vehicles and congestion by construction.	• To construct temporary road within the road right-of-way for transporting construction materials, equipment and laborers. • To implement proper traffic management with close coordination with local police and barangay captains. • To provide proper information on construction schedule and traffic management plan.
5*	Poor	About 58.7% of affected households belong to the poor (or below Region III poverty threshold). (+) Demands for labor to the construction and related work are expected to be increased temporarily, which further	• Qualified skilled workers and laborers in the Direct Impact Areas (DIA) duly endorsed by the Brgy. Captains will be given priority in hiring during implementation of the project. • To include condition of

	Item	Assessment	Mitigation
		stimulates local economy. (-) Shops and small businesses locating on CLLEX I/C construction sites will have to be relocated.	priority employment of PAPs below poverty line into construction contractor's contract. • To provide just (or fair) compensation for income loss and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12.
8*	Local Conflict of Interests	Stakeholder of Zaragoza requested of installation of an I/C. La Paz also requested an I/C. However, Zaragoza and La Paz related traffic demand is still very low.	• To consider additional I/C when traffic demand justify additional I/Cs.
9*	Water Use, Water Rights	All project areas are provided with the irrigation system. Water right of irrigation water is held by National Irrigation Administration (NIA). Farmers pay water fee to NIA. Excess water due to loss of agricultural land will be returned to existing river system.	• To assure by Detailed Design that the existing irrigation system shall not be disturbed. Irrigation channels and their maintenance roads shall be provided with box culverts and when necessary, rechanneling of irrigation canal shall be designed. • Inventory of drainages and irrigation distribution means must be cataloged with lawful owners and practical users' name. In case of the area where CLLEX Project takes place, the water right for irrigation belongs to National Irrigation Administration (NIA). Just allocation of irrigation water to the farmers is NIA's responsibility.
10*	Sanitation	Sanitary condition around construction site is anticipated to become worse due to generation of wastes during the construction.	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be

	Item	Assessment	Mitigation
			undertaken by DPWH to ensure proper management of the solid and domestic wastes generated.
11*	Risk, HIV/AIDS, Infectious disease	Temporally increase in infectious and communicable diseases is possible during construction phase due to influx of construction workers. Poor sanitary environment can generate and spread communicable diseases such as diarrhea, common cold, and such.	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be undertaken by DPWH to ensure proper management of the solid and domestic wastes generated. • To provide Information, Education and Communication (IEC) on healthy behavior and Sexually Transmitted Disease (STD) to the construction workers.
12*	Accident	Accidents involving construction works, vehicles and machineries operation are anticipated. Traffic accidents may happen by construction vehicles and heavy machines during construction. Construction personnel, particularly operators of heavy equipment and machineries may experience respiratory ailments. Fall down from higher position such as piers and bridges may happen.	• To construct temporary construction road within road right-of-way, implement traffic management plan in coordination with local police and inform construction schedule, etc. to people within the project area to prevent traffic accidents. • To implement proper stock piling of materials, watering of soils and covering materials to prevent dusting. • To educate construction workers on various construction safety measures, and strictly implement such safety measures. • To provide adequate lighting and reflectors and construction warning signs at construction sites as well as

	Item	Assessment	Mitigation
			at traffic accident-prone sections of roads. • To provide temporary fences so as ordinary people not to enter in the construction sites.
13	Topography, Geographical Feature	Minor geographical changes are anticipated at CLLEX construction site, quarry, and disposal site of earth materials. Topographical changes by embankment cause flow and retention of surface water.	• To provide adequate drainage facility • To provide appropriate number of box culverts. • To follow protocols to use a quarry site and disposal site.
14	Soil Erosion	During the construction stage, erosion is likely to occur mainly by intense rain.	• To provide proper temporary drainage system to prevent water concentration at certain locations. • To provide temporary dike within the road right-of-way to prevent flow of eroded soils. • For high embankment construction section, to cover embankment by vinyl sheet during heavy rain for prevention of slope collapse.
15	Groundwater	Groundwater table at project site is between GL-0.5m and GL-4.3m deep. Groundwater level might temporarily be dropped during construction by cutting off of recharge source e.g. surface water flow.	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage.
16	Hydrology	CLLEX traverses the flood-prone area where the river bed gradient is very gentle (1/3,000). Due to insufficient river banks distance, sufficient river channel capacity is not provided, thus storm water overflows the banks. By construction of CLLEX, hydrological condition may be	• To design and construct sufficient length of bridges and also provide sufficient number of box-culverts in order not to change and worsen the current condition. • During construction, to undertake bridge substructure construction only during dry season and to avoid

	Item	Assessment	Mitigation
		affected if proper design is not made.	stockpiling of materials in a manner to disturb water flow.
17	Flora, Fauna and Biodiversity	Agricultural flora, mainly rice, and trees growing in CLLEX alignment are expected to be removed. Removal of such flora also causes impact slightly on local ecology and biodiversity negatively.	• To obtain "Permit To Cut" prior to tree cutting activities along the alignment. • To limit Tree cutting only within the required ROW. • Relocation of trees will be carefully undertaken. • Reforestation at areas designated by the DENR-FMB to replace cut tree species. Replacement ratio and species to be introduced will be determined by the DENR-FMB (Forest Management Bureau).
20*	Global Warming	It is estimated that total emission of CO_2 will be about 59,584 tons during construction phase.	• To use clean filters and mufflers of engines. • To minimize idling of engines. • To minimize traveling frequencies between construction sites and origin by making and executing efficient construction materials transportation schedule. • To prohibit old model equipment and vehicles. • To follow mitigation measures suggested for AIR POLLUTION. • To off-set this impact, plant enough trees along expressway and interchange sites.
21*	Air Pollution	Air quality was measured at 4 stations in dry season (2010 FS) and 7 stations in wet season (2011). Results shows that highest values of TSP, SO_2 and NO_2 are 299 (DENR Standard: 300), 30 (DENR Standard: 340) and 11 (DENR Standard: 260), respectively. Although SO_2 and NO_2 are far below DENR standard, TSP at one station in Cabanatuan City is close to DENR Standard.	• To spray exposed ground with water to minimize dust re-suspension. • To cover temporary stockpiles of excavated materials and construction spoils with tarpaulin or sack materials. • To transport and dispose construction spoils regularly to hauled areas duly-approved by the DENR/LGUs.

	Item	Assessment	Mitigation
		Air pollution will be expected due to emissions from construction vehicles and dust generated from construction activities during construction period. In dry and wet weather pollutants and particulates matters disperse to further distance and might affect sensitive area such as hospital and residential area	• To perform regular maintenance of construction vehicles, heavy equipment and machineries. • Follow mitigation measures suggested for GLOBAL WARMING. • Aggravation of air pollution will be minimized by adoption of above measures, considering that most of construction sites are located in the rice field areas.
22*	Water Pollution	Water quality was measured at 2 stations in dry season (2010 FS) and 7 stations in wet season (2011). In dry season, all of BOD, TSS and Total Coliforms exceeded DENR Standard. In wet season, BOD exceeds DENR Standard at one station, TSS at 4 stations and TC at 5 stations. It is important not to worsen water quality than at present.	• To adopt construction method minimizing generation of drainage water (e.g. river realignment plan for substructure construction). • To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and to prevent oil leakage. • Aggravation of water quality will be minimized by adoption of above measures.
23*	Soil Contamination	During the construction, excavated soil, surface water and oil from vehicles and machineries may pollute the ground.	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage.

	Item	Assessment	Mitigation
			• Aggravation of soil contamination will be minimized by adoption of above measures.
24*	Waste	Construction debris and excavated soil are generated during the construction. Human waste will be generated from workers during construction and operation.	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them at the disposal sites approved by respective LGUs and DPWH. • To select eco-friendly waste disposal methods. • To edificate and educate construction workers. • To conduct EIS on the disposal site if the site is to be newly developed for the project. • Effect of waste will be minimized by adoption of above measures.
25*	Noise and Vibration	Noise level was measured along the national roads at 3 stations in dry season (2010 FS) and 5 stations in wet season (2011). Noise level at all stations exceeded DENR Standard. It is important to adopt measures not to worsen noise level than at present. Noise and vibration occur from machineries and vehicles used during construction work, hence construction work and transporting of materials need to be carefully done.	• To bore piles using a special boring equipment will be adopted during foundation works instead of pile driving. • To use noise suppressors equipped machineries. • To work in day time or non-critical time to minimize noise disturbance to adjacent residential areas. • To install temporary noise barriers at noise sensitive areas such as residential, schools, and places of worships to maintain noise level at permissible limit. • To strictly prohibit overloading on trucks. • Aggravation of noise and vibration will be minimized by adoption of above measures, considering that most construction sites are located in the rice field area.
27*	Offensive Odor	Possible offensive odor might be generated from construction vehicles and portable toilets for workers during construction.	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them off in an LGU approved solid wastes

	Item	Assessment	Mitigation
			disposal site. • To install and manage portable toilets for construction workers properly. • To do good camp management.
29*	Traffic Congestion	During the construction, trucks transporting construction materials will cause traffic congestion.	• To implement traffic management plan in coordination with local police. • To transport materials during off-peak hours. • To prohibit parking of construction-related vehicles on the national/provincial roads. • To use temporary construction road built within the acquired road right-of-way as much as possible. • To educate truck drivers.
30*	Flood	CLLEX traverses the flood-prone area, and floods are frequently experienced at present. Construction work needs to be done in anticipation of flood.	• To construct bridges during dry season. • To construct box-culverts prior to the start of embankment work. • Aggravation of flood condition will be minimized by adoption of above measures.

Note: these concerned items with * symbols are not included in EIS (2010) but in JICA Guidelines for Environmental and Social Considerations (2010)

9.5.4.2 Operation and Management Phase

Results of assessment and mitigation measures are shown in **Table 9.5.4.2-1.**

TABLE 9.5.4-2 OPERATION AND MAINTENANCE PHASE

	Item	Assessment	Mitigation
2	Local Economy such as Employment	(+) CLLEX will connect the growth pole cities of Tarlac and Cabanatuan each other and these cities will be connected with Manila in shorter hours. CLLEX will stimulate social and economic activities of the project area and employment will be increased. It will be also an efficient alternative route to and from the food baskets of Region II. Operation and maintenance of CLLEX will be done by the selected concessionaire who will employ maintenance workers, road condition inspection staff and toll collection staff from local communities, hence new jobs will be created for about 30 years after construction of the project. (-)Young people who are currently doing farming may be reduced, as they may prefer to work other than farming at the center of municipalities or cities with better job opportunities. About 201 ha. of farm land is lost which is equivalent to about 0.05% loss of rice production of Tarlac and Nueva Ecija Provinces.	• To adopt high productivity farming methods and high yield seeds. • To educate and finance farmers so as for them to adopt above. • To include in the Toll Concession Agreement the priority employment of PAPs for O & M activities.
3	Land Use	(-) Agricultural lands will be converted to other purpose of land use, particularly at the area near the interchanges.	• LGUs should modify the land use plan and zoning ordinance to strictly control conversion of agricultural land to other purposes of land use. • LGUs should strictly implement modified zoning ordinance and building permits should only be issued to those which comply with zoning ordinance.
	Farm Land	Estimated monetary values of paray that would yield in the land acquired for CLLEX were estimated to be 14.75 million pesos per year. Some of PAPs who lose farm land might face financial difficulty if their losses of income sources are not properly compensated or alternative means of compensation have been provided.	• To adopt high productivity farming methods and high yield seeds. • To educate and finance farmers so as for them to adopt above • Properly compensation such as job training and prioritized job opportunity.

	Item	Assessment	Mitigation
6*	Misdistribution of Benefit and Damage	Misdistribution of benefit and damage by construction of roads will not occur.	• N/A
8*	Local Conflict of Interests	(-) Stimulating of commercial activities in Cabanatuan, Tarlac, and other municipalities by CLLEX might cause competitions among traditional local establishments and new influx of business from surrounding cities and regions..	• To develop economic development plan for each LGU considering existing business establishment and culture. • To equip local business establishment with skills to be competitive.
9*	Water Usage and Water Rights	Existing irrigation channels are designed and constructed to maintain existing system. Possible impact is clogging of box culverts and pipe culverts due to overflow of trees and other materials.	• Inspect box culverts and pipe culverts particularly before and during wet season and remove clogged materials.
11*	Risk, HIV/AIDS, Infectious disease	HIV/AIDS' prevailing rate is exponentially increasing in the Philippines, five (5) new cases in December 2010 to about 46,000 cases by 2015 (DOH prediction) while truck drivers are known to spread HIV (UNAID study in Africa).	• To provide IEC to truck drivers and general population through other HIV/AIDS campaign provided by AIDS Council
12*	Accident	CLLEX will be built as 4-lane divided facility with center median and international geometric design standard is adopted. Traffic on CLLEX will not be so heavy; therefore, occurrence of accidents will be unlikely due to quality of the facility. Accident may occur only when a driver does not follow traffic rules and regulations. Traffic on existing roads will be decreased, thus accidents will be expected to reduce.	• Educate drivers to follow traffic rules and regulations. • Install traffic signboards at appropriate places. • Regularly repair roads and bridges to ensure good condition for vehicle movement.
17	Flora, Fauna	Quite many number of box culverts for farm roads, irrigation channels and equalizers are provided. Restriction of fauna movement and increase in road kills will not occur.	• N/A
19*	Landscape	Adverse impact on landscape is not expected.	• N/A
20*	Global Warming	Amount of GHG e.g. CO_2 is expected to increase as number of vehicles travel through CLLEX increases. But CO_2 is estimated to decrease 16,810 tons, 21,073 tons and 34,654 tons in 2017, 2020 and 2030, respectively compared with the without Project case. *CO2 estimation(With CLLEX and Without) unit; ton/year*	• To use clean filters and mufflers of engines • To minimize idling of engines • To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape

<table>
<tr><th></th><th>Item</th><th>Assessment</th><th>Mitigation</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Year</th><th>W/O case</th><th>With case</th><th>W-W/O</th></tr>
<tr><td>2017</td><td>3,170,355</td><td>3,153,545</td><td>-16,810</td></tr>
<tr><td>2020</td><td>3,572,855</td><td>3,551,782</td><td>-21,073</td></tr>
<tr><td>2030</td><td>4,479,900</td><td>4,425,245</td><td>-34,654</td></tr>
</table>
</td><td>

To prohibit old model vehicles
To strengthen vehicle emission regulation

</td></tr>
<tr><td>21*</td><td>Air Pollution</td><td>
Predicted air qualities such as NOX, $SO^2$and PM-10 are less than 1μg/Ncm with CLLEX. During all parameters are below DENR Standards.
Maximum Predicted Air Quality along CLLEX(Cabanatuan)
<table>
<tr><th>Year</th><th>NOX (μg/Ncm)</th><th>SO^2 (μg/Ncm)</th><th>PM-10 (μg/Ncm)</th></tr>
<tr><td>2020</td><td>0.297</td><td>0.0003</td><td>0.005</td></tr>
<tr><td>2030</td><td>0.503</td><td>0.0005</td><td>0.009</td></tr>
<tr><td>DENR Standard (Time average 24hr)</td><td>150</td><td>180</td><td>150</td></tr>
</table>
</td><td>

To use clean filters and mufflers of engines
To minimize idling of engines
To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape
To prohibit old model vehicles
To strengthen vehicle emission regulation

</td></tr>
<tr><td>22*</td><td>Water Pollution</td><td>Litters on road surface and eroded soils from embankment slope may cause water pollution, however, minimal impact.</td><td>Implement proper road maintenance.</td></tr>
<tr><td>23*</td><td>Soil Contamination</td><td>Soil contamination is not expected.</td><td>N/A</td></tr>
<tr><td>25*</td><td>Noise and Vibration</td><td>Predicted noise level at church and school (15points) along CLLEX are from 59.4 to 70.9 dBA during day time period and from 55.9 to 67.4 dBA for night time period on year 2020.Since the noise level standard of DENR during the day time and night time are 50 dBA and 40 dB respectively, noise level of all point excess the standard.
For residential area (19 points), predicted noise level on year 2020 are from 57.8 to 75.2 dBA during day time period and from 54.3 to 71.6 dBA during night time period. Since the noise level standard of DENR during the day time and night time are 65 dBA and 55 dB respectively, 6 points exceed noise standard during day time and 16 points exceed noise standard during night time.
It is necessary to reduce noise levels and make them acceptable based on the DENR regulation and/or at least the present average noise level of the area.</td><td>Noise barriers can achieve 10dBA noise level reduction according to noise model prediction.
Noise barriers will be constructed at the sensitive areas along CLLEX before operation.</td></tr>
<tr><td>28*</td><td>Bottom Sediment</td><td>Impact on bottom sediments is not expected.</td><td>N/A</td></tr>
</table>

	Item	Assessment	Mitigation
30*	Flood	Bridges of enough length to discharge flood water, equalizers, box culverts for farm roads and irrigation channels will be constructed, therefore, flood condition will not be worsen after the construction of CLLEX. Clogging of box-culverts and pipe-culverts will affect flood condition negatively.	• Strict implementation of maintenance work is specified in the Toll Concession Agreement.

Note: these concerned items with * symbols are not included in EIS (2010) but in JICA Guidelines for Environmental and Social Considerations (2010)

9.5.5 Environmental Management and Monitoring Plan

9.5.5.1 Environmental Management and Monitoring Plan

Environmental Management and Monitoring Plan for Pre-construction and Construction Stage and Operation/Maintenance Stage are shown in **Table 9.5.5-1** and **Table 9.5.5-2**, respectively.

The DENR ambient air quality guideline for critical pollutants, for noise in general area and for water quality are shown in **Table 9.5.5-3, Table 9.5.5-4,** and **Table 9.5.5-5,** respectively.

TABLE 9.5.5-1 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

PRE-CONSTRUCTION AND CONSTRUCTION STAGE

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
1	Involuntary Resettlement	• To prepare Final RAP with full consensus with PAPS, and inventories of land and other assets.	• Inventory of land and asset • Valuation of land and assets by replacement cost.	• PMO-PJHL with the Detailed Design (D/D) Consultant	• Parcellary Survey Cost: Php 5.05 Million • Final RAP preparation: Php 7.05 Million • Independent Assesor: Php 3.00 Million
		• To provide relocation sites for PAPs to be relocated.	• Relocation sites are provided and at PAPs' satisfaction.	• PMO-PJHL with the Detailed Design (D/D) Consultant	• Relocation site development: Php 25.00 Million
		• To provide just (or fair) compensation, relocation sites, and other supports that are stated in LARRIPP/WB OP 4.12.	• Valuation is made at the replacement cost and fair compensation is offered to PAPs.	• PMO-PJHL, Region III, DEO, MRIC/CRIC	• Estimated at Php 294.35 Million
2	Local Economy such as Employment	• To assure priority employment of PAPs during construction. Construction contract between DPWH and the selected contractor shall specify this condition.	• Contract specified this condition.	• PMO-PJHL, Detailed Design Consultant	–
			• They are employed during construction.	• PMO-PJHL, Construction Supervision (C/S) Consultant	–
		• To provide just (or fair) income loss compensation and rehabilitation assistance.	• PAPs are provided such compensation and assistance.	• PMO-PJHL, Region III, DEO, MRIC/CRIS, C/S Consultant	• Income loss : Php 2.37 Million • Rehabilitation : Php 2.57 Million
3	Land Use	• Respective LGUs shall amend city/municipality Land Use Plan and Zoning Ordinance to control unorderly urban development along	• Zoning ordinance is amended and implemented.	• PMO-PJHL, Region III through Regional Development	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		CLLEX and to restrict conversion of farm land to other land use purposes, and strictly enforce amended zoning ordinance.		Council	
	Utilization of Local Resources	• Detailed design shall adopt construction methods which utilize available local resources.	• Local resources are incorporated in design.	• PMO-PJHL, D/D Consultant	• Embankment material and sand/gravel : Php 3,500 Million
			• Local resources are used.	• Contractor, PMO-PJHL, C/S Consultant	–
		• Construction contract between DPWH and the selected contractor shall specify maximum utilization of available local resources.	• Utilization of local resources are specified in the contract.	• PMO-PJHL, D/D Consultant	–
			• Local resources are used.	• Contractor, PMO-PJHL, C/S Consultant	–
	Farm Land	• To provide just (or fair) compensation, replacement of land when feasible and other supports such as disturbance compensation and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12.	• Fair valuation is made, fair compensation is estimated and paid.	• PMO-PJHL, Region III, DEO, MRIC/CRIC	• Included in the estimated cost of Php 294.35 Million above.
		• Detailed design shall be undertaken focusing on maintaining of existing irrigation system and existing farm roads to assure accessibility to farm lands. • Detailed design shall be undertaken to provide accessibility between the lands divided by CLLEX by providing enough box-culverts.	• Detailed Design is made in accordance with this concept.	• PMO-PJHL, D/D Consultant	• Box culverts for irrigation canal and farm road : Php 637 Million
			• Designed features are constructed and functioning efficiently as design concept.	• PMO-PJHL, C/S Consultant	–
4*	Social Institution, and Local	• Although no concern was raised by PAPs, DPWH shall continue to	• Any concerns are raised.	• PMO-PJHL, C/S Consultant	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
	Decision-making	dialogue with social institution and local decision-making bodies.			
	Social Infrastructure	• To construct temporary road within the road right-of-way for transporting construction materials, equipment and laborers. • To implement proper traffic management with close coordination with local police and barangay captains. • To provide proper information on construction schedule and traffic management plan.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Traffic management plan : Php 2.8 Million
			• These are implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
5*	Poor	• Qualified skilled workers and laborers in the Direct Impact Areas (DIA) duly endorsed by the Brgy. Captains will be given priority in hiring during implementation of the project. • To include condition of priority employment of PAPs below poverty line into construction contractor's contract.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Unskilled labor cost: Php 476.74 Million
			• These are implemented by the Contractor.	• PMO-PJHL, C/S Consultant, Contractor	–
		• To provide just (or fair) compensation for income loss and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12.	• Fair compensation and rehabilitation assistance are made.	• PMO-PJHL, Region III, DEO, MRIC/CRIC	• Included in the estimated cost of Php 294.35 Million
8*	Local Conflict of Interests	• To consider additional I/C when traffic demand justify additional I/Cs.	• Observe traffic increase.	• PMO-PJHL	–
9*	Water Use, Water Rights	• To assure by Detailed Design that the existing irrigation system shall not be disturbed. Irrigation channels and their maintenance roads shall be	• Detailed Design incorporated this requirement.	• PMO-PJHL, D/D Consultant	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		provided with box culverts and when necessary, rechanneling of irrigation canal shall be designed. • Inventory of drainages and irrigation distribution means must be cataloged with lawful owners and practical users' name. In case of the area where CLLEX Project takes place, the water right for irrigation belongs to National Irrigation Administration (NIA). Just allocation of irrigation water to the farmers is NIA's responsibility.	• Designed features are constructed and functioning efficiently	• PMO-PJHL, C/S Consultant, Contractor	–
10*	Sanitation	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be undertaken by DPWH to ensure proper management of the solid and domestic wastes generated.	• These requirements are specified in the contract.	• PMO-PJHL, D/D Consultant	• Sanitation facility cost : Php 1.4 Million • Unsuitable material disposal : Php 59.81 Million
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
11*	Risk, HIV/AIDS, Infectious disease	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at	• These requirements are specified in the contract.	• PMO-PJHL, D/D Consultant	• HIV/AIDS counter measures : Php 1.4 Million

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be undertaken by DPWH to ensure proper management of the solid and domestic wastes generated. • To provide Information, Education and Communication (IEC) on healthy behavior and Sexually Transmitted Disease (STD) to the construction workers.	• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
12*	Accident	• To construct temporary construction road within road right-of-way, implement traffic management plan in coordination with local police and inform construction schedule, etc. to people within the project area to prevent traffic accidents. • To implement proper stock piling of materials, watering of soils and covering materials to prevent dusting. • To educate construction workers on various construction safety measures, and strictly implement such safety measures. • To provide adequate lighting and reflectors and construction warning signs at construction sites as well as at traffic accident-prone sections of	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Safety measures cost : Php 2.8 Million
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		roads. • To provide temporary fences so as ordinary people not to enter in the construction sites.			
13	Topography, Geographical Feature	• To provide adequate drainage facility • To provide appropriate number of box culverts. • To follow protocols to use a quarry site and disposal site.	• These are incorporated in the detailed design and specified in the contract.	• PMO-PJHL, D/D Consultant	• Drainage facility and slope protection cost : Php 982 Million
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
14	Soil Erosion	• To provide proper temporary drainage system to prevent water concentration at certain locations. • To provide temporary dike within the road right-of-way to prevent flow of eroded soils. • For high embankment construction section, to cover embankment by vinyl sheet during heavy rain for prevention of slope collapse.	• These are incorporated in the contract.	• PMO-PJHL, D/D Consultant	• Same as 13 above.
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
15	Groundwater	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Same as 10 above.
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
16	Hydrology	• To design and construct sufficient length of bridges and also provide sufficient number of box-culverts in order not to change and worsen the current condition. • During construction, to undertake bridge substructure construction only during dry season and to avoid stockpiling of materials in a manner to disturb water flow.	• These are incorporated in the detailed design.	• PMO-PJHL, D/D Consultant	• Bridge and box-culvert cost : Php 3,170 Million
			• Check work schedule of the Contractor	• PMO-PJHL, C/S Consultant	–
17	Flora, Fauna and Biodiversity	• To obtain "Permit To Cut" prior to tree cutting activities along the alignment. • To limit Tree cutting only within the required ROW. • Relocation of trees will be carefully undertaken. • Reforestation at areas designated by the DENR-FMB to replace cut tree species. Replacement ratio and species to be introduced will be determined by the DENR-FMB (Forest Management Bureau).	• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	• Bridge and box-culvert cost : Php 3,170 Million
20*	Global Warming	• To use clean filters and mufflers of engines. • To minimize idling of engines. • To minimize traveling frequencies between construction sites and origin by making and executing efficient construction materials transportation schedule. • To prohibit old model equipment and vehicles.	• These requirements are specified in the contract.	• PMO-PJHL, D/D Consultant	• Tree planting cost : Php 1.0 Million
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		• To follow mitigation measures suggested for AIR POLLUTION. • To off-set this impact, plant enough trees along expressway and interchange sites.			
21*	Air Pollution	• To spray exposed ground with water to minimize dust re-suspension. • To cover temporary stockpiles of excavated materials and construction spoils with tarpaulin or sack materials. • To transport and dispose construction spoils regularly to hauled areas duly-approved by the DENR/LGUs. • To perform regular maintenance of construction vehicles, heavy equipment and machineries. • Follow mitigation measures suggested for GLOBAL WARMING. • Aggravation of air pollution will be minimized by adoption of above measures, considering that most of construction sites are located in the rice field areas.	• Measure air quality quarterly.	• C/S Consultant	• Dust control cost : Php 10.00 Million
			• These are specified in the contract.	• PMO-PJHL, D/D Consultant	–
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
22*	Water Pollution	• To adopt construction method minimizing generation of drainage water (e.g. river realignment plan for substructure construction). • To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Same as 10 above.
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		for construction workers properly. • To maintain machineries and generators and to prevent oil leakage. • Aggravation of water quality will be minimized by adoption of above measures.			
23*	Soil Contamination	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage. • Aggravation of soil contamination will be minimized by adoption of above measures.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Same as 10 above.
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
24*	Waste	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them at the disposal sites approved by respective LGUs and DPWH. • To select eco-friendly waste disposal methods. • To edificate and educate construction workers. • To conduct EIS on the disposal site if the site is to be newly developed for the project. • Effect of waste will be minimized by adoption of above measures.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Same as 10 above.
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
25*	Noise and Vibration	• To bore piles using a special boring equipment will be adopted during foundation works instead of pile driving. • To use noise suppressors equipped machineries. • To work in day time or non-critical time to minimize noise disturbance to adjacent residential areas. • To install temporary noise barriers at noise sensitive areas such as residential, schools, and places of worships to maintain noise level at permissible limit. • To strictly prohibit overloading on trucks. • Aggravation of noise and vibration will be minimized by adoption of above measures, considering that most construction sites are located in the rice field area.	• Measure noise quarterly.	• C/S Consultant	• Noise barrier installation cost: Php 50.00 Million
			• These are specified in the contract.	• PMO-PJHL, D/D Consultant	–
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
27*	Offensive Odor	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them off in an LGU approved solid wastes disposal site. • To install and manage portable toilets for construction workers properly. • To do good camp management.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	–
			• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
29*	Traffic Congestion	• To implement traffic management plan in coordination with local police. • To transport materials during off-peak	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Same as 4 above.

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		hours. • To prohibit parking of construction-related vehicles on the national/provincial roads. • To use temporary construction road built within the acquired road right-of-way as much as possible. • To educate truck drivers.	• These are properly implemented.	• PMO-PJHL, C/S Consultant, Contractor	–
30*	Flood	• To construct bridges during dry season. • To construct box-culverts prior to the start of embankment work. • Aggravation of flood condition will be minimized by adoption of above measures.	• These are specified in the contract.	• PMO-PJHL, D/D Consultant	• Bridge and box culvert construction cost : Php 3,170 Million
			• Check Contractor's work schedule.	• PMO-PJHL, C/S Consultant, Contractor	–

Source: JICA Study Team (2011)

TABLE 9.5.5-2 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

OPERATION AND MAINTENANCE STAGE

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
2	Local Economy such as Employment	• To adopt high productivity farming methods and high yield seeds. • To educate and finance farmers so as for them to adopt above.	• Check rice production of provinces of Tarlac and Nueva Ecija.	• PMO-BOT	• Cost of education : Php 0.50 Million
		• To include in the Toll Concession Agreement the priority employment of PAPs for O & M activities.	• This is specified in the toll concession agreement, and number of PAPs employed.	• PMO-BOT, Concessionaire	• Cost of O & M Staff : Php 55.1 Million per year
3	Land Use	• LGUs should modify the land use plan and zoning ordinance to strictly control conversion of agricultural land to other purposes of land use.	• Zoning ordinance is modified.	• PMO-PJHL, PMO-BOT, DPWH Region III	–
		• LGUs should strictly implement modified zoning ordinance and building permits should only be issued to those which comply with zoning ordinance.	• Zoning ordinance is strictly implemented.	• DEO, Region III	–
	Farm Land	• To adopt high productivity farming methods and high yield seeds. • To educate and finance farmers so as for them to adopt above	• Check rice production of provinces of Tarlac and Nueva Ecija.	• PMO-BOT	–
		• Proper compensation such as job training and prioritized job opportunity.	• Number of PAPs who received training. • Number of jobs provided to PAPs	• PMO-BOT, Concessionaire	• Cost of O & M Staff : 55.1 Million per year
8*	Local Conflict of Interests	• To develop economic development plan for each LGU considering existing business establishment and culture. • To equip local business	• GRDP of Region III. • Interview LGUs regarding business environment.	• PMO-BOT, concerned LGUs	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		establishment with skills to be competitive.			
9*	Water Usage and Water Rights	• Inspect box culverts and pipe culverts particularly before and during wet season and remove clogged materials.	• Maintenance Report from the Concessionaire.	• PMO-BOT, Concessionaire	• Routine maintenance cost : Php 16.8 Million per year
11 *	Risk, HIV/AIDS, Infectious disease	• To provide IEC to truck drivers and general population through other HIV/AIDS campaign provided by AIDS Council	• Check report of AIDS Council	• PMO-BOT	• HIV/AIDS campaign : Php 0.12 Million per year
12 *	Accident	• Educate drivers to follow traffic rules and regulations. • Install traffic signboards at appropriate places. • Regularly repair roads and bridges to ensure good condition for vehicle movement.	• Check report of Concessionaire.	• PMO-BOT, Concessionaire	–
20 *	Global Warming	• To use clean filters and mufflers of engines • To minimize idling of engines • To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape • To prohibit old model vehicles • To strengthen vehicle emission regulation	• Check report of Concessionaire on traffic volume and travel speed.	• PMO-BOT, Concessionaire	–
21 *	Air Pollution	• To use clean filters and mufflers of engines • To minimize idling of engines • To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape • To prohibit old model vehicles	• Measure air quality quarterly.	• PMO-BOT, Concessionaire	–

	Item	Mitigation Measures	Mitigation Measures Monitoring Item	Responsible Monitoring Agency	Cost for Mitigation Measures
		• To strengthen vehicle emission regulation			
22 *	Water Pollution	• Implement proper road maintenance.	• Check maintenance report of the Concessionaire.	• PMO-BOT, Concessionaire	–
25 *	Noise and Vibration	• Noise barriers can achieve 10dBA noise level reduction according to noise model prediction. • Noise barriers will be constructed at the sensitive areas along CLLEX before operation.	• Measure noise quarterly.	• PMO-BOT, Concessionaire	–
30 *	Flood	• Strict implementation of maintenance work is specified in the Toll Concession Agreement.	• Check maintenance report of the Concessionaire.	• PMO-BOT, Concessionaire	–

Source: JICA Study Team (2011)

TABLE 9.5.5-3 DENR NATIONAL AMBIENT AIR QUALITY GUIDELINE FOR CRITERIA POLLUTANTS

Pollutant	Short Term (a)			Long Term (b)		
	µg/Ncm	ppm	Ave. Time	µg/Ncm	ppm	Ave. Time
Suspended Particulate Matter (e) - TSP PM -10	 230 (f) 150 (g)		 24 hours 24 hours	 90 60	 -- --	 1 year (c) 1 year (c)
Sulfur Dioxide (SO_2) (e)	180	0.07	24 hours	80	0.03	1 year
Nitrogen Dioxide (NO_2)	150	0.08	24 hours	--	--	--
Photochemical Oxidants As Ozone	140 60	0.07 0.03	1 hour 8 hours	-- --	-- --	-- --
Carbon Monoxide (CO)	35 mg/Ncm 10 mg/Ncm	30 9	1 hour 8 hours	-- --	-- --	-- --
Lead (d)	1.5	--	3 mo. (d)	1.0	--	1 year

(a) Maximum limits represented by (98%) values not to be exceeded more than once a year.

(b) Arithmetic Mean

(c) Annual Geometric Mean

(d) Evaluation of this guideline is carried out for 24- hours averaging time and averaged over three moving calendar months.

(e) SO_2 and Suspended Particulates are sampled once every 6-days when using the manual method

(f) with mass median diameter less than 25-50 µm.

(g) with mass median less than 10 µm.

TABLE 9.5.5-4 DENR STANDARDS FOR NOISE IN GENERAL AREAS (DBA)

TIME	CLASS				
	AA	A	B	C	D
Daytime (0700Hr-700Hr)	50	60	65	70	75
Evening (1700Hr-100Hr)	45	50	60	65	70
Nighttime (2100Hr-500Hr)	40	45	55	60	60
Morning (0500Hr-700Hr)	45	50	60	65	70

Class AA – a section of contiguous area which requires quietness, such as areas within 100 meters from school sites, nursery schools, hospitals and special homes for the aged.

Class A – a section or contiguous area which is primarily used for residential purposes.

Class B – a section or contiguous area which is primarily a commercial area.

Class C – a section primarily zoned or used as light industrial area.

Class D – a section which is primarily reserved, zoned or used as a heavy industrial area.

TABLE 9.5.5-5 WATER QUALITY CRITERIA FOR CONVENTIONAL AND OTHER POLLUTANTS CONTRIBUTING TO AESTHETIC AND OXYGEN DEMAND FOR FRESH WATERS

Fresh Surface Water Parameter	Unit	Class C	Class D
		Fishery, Recreational(Boating), Industrial use (after treated)	For agriculture, irrigation, livestock, industrial use, other inland water
Temperature	°C	3°C maximum rise	3°C maximum rise
pH	-	6.5 - 8.5	6.0 - 9.0
Dissolved Oxygen (DO)	mg/L	minimum 5.0 mg/L	3.0 (at 40% saturation)
Biochemical Oxygen Demand (BOD5)	mg/L	< 10.0 mg/L	10 (15)
Total Coliform	MPN/ 100ml	5,000	N/A
Total Suspended Solids (TSS)	mg/L	Not more than 30mg/L increase	Not more than 60mg/L increase
Total Dissolved Solids (TDS)	mg/L	N/A	1000 (or natural back ground value if greater than 1000)
SAR		N/A	8-18

N/A: No standards stipulated in DAO No. 34 Series of 1990

Monitoring form for JICA for this project is shown in **Table 9.5.5-6.**

TABLE 9.5.5-6 MONITORING FORM OF JICA

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results During Report Period
Number of Responses/Actions to Comments and Guidance from Government Authorities (DENR, NIA, LGUs, DA, DOLE, DSWD)	- Quarterly during construction - Twice a year during operation for two years

2. Mitigation Measures

- Air Quality (Emission Gas/Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
SO_2	µg/Ncm	19.4	30	340	-	- Same points as baseline survey - Quarterly during construction - Twice a year during operation - Air sampler & high volume sampler
NO_2	µg/Ncm	7	11	260	200 (IFC)	
CO	mg/Ncm	*	*			
Dust (TSP)	Mg/Ncm	156	299	300	-	

* Note: Data will be provided during construction phase of the project.

- **Water Quality (Effluent/Wastewater/Ambient Water Quality)**

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH	-	7.7	8.2	6.5 – 8.5		- Upstream and downstream portions of affected water bodies - Monthly during construction - Twice a year during operation - Grab sampling
TSS (Suspended Solid)	Mg/L	91	177	15 – 50		
BOD	Mg/L	5	8	5 – 7		
DO	Mg/L	5.3	8.1	3.0 – 5.0		
Temperature	°C	30	31	-		

- **Waste**

Monitoring Item	Monitoring Results During Report Period
Solid Wastes (ton/day)	- Monthly during construction - Twice a year during operation for two (2) years
Sanitary Waste (ton/day)	
Unsuitable Soil (cubic meter/day)	
Spill-out oil from equipment (liter/month)	
Hazardous Wastes (liquid: liter/month)	
Hazardous Wastes (solid: kg/month)	

- **Noise/Vibration**

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dBA	59.5	70.9	40-50 (hospital) 45-55 (residential) 55-65 (commercial) 60-70 (L industrial) 65-75 (H industrial)	45-55 (hospital) 45-55 (residential) 70 (commercial) 70 (industrial)	- Same points as baseline survey - Quarterly during construction - Twice a year during operation - Digital sound level meter

3. Natural Environmental

- **Ecosystem**

Monitoring Item	Monitoring Results During Report Period
Number of trees cut	- Monthly during construction
Number of trees planted	- Monthly during construction - Twice a year during operation for two (2) years

4. Social Environment

- For the IMA

Monitoring Item	Monitoring Results During Report Period
1. Budget and Timeframe – Schedule for the mobilization of appointed land acquisition and resettlement staff – Schedule for the capacity building and training activities – Achievement of resettlement implementation activities against the agreed implementation plan – Disbursement of funds in accordance to RPAP – Schedule of social preparation phase – Schedule for the occupation of acquired land for project implementation 2. Delivery of Compensation – AF entitlements as provided in the entitlement matrix, such as payments on structure and lands. – Number of PAF to donate to the Government – Number of PAFs with land title under C.A. 141, Sec. 112. – Land holdings with quit claims & easements. – PAFs preference of payment compensation on land and expropriation. – Number of PAF receiving relocation & actual occupations. – Implementation of income and livelihood restoration activities. 3. Public Participation – Schedules of Consultations & community activities. – PAFs awareness on their entitlements. – Issues in grievance mechanism and resolution of conflicts. 4. Benefits – Changes incurred in the patterns of occupation, production and resources compared to pre-project situation. – Changes in income and expenditures patterns compared to pre-project situation. – Changes in key social and cultural parameters relating to living standards. – Changes encountered by the vulnerable groups.	- Monthly during RAP Implementation - Quarterly during construction - Twice a year during operation for two (2) years

- **For the EMA**

Monitoring Item	Monitoring Results During Report Period
1. Restoration of Living Standards – Compensation Payments on house free of depreciation, fees or transfer cost – Restoration on Community Perceptions. – Achievement of PAFs on the replacement of key social cultural elements. 2. Restoration of Livelihoods – Sufficiency of payment compensation to replace lost assets. – Assistance to re-establish the affected enterprises. – Effectiveness and sustainability of the provided income earning opportunities for the vulnerable groups. – Restoration of pre-project income levels and living standards through the jobs provided by the project. 3. Levels of PAP Satisfaction – Awareness of Affected Families on the resettlement procedures and their entitlements , including its realization. – Assessment of PAFs on the restoration of their living standards and livelihood. – PAFs awareness on the grievance mechanism, including the procedures in the resolution of conflicts and their satisfactions. 4. Effectiveness of Resettlement Planning – Proper identification of PAFs affected assets. – Sufficiency of budget and adequacy of timelines to properly meet objectives. – Generousity of entitlement packages. – Identification and assistance to the vulnerable groups. – Actions of resettlement implementers on the unforeseen problems. 5. Social and Environmental Impact – Unintended environmental impacts. – Unintended impacts on employment or incomes.	- Monthly during RAP implementation - Quarterly during construction - Twice a year during operation for two (2) years

9.5.5.2 Monitoring Frequency and Monitoring Report

RAP Implementation Stage

- Detailed Design (D/D) Consultant shall hire RAP Implementation Specialists and undertake daily monitoring.
- D/D Consultant shall prepare a monthly monitoring report and submit to PMO-PJHL, DPWH Region III, ESSO, and PMO-IROW.
- PMO-PJHL prepares quarterly monitoring report and submit to JICA.

Construction Stage

- PMO-PJHL shall organize an Environmental Unit.
- The Contractor shall organize Environmental Unit and undertake daily monitoring.
- The contractor shall prepare a monthly monitoring report and submit to the Construction Supervision (C/S) Consultant, PMO-PJHL, DPWH Region III, and ESSO.

- C/S Consultant shall hire Environmental Monitoring Specialists and undertake daily monitoring.
- C/S Consultant shall prepare a monthly monitoring report and submit to PMO-PJHL, DPWH Region III, and ESSO.
- PMO-PJHL prepares quarterly monitoring report and submits to JICA.

Operation and Maintenance Stage

- The Concessionaire shall organize Environmental Unit and undertake daily monitoring.
- The Concessionaire shall measure noise and air quality semi-annually and submit it to PMO-BOT.
- The Concessionaire shall prepare semi-annual monitoring report and submit it to PMO-BOT and ESSO.
- PMO-BOT prepares semi-annual monitoring report and submit to JICA for the first 2 years of O/M Stage.

9.5.6 Institutional Arrangement and Budget

9.5.6.1 Institutional Arrangement

Environmental management and monitoring organization is shown in **Figure 9.5.6-1** which shows concerned agencies by implementation stage and their functions.

PMO-PJHL, PMO-BOT, the Contractor and the Concessionaire are required to organize an "Environmental Unit".

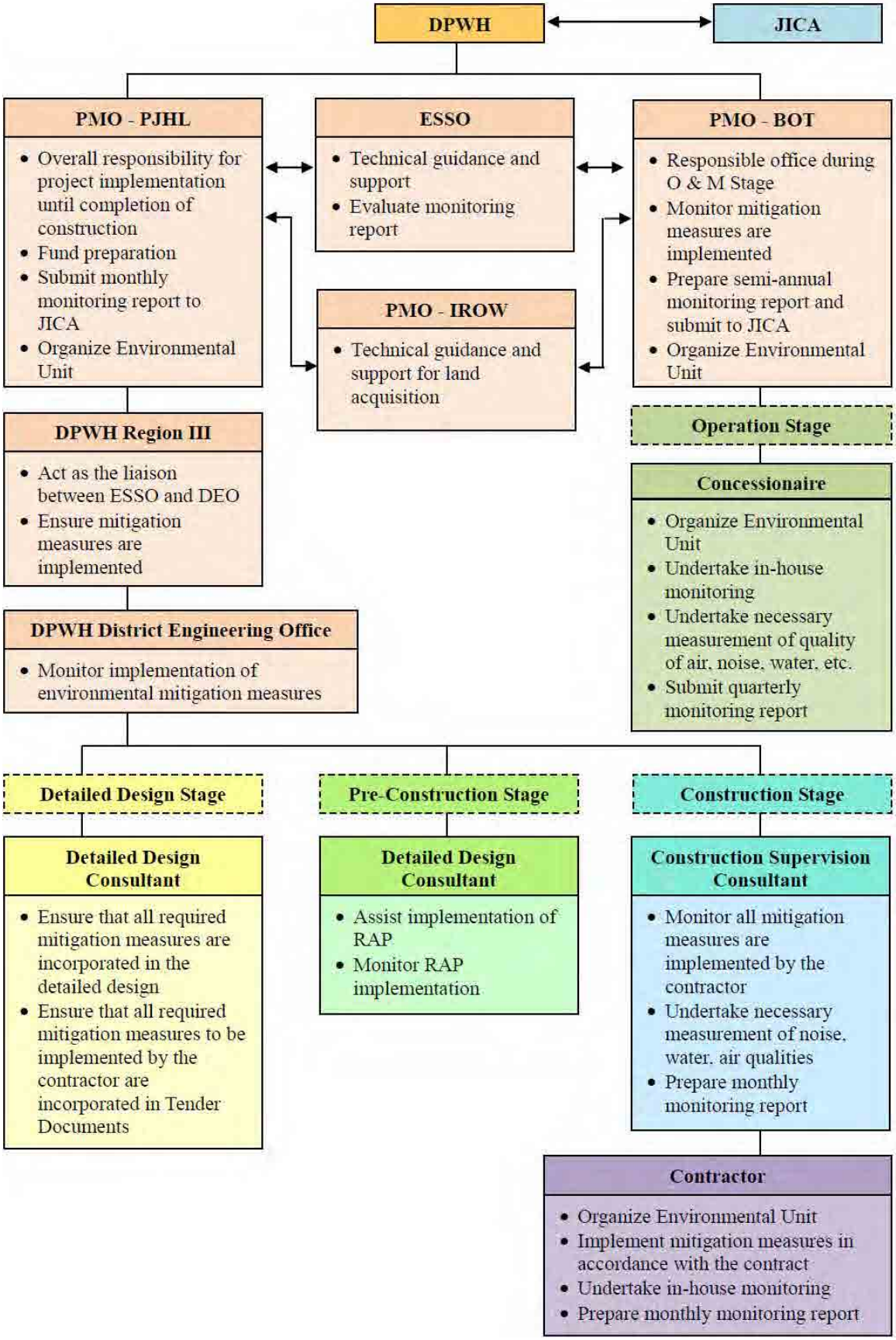


FIGURE 9.5.6-1 ENVIRONMENTAL MANAGEMENT AND MONITORING IMPLEMENTATION ORGANIZATION

9.5.6.2 Budget

DPWH Administrative Cost

Total administrative cost of the Project is estimated at Php 143.69 Million for DPWH's staff and other expenditure including cost of PMO-PJHL, ESSO, PMO-IROW, DPWH Region III, DEO and PMO-BOT. Environmental and Management and Monitoring Cost for DPWH will be sub-alloted from the total administrative cost.

Consultancy Cost

Monitoring cost by the D/D and C/S Consultants is included in the Consultancy Service Contract as follows;

Detailed Engineering and Pre-construction Stage:

Cost for Environmental Specialist, RAP Specialists, Independent Assessors, RAP Monitoring Specialist are included in the Consultancy Contract (estimated at 11.45 Million Pesos).

Construction Supervision Stage:

Cost for Environmental Monitoring Specialist is included in the Consultancy Contract (estimated at 8.71 Million Pesos).

Contractor's Cost

Monitoring cost by the Contractor will be included in the Civil Work Contract. Cost for noise and air quality measurements is included in the Civil Work Contract.

Concessionaire's Cost

Monitoring cost by the Concessionaire during O & M period will be included in the Toll Concession Agreement. Cost for noise and air quality measurements is included in the Toll Concession Agreement.

9.5.7 System for Environmental Management

Project proponent and construction contractor must ensure compliance with ECC by Establishing

an Environmental Unit (EU) to effectively handle, implement, and manage all environmental-related aspects of the project. Proof of establishment of the EU shall be submitted to EMB. The EU shall also have the following responsibilities:

- Implement the approved Environmental Management and Monitoring Program; and
- Monitor actual impacts vis-à-vis the predicted impacts on human/social and physical environmental management measures in the EIS.

9.6 RELOCATION ACTION PLAN

9.6.1 Relocation Policy

Since CLLEX is located in a rural area, DPWH's relocation policy in LARRIPP which has been created for the World Bank funded project, i.e. satisfies OP4.12, can be applied.

- The Government of the Republic of Philippines is bound to follow the Project Resettlement Policy (the Project Policy) for the CLLEX (Phase-1) specifically which is intended to comply with JICA's guidelines.
- Where there are gaps between the Republic of Philippines legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.
- Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
- Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
- Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their standard of living adversely affected;
  - Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;
  - Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or
  - Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

- All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives outlined above.
- Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives.
- All PAPs residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets (IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.
- PAPs that lose only part of their physical assets will not be left with a portion that will be inadequate to sustain their current standard of living. The minimum size of remaining land and structures will be agreed during the resettlement planning process.
- People temporarily affected are to be considered PAPs and resettlement plans address the issue of temporary acquisition.
- Where a host community is affected by the development of a resettlement site in that community, the host community shall be involved in any resettlement planning and decision-making. All attempts shall be made to minimize the adverse impacts of resettlement upon host communities.
- The resettlement plans will be designed in accordance with Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy (LARRIPP) of DPWH (February, 2007) and JICA's Policy on Involuntary Resettlement.
- The Resettlement Plan will be translated into local languages and disclosed for the reference of PAPs as well as other interested groups.
- Payment for land and/or non-land assets will be based on the principle of replacement cost.
- Compensation for PAPs dependent on agricultural activities will be land-based wherever possible.
- Resettlement assistance will be provided not only for immediate loss, but also for a transition period needed to restore livelihood and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.
- The resettlement plan must consider the needs of those most vulnerable to the adverse impacts of resettlement (including the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure they are considered in resettlement planning and mitigation measures identified. Assistance should be provided to help them

improve their socio-economic status.

- PAPs will be involved in the process of developing and implementing resettlement plans.
- PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to the extent possible be involved in the decisions that are made concerning their resettlement.
- Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period.
- Displacement does not occur before provision of compensation and of other assistance required for relocation.
- Sufficient civic infrastructure must be provided in resettlement site prior to relocation.
- Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, will be completed prior to any construction activities, except when a court of law orders so in expropriation cases
- Livelihood restoration measures must also be in place but not necessarily completed prior to construction activities, as these may be ongoing activities.
- Organization and administrative arrangements for the effective preparation and implementation of the resettlement plan will be identified and in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities.
- Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the resettlement management system.
- An external monitoring group will be hired by the project and will evaluate the resettlement process and final outcome. Such groups may include qualified consultants, NGOs, research institutions or universities.
- Monitoring reports shall be forwarded directly to the JICA.

9.6.2 Summary of Relocation and Assets

9.6.2.1 Household Interview Survey

Households in the project area were classified into the following three (3) types;

Type-A: Households who are living in the residential houses which are affected by the project. A total of 67 households were identified and 64 (or 96%) households answered the interview.

Type-B: Households who are doing the farming and their farm lands are affected by the project. Estimated number of farm lots is about 505, of which 160 households (about 32%) were interviewed.

Type-C: Households who are living in the project area, but their houses and farm lands are not affected by the project. A total of 160 households were interviewed.

Household structure, income, assets, expenditures, household and business expenditure, education, available skills, available facilities, about relocation, affected land, affected structure, land validity, structure validity, perception on the project, project awareness, and project acceptability were included in the interview.

9.6.2.2 Summary of Project Affected Persons (PAPs)

Summary of Survey Result

Table 9.6.2-1 shows the summary of the number of households and people whose houses are affected and to be relocated. **Table 9.6.2-2** shows the summary of the number of household who will lose their farm land.

TABLE 9.6.2-1 NUMBER OF HOUSEHOLD WHOSE RESIDENTIAL HOUSES ARE AFFECTED AND TO BE RELOCATED

Municipality/ City	No. of Residential Household affected	No. of Residential Household relocated (a)*	Status of (formal/ informal) of (a)	No. of People relocated	Size of relocation areas (ha)	PAPs with Loss of Income	Note (if any)
La Paz	3	3	3 (informal)	14	2 sites (2ha., 2ha.)	-	All free occupation w/ permit of land owner
Aliaga	32	32	32 (informal)	158	2 sites (0.48ha., 0.8ha.)	-	3 informal settlers on public land. 29 free occupation with permit of land owner
Cabanatuan City	32	32	1 (formal) 31 (informal)	162	1 site (1.5ha.)	4 house-holds	1 tenant, all others free occupation with permit of land owner
Total	67	67	1 (formal) 66 (informal)	334	5 sites (6.78ha.)	4 house-holds	

*Only if PAPs opted to be relocated

TABLE 9.6.2-2 NUMBER OF HOUSEHOLD WHO WILL LOSE FARM LAND

Municipality/ City	No. of Farm Lot Affected (1)	No. of Household who will lose Farm Land (2)	Ownership of Land (3)			No. of People who lose Farm Land (4)
			Owner	Tenant	Free Occupation with Permit	
Tarlac City	2	2	2	-	-	9
La Paz	73	73	70	3	-	360
Zaragosa	186	186	186	-	-	610
Aliaga	216	216	203	-	13	986
Cabanatuan City	28	28	28	-	-	168
Total	505	505	489	3	13	2,133

Note: (1) Approximate number. Final number will be determined through legal research on land title and parcellary survey during the D/D Stage.

(2), (3), (4): Estimated based on the sample survey of the 160 households. To be confirmed by the parcellary survey.

(3) Assumed that there is no lot owner of the same household. To be confirmed by the parcellary survey.

Survey Results

Table 9.6.2-3 shows number of residential houses, households and people affected and relocated.

TABLE 9.6.2-3 NUMBER OF RESIDENTIAL HOUSE, HOUSEHOLD AND PEOPLE AFFECTED

Municipality/ City	Barangay	No. of Residential Houses Affected	No. of Household Affected	No. of People Affected	PAPs with Loss of Income
La Paz	Macalong	2	2	14	0
	Laungcapang	1	1		
	Sub-Total	3	3	14	0
Aliaga	Pantoc	3 (note-1)	3	158	0
	Betes	2	2		
	Bucot	1	1		
	Umangan	25	26		
	Sub-Total	31	32	158	0
Cabanatuan City	Caalibang-bangan	27 (note-2)	32	162	4
Total		61	67	334	4

Source: JICA Study Team (2011)

Note-1: Informal settlers on the public land

Note-2: One (or 5 persons) out of 27 respondents is a tenant. All others are free occupation of the private land

Note-3: All others (excluding Notes-1 and 2) are informal settlers on the private land. They are settling on the private land with the permission of the land owners. No lease fee is paid, nor lease contract. In the Philippines, they are classified as informal settlers.

Note-4: All of above (61 residential houses, 67 households and 334 PAPs) are severely affected, and need to be relocated.

Note-5: PAPs with loss of income: sari-sari store owner

Number of lots of farm land was counted based on the Cadastral Map. Since the parcellary survey is not undertaken, number of farm land lots is approximate only and still tentative number. (see **Table 9.6.2-5**).

Land tenure of residential houses affected is shown in **Table 9.6.2-4**. Out of 67 household, 1 is classified as formal settlers (5 persons) and remaining 66 households (329 persons) are classified as informal settlers.

TABLE 9.6.2-4 LAND TENURE OF RESIDENTIAL HOUSES AFFECTED

Unit : No. of Respondents

Municipality/ Province	Barangay	Private Land				
		Own	Tenant	Free Occupation with Permit	Public Land	Total
La Paz, Tarlac	Macalog	-	-	2 (2)	-	2 (2)
	Laungcapang	-	-	1 (1)	-	1 (1)
Aliaga, Nueva Ecija	Pantoc	-	-	-	3 (3)	3 (3)
	Betes	-	-	2 (2)	-	2 (2)
	Bucot	-	-	1 (1)	-	1 (1)
	Umangan	-	-	25 (26)	-	25 (26)
Cabanatuan City	Caalibangbangan	-	1 (1)	26 (31)	-	27 (32)
Total		-	1 (1)	57 (63)	3 (3)	61 (67)

Source: JICA Study Team (2011)

Note: Figure in ( ) is no. of families. Families in the houses affected living with free occupation status are classified as informal settlers.

As shown in **Table 9.6.2-4**, one family is formal settler and the remaining 66 families are informal settlers.

TABLE 9.6.2-5 NUMBER OF LOT OF FARM LAND AFFECTED (APPROXIMATE ONLY)

Province	Permanent LOSS (No. of lot)		
	Severe (more than 20%)	Marginal	Total
Tarlac	6	69	75
Nueva Ecija	25	405	430
Total	31	474	505

Source: JICA Study Team (2011)

Note: Farm Land in this case means rice field

Sample survey result of land tenure of farm land is shown in **Table 9.6.2-6**.

TABLE 9.6.2-6 LAND TENURE: FARM LAND (SAMPLE SURVEY ONLY)

City/Municipality		Own	Tenant	Free Occupation w/ Permit	Total
Tarlac	La Paz	43	2	-	45
Nueva Ecija	Zaragoza	25	-	-	25
	Aliaga	80	-	5	85
	Cabanatuan City	5	-	-	5
	Sub-Total	110	-	5	115
Total		153 (95.6%)	2 (1.3%)	5 (3.1%)	160 (100%)

Source: JICA Study Team (2011)

Other improvements affected are summarized in **Table 9.6.2-7**.

TABLE 9.6.2-7 OTHER IMPROVEMENTS AFFECTED

	Unit	Permanent LOSS											
		Severe (more than 20%)				Marginal				Total			
		Tarlac	Aliaga	Cabanatuan	Total	Tarlac	Aliaga	Cabanatuan	Total	Tarlac	Aliaga	Cabanatuan	Total
Sugarland	ha.	-	-	-	-	3	-	-	3	3	-	-	3
Auxiliary Structure	No.	9	19	9	37	3	6	4	13	12	25	13	50
Public Infrastructure	No.	1	1	4	6	-	-	-	-	1	1	4	6
Fruit Bearing & Crops	No.	294	498	105	897	-	-	-	-	294	498	105	897
Non Bearing Trees	No.	188	75	18	281	-	-	-	-	188	75	18	281

Source: JICA Study Team (2011)

Note: Sugarland: property of Hacienda Luisita.
Auxiliary Structured: Fish pond, carabao shed, pig pen, deep well. Fence/gate, etc.
Public Infrastructure: Waiting shed, electrical post.
Fruit Bearing: Mango, Avocado, Santol, Jack Fruit, etc.
Crops: Banana, Coconut, etc.
None Bearing Tree: Narra, Ipil-Ipil, palm tree, etc.

Size of farm land affected by the project is shown in **Table 9.6.2-8**. About 47.4% of farm lands are less than 2 ha.

TABLE 9.6.2-8 SIZE OF FARM LAND AFFECTED BY THE PROJECT
(TYPE-B: SAMPLE SURVEY)

Unit: No. of Respondents

Municipality/ Province	Farm Land Size Affected (Unit: Ha)						
	Less than 0.99	1.00-1.99	2.00-2.99	3.00-3.99	4.00-4.99	Over 5.001	Total
La Paz, Tarlac	9	15	2	3	4	7	40
Zaragoza, Nueva Ecija	2	6	4	4	4	5	25
Aliaga, Nueva Ecija	12	27	10	5	6	25	85
Cabanatuan City	2	-	-	-	-	2	4
Total	25 (16.2%)	48 (31.2%)	16 (10.4%)	12 (7.8%)	14 (9.1%)	39 (25.3%)	154 (100%)

Source: JICA Study Team (2011)

Note: Not all of respondents answered.

Number of respondents who have land other than affected by the Project is 121 as shown in **Table 9.6.2-9**.

TABLE 9.6.2-9 SIZE OF FARM LAND CULTIVATING OTHER THAN AREA
(TYPE-B: SAMPLE SURVEY)

Unit: No. of Respondents

Municipality/ Province	Farm Land Size Cultivating (Unit: Ha)						
	Less than 0.99	1.00-1.99	2.00-2.99	3.00-3.99	4.00-4.99	Over 5.001	Total
La Paz, Tarlac	1	5	21	-	-	4	31
Zaragoza, Nueva Ecija	-	1	24	-	-	-	25
Aliaga, Nueva Ecija	-	3	60	-	1	-	64
Cabanatuan City	-	-	-	-	-	1	1
Total	1 (0.8%)	9 (7.4%)	105 (86.8%)	-	1 (0.8%)	5 (4.1%)	121 (100%)

Source: JICA Study Team (2011)

Note: Not all of respondents answered.

Estimated income from the affected farm lands is shown in **Table 9.6.2-10**. About 68% of respondents have income of less than 200,000 pesos from the affected farm lands.

TABLE 9.6.2-10 INCOME FROM FARMING

(TYPE-B: SAMPLE SURVEY)

Unit: No. of Respondents

Municipality/ Province	Income Range (Pesos per Year)						
	Less than 100,000	100,000-200,000	200,000-500,000	500,000-1,000,000	1,000,000-2,000,000	Over 2,000,000	Total
La Paz, Tarlac	19	9	8	3	1	-	40
Zaragoza, Nueva Ecija	12	8	2	1	2	-	25
Aliaga, Nueva Ecija	43	13	10	10	4	5	85
Cabanatuan City	-	1	-	1	1	1	4
Total	74 (48.1%)	31 (20.1%)	20 (13.0%)	15 (9.7%)	8 (5.2%)	6 (3.9%)	154 (100%)

Source: JICA Study Team (2011)

Note: Not all of respondents answered.

Table 9.6.2-11 shows marketing status. About 83% of respondents sell palay through middlemen.

TABLE 9.6.2-11 MARKETING

Unit: No. of Respondents

Municipality/Province	Middleman	Thru Cooperative	Direct to Consumers	Total
La Paz, Tarlac	35	-	10	45
Zaragoza, Nueva Ecija	17	1	7	25
Aliaga, Nueva Ecija	76	4	5	85
Cabanatuan City	5	-	-	5
Total	133 (83%)	5 (3.1%)	22 (13.8%)	160 (100%)

Source: JICA Study Team (2011)

There are some respondents who do farming other than palay production as shown in **Table 9.6.2-12**.

TABLE 9.6.2-12 OTHER FARMING THAN PALAY PRODUCTION

Unit: No. of Respondents

Municipality/Province	Vegetable Production	Poultry	Total
La Paz, Tarlac	3	1	4
Zaragoza, Nueva Ecija	1	-	1
Aliaga, Nueva Ecija	2	1	3
Cabanatuan City	-	-	-
Total	6	2	8

Source: JICA Study Team (2011)

Overall RAP requirements are shown in **Table 9.6.2-13**.

TABLE 9.6.2-13 OVER-ALL RAP REQUIREMENTS

	Compensation Structure	LARRIPP, 2007	This Project
Compensation	For Structure	• Cash including cost of restoring the remaining structure • Determined by Appraisal Committee • No deduction for salvaged building materials (Replacement Cost)	• No. of residential houses affected: 61 (67 HH, 334 persons) • 1 is tenant, 63are occupation of private land and 3 on public land (a total of 66 are informal settlers) • 1 formal settler and 66 informal settlers • 61 (67 HH) shall be provided with relocation site by respective LGUs
	For Other Improvement	• Cash • Replacement cost for the affected portion of public structure to the Government or non-Government agencies or to the community • Cost for reconnecting the facility such as water, power and telephone	• Sugar land: 3 ha. • Auxiliary Structure: 50 • Public Infrastructure: 6
	For Crops, Trees and Perennials	• Cash • Commercial value as determined by DENR or Appraisal Committee • PAFs given sufficient time to harvest crops • Compensation for damaged crops (palay, corn) at market value • Fruit-bearing trees based on assessment of Provincial/Municipal Assessors	• Fruit bearing/crops: 897 • None Fruit Bearing Trees: 281
	For Land	• Replacement Cost – Initial Offer: Zonal Valuation – Second Offer: Market Value • Land Swapping if feasible (Land for Land) (Cash compensation when affected holding has a higher value than relocation plot.)	• Residential house land: 9 lots (9 owners, all severe) • Farm Land: Approximately 505 lots (Severe 31, Marginal 474) • Sample Survey Result…95.6% are land owners, 1.3% are tenants and 3.1% are free occupation with permit.

	Other Types of Assistance or Entitlement	**Disturbance Compensation** • Lessees: 5 times the average of gross harvest for the past three years, but not less than Php15,000. • Tenant: Value of gross harvest of 1 year and not less than Php15,000 per ha. (E.O. 1035)	• About 95.6% of farm lands are owned. • No Lessee • 4.4% are classified as tenant farmers
		Income Loss • Loss of business/income, entitled to an income rehabilitation assistance not to exceed Php15,000 or based on tax record.	• Four (4) Sari-sari store owners are affected.
		Inconvenience Allowance • Php10,000 to PAF when severely affected structures which require relocation and new construction.	• Sixty one (61) residential houses (67 households)
		Rehabilitation Assistance • Skills training and other development activities equivalent to Php15,000 per family	• Max. Sixty seven (67) households who lose income. • Some farmers who become land less.
		Rental Subsidy • Without sufficient additional land to allow reconstruction of their lost house. • Equivalent to prevailing average monthly rental. • Period between delivery of house compensation and the delivery of land compensation	• When availability of relocation sites is delayed, this should be considered (maximum of 67 households)
		Transportation Allowance and Assistance	• 67 households

Note: Severe –More than 20% of Total Land/Properties affected

Marginal – Less than 20% and still viable for continued use.

Source: JICA Study Team (2011)

9.6.3 Household Survey Result

Socioeconomic survey of PAPs was conducted from July 23, 2011 to August 13, 2011.

9.6.3.1 Bio Data of PAFs

Majority of the respondents have an average household size of 1 to 4 with 53.1%; 44.6% have household size of 5 to 10; and 2.2% have household size greater than 10. (see **Table 9.6.3-1**).

The residency history of the respondents is shown table below. Majority (93.7%) of the respondents have been residing in these areas before 1970's; 5.8% in 1980s; only 0.4% who are recently residing in the area in 1990s. This table indicates that majority of the PAPs are original settlers in the area, most of them inherited the ownership from the original tenants/awardees of CARP (Comprehensive Agrarian Reform Program)

TABLE 9.6.3-1 PAPS HOUSEHOLD SIZE

City/Municipality		1-4	5-10	More than 10	Total
Type A – Structure Owner					
TARLAC					
La Paz	Count	2	1	-	3
	%	66.7%	33.3%	-	100.0%
NUEVA ECIJA					
Zaragoza	Count	1	-	-	1
	%	100.0%	-	-	100.0%
Aliaga	Count	15	17	-	32
	%	46.9%	53.1%	-	100.0%
Cabanatuan	Count	11	15	2	28
	%	39.3%	53.6%	7.1%	100.0%
Sub-total 1	Count	29	33	2	64
	%	45.3%	51.6%	3.1%	100.0%
Type B – Landowner					
TARLAC					
La Paz	Count	19	26	-	45
	%	42.2%	57.8%	-	100.0%
NUEVA ECIJA					
Zaragoza	Count	19	6	-	25
	%	76.0%	24.0%	-	100.0%
Aliaga	Count	50	33	2	85
	%	58.8%	38.8%	2.4%	100.0%
Cabanatuan	Count2	2	2	1	5
	%	40.0%	40.0%	20.0%	100.0%
Sub-total 2	Count	90	67	3	160
	%	56.3%	41.9%	1.9%	100.0%
Grand Total	Count	119	100	5	224
	%	53.1%	44.6%	2.2%	100.0%

Source: JICA Study Team (2011)

TABLE 9.6.3-2 RESIDENCY OF RESPONDENTS

City/Municipality		70's and below	1980s	1990s	Total
Type A – Structure Owner					
TARLAC					
La Paz	Count	3	-	-	3
	%	100.0%	-	-	100%
NUEVA ECIJA					
Aliaga	Count	26	5	1	32
	%	81.3%	15.6%	3.1%	100%
Cabanatuan	Count	21	7	-	28
	%	75.0%	25.0%	-	100%
Sub-total 1	**Count**	**50**	**12**	**1**	**63**
	%	**79.4%**	**19.0%**	**1.6%**	**100%**
Type B – Landowner					
TARLAC					
La Paz	Count	45	-	-	45
	%	100%	-	-	100%
NUEVA ECIJA					
Zaragosa	Count	24	1	-	25
	%	96.0%	4.0%	-	100%
Aliaga	Count	85	-	-	85
	%	100%	-	-	100%
Cabanatuan	Count	5	-	-	5
	%	100%	-	-	100%
Sub-total 2	**Count**	**159**	**1**	**-**	**160**
	%	**99.4%**	**0.6%**	**-**	**100%**
Grand Total	**Count**	**209**	**13**	**1**	**223**
	%	**93.7%**	**5.8%**	**0.4%**	**100%**

Source: JICA Study Team (2011)

9.6.3.2 Communication/Language

The most common dialect is Ilocano. This dialect is used by 48.7% of the respondents, followed by 'Ilocano" with 45.5%. The remaining 5.8% are shared among "Kapampangan" and 'Ilonggo" dialects. (see **Table 9.6.3-3**)

TABLE 9.6.3-3 MOTHER TONGUE

City/Municipality		Tagalog	Kapampangan	Ilocano	Ilonggo	Total
Type A – Structure Owner						
TARLAC						
La Paz	Count	0	1	1	1	3
	%	0.0%	33.3%	33.3%	33.3%	100%
NUEVA ECIJA						
Zaragosa	Count	0	0	0	1	1
	%	0.0%	0.0%	0.0%	100.0%	100%
Aliaga	Count	1	0	30	1	32
	%	3.1%	0.0%	93.8%	3.1%	100%
Cabanatuan	Count	0	0	28	0	28
	%	0.0%	0.0%	100.0%	0.0%	100%
Sub-total 1	Count	1	1	59	3	64
	%	1.6%	1.6%	92.2%	4.7%	100%
Type B – Landowner						
TARLAC						
La Paz	Count	32	0	7	6	45
	%	71.1%	0.0%	15.6%	13.3%	100%
NUEVA ECIJA						
Zaragosa	Count	23	1	1	0	25
	%	92.0%	4.0%	4.0%	0.0%	100%
Aliaga	Count	53	0	31	1	85
	%	62.4%	0.0%	36.5%	1.2%	100%
Cabanatuan	Count	0	1	4	0	5
	%	0.0%	20.0%	80.0%	0.0%	100%
Sub-total 2	Count	108	2	43	7	160
	%	67.5%	1.3%	26.9%	4.4%	100%
Grand Total	Count	109	3	102	10	224
	%	48.7%	1.3%	45.5%	4.5%	100%

Source: JICA Study Team (2011)

9.6.3.3 Educational Attainment

The level of educational attainment of the project affected respondents in the host city/municipality: 71.9% of the respondents were able to finish the primary education. Those who finished secondary education are 15.2% of PAPs. In terms of respondent PAPs who finished college, there are 8.9% and 4.0% took vocational courses. (see **Table 9.6.3-4**)

TABLE 9.6.3-4 EDUCATION LEVEL

City/Municipality		Primary	Secondary	Tertiary	Vocational	Total
Type A – Structure Owner						
TARLAC						
La Paz	Count	2	1	-	-	3
	%	66.7%	33.3%	-	-	100 %
NUEVA ECIJA						
Zaragosa	Count	-	-	1	-	1
	%	-	-	100%	-	100%
Aliaga	Count	20	9	9	1	32
	%	62.5%	28.1%	6.3%	3.1%	100%
Cabanatuan	Count	16	9	2	1	28
	%	50%	32.1%	14.3%	3.6%	100%
Sub-total 1	Count	38	19	5	2	64
	%	59.4%	29.7%	7.8%	3.1%	100%
Type B – Landowner						
TARLAC						
La Paz	Count	28	5	9	3	45
	%	62.2%	11.1%	20 %	6.7%	100%
NUEVA ECIJA						
Zaragosa	Count	24	-	1	-	25
	%	96%	-	40%	-	100%
Aliaga	Count	68	9	4	4	85
	%	80%	10.6%	4.7%	4.7%	100%
Cabanatuan	Count	3	1	1	-	5
	%	60%	20%	20%	-	100%
Sub-total 2	Count	123	15	15	7	160
	%	76.9%	9.4%	9.4%	4.4%	100%
Grand Total	Count	161	34	20	9	224
	%	71.9%	15.2%	8.9%	4%	100%

Source: JICA Study Team (2011)

9.6.3.4 Main Occupation of PAPs

Of 63 respondents whose houses are affected, main occupation of the 12 households (19.0%) is farming, 40 households (63.5%) is employment and 11 household (17.5%) is commerce.

Of 160 respondents whose farm lands are affected, main occupation of 100 households (62.5%) is farming, 47 households (29.4%) is employment and 13 households (8.1%) is commerce.

9.6.3.5 Family Economy

Majority of the heads of families of PAFs are male with 87.5% followed by female with only 5.8%.

The surveyed households (37.5%) earning above Php 69,192 which is Region III Central Luzon annual poverty threshold (based on incidences in 2006, Philippine Statistical Yearbook, 2010). Majority of these are engaged in large-scale farming and businesses. The remaining 62.5% are earning below the poverty threshold. Of these, 58.5% have incomes that are below the annual food threshold of Php 43,588 for a family of four.

PAFs have livelihoods that are primarily derived from farming; bulk of their expenditures are allocated for food (80.4%), followed by utilities (11.9%). (see **Table 9.6.3-5**)

TABLE 9.6.3-5 HOUSEHOLD INCOME OF PAPs

City/Municipality		<P43,588 Below the annual food threshold	P43,588 to P69,192	>P69,192 Above the poverty threshold	Total
Type A – Structure Owner					
TARLAC					
La Paz	Count	2	-	1	3
	%	66.7%	-	33.3%	100%
NUEVA ECIJA					
Zaragosa	Count	-	-	1	1
	%	-	-	-	100%
Aliaga	Count	18	3	11	32
	%	56.3%	9.4%	34.4%	100%
Cabanatuan	Count	2	5	21	28
	%	7.1%	17.9%	75%	100%
Sub-total 1	Count	22	8	34	64
	%	34.4%	12.5%	53.1%	100 %
Type B - Landowners					
TARLAC					
La Paz	Count	24	1	20	45
	%	53.3%	2.2%	44.4%	100%
NUEVA ECIJA					
Zaragosa	Count	25	-	-	25
	%	100%	-	-	100%
Aliaga	Count	59	-	26	85
	%	69.4%	-	30.6%	100%
Cabanatuan	Count	1	-	4	5
	%	20%	-	80 %	100%
Sub-total 2	Count	109	1	50	160
	%	68.1%	0.6%	31.3%	100%
Grand Total	Count	131	9	84	224
	%	58.5%	4%	37.5%	100%

Source: JICA Study Team (2011)

9.6.3.6 Income Sources

The main source of income of PAPs who lose structures is via employment while the PAPs who lose land are by farming. Employment here refers to jobs in government and private offices including skilled workers. Small-scale business operations consist of "sari-sari" stores and "carinderia" (small eateries). Aside from the primary occupation of the PAPs there are others sources of income of their household members but majority (49.3%) of them has no secondary source of income.

9.6.3.7 Land Ownership

Inquiries and data gathered from the City/Municipal Assessors' show that most of these land properties are still under the names of the original owners or their legal heirs.

The respondents dwelling at Caalibangbangan, Cabanatuan City have permit from the landowner. Dwellers at Barangay Umangan, Aliaga are children of the original Emancipation Paten title ("EP") holder. Majority of the respondents owns their land constitutes of 96.6% but most of them do not have other land to construct to relocate their house or other farm land to cultivate. (see **Table 9.6.3-6**)

TABLE 9.6.3-6 LAND TENURE OF THE RESPONDENTS

City/Municipality		Own	Tenant	Free occupation w/ permit	Total
Type A – Structure Owner					
TARLAC					
Tarlac City		-	-	-	-
	%	-	-	-	-
La Paz	HH	3	-	-	3
	%	100.0%	-	-	100.0%
NUEVA ECIJA					
Zaragoza	HH	1	-	-	1
	%	100.0%	-	-	100.0%
Aliaga	HH	32	-	-	32
	%	100.0%	-	-	100.0%
Cabanatuan	HH	2	1	25	28
	%	7.1%	3.6%	89.3%	100.0%
Sub Total A	HH	38	1	25	64
	%	59.4%	1.6%	39.0%	100.0%
Type B - Landowners					
TARLAC					
Tarlac City	HH	-	-	-	-
	%	-	-	-	-
La Paz	HH	43	2	-	45
	%	95.6%	4.4%	-	100.0%
NUEVA ECIJA					

Zaragoza	HH	25	-	-	25
	%	100.0%	-	-	100.0%
Aliaga	HH	80	-	5	85
	%	100.0%	-	-	100.0%
Cabanatuan	HH	5	-	-	5
	%	100.00%	-	-	100.0%
Sub-total B	HH	153	2	5	160
	%	96.6%	1.3%	3.1%	100.0%
Grand Total	HH	191	3	30	224
	%	85.3%	1.3%	13.4%	100.0%

Source: JICA Study Team (2011)

The rest of the respondents (Tenants and Free Occupation with Permit) are 7 (4.4%). As estimated based on the sample survey of 160 households, the assumed number of NOT landowner is 16 (Tenant - 3, Free Occupation with Permit - 13) shown in **Table 9.6.2-2.** The income of six (6) respondents is below the annual food threshold of Php 43,588 for a family of four. Only one (1) respondent is earning above Php 69,192 which is Region III's annual poverty thresholds. Four (4) respondents are earning from farming as their prime source of income and three (3) respondents are earning from farming as their secondary source of income.

9.6.3.8 Structure Ownership

A majority or 92.2% of the PAPs own the structures they are occupying. Only a few are either sharing (6.2%) or occupying the structures (1.6%) with permission from owners. (see **Table 9.6.3-7**)

TABLE 9.6.3-7 OWNERSHIP OF STRUCTURES

City/Municipality		Owner	Sharer	Free occupation with permit	Total
TARLAC					
La Paz	HH	3	-	-	3
	%	100.0%	-	-	100%
NUEVA ECIJA					
Zaragoza	HH	1	-	-	1
	%	100.0%	-	-	100%
Aliaga	HH	32	-	-	32
	%	100.0%	-	-	100%
Cabanatuan	HH	23	4	1	28
	%	82.1%	14.3%	3.6%	100%
Total	HH	59	4	1	64
	%	92.2%	6.2%	1.6%	100%

Source: JICA Study Team (2011)

9.6.3.9 PAP's Willingness to Relocate and Preferred Sites

Out of 67 PAFs 64 are interviewed. There are 68.8% of PAPs agreed to be relocated. (see **Table 9.6.3-8**) 93.55% of them are opting to be relocated in the same city/municipality. The remaining 6.5% are willing to be relocated within the provinces of Tarlac and Nueva Ecija. (see **Table 9.6.3-9**)

TABLE 9.6.3-8 PAPS WILLING TO BE RELOCATED

City/Municipality		YES	NO	Total
Type A – Structure Owner				
TARLAC				
La Paz	Count	2	1	3
	%	66.7%	33.3%	100
NUEVA ECIJA				
Zaragoza	Count	1		1
	%	100.0%		100%
Aliaga	Count	16	16	32
	%	50.0%	50.0%	100%
Cabanatuan	Count	25	3	28
	%	89.3%	10.7%	100%
Total	Count	44	20	64
	%	68.8%	31.3%	100%

Source: JICA Study Team (2011)

TABLE 9.6.3-9 PREFERRED RELOCATION SITE OF PAPS TYPE A

City/Municipality		Relocation site within the City/Municipality	Relocation site within the Province	Total
Type A– Structure Owner				
TARLAC				
La Paz	Count	2		2
	%	100.0%		100%
NUEVA ECIJA				
Zaragoza	Count	1		1
	%	100.0%		100%
Aliaga	Count	17	1	18
	%	94.4%	5.6	100%
Cabanatuan	Count	23	2	25
	%	92.0%	8.0%	100%
Total	Count	43	3	46
	%	93.5%	6.5%	100%

Source: JICA Study Team (2011)

For those who answered "No" to be relocated, the following are their reasons;

La Paz

1 PAF: Currently they live under the permission of the landlord for free and because they have their own farm land in other place, they want to transfer there.

Aliaga

16 PAFs: The proposed relocation site is very far from present location. It is far from their working place. They want the relocation site at the same barangay area.

Cabanatuan City

3PAFs: They want to find the relocation site by and relocate themselves.

9.6.3.10 Relocation/Compensation Preference by Farmland Owners

When asked about the compensation preference of farm PAPs (Type B), they prefer to receive just compensation (53.8%). (see **Table 9.6.3-10**) They fear that a land for land agreement might totally displace them from the provinces of Tarlac and Nueva Ecija. They believe that the only land available is in part of Mindanao. They also said that the land that might be given to them is unproductive.

TABLE 9.6.3-10 COMPENSATION PREFERENCE OF FARMLAND OWNER

City/Municipality		Just Compensation (payment)	Job Employment	Livelihood Assistance	Land for Land	Total
Type B– Land Owner						
TARLAC						
La Paz	Count	18	16	9	2	45
	%	40.0%	35.6%	20.0%	4.4%	100%
NUEVA ECIJA						
Zaragoza	Count	11	11	2	1	25
	%	44.0%	44.0%	8.0%	4.0%	100%
Aliaga	Count	53	17	14	1	85
	%	62.4%	20.0%	16.5%	1.2%	100%
Cabanatuan	Count	4		1		5
	%	80.0%		20.0%		100%
Total	Count	86	44	26	4	160
	%	53.8%	27.5%	16.3%	2.5%	100%

Source: JICA Study Team (2011)

In terms of additional assistance, the PAPs preferred provision of business capital or funds (65%) to augment the loss of income from farming. Their second preference is to give them a permanent job employment (21.9%) in replacement to their loss livelihood. (see **Table 9.6.3-11**)

TABLE 9.6.3-11 ACCEPTABLE LIVELIHOOD ASSISTANCE FOR PAPS TYPE B

City/Municipality		Provision of another farmland	Provision of job employment	Provision of business capital/funds	Total
Type B– Land Owner					
TARLAC					
La Paz	Count	7	15	23	45
	%	15.6%	33.3%	51.1%	100%
NUEVA ECIJA					
Zaragoza	Count	14	3	8	25
	%	56.0%	12.0%	32.0%	100%
Aliaga	Count		16	69	85
	%		18.8%	21.2%	100%
Cabanatuan	Count		1	4	5
	%		20.0%	80.0%	100%
Total	Count	21	35	104	160
	%	13.1%	21.9%	65.0%	100%

Source: JICA Study Team (2011)

9.6.3.11 Availability of Social Services

All the barangays are served by electricity namely Tarlac Electric Cooperative (TARELCO), Nueva Ecija Electric Cooperative (NEECO) and Cabanatuan Electric Corporation (CELCOR).
In terms of water supply, majority respondents get their drinking and domestic water supply from artesian well.

Health

Health personnel visit all the barangays, but for more modern health facilities the nearest hospitals are located in Poblacion: Tarlac Provincial Hospital, a government hospital located in Barangay San Vicente; La Paz Community and Medicare Hospital is located in barangay San Roque Poblacion; only private clinics are available in Zaragoza. The nearest hospital in Aliaga is ELJ Bitas Hospital in Cabanatuan and Talavera District Hospital. There are eight (8) hospitals and forty seven (47) clinics available in Cabanatuan City.

Education

With regard to educational facilities, elementary schools are available in every barangay. There are 22 secondary schools in Tarlac City and four (4) schools that offer Tertiary education: Tarlac State University and three (3) private schools. There are four (4) secondary schools in the Municipality of La Paz; of these three (3) are public schools namely Guevarra High School, Comillas High School, and La Paz National High School. In the Municipality of Zaragoza, there are two (2) secondary schools available National High School and Vicentian Catholic School located in Poblacion. There are four (4) secondary schools in Aliaga located in Bibiclat (2), Poblacion East II and Sto. Tomas. There are no school offering tertiary education in the municipalities of La Paz, Zaragoza and Aliaga. There are seven (7) secondary schools strategically located in the different barangays of Cabanatuan City. There are fourteen (14) universities in Cabanatuan City, five (5) of them obtains large number of enrollees namely Nueva Ecija University of Science and Technology, Wesleyan-University Philippines, Auraullo University, College of the Immaculate Conception and Nueva Ecija College. There are twenty two (22) vocational and technical schools in Cabanatuan City

Life in Province

The collection of garbage is only in Poblacion. The project affected barangays mostly bury or burn they waste. The common means of transportation in the project area is tricycle. Barangays along the provincial roads are accessible by bus and jeepneys.

Barangay tanods and other barangay officials and some volunteers maintain peace and order in the barangays of all host municipalities and cities. Police stations are located near the city and municipal hall.

9.6.4 Compensation and Livelihood Restoration Plan

9.6.4.1 Assets Inventory

Number of residential houses affected is shown in **Table 9.6.2-1**. Approximate number of farm land lot affected is shown in **Table 9.6.2-2**. Other improvement affected is shown in **Table 9.6.2-7**.

9.6.4.2 Eligibility

Legal owners of residential, commercial and institutional land who have full title, tax declaration or other acceptable proof of ownership shall be eligible for compensation. On the other hand, owners of structures, whether these are based on legitimate or informal occupation of lands including, shanty dwellers, who have no land title or tax declaration or other acceptable proof of

ownerships, shall be compensated based on replacement cost, as defined in the IRR of R.A. 8974. LARRIPP clearly agreed to WP OP4.12 stating in its CHAPTER 2 sectionE.2 (pp8):

Quote;

a. The absence of a formal legal title to land by some affected groups should not be a bar to compensation, especially if the title can be perfected; particular attention should be paid to households headed by women and other vulnerable groups, such as indigenous peoples and ethnic minorities, and appropriate assistance provided to help them improve their status.
b. In case of severe impacts on agricultural land use, rehabilitation measures shall be given to PAFs
c. If possible, income restoration entitlements many also be given to informal settlers affected by non-severe loss of agricultural land.

Unquote.

(1) the majority of the respondents who owns their land constitutes of 96.6% but do not have other land to construct to relocate their house or other farm land to cultivate
(2) A majority or 92.2% of the PAPs own the structures they are occupying. Only a few are either sharing (6.2%) or occupying the structures (1.6%) with permission from owners.
(3) mostly situated in private lands which they inherited from relatives who were former tenants of vast haciendas of landed families in Nueva Ecija.
(4) These residential properties through the years were transferred down to several generations up to the present occupants and real ownership status nobody really knows. Most responses gathered from the structure occupants were that they inherited the land where their houses are now situated. (No title)

With the foregoing premises, for most of the structure occupants, ownership of the lots where their houses were built is considered free occupation on private land with permit.

TABLE 9.6.4-1 ENTITLEMENT MATRIX

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
LAND (classified as Agricultural, Residential, Commercial or Institutional).	More than 20% of the total landholding lost or where less than 20% lost but the remaining land holding become economically unviable.	Project affected Family (PAF) with Torrens Certificate of Title (TCT) or tax declaration (Tax declaration can be legalized to full title).	PAF will be entitled to: • Cash compensation for loss of land at 100% replacement cost at the informed request of PAFs. This entitlement covers the residential land if the remaining farm land holding becomes economically unviable and (it's the only asset/property the PAF has, thus) the Project Affected Family (PAF) is obliged to relocate their house to other place for new jobs (refer to STRUCTURE (B) below). • 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. • Cash compensation for damaged crops at market value at the time of taking. • Cash compensation for disturbance allowance equivalent to 5 times of average gross harvest, but not greater than P 15,000.00 • Rehabilitation assistance in the form of skills training equivalent to the amount of P15,000.00, per family, if the present means of	(1) Public consultation meeting (2) Parcellary survey to identify land owners, area to be acquired, preparation of subdivision map, etc. (3) Assessment of land value, procurement of independent land/asset appraiser, damaged crops, disturbance compensation, etc. (4) Validation of assessment (5) Preparation of RAP Report (6) Approval of RAP (7) Disclosure of Compensation Package (8) Land purchase contract with land owners (9) Payment to land owners (10) Transfer of Title	(1) PMO, RO/DEO with D/D Consultant (2) PMO,RO/DEO with D/D Consultant (3) Independent land/ Asset Appraiser (4) PMO, RO/DEO, MRIC/CRIC (5) PMO, D/D Consultant (6) DPWH Secretary (7) PMO, RO/DEO (8) RO/DEO (9) PMO, RO/DEO (10) RO/DEO

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
			livelihood is no longer viable and the Affected Family (AF) will have to engage in a new income activity.		
		AF without TCT	• Cash compensation for damaged crops at market value at the time of taking. • Agricultural lessees are entitled to disturbance compensation equivalent to five times the average of the gross harvest for the past 3 years but not less than P15,000.00. (E.O. 1035) • Tenant farmers are entitled to disturbance compensation equivalent to the value of gross harvest for one year based on the average annual gross harvest for the last three years. (E.O. 1035)		
	Less than 20% of the total landholding lost or where less than 20% lost or where the remaining landholding still viable for use.	AF with TCT or tax declaration (Tax declarations that are legalizable to full title).	PAF will be entitled to: • Cash compensation for loss of land at 100% replacement cost at the informed request of PAFs. • Cash compensation for damaged crops at market value at the time of taking. • Cash compensation for disturbance allowance equivalent to 5 times of average gross harvest, but not greater than P 15,000.00.		
		AF without TCT	• Cash compensation for damaged crops at market value at the time of taking.		

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
			• Agricultural lessees are entitled to disturbance compensation equivalent to five times the average of the gross harvest for the past three years but not less than P15,000.00. • Tenant farmers are entitled to disturbance compensation equivalent to the value of gross harvest for one year based on the average annual gross harvest for the last three years.		
STRUCTURES (A) (classified as Residential, Commercial & Industrial)	More than 20% of the total landholding loss or where less than 20% loss but the remaining structure no longer functions as intended or no longer viable for continued use.	AF with TCT or tax declaration (Tax declaration can be legalized to full title).	AF will be entitled to: • Cash compensation for entire structure at 100% replacement cost.	(1) Public Consultation Meeting (2) Parcellary Survey to identify asset owners, assets to be acquired, (3) Valuation (4) Validation of assets (5) Preparation of RAP (6) Approval of RAP (7) Disclosure of Compensation Package (8) Pledge of undertakings (9) Payment (10) Relocation (11) Demolition	(1) PMO, RO/DEO with D/D Consultant (2) PMO,RO/DEO with D/D Consultant (3) Independent land/ Asset Appraiser (4) PMO, RO/DEO, MRIC/CRIC/ESSO (5) PMO, D/D Consultant/ESSO (6) DPWH Secretary (7) PMO, RO/DEO/ESSO (8) RO/DEO/PMO/ESSO (9) PMO, RO/DEO (10) PMO, RO/DEO (11) RO/DEO
		AF without TCT.	AF will be entitled to: • Cash compensation for entire structure at 100% of replacement cost. • Relocation site will be provided by LGUs.		
		AF who are Renter	• Three (3) months rental subsidy shall be provided equivalent to the amount that will equal to the rent of the same type of house rented.		

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
	Less than 20% of the total landholding lost or where the remaining structure is still functional and is viable for continued use.	PAF with TCT or tax declaration (Tax declaration can be legalized to full title).	• Compensation for affected portion of the structure¨		
		PAF without TCT	• Compensation for affected portion of the structure.		
STRUCTURES (B)	(B) Farm land becomes economically unviable due to the Project and the Project Affected Family (PAF) is obliged to relocate their house to other place.	PAF with Torrens Certificate of Title (TCT) or tax declaration	PAF will be entitled to: (a) Cash compensation for entire structure at 100% Replacement Cost (RC), (b) Moving allowance, (c) Income rehabilitation, if source of income is severely affected		
		PAF without TCT	PAF will be entitled to: (a) Cash compensation for entire structure at RC, (b) Moving allowance, (c) Income rehabilitation, if source of income is severely affected		
		PAF who are	PAF will be entitled to:		

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
		Renter whose source of income are severely affected	(a) Rental subsidy (refer to renter, structure (A) (b) Moving allowance, (c) Income rehabilitation if source of income is severely affected		
Improvements	Severely or marginally affected	PAF with or without TCT, tax declaration	Cash compensation for affected improvements at replacement cost.	Same as "Structure"	Same as "Structure"
Trees and perennials	Severely or marginally affected	PAF with or without TCT, tax declaration	Cash compensation for affected trees and perennials at current market value as prescribed by the concerned LGUs and/or DENR.	Same as "Structure"	Same as "Structure"
Income loss	Severely or marginally affected	PAF that own Small shops with or without TCT, or tax declaration (small shops are for example Sari-sari store, carinderia, fruit-stand, etc.)	Cash compensation equivalent to one month minimum wage as prescribed by the Regional Wage Board; or Cash compensation equivalent to income loss during demolition and reconstruction of their shop but not to exceed one month period; Rehabilitation assistance in the form of skills training equivalent to the amount of P15,000.00 per family, if their current means of livelihood is no longer viable in the relocation site, and the PAF will have to engage in a new income generating activity.	(1) Public consultation meeting (2) Socio-economic survey to identify income loss families (3) Evaluation of income loss (4) Validation (5) Payment	(1) RO/DEO with D/D Consultant (2) RO/DEO with D/D Consultant (3) RO/DEO with Independent Asset Assessor (4) RO/DEO, MRIC, CRIC (5) RO/DEO (Regional Office/District Engineering Office)
		PAPs that own large scale commercial establishments with or	Cash compensation equivalent to one month net income based on the average monthly net income over the period of 3 years, as declared by the PAPs at the Bureau of Internal Revenue (BIR)		

Type of Loss	Application	Entitled Person	Compensation/Entitlements	Actions For Each Compensation/ Entitlement	Organization Responsible For Each Action
		without TCT, or tax declaration			
Unemployed Women/wives	Severely or marginally affected	Women/wives who lose a job	Vocational training equivalent to the amount of P 15,000.00 per family	Same as “Income Loss”	Same as “Income Loss”
Additional allowance	Vulnerable persons as head of households	Person with disability, senior citizens	Additional allowance to be determined by RAP preparer.	Same as “Income Loss”	Same as “Income Loss”

Source: JICA Study Team (2011)

9.6.4.3 Valuation and Compensation for Losses

Valuation for compensating loss of land shall be in accordance with Section 5 of R.A. 8974; for dwellings and other structures, on replacement cost as defined in Section 10 of its Implementing Rules and Regulations (IRR), as well as the LARRIPP of the DPWH. Small-scale commercial establishments like sari-sari stores, which will incur temporary decrease in income due to limited access/frontage, shall also be provided income rehabilitation assistance. Inconvenience allowance shall be given to PAPs with severely affected structures, which require relocation and new construction.

For informal settlers, affected families shall be provided free transportation (including those who opt to go back to their province) upon their transfer to the relocation sites. Rehabilitation assistance such as skills training and other development activities per family will be provided in coordination with other government agencies, if the present means of livelihood is no longer viable and the PAPs will have to engage in a new income activity. Rental Subsidy will be given to PAPs without sufficient additional land to allow the reconstruction of their lost house.

1) Principle of Replacement Cost

All compensation for land and non-land assets owned by households/shop owners who meet the cut-off-date will be based on the principle of replacement cost.
Replacement cost is the amount calculated before displacement which is needed to replace an affected asset without depreciation and without deduction for taxes and/or costs of transaction.

- Existing regulations, methods and market price survey results of DPWH, DENR, DA, and LGUs will be used where ever available for compensation calculations for building, crops and trees.
- Independent asset assessor is employed to valuate lands, structures, trees and other compensations.
- Houses and other related structures based on actual current market prices of affected materials, labor and mark-up costs. Unit cost for the materials is updated every year, using standard price in each region. Labor cost is added as 25 % of the material cost. In addition to the total estimated direct cost, 20 % mark-up is included in the grand total of replacement cost, covering transfer cost and taxes.
- Annual crops equivalent to current market value of crops at the time of compensation;
- For perennial crops, cash compensation at replacement cost that should be in line with local government regulations, if available, is equivalent to current market value given the type and age at the time of compensation.

For timber trees, cash compensation at replacement cost that should be in line with local government regulations, if available, will be equivalent to current market value for each type, age and relevant productive value at the time of compensation based on the diameter at breast height of each tree.

Land	Agricultural Land	The pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes.
	Land in Urban Areas	The pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes.
Structure	Houses and Other Structures	The market cost of the materials to build a replacement structure with an area and quality of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes.

2) Standards to determine market value

Negotiated sale between DPWH and the PAF based on the following standards to determine the market value:

- The 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 improvements on the land and for the value for improvements thereon;
- The size, shape and 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.

9.6.5 Relocation Site Development Plan

9.6.5.1 Ideal Relocation Site

With the foregoing premises, for most of the structure occupants, ownership of the lots where their houses were built is considered free occupation on private land with permit.

In the consultation meeting for the Project, affected families of Barangay Umangan, Municipality of Aliaga and Barangay Caalibangbangan, Cabanatuan City, both in the Province of Nueva Ecija

have expressed their desire for an in-barangay relocation. This concern was echoed by their respective city/municipal and barangay officials. Coordination with the host LGUs of these PAPs, despite the above circumstances are willing to provide relocation sites.

Out of 67 PAFs 63 (i.e. 63families) are interviewed for relocation site preference. Their willingness to relocate is shown in **Table 9.6.3-8** and their preferences are in **Table 9.6.3-9**. There are 68.3% of PAPs very much willing to be relocated 93.0% of them are opting to be relocated in the same city/municipality. The remaining 7.0% are willing to be relocated in nearby provinces of Tarlac and Nueva Ecija.

9.6.5.2 Available Relocation Sites

1) Municipality of La Paz

The municipality of La Paz was not able to provide proposed a relocation site at the time of Stakeholders meeting. There are identified three (3) families/structure owners to be severely affected by the proposed project. The said households are also considered landless citizens who are occupying private lands that need to be relocated. The presently proposed relocation sites in La Paz are Brgy. Balanoy and Brgy. Dumarais is shown in **Figure 9.6.5-1**.

2) Municipality of Aliaga

The Municipality of Aliaga through its Municipal Planning and Development Office (MPDO) have a ready relocation site to accommodate the thirty two (32) severely affected families of Barangays Pantoc (3 families), Barangay Bucat (1 family), Barangay Betes (2 families) and Umangan (26 families). The said original relocation site which is owned by the municipality is situated in Brgy. Pantoc (see **Figure 9.6.5-2**). It has a total area of 4,844 square meters, large enough to contain above number of families.

Affected families of Brgy. Umangan do not agree to be relocated in Brgy. Pantoc, since they would be far-off from their present places of work and business. They would rather stay and find a place within the barangay. This prompted the MPDO and Office of the Vice-Mayor to look for a lot within Brgy. Umangan, to be purchased by the municipality, for the PAPs' in-barangay relocation site. The presently proposed relocation site for the affected families of Brgy. Umangan is within the same barangay as shown in **Figure 9.6.5-3**.

3) Cabanatuan City

During the consultation meetings with the City Planning and Development Coordinator, Cabanatuan City have various relocation sites within the city for its marginalized constituents.

But a formal response to the JICA Study Team has to be made by the city government regarding the PAPs (29 families, severely affected) of Brgy. Caalibangbangan.

Suggestion was also made during the Public Consultation Meeting and socio-economic survey of the Caalibangbangan PAPs, that they formally organize themselves and be recognized as an entity so that they can have access and be illegible for the national government's Community Mortgage Program (CMP) for Socialized Housing. Definitely this will be collaboration with their LGU. The presently proposed relocation site for the affected families of Cabanatuan City is shown in **Figure 9.6.5-3**.

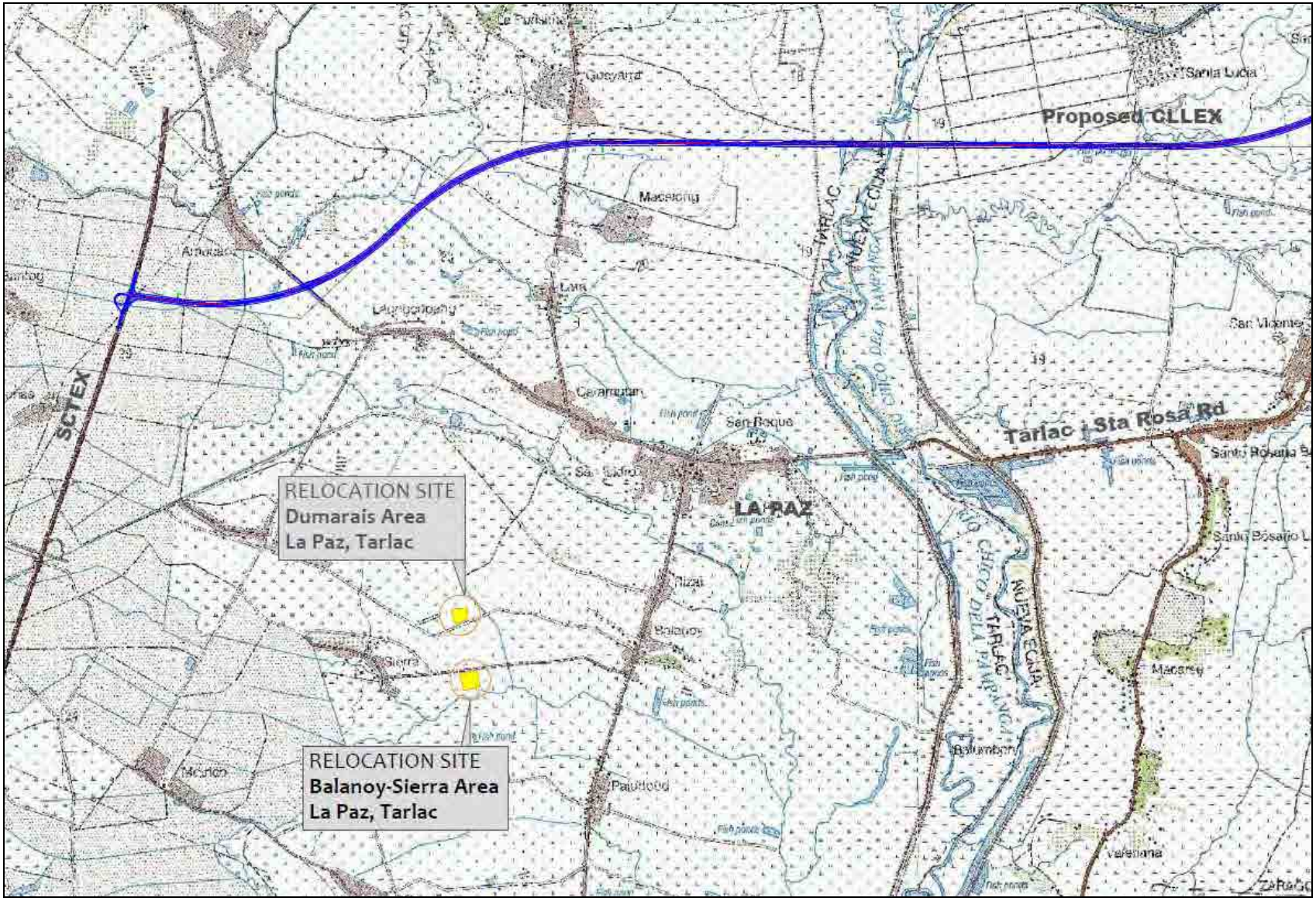
TABLE 9.6.5-1 PROPOSED RELOCATION SITES

Item No.	Relocation Site Location		Total Area of Proposed Relocation Site (M^2)	PAPs To Be Relocated		Remarks
	Sitio, Barangay City/ Municipality, Province	Geographical Coordinates		Present Location of PAPs	Total No. of PAPs	
1.0	**LA PAZ, TARLAC** Brgy. Balanoy, La Paz, Tarlac (along Balanoy-Sierra Road in front of Municipal Solid Waste Materials Recovery Facility)	15° 25' 37.2" N Latitude / 120° 42' 23.6" E Longitude	~ 20,000	Brgy. Laungcupang, La Paz, Tarlac (bet. CLLEx Sta. 1+900 & Sta. 2+200)	1	Two lots (Balanoy & Dumarais) for relocation sites owned by the Municipality of La Paz, Tarlac. Presently leased for agriculture purpose (planted with palay), wherein LGU has a percentage share from the palay/rice production as payment.
	Brgy. Dumarais, La Paz, Tarlac (along NIA irrigation canal/ maintenance road in Brgy. Dumarais)	15° 25' 53.7" N Latitude / 120° 42' 21.4" E Longitude	~ 20,000	Brgy. Macalong, La Paz, Tarlac (between CLLEX Sta. 3+660 & Sta. 4+800)	2	
2.0	**ALIAGA, NUEVA ECIJA** Brgy. Pantoc, Aliaga, Nueva Ecija (along Poblacion-Pantoc Road, Pantoc Centro)	15° 31' 42.4" N Latitude / 120° 50' 44.8" E Longitude	~ 4,844	Along Pantoc Creek, Brgy. Pantoc, Aliaga, Nueva Ecija (at ~ CLLEX Sta.	3 1 2	Lot owned by the Municipality of Aliaga, Nueva Ecija and have allocated it as relocation site for its

Item No.	Relocation Site Location		Total Area of Proposed Relocation Site (M^2)	PAPs To Be Relocated		Remarks
	Sitio, Barangay City/ Municipality, Province	Geographical Coordinates		Present Location of PAPs	Total No. of PAPs	
				20+900); Brgy. Bucot, CLLEX Sta.24 + 120; Brgy. Betes, CLLEX Sta. 26 + 300;		constituents to be affected by the CLLEX Project.
	Brgy. Umangan, Aliaga, Nueva Ecija (between Umangan Brgy. Road and Mabalasbas Creek)	15° 31‘ 34.5” N Latitude / 120° 55’ 22.6” E Longitude	~ 8,000	Along and between Umangan Brgy. Road & Mabalasbas Creek (between CLLEX Sta. 29+900 & Sta. 30+000)	26	Lot 2038 (portion) owned by Norberto A. Dionisio (Tax Dec. #05-01026-00118) & willing to sell; May be purchased for relocation site thru the Community Mortgage Program (CMP) & the Aliaga LGU to help organize the CA & act as Originator; Another option is outright purchase of lot by LGU & adapt same deal with beneficiaries as that of the CMP;
3.0	**CABANATUAN CITY, NUEVA ECIJA** Sitio Embuscado, Brgy. Caalibangbangan, Cabanatuan City, Nueva Ecija	15° 31‘ 28.2” N Latitude / 120° 55’ 34.2” E Longitude	~ 15,370	Between Maharlika & Vergara Highways at Brgy. Caalibangbangan, Cabanatuan City, Nueva	32	Lot owned by Angel A. Padilla (TCT 2916) & willing to sell; May be purchased for relocation site thru the CMP & the

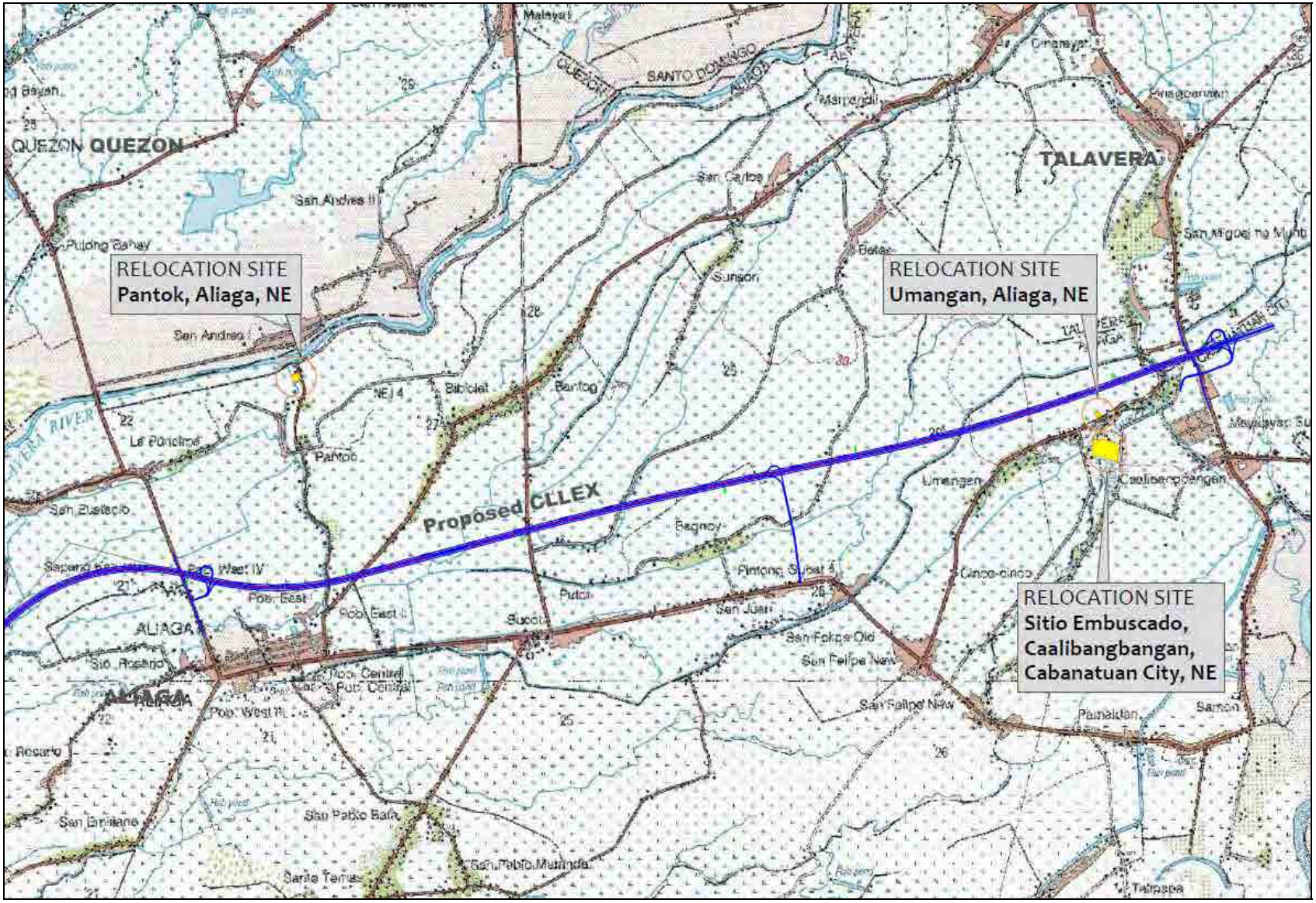
Item No.	Relocation Site Location		Total Area of Proposed Relocation Site (M^2)	PAPs To Be Relocated		Remarks
	Sitio, Barangay City/ Municipality, Province	Geographical Coordinates		Present Location of PAPs	Total No. of PAPs	
				Ecija (bet. Sta. 30+300 & Sta. 30+400)		Aliaga LGU to help organize the CA & act as Originator; Another option is outright purchase of lot by LGU & adapt same deal with beneficiaries as that of the CMP;

Source: JICA Study Team (2011)



Source: JICA Study Team (2011)

FIGURE 9.6.5-1 PROPOSED RELOCATION SITE (TARLAC)



Source: JICA Study Team (2011)

FIGURE 9.6.5-2 PROPOSED RELOCATION SITE (NUEVA ECIJA)

9.6.5.3 Relocation Site Development Plan

Another stakeholders meetings with the affected families in Cabanatuan City and Aliaga Municipality were held on November 3,4, 8 and 9, 2011. Based on these stakeholders meetings, final relocation site for Cabanatuan City and Aliaga Municipality was selected.

(1) For Affected Families in Brgy. Caalibangbangan, Cabanatuan City

(a) Criteria of selection of the sites:

The new proposed relocation site is a preference of the PAF, since the site is just near to their residence and within the same barangay. The lot is just near to their residence. The lot if subdivided for the PAFs will all be fronting the existing barangay road. The new proposed relocation site is a preference of the PAF since the site is just near to their residence and within the same barangay.

(b) Current situation of the sites (see **Figure 9.6.5-3**)

The site is empty space and located in the vicinity of the current residential location.

The new proposed relocation site has an area of about 1 hectare. It is located in barangay Caalibangbangan, the same barangay where the PAF are residing. The relocation site is an agricultural land and at the moment, it is observed to be an idle land. The site is about 1 meter lower than the existing roadway and will require filling materials when used as relocation site. It is about 200 meters away from the residence of the affected PAF. The relocation site is adjacent to the existing barangay road that will lead to the National Highway. The proposed relocation site is owned by a private individual by a certain Mr. Dela Cruz.

(c) Related organizations and their roles (organization structure):

LGU will prepare sites in coordination with DPWH while DPWH will develop roads, elevated water tank, and provision for drainage facilities. National Housing Authority (NHA) will mainly build houses. The institutional arrangement for the development of relocation sites will be formulated before final RAP is completed.

(d) Schedule for preparation of the sites (including land acquisition, procurement, construction, etc.):

	Agency	2013				2014			
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Preparation of IEE Checklist	LGU								
Secure CNC	LGU								
Negotiation with land owner and purchase	LGU								
Selection of Land Development Contractor	LGU								
Land Development	DPWH								
Arrangement of Mortgage Plan, Resettlement	NHA								
Building of Houses	PAF								
Relocation	PAF								
Demolition of Affected Houses	DPWH/PAF								

Source: JICA Study Team (2011)

(e) Cost and Budget:

Relocation Site: **Cabanatuan City** (Relocation Area = 1.0 ha.)

	Item	Estimated Cost (1,000 Php)	Responsible Agency
1. Preparation of IEE Checklist and secure CNC		100	Cabanatuan City Government
2. Land Acquisition of Relocation site (Php 200/m^2x10, 000 sq. m.)		2,000	Cabanatuan City Government
3. Development of relocation site	Embankment (Height = 1.0 m) (10,000 sq. m. x 1.0m x Php 600/m^3)	6,000	DPWH
	Side Ditch (1,000 m x Php 1,800 /m^3)	1,800	
	Water Tank	500	
	Miscellaneous	700	
	Sub-total	9,000	
4. Arrangement of mortgage plan, relocation contract and other management (Php 80,000 x 10 MM)		800	NHA
	Total	**11,900**	

Source: JICA Study Team

(f) PAPs' preference on the sites:

The PAF recommended the new relocation site, primarily because it is near to their present residence. Also, the site is already installed with electric lines and with a readily access road. The PAF feels to be comfortable to live in the new proposed relocation site compared to the previous site.

(g) CNC is needed for the relocation sites

(2) For Affected Families in Brgy. Umangan, Aliaga Municipality

(a) Criteria of selection of the sites:

The proposed relocation site should be within the same barangay where PAFs are residing at present, so that their present life can be maintained in terms of current job place, schools attending and community relationship.

(b) Current situation of the sites (see **Figure 9.6.5-3**)

The site is empty space and located in the vicinity of the current residential location. The site is owned by Mr. Norberto A. Dionisio and willing to sell the land. Municipal Government of Aliaga also confirmed its willingness to acquire the land. The land is located in the same barangay: Barangay Umangan as PAFs are residing now. The land is currently agricultural land and about 1 m. lower than the barangay road. Electricity is available. Land area is about 0.8 ha.

(c) Related organizations and their roles (organization structure):

LGU will prepare sites in coordination with DPWH while DPWH will develop roads, elevated water tank, and provision for drainage facilities. National Housing Authority (NHA) will mainly build houses. The institutional arrangement for the development of relocation sites will be formulated before final RAP is completed.

(d) Schedule for preparation of the sites (including land acquisition, procurement, construction, etc.)

	Agency	2013				2014			
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Preparation of IEE Checklist	LGU								
Secure CNC	LGU								
Negotiation with land owner and purchase	LGU								
Selection of Land Development Contractor	LGU								
Land Development	DPWH								
Arrangement of Mortgage Plan, Resettlement	NHA								
Building of Houses	PAF								
Relocation	PAF								
Demolition of Affected Houses	DPWH/PAF								

Source: JICA Study Team (2011)

(e) Cost and Budget:

Relocation Site: **Aliaga Municipality** (Relocation Area = 0.8 ha.)

	Item	Estimated Cost (1,000 Php)	Responsible Agency
1. Preparation of IEE Checklist and secure CNC		100	Aliaga Municipality
2. Land Acquisition of Relocation Site (Php 200/sq.m. x 8,000 sq.m.)		1,600	Aliaga Municipality
3. Development of relocation site	Embankment (Height = 1.0 m) (8,000 sq. m. x 1.0m x Php 600/m^3)	4,800	DPWH
	Side Ditch (1,500 m x Php 1,800 /m^3)	2,700	
	Water Tank	500	
	Miscellaneous	800	
	Sub-total	8,800	
4. Arrangement of mortgage plan, relocation contract and other management (Php 80,00 x 10 MM)		800	NHA
	Total	**11,300**	

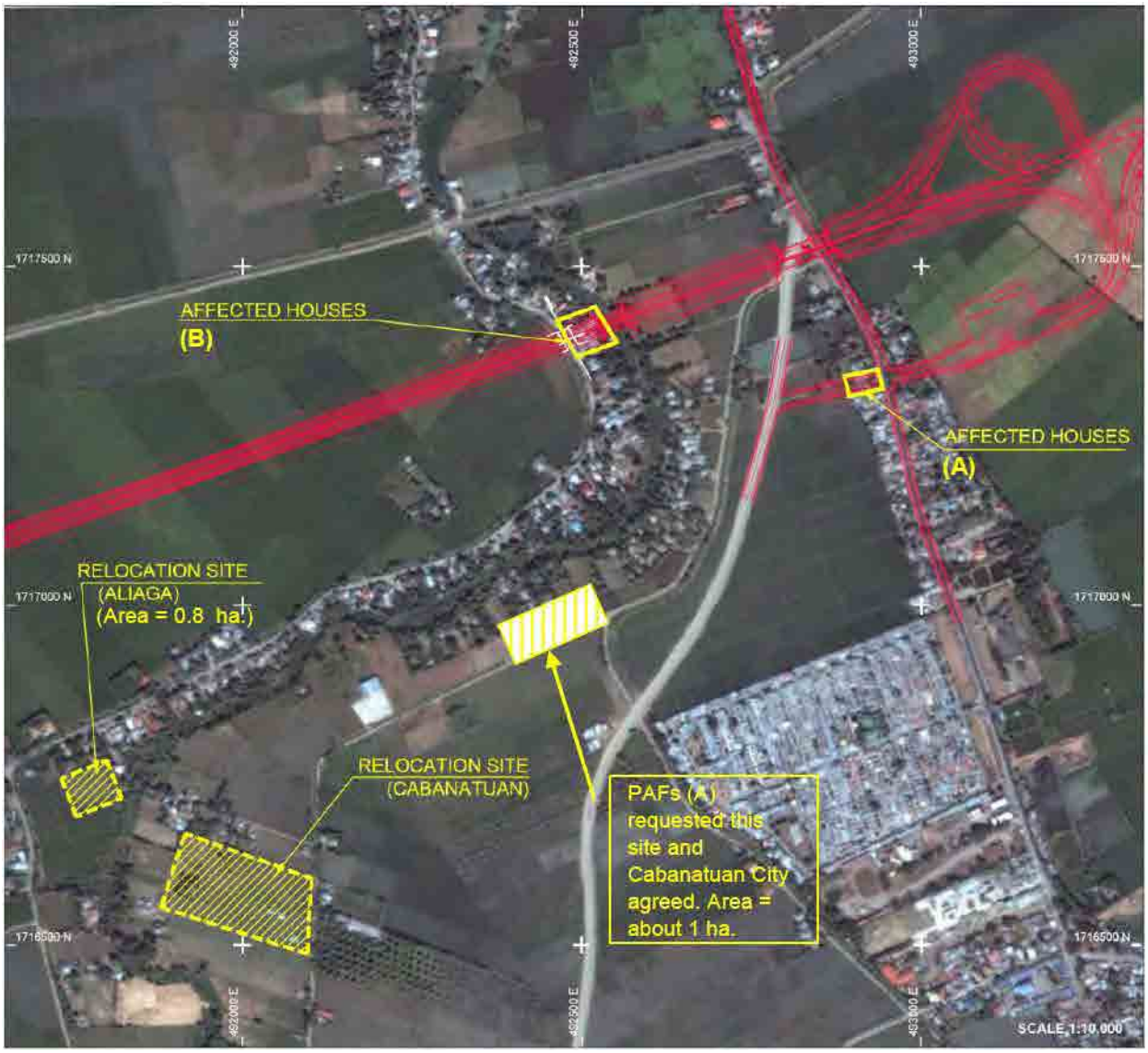
Source: JICA Study Team

(f) PAPs' preference on the sites:

All PAFs belongs to one family wherein owner of the land is their father who already passed away and the land subdivided was accordingly to his children. Although the land was subdivided, registration was not executed yet (free occupation status). PAFs are planning to buy new land at their choice using the replacement cost as payment for the new land. Nonetheless, if their plan is not pursued, they have alternative choice to reside at the proposed relocation site.

(g) ECC or CNC needed for the relocation sites

CNC is needed for developing the site.



Source: JICA Study Team (2011)

FIGURE 9.6.5-3 FINALLY PROPOSED RELOCATION SITES

9.6.5.4 Social Development Program (SDP) for Direct Impact Area (DIA)

DPWH must support a Social Development Program (SDP) that will ensure that affected communities get compensated for the disturbance to their normal lives, not only in terms of monetary settlement for the damages. It is just fair that they be assisted so that the processing of payment due them can be expedited. Aside from these, DPWH must also make sure that the relocation plan is sustainable; i.e., aside from the basic amenities at the resettlement area, an alternative livelihood assistance program must be included. The criteria used for identifying beneficiaries who would be eligible to the SDP for the CLLEX Project Phase 1 are those:

(1) Informal settlers who have no awarded land from government housing project;
(2) Informal settlers who no other place to thrive in;
(3) Who do not have other means of livelihood?
(4) Farmers who will loss income and land.

For employment opportunities and livelihood assistance, qualified, residents of the Direct Impact Area (DIA) must be given first priority in hiring during the pre-construction and construction stage of the project. The survey showed that most of the male household members can also work as driver (29.9%) aside from their present occupation, and also as laborers (37.5%), carpenters (14.7%), mason (6.3%), mechanic (3.6%) and utility (1.8%).

TABLE 05-2 SKILLS OF MEN IN THE DIA BASED ON SURVEY/INTERVIEW

City/Municipality		Laborer	Carpenter	Mason	mechanic	driver	Utility	none	Total
Type A – Structure Owner									
TARLAC									
La Paz	Count	-	2	-	-	-	-	1	3
	%	-	66.7%	-	-	-	-	33.3%	100.0%
NUEVA ECIJA									
Zaragosa	Count	1	-	-	-	-	-	-	1
	%	100.0 %	-	-	-	-	-	-	100.0%
Aliaga	Count	10	5	-	2	12	-	3	32
	%	31.3%	15.6%	-	6.3%	37.5%	-	9.4%	100.0%
Cabanatuan	Count	6	3	3	-	14	1	1	28
	%	21.4%	10.7%	10.7%	-	50.0%	3.6%	3.6%	100.0%
Sub-Total 1	**Count**	**17**	**10**	**3**	**2**	**26**	**1**	**5**	**64**
	%	**26.6%**	**15.6%**	**4.7%**	**3.1%**	**40.6%**	**1.6%**	**7.9%**	100.0%
Type B – Landowner									
TARLAC									
La Paz	Count	23	5	2		8	2	5	45
	%	51.1%	11.1%	4.4%		17.8%	4.4%	11.1%	100.0%
NUEVA ECIJA									
Zaragosa	Count	6	6	4	3	4	1	1	25
	%	24.0%	24.0%	16.0%	12.0%	16.0%		4.0%	100.0%
Aliaga	Count	36	12	5	3	26		3	85
	%	42.4%	14.1%	5.9%	3.5%	30.6%		3.6%	100.0%
Cabanatuan	Count	2				3			5
	%	40.0%				60.0%			100.0%
Sub-Total 2	**Count**	**67**	**23**	**11**	**6**	**41**	**3**	**9**	**160**
	%	**41.9%**	**14.4%**	**6.9%**	**3.8%**	**25.6%**	**1.9%**	**5.6%**	**100.0%**
Grand Total	**Count**	**84**	**33**	**14**	**8**	**67**	**4**	**14**	**224**
	%	**37.5%**	**14.7%**	**6.3%**	**3.6%**	**29.9%**	**1.8%**	**6.3%**	**100.0%**

Source: JICA Study Team (2011)

If the proposed relocation site for affected families is proximal to their present location, they should still be able to continue with their present source of livelihood. However, if the relocation site is far from the community's main source of livelihood, technical training must be provided to the beneficiaries to equip them in acquiring alternative means of livelihood.

Among the target female beneficiaries, the result of the survey showed that most of the available skills are cooking, seedling nursery and manufacturing **Table 9.6.5-3.**

TABLE 05-3 SKILLS OF WOMAN IN THE DIA BASED ON SURVEY/INTERVIEW

City/Municipality		Cook maintenance	sewer	Timekeeper clerk	Seedling nursery caretaker	Factory worker	house help	none	Total
Type A – Structure Owner									
TARLAC									
La Paz	Count	1	1	-	-	-	-	1	3
	%	33.3%	33.3%	-	-	-	-	33.3%	100.0%
NUEVA ECIJA									
Zaragosa	Count	1							1
	%	100.0%							100.0%
Aliaga	Count	11	6	1		6	4	4	32
	%	34.4%	18.8%	3.1%		3.1%	12.5%	12.5%	100.0%
Cabanatuan	Count	12	2	1		8	4	1	28
	%	42.9%	7.1%	3.6%		28.6%	14.3%	3.6%	100.0%
Sub-total 1	**Count**	**25**	**9**	**2**		**14**	**8**	**6**	**64**
	%	**39.1%**	**14.1%**	**3.1%**		**21.9%**	**12.5%**	**9.4%**	**100.0%**
Type B – Landowner									
TARLAC									
La Paz	Count	7	5		9	9	5	10	45
	%	15.6	11.1		20.0	20.0	11.1	22.2	100.0
NUEVA ECIJA									
Zaragosa	Count				12	5	6	2	25
	%				48.0%	20.0%	24.0%	11.8%	100.0%
Aliaga	Count	4	10		42	19	10		85
	%	4.7%	11.8%		49.4%	22.4%	11.8%		100.0%
Cabanatuan	Count	2	1			2			5
	%	40.0%	20.0%		40.0%				100.0%
Sub-total 2	**Count**	**13**	**16**		**63**	**35**	**21**	**12**	**160**
	%	**8.1%**	**10.0%**		**39.4%**	**21.9%**	**13.1%**	**7.5%**	**100.0%**
Grand Total	**Count**	**13**	**16**		**63**	**35**	**21**	**12**	**160**
	%	**8.1%**	**10.0%**		**39.4%**	**21.9%**	**13.1%**	**7.5%**	**100.0%**

Source: JICA Study Team (2011)

Such being the case, it is deemed necessary that female spouses are provided with additional livelihood training activities so that they can help their husbands in augmenting their family income. Some of these are:

(1) Livelihood seminars on dressmaking, food processing, handicraft making, and crop production enhancement;
(2) Productivity skills training; and
(3) Gender awareness and self enhancement skills development

DPWH, LGUs, DSWD, NGOs operating in the area, and other concerned private entities must join hands in the realization of these proposed training programs. For example skills training in coordination with the Technical and Educational Skills Development Administration (TESDA) can be arranged so that qualified beneficiaries may be able to avail of said trainings, without incurring too much cost on the part of the government.

9.6.6 PAP's Willingness to Relocate and Preferred Sites

Out of 67 PAFs 64 are interviewed for this topic. There are 68.8% of PAPs very much willing to be relocated 93.55% of them are opting to be relocated in the same city/municipality. The remaining 6.5% are willing to be relocated in nearby provinces of Tarlac and Nueva Ecija.

TABLE 9.6.6-1 ACCEPTABLE LIVELIHOOD ASSISTANCE FOR PAPS (TYPE B)

City/Municipality		Provision of another farmland	Provision of job employment	Provision of business capital/funds	Total
Type B– Land Owner					
TARLAC					
La Paz	Count	7	15	23	45
	%	15.6%	33.3%	51.1%	100.0%
NUEVA ECIJA					
Zaragoza	Count	14	3	8	25
	%	56.0%	12.0%	32.0%	100.0%
Aliaga	Count		16	69	85
	%		18.8%	21.2%	100.0%
Cabanatuan	Count		1	4	5
	%		20.0%	80.0%	100.0%
Total	Count	21	35	104	160
	%	13.1%	21.9%	65.0%	100.0%

Source: JICA Study Team (2011)

TABLE 9.6.6-2 PREFERENCE OF RELOCATION SITES BY PAPS (STRUCTURE OWNER)

City/Municipality		Relocated within current city/municipality	Relocated within current province	Total
TARLAC				
La Paz	HH	2	0	2
	%	100 %	0	100 %
NUEVA ECIJA				
Zaragoza	HH	1	0	1
	%	100 %	0	100 %
Aliaga	HH	17	1	18
	%	94.4 %	5.6%	100 %

Cabanatuan	HH	23	2	25
	%	92 %	8.0%	100 %
Total	HH	43	3	46
	%	93.5 %	6.5%	100 %

Source: JICA Study Team (2011)

9.6.7 Grievance Redressing Mechanism

If there will be grievances arising from any aspect of the Project, these will be handled through negotiations following the succeeding procedures.

In accordance with the LAPRAP Tracking Manual of DPWH, a Grievance Handling Committee (HGC) shall be formed within the City/Municipal Resettlement Implementing Committee (CRIC/MRIC-GHC) to facilitate the resolution of the PAPs' grievances. The CRIC's/MRIC's Chairperson shall head this Committee. Each representative from concerned Barangay government shall be his Co-Chairperson(s). The GHC shall consist of the following:

- Legal Officer from the Legal Service (DPWH Central)
- IROW Engineer
- IROW Agent
- Land Management Section Chief/Representative (DENR Regional/Provincial Office)
- City/Municipal Assessor
- Community Environment and Natural Resources Officer (CENRO)
- RP Preparer (from PJHL-PMO or their Consultant)
- Representatives of PAPs
- Representatives of NGOs

This procedure is initiated once the letters from PAFs, expressing their grievances are received by the CRIC-GHC. The deadline for submitting letters of grievances shall be set 30 days after the date of public disclosure; with a maximum extension of another 15 days, if request was made by more than ten percent (10%) of the PAFs.

A Grievance Action Form (GAF), as prescribed in the said LAPRAP Tracking Manual shall be used during the detailed design stage to cover the various aspects of property acquisition based on validation of the RP. The GAF shall, at the very least, contain the following:

- Basic information on PAPs (Name, Address, Contact Number)
- Date of last disclosure meeting;
- Category of grievance filed (Legal, Technical/Engineering, Social, and Financial)

- Type of action taken (Resolved at the CRIC level, or referred to higher authorities.

Respective Barangay Captains, as Co-Chairperson of the GHC shall be the first recipient of the GAF. All GAFs shall be consolidated by the CRIC/MRIC Chairperson and presented to the CRIC/MRIC for deliberation and appropriate action, on a weekly basis. Unresolved grievances at the CRIC/MRIC level shall be elevated to the respective District Engineering Offices for resolution of complaints. Recommendations of the District Engineer shall be elevated to the Regional ESSO for approval and final action. If there are still unresolved grievances, a case shall be filed in the proper courts.

PAPs shall be exempted from all administrative and legal fees incurred in pursuant to the grievance redress procedures.

9.6.8 Institutional Arrangement

The implementation of the RAP will be pursued by various government offices in cooperation with the PAFs and expressway concessionaire. In this section, the various players involved in the RAP implementation are named and their respective roles defined. While the expressway project is pursued under the Japan ODA Loan arrangements, the primary responsibility for the implementation of the project still lies with government specifically the Department of Public Works and Highways. This section is based on DAO D.O. 5, Series of 2003 and the DPWH LARRIP 3rd Edition.

9.6.8.1 Department of Public Works and Highways

DPWH is the Executing Agency (EA) who is responsible to the Philippine Government and the donor agency for the planning and implementation of the expressway project. DPWH will initiate through its relevant departments and PMOs the preparation of all documents necessary for the approval and implementation of the expressway project which includes the updating of feasibility studies, securing of clearances/permits, acquisition of ROW, and monitoring of project implementation. The expressway project will be overseen by the Office of the Assistant Secretary for Planning who shall report directly to the DPWH Secretary on matters related to the project.

9.6.8.2 Philippine-Japan-Highway Loan – Project Management Office (PJHL-PMO)

PJHL-PMO has the overall operational responsibility for implementing the project from the detailed design up to construction. In coordination with other relevant government agencies and the detailed design consultant, the PJHL-PMO shall manage and supervise the project, including resettlement planning and land acquisition. It shall ensure that funds for the timely

implementation of the RAP is available and that expenses are properly accounted for. PJHL-PMO will be assisted by ESSO and IROW-PMO who provides technical guidance and support in the preparation and implementation of the RAP.

9.6.8.3 Environmental and Social Services Office (ESSO)

ESSO shall provide technical guidance and support in the implementation of the RAP and will be responsible for the following resettlement activities:

- Oversee the preparation and planning of the RAP;
- Submit RAP budgetary requirements for approval and allocation of needed financial resources by the DPWH central office;
- In accordance to the Department's resettlement policies, guide the project consultants, and Regional Offices in their tasks, such as parcellary survey of project area, verification of PAFs, final inventory of affected assets, and information dissemination;
- Amend or update the RAP in the event problems arise during the internal and/or external monitoring of its implementation;
- Follow-up with the DPWH Accounting Office for the processing of compensation claims of PAFs;
- In collaboration with the IROW-PMO, monitor the actual payment of compensation to PAFs; and
- In collaboration with IROW-PMO, prepare periodic supervision and monitoring reports on RAP implementation for submission to the PJHL-PMO and the donor institution.

9.6.8.4 Infrastructure Right-of-Way (IROW)- PMO

IROW-PMO will provide guidance to PJHL-PMO and consultants on the preparation of RAP;

- It will spearhead the negotiations with the PAFs and secure agreements on the final valuation of the affected assets which will be used in the payment of compensation;
- It will finalize the compensation plan for the PAFs, based on the result of the negotiation process; and submit the same to the DPWH financial service for approval and payment;
- In collaboration with ESSO, monitor the progress of RAP implementation, including compensation disbursements and prepare monitoring reports for submission to the PJHL-PMO and donor institution.

9.6.8.5 District Engineering Office (DEO) of DPWH

The concerned DEO will serve as the major player in the implementation of the RAP with the following functions:

- Oversee the staking-out, verification and validation of the PAF's affected assets;
- Conduct inventories of properties that will be affected in coordination with the Detailed Design Consultant;
- Prepare parcellary maps of the project area in coordination with the Detailed Design Consultant;
- Approve disbursement vouchers/payments on PAFs compensation and other benefits;
- Submit disbursement reports on payments to PAFs to the Regional/Central Office accounting office and PJHL-PMO;
- Submit monthly progress reports to ESSO, Regional Office and PJHL-PMO; and
- Serve as an active member of the Resettlement Implementation Committee (RIC) of the City/Municipality.

9.6.8.6 Regional Office (Region III) of DPWH

The Regional Office shall act as the Liaison between ESSO, IROW-PMO and the District Engineering Offices and shall ensure that the RAP is implemented as planned. Its specific activities are:

- Oversee the activities of DEOs;
- Monitor the RAP implementation and fund disbursement;
- Submit monthly progress reports to ESSO;
- Monitor payments to PAFs;
- Address grievances filed at its office by the PAFs for speedy resolution.

9.6.8.7 Resettlement Implementation Committee (RIC)

The RIC shall be composed of representatives from the Regional Office and District Engineering Office, the City/Municipality LGU, affected barangays, and PAFs/PAPs. No NCIP nor ICC/IP representatives are included in the RIC as Region III is not a recognized ancestral land. The establishment of the RIC shall be made through the signing of a Memorandum of Understanding (MOU) between DPWH, the concerned LGU. The function of the RIC includes:

- Assist the project consultants and DPWH staff engaged in RAP preparation activities in (a) validating the list of PAFs; b) validating the assets of the PAFs that will be affected by the

project; (c) assist DPWH in arranging for a suitable relocation facility for the displaced PAFs, and (d) participate in monitoring the RAP implementation;

- Assist the DPWH staff engaged in the RAP preparation in the public information campaign, public participation and consultation meetings;
- Receive complaints and grievances from PAFs and other stakeholders and refer the matter to the appropriate authorities;
- Maintain a record of all public meetings, complaints and actions taken to address complaints and grievances; and
- In coordination with concerned government authorities, assist in the enforcement of laws/ordinances regarding encroachment into the project site or ROW.

9.6.8.8 National Housing Authority (NHA)

Although relocation of informal settlers is among the tasks of the National Housing Authority (NHA), there are just too many government projects that require relocation, particularly in urban areas where there is very little land that can be utilized as relocation site. It is quite important to coordinate with NHA at the early stage of the Project. For this particular project, NHA's functions are as follows;

- Coordinate with DPWH and LGUs for relocation of PAFs;
- Build houses at relocation sites, if necessary;
- Undertake the Social Development Program (SDP).

9.6.8.9 Organization Chart of RAP Implementation

Organization chart of RAP Implementation is shown in **Figure 9.6.8-1**.

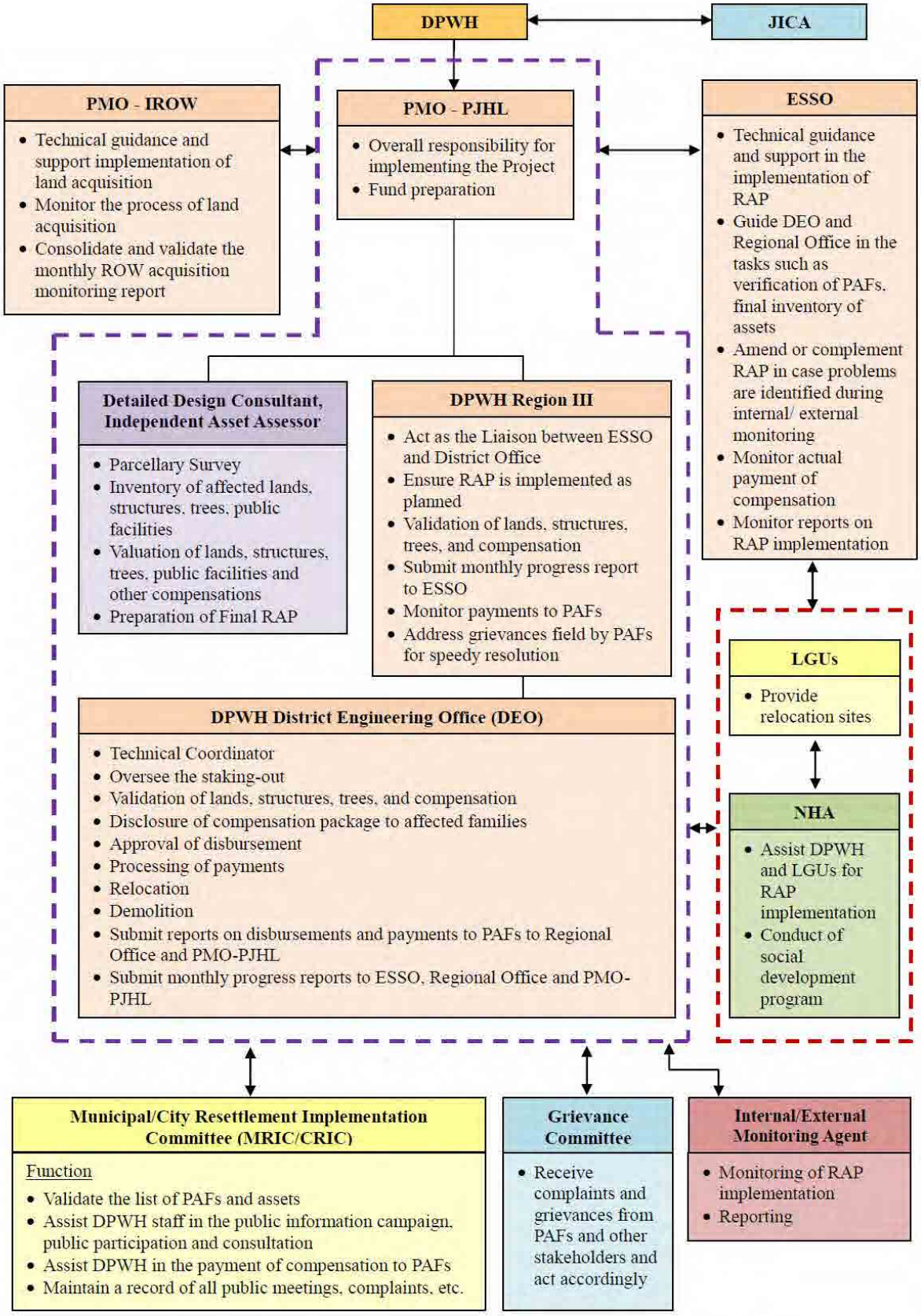


FIGURE 9.6.8-1 RAP IMPLEMENTATION ORGANIZATION

9.6.9 RAP Implementation Process

RAP implementation process is shown in **Figure 9.6.9-1**.

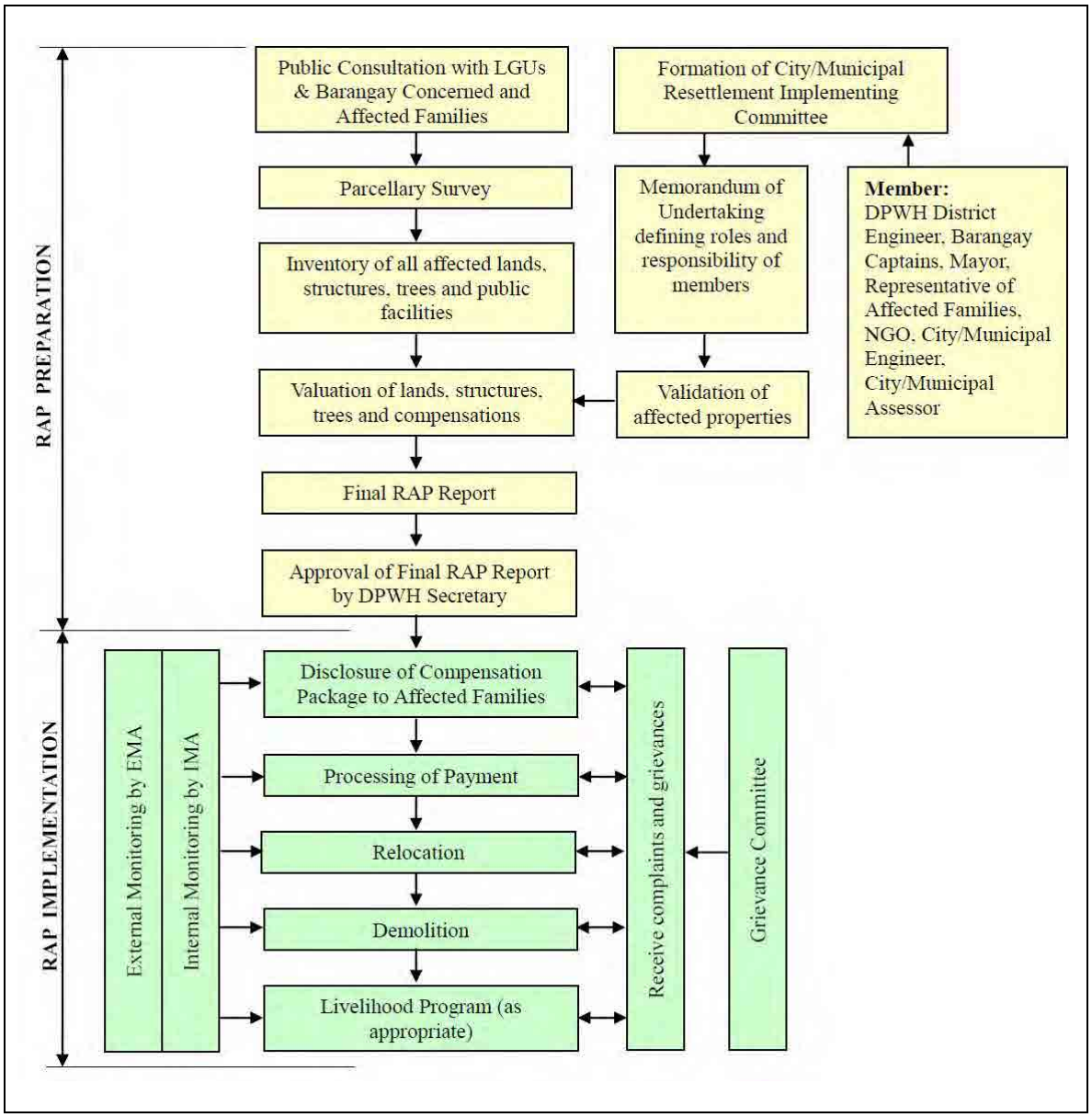


FIGURE 9.6.9-1 RAP IMPLEMENTATION PROCESS

9.6.10 Implementation schedule

9.6.10.1 Cut-off date (Survey Commencement date)

Cut-off date for compensation eligibility is the date when social survey was carried out. The concept of the "cut-off date" was also emphasized during each IEC. "Cut-off date", as defined in the Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples Policy (LARRIPP, 3rd Edition 2007) of DPWH is "the date of the census of affected families within the Project boundaries". As cited in World Bank's O.P. 4.12, cut-off date is the date the census begins. The cut-off date could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated, and systematic and continuous dissemination subsequent to the delineation to prevent further population influx.

TABLE 9.6.10-1 DATES OF CENSUS COMMENCEMENT (CUT-OFF DATE)

Province	City	Barangay	Starting Date(Cutoff date)
Tarlac	La Paz	Macalong	August 07, 2011
		Laungcupang	August 12, 2011
Nueva Ecija	Zaragoza	Sta. Lucia Old	August 08, 2011
	Aliaga	Pantoc	July 23, 2011
		Umangan	August 06, 2011
		Betes	August 11, 2011
		Bucot	August 11, 2011
	Cabanatuan	Caalibangbangan	July 30, 2011

Source: JICA Study Team (2011)

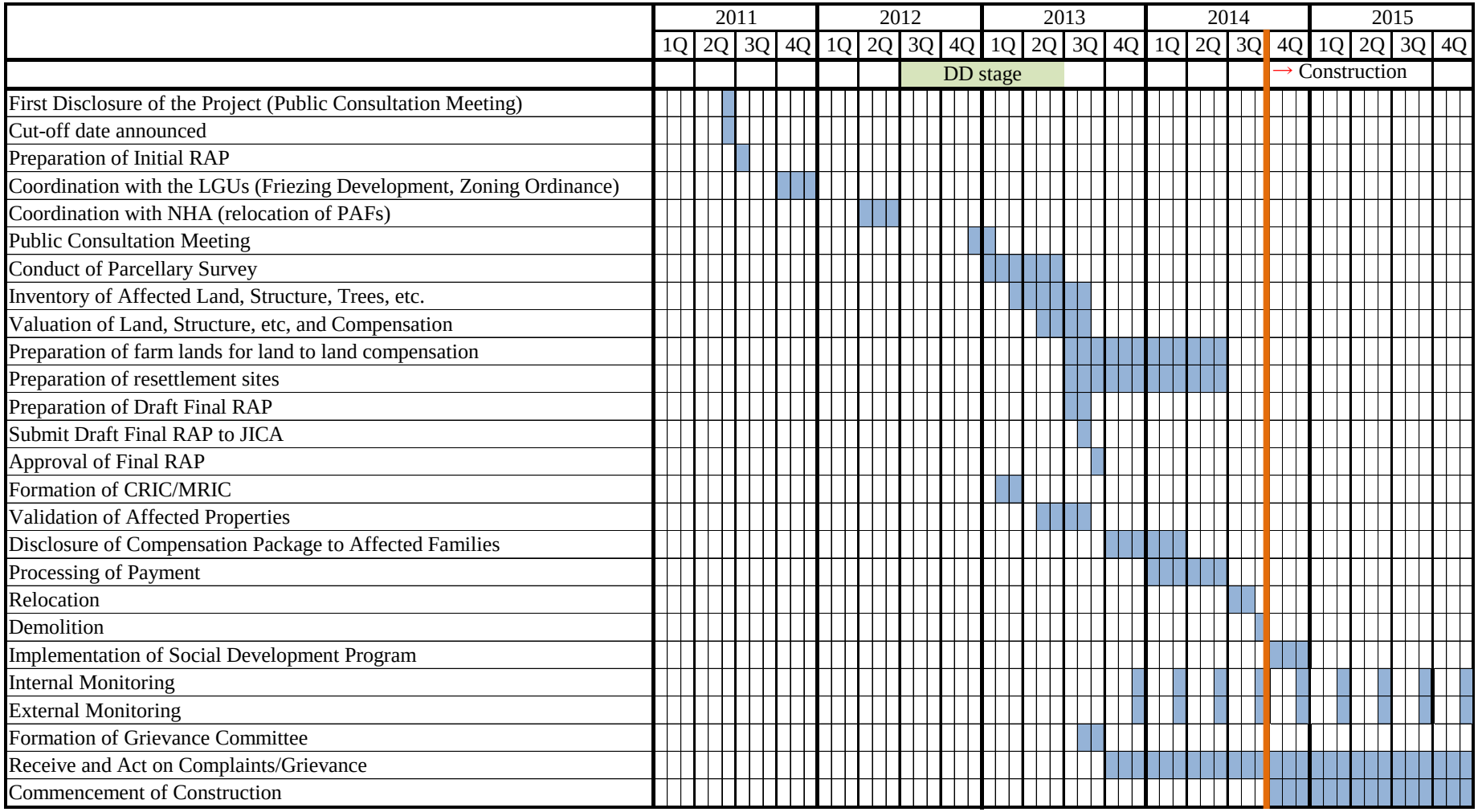
9.6.10.2 Tagging

Process of tagging of affected structures, which was carried out by the RAP Team was well explained during consultation meetings to make sure that the PAPs are well informed of the purpose of the sticker tags and photographs. It was also pointed out during said meetings that the preparation of the parcellary plans (prepared by the DPWH - District Office) should be completed first before the final location and extent (size) of land take can be determined. Tagging of affected structures and improvements commenced in July 23, 2011 using the project design and alignment provided by the JICA Study Team.

9.6.10.3 RAP Implementation Schedule

RAP implementation schedule is shown in **Table 9.6.10-2**.

TABLE 9.6.10-2 RAP IMPLEMENTATION SCHEDULE



Source: JICA Study Team (2011)

9.6.11 Financial Arrangement

All necessary cost except purchasing/providing the resettlement sites shall be arranged, budgeted and released by PMO-PJHL of DPWH. LGUs shall provide available or new relocation sites of which procurement cost shall be arranged by the respective LGUs.

9.6.12 Estimated Cost

Acquisition cost of land and structure/improvement/trees, compensation cost, resettlement site development cost, RAP implementation cost, etc. are estimated as shown in **Table 9.6.12-1.**

TABLE 9.6.12-1 ESTIMATED RAP IMPLEMENTATION COST

Activity	Cost Item	Amount (in 1,000 Php)	Remarks
A. Land Acquisition, Structures and Trees	Land	36,718	• Estimated based on current BIR Zonal Valuation or City/Municipality Assessor's value whichever is higher.
	Contingency for Land	108,713	• Estimated based on information of residents on current market value
	Structure, Improvement and Trees	35,782	• Based on current replacement cost.
	Sub-Total for (A)	**181,213**	
B. Compensations	Cash compensation for damaged crops	14,670	• 200 ha. x 4.89 t/ha x 15P/kg = 14.670 Million Pesos
	Disturbance Allowance	7,890	• Land owner: 483 x 15,000 P/household = 7.245 Million Pesos • Tenant Farmer & Free occupation = 8.8 ha. x 4.89 t/ha. x 15P/kg = 0.645 Million Pesos
	Rehabilitation Assistance	2,574	• (505 + 67) household x 15,000 P/household x 30% = 2.574 Million Pesos
	Rental Subsidy	1,005	• 67 x 15,000 P/household = 1.005 Million Pesos
	Income Loss	2,373	• (505 x 30% + 67 x 60%) x 15,000 P/household = 2.373 Million Pesos
	Unemployed women	1,716	• (505 + 67) x 20% x 15,000 P/person = 1.716 Million Pesos
	Allowance for vulnerable persons	1,850	• (2,133 + 334) x 5% x 15,000 P/person = 1.850 Million Pesos
	Sub-Total for (B)	**32,078**	
C. Development of Relocation	Land development,	**23,200**	• 2 sites

Activity	Cost Item	Amount (in 1,000 Php)	Remarks
Sites	water, electricity supply access roads		
D. RAP Implementation	RAP monitoring cost	-	• Included in DPWH's Administration Cost (Total Administration Cost Php 143.69 Million, a part of which is to be allocated for this.) • Included in Consultancy Services Cost (Php 2.42 Million)
	Parcellary Cost	-	• Included in Consultancy Services Cost (Php 5.05 Million)
	Cost for Hiring Independent Asset Assessor	-	• Included in Consultancy Services Cost (Php 3.22 Million)
	Cost for External Monitoring	1,600	• 8 times
	Cost for MRIC/CRIC	2,250	• Allowances and per diem of members
	Cost for Grievance Committee	750	• 1/3 of MRIC/CRIC Cost
	Cost for Social Development Program	1,500	• SDP for 100 households
	Cost for Public Meetings	900	• 30 times
	Sub-Total for (D)	**7,000**	
Total (A + B + C+D)		**243,491**	
E. Contingency	20%	**48,698**	
Grand Total (A + B + C + D + E)		**292,189**	

Source: JICA Study Team (2011)

Estimated cost of land, structures and trees by city/municipality is shown in **Table 9.6.12-2.**

TABLE 9.6.12-2 COST OF LAND, STRUCTURE AND TREES BY CITY/MUNICIPALITY

Unit: Pesos

Affected City/Municipality	Land	Structures	Trees
Tarlac City, Tarlac	421,000.00	240,000.00	99,000.00
La Paz, Tarlac	2,898,000.00	547,125.00	509,695.00
Zaragoza, Nueva Ecija	9,036,196.00	155,826.68	289,080.00
Aliaga, Nueva Ecija	19,723,158.00	19,811,319.82	1,461,824.00
Cabanatuan, Nueva Ecija	4,648,760.00	12,256,237.00	411,750.00
Total:	36,718,114.00	33,010,508.50	2,771,349.00

Source: JICA Study Team (2011)

9.6.13 Monitoring and Evaluation

9.6.13.1 Monitoring Agents

(1) Internal Monitoring

An Internal Monitoring Agent (IMA) will be commissioned by the PMO-PJHL to undertake independent internal monitoring and evaluation.

The tasks of the IMA are to:

a) Regularly supervise and monitor the implementation of the RAP in coordination with the concerned CRIC/MRIC. The findings will be documented in the quarterly report to be submitted to the PMO and ESSO, and PMO-PJHL in turn will submit the report to JICA.

b) Verify that the re-inventory baseline information of all PAFs has been carried out and that the valuation of assets lost or damaged, the provision of compensation and other entitlements, and relocation, if any, has been carried out in accordance with the LARRIP and the respective RAP Reports.

c) Ensure that the RAP are implemented as designed and planned.

d) Verify that funds for implementing the RAP are provided by the PMO-PJHL in a timely manner and in amounts sufficient for the purpose.

e) Record all grievances and their resolution and ensure that complaints are dealt with promptly.

All activities in RAP implementation will require for quality and quantity results which are time bounded. The PMO-PJHL will be responsible for the internal monitoring of the actual

implementation jointly with ESSO of DPWH against the planned activities, time frame, budget and entitlement that will be done on an on-going basis throughout the subproject construction and in the livelihood period of the affected households.

(2) External Monitoring

An External Monitoring Agent (EMA) will be commissioned by the PMO-PJHL to undertake independent external monitoring and evaluation. The EMA for the Project will be either a qualified individual or a consultancy firm with qualified and experienced staff. The Terms of Reference of the engagement of the EMA shall be prepared by the DPWH and shall be acceptable to the JICA prior to the engagement.

The tasks of the EMA shall be the following:

a) Verify results of internal monitoring;
b) Verify and assess the results of the information campaign for PAFs rights and entitlements;
c) Verify that the compensation process has been carried out with the procedures communicated with the PAFs during the consultations;
d) Assess whether resettlement objectives have been met; specifically, whether livelihoods and living standards have been restored or enhanced;
e) Assess efficiency, effectiveness, impact and sustainability of resettlement and RAP implementation drawing lessons as a guide to future resettlement and indigenous peoples' policy making and planning;
f) Ascertain whether the resettlement were appropriate to meet the objectives, and whether the objectives were suited to PAF conditions;
g) Suggest modification in the implementation procedures of the RAP, if necessary, to achieve the principles and objectives of the Resettlement Policy;
h) Review on how compensation rates were evaluated; and
i) Review of the handling of compliance and grievances cases.

External monitoring and evaluation will be of two kinds: 1) random observation visits and 2) consultation with PAFs, both at their current residence area and at their relocation site.

9.6.13.2 Stages and Frequency of Monitoring

The stages and monitoring frequency of the contract packages by the IMA and EMA as follows.

(1) Inception Report

This is the first activity that both IMA and EMA shall undertake to determine whether or not the RAP was carried out as planned and according to this Policy.

The IMA / EMA will submit an Inception Report and Compliance Report one month after receipt of Notice to Proceed for the engagement. The engagement of the IMA/EMA shall be scheduled to meet the Policy's requirement of concluding RAP implementation activities at least one (1) month prior to the start of civil works.

(2) IMA Monthly Monitoring

The IMA will be required to conduct a monthly monitoring of RAP implementation activities.

(3) IMA Final Evaluation

Final evaluation of the implementation of the LARRIP will be conducted three months after the completion of payments of compensation to PAFs.

(4) IMA Post-Resettlement Semi-Annual Monitoring and Evaluation

This activity will be undertaken every 6 months until the construction works end, to determine whether the social and economic conditions of the PAFs after the implementation of the project have improved.

When the PAF are found that their living standard worsens, or whose present means of livelihood became not-viable, DPWH, in coordination with other appropriate institutions, will provide assistances, such as skills and livelihood trainings.

(5) EMA Semi-Annual Monitoring

This activity will be undertaken every 6 months until the construction works end to follow-up whether the social and economic conditions of the PAFs after the implementation of the project have improved.

When the PAF are found that their living standard worsens, or whose present means of livelihood became not-viable, DPWH, in coordination with other appropriate institutions, will provide assistances, such as skills and livelihood trainings.

(6) IMA/EMA Final Evaluation and Proposal Report

Final Evaluation and Proposal Report will be submitted one month after the completion of the construction work.

9.6.13.3 Schedule of Implementation of RAP and Monitoring

PMO-PJHL through Project Consultant in coordination with the ESSO shall establish a schedule for the implementation of RAP and the required monitoring taking into account the project's implementing schedule. It is expected that one month prior to the start of the civil works, all RAP activities have been determined by the IMA and EMA as having been concluded.

TABLE 9.6.13-1 RAP MONITORING SCHEDULE

	Internal Monitoring Agent	External Monitoring Agent
RAP Implementation Period (May 2013 to December 2014: 20 months)	• Inception Report (1) • Monthly Monitoring and Reporting (20) • Final evaluation (1)	• Inception Report (1) • Semi-Annual Report
Construction Period (January 2015 – April 2017: 28 months)	• Semi-Annual Monitoring and Reporting (9) • Final Evaluation Report (1)	• Semi-Annual Report (9) • Final Report (1)

9.6.13.4 Reporting

The IMA and the EMA are accountable to the PMO-PJHL and also report to the ESSO. The PMO-PJHL submits copy of their reports to JICA.

9.6.13.5 Monitoring Indicator

Monitoring indicators are shown in **Table 9.6.13-2.**

TABLE 9.6.13-1 MONITORING INDICATORS

Monitoring Indicators	Basis for Indicators / Check List
1. For the IMA	
1. Budget and timeframe	□ Have all land acquisition and resettlement staff been appointed and mobilized for the field and office work on schedule? □ Have capacity building and training activities been completed on schedule? □ Are settlement implementation activities being achieved against the agreed implementation plan? □ Are funds for resettlement being allocated to resettlement agencies on time? □ Have funds been disbursed according to the RAP? □ Has the social preparation phase taken place as scheduled? □ Have all lands been acquired and occupied in time for project implementation?
2. Delivery of Compensation and Entitlements	□ Have all PAFs received entitlements according to numbers and categories of loss set out in the entitlement matrix? □ Have PAFs received payments for affected structures on time? □ How many PAFs opted to donate their land to the government? □ How many PAFs did not receive payment because their title is covered by the provisions of Sec. 112 of CA 141? □ How many landholdings were subjected to quit claim? Easement? □ How many PAFs accepted the first offer at zonal valuation? □ How many PAFs rejected the first offer and accepted the second offer? □ How many PAFs resorted to expropriation? □ How many PAFs have received housing as per relocation options in the RPAP? □ Have relocation sites been selected and developed as per agreed standards? □ Are the PAFs occupying the new houses? □ Is restoration proceeding for social infrastructure and services? □ Are income and livelihood restoration activities being implemented

Monitoring Indicators	Basis for Indicators / Check List
	as set out in income restoration plan? For example utilizing replacement land, commencement of production, numbers of PAFs trained and provided with jobs, micro-credit disbursed, number of income generating activities assisted? □ Have affected businesses received entitlements including transfer and payments for net losses resulting from lost business and stoppage of production?
3. Public Participation and Consultation	□ Have consultations taken place as scheduled including meetings, groups, and community activities? Have appropriate resettlement leaflets been prepared and distributed? □ How many PAFs know their entitlements? How many know if they have been received? □ Have any PAFs used the grievance redress procedures? What were the outcomes? □ Have conflicts been resolved? □ Was the social preparation phase implemented?
4. Benefit monitoring	□ What changes have occurred in patterns of occupation, production and resources use compared to the pre-project situation? □ What changes have occurred in income and expenditure patterns compared to pre-project situation? What have been the changes in cost of living compared to pre-project situation? Have PAFs' incomes kept pace with these changes? □ What changes have taken place in key social and cultural parameters relating to living standards? □ What changes have occurred for vulnerable groups?
2. For the EMA	
1. Basic information on PAP households	□ Location □ Composition and structures, ages, education and skills levels □ Gender of household head □ Ethnic group □ Access of health, education, utilities and other social services □ Housing type □ Land use and other resource ownership patterns □ Occupation and employment patterns □ Income sources and levels

Monitoring Indicators	Basis for Indicators / Check List
	□ Agricultural production data (for rural households) □ Participation in neighborhood or community groups □ Access to cultural sites and events □ Value of all assets forming entitlements and resettlements and resettlement entitlements
2. Restoration of living standards	□ Were house compensation payments made free of depreciation, fees or transfer costs to the PAF? □ Have perceptions of "community" been restored? □ Have PAFs achieved replacement of key social cultural elements?
3. Restoration of Livelihoods	□ Were compensation payments made free of deduction for depreciation, fees or transfer costs to the PAF? □ Were compensation payments sufficient to replace lost assets? □ Was sufficient replacement land available of suitable standard? □ Have enterprises affected received sufficient assistance to re-establish themselves? □ Have vulnerable groups been provided income-earning opportunities? Are these effective and sustainable? □ Do jobs provided restore pre-project income levels and living standards?
4. Levels of PAP Satisfaction	□ How much do PAFs know about resettlement procedures and entitlements? Do PAFs know their entitlements? □ Do they know if these have been met? □ How do PAFs assess the extent to which their own living standards and livelihood been restored? □ How much do PAFs know about grievance procedures and conflict resolution procedures? How satisfied are those who have used said mechanisms?
5. Effectiveness of Resettlement Planning	□ Were the PAFs and their assets correctly enumerated? □ Was any land speculators assisted? □ Was the time frame and budget sufficient to meet objectives? □ Were entitlements too generous? □ Were vulnerable groups identified and assisted? □ How did resettlement implementers deal with unforeseen problems?
6. Other Impacts	□ Were there unintended environmental impacts? □ Were there unintended impacts on employment or incomes?

9.7 STAKEHOLDERS MEETING/ CONSULTATION MEETING

Total of nine (9) stakeholders meetings/consultation meetings were conducted between 25th and 29th of July, 2011 in Provinces of Nueva Ecija and of Tarlac.

9.7.1 Procedure of the Meeting

Total of fourteen (14) consultation meetings were held for EIS and RAP formations. There are three levels of meeting according to types of interest groups.

- **Government level**: Three (3) Coordination meetings with concerned agencies – DPWH Region 3, NIA Tarlac Province and the Upper Pampanga River Integrated Irrigation System (UPRIIS)
- **LGU level**: Two (2) City level and three (3) Municipal level meetings with the LGUs of Tarlac City (including PAPs) and La Paz in the Province of Tarlac, Zaragoza, Aliaga and Cabanatuan City in the Province of Nueva Ecija
- **Barangay level**: Five (5) Barangay level meetings with Project Affected Persons (PAPs)–One (1) in the Municipality of La Paz (Barangays Amucao, Guevarra and Laungcupang), one (1) in the Municipality of Zaragoza (Barangays Sta. Lucia Young and Old), one (1) in the Municipality of Aliaga (Barangays Betes, Bibiclat, Bucot, Magsaysay, Pantoc, Poblacion East 1, San Juan, San Eustacio, Sta. Monica, Sto. Rosario), one (1) Barangay Umangan, Municipality of Aliaga, and one (1) in the City of Cabanatuan (Barangays Caalibangbangan and Mayapyap Norte)
- **Others**: One (1) Coordination meeting with Hacienda Luisita.

The Study Team consulted with the concerned Mayors of the affected areas and set the date of the stakeholder meeting. Official letters were sent to the concerned Mayors prior to at least one week before and Mayors informed about the Stakeholders meeting to concerned barangay captains requesting them to inform the concerned people within their jurisdiction.

Venue was selected based on the advice of Mayor in consideration of the following;

- Venue where easily accessible by the concerned people.
- Venue where the power point presentation for a better understanding of the presentation is possible.
- Venue where concerned people know and familiar with it.

The consultation meetings were undertaken to:

- Inform about the Project/CLLEX including alternatives of project designs;
- Inform of and confirm the revised Scoping Matrix and concerns with the stakeholders;
- Inform and generate awareness and understanding of the concerned public about the project;
- Provide the stakeholders and avenue to ventilate salient issues and concerns regarding the project;
- Give an opportunity to the stakeholders to have an open discussion with the Preparers, Proponent, and LGUs about the project;
- Inform the stakeholders of their rights and privileges; and
- Enable the stakeholders to effectively participate and make informed and guided decisions.

Complete and proper documentations of the proceedings were strictly observed. All participants of each activity were noted and proceedings were recorded on a digital voice recorder. Photographs were likewise taken during the consultations.

Results of the Stakeholder meetings were summarized in the minutes of the meeting which were sent to concerned Mayors requesting them to distribute minutes to concerned Barangay Captains who are requested to post the minutes at the Barangay Hall.

CONSULTATION MEETING SCHEDULE AND PARTICIPANTS

Date/Time	Target Municipality	Main Participants
25 July, 2011 14:00 – 16:00	Aliaga, Province of Nueva Ecija	Municipal Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group
26 July, 2011 10:00 – 12:00	Cabanatuan, Province of Nueva City	City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group
26 July, 2011 14:00 – 16:00	Cabanatuan, Province of Nueva City	PAPs, City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group
27 July, 2011 14:00 – 16:00	Tarlac, Province of Tarlac	PAPs, City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group, Hacienda Luisita
28 July, 2011 10:00 – 12:00	Zaragoza, Province of Nueva Ecija	Municipal Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group
28 July, 2011 1400 – 16:30	La Paz, Province of Tarlac	PAPs, City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group

29 July, 2011 10:00 – 12:00	Aliaga, Province of Nueva Ecija	PAPs, City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group
29 July, 2011 10:00 – 12:00	Zaragoza, Province of Nueva Ecija	PAPs, City Officials, Barangay Officials, People's Organization, Farmer's Association, NGO, Homeowner's Association, Transport Group

9.7.2 Program

An outline of consultation meeting is shown below.

PROGRAMME

Information, Education & Communication (IEC) Meeting
Municipal Level
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
PROPOSED CENTRAL LUZON LINK EXPRESSWAY (CLLEX) PROJECT

Venue: G/F Kairos Hotel and Resort, Aliaga, Province of Nueva Ecija
1400 – 1600HH, July 25, 2011

I.	Registration	1400 – 1415HH	G/F Kairos Hotel & Resort
II.	Welcome Remarks		Mr. Jose Gaya *Municipal Administrator*
III.	Introduction of Participants		Ms. Crisley Ian V. Diot *Ecosyscorp, Inc.*
IV.	Objectives of the Meeting		Ms. Annabelle N.Herrera *Ecosyscorp Inc.*
V.	Presentation of the Project		Ms. Annabelle N. Herrera *Ecosyscorp, Inc.*
VI.	Objectives and Activities of the Study		Ms. Annabelle N. Herrera *Ecosyscorp, Inc.*
VII.	Open Forum:		Felicia G. Rubianes *Ecosyscorp, Inc.*
VIII.	Closing Remarks		Hon. Elizabeth Vargas *Vice Mayor*

A PROGRAM OF STAKEHOLDER MEETING

9.7.3 Attendants

INFORMATION EDUCATION AND COMMUNICATION MEETINGS					
Activity	Milestone and Purpose	Venue	Number of Attendees		Date
			(Male)	(Female)	
Coordination Meeting	DPWH Region III	Office of the Regional Director, City of San Fernando, Pampanga	2	3	July 18, 2011
	National Irrigation Authority (NIA)	NIA Office, Brgy. Matatalaib, Tarlac City	4		July 22, 2011

INFORMATION EDUCATION AND COMMUNICATION MEETINGS					
Activity	Milestone and Purpose	Venue	Number of Attendees		Date
			(Male)	(Female)	
	NIA-Upper Pampanga River Integrated Irrigation System (UPRIIS)	Brgy. Capt. Pepe, Cagayan Valley Road, Cabanatuan City	4		July 22, 2011
	Hacienda Luisita	Conference room, Central Azucarera De Tarlac, Tarlac	5	1	August 5, 2011
IEC of LGUs	a. LGU Officials of Aliaga	G/F, Kairos Hotel and Resort, Aliaga, Nueva Ecija	39	14	July 25, 2011
	b. LGU Officials of Cabanatuan	City Hall of Cabanatuan, Nueva Ecija	18	8	July 26, 2011
	c. LGU Officials of Tarlac	City Hall of Tarlac, Province of Tarlac	16	10	July 27, 2011
	d. LGU Officials of La Paz	Municipal Hall of Lapaz, Tarlac	13	8	July 27, 2011
	e. LGU Officials of Zaragoza	Municipal Hall of Zaragoza, Nueva Ecija	24	11	July 28, 2011
IEC of PAPs	<u>Project Disclosure:</u> a. To inform the PAPs about: the configuration of the proposed CLLEX Expressway the expected adverse impacts such as displacements of households, damage to crops; That there will be parcellary survey to finalize number of PAPs to be affected and extent of impact; The concept of Cut-Off Dates b. To encourage PAP's to speak up their ideas, concerns and apprehensions, and other related issues (open discussion)	Barangay Hall of Caalibangbangan, Cabanatuan City, Nueva Ecija	22	15	July 26, 2011
		ABC Session Hall of Lapaz, Tarlac	24	36	July 28, 2011
		Municipal Session Hall of Zaragoza, Nueva Ecija	26	14	July 29, 2011
		2/F, Kairos Hotel and Resort, Aliaga, Nueva Ecija	94	22	July 29, 2011
		Umangan, Aliaga, Nueva Ecija	11	13	August 06, 2011

9.7.4 Discussion

EIS and RAP were discussed in the same meeting.

Aside from IEC Meetings, the Consultant paid visits to the Office of Provincial Assessor of Tarlac and Nueva Ecija, City Assessors of Tarlac and Cabanatuan and Municipal Assessors of La Paz, Zaragoza and Aliaga to request for assistance in identifying owners of lots to be affected. The project was also presented to the different department and offices of the Local Government Unit such as Treasury, Municipal Agrarian Reform Office (MARO), Provincial Agrarian Reform Office (PARO) and Department of Agrarian Reform (DAR).

During these meetings, the project in terms of ROW width, type of surfacing, alignments, and target implementation schedule, among others, were presented to the PAPs. To familiarize them with the RAP preparation process, field activities that were undertaken namely: (i) linear mapping and tagging; (ii) taking of PAP's photograph in front of their houses/properties carrying a board showing the tag/control number of the affected structure/property; and (iii) conduct of socioeconomic.

SUMMARY OF MINUTES OF MEETING

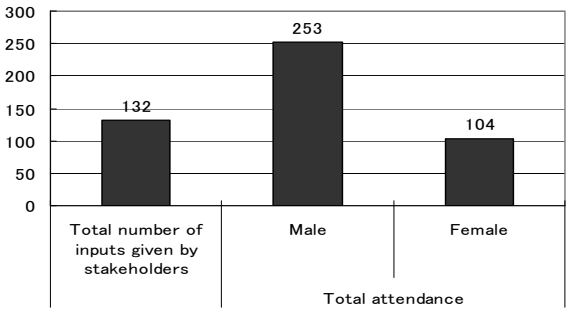
	Inquiry and Opinion	Response
25 July 2011 Aliaga	We suggest that instead of an embankment, we should use viaducts for the project.	The design of the embankments now will have box culverts that will act as equalizers so that it may not cause or worsen floodings.
	If the height of the embankment is 6~7meters, from Barangay Sto. Rosario, to Barangay. Magsaysay up to Sta. Monica, this will cause river-like floods. If possible, not to use embankment.	Viaducts cost 10 times more than an embankment. All aspects of the project including engineering, environmental concerns are carefully studied including the projects economic benefits. NEDA would not approve the project if the economic benefits are not good.
	We suggest that only one interchange would be constructed in Aliaga instead in San Juan. We can instead transfer the interchange to Sto. Rosario.	We will send this concern to the engineering and design team so that they will consider your suggestion when they deal with flooding.
26 July 2011 Cabanatuan	It may be better if we hire a private appraiser because the prevailing price is very low if applied to the just compensation pushed by the government.	DPWH will follow the prevailing BIR zonal value based on RA 8974. DPWH will present to the owners the price of value of their land. If the owners does not agree with the price, the LGU will have to intervene and will have to convene an appraisal committee and they will appraise the property

	Inquiry and Opinion	Response
	We would like to request that the end of the alignment of the CLLEX project phase1 will just be within the Cabanatuan City.	If you can provide us the correct coordinates, then we might give you,
	Everyone who would be affected should just be paid and it's up to them to transfer and relocate.	Only affected homes will be compensated. DPWH cannot pay for lands without titles. DPWH can get sued if they purchase lands without title. Compensation received for affected homes can be used to pay for CMP.
	35,000 metric tons of rice can be harvested from the property that will be hit by the interchange, that's why there will be great loss and great damage. We pay real property tax because the government gave the lands to the people without paying for it. This was filed PD 27 that's why it was returned to us. This project will greatly impact our rice production.	Your concern will be noted and will be discussed. It is very important that you are compensated for your loss during the entire harvest. It is also important that you answer the survey form on how much this project will impact your income.
28 July Zaragoza	I hope the high traffic of transporters who avoid SCTEX will not be affected.	We will raise your concern if we can have access in La Paz and Zaragoza.
	The land area of Zaragoza and the barangays will be lessened once the government acquires the land from the CLLEX project.	The land area will not be lessened. If the population increases that is where ERA will base.
28 July 2011, Zaragoza	How does the CLLEX Project become beneficial to the Municipality? She requested also for on and off ramp for Zaragoza.	There is no interchange here in Zaragoza. We will relay this to our Team Leader but I will also give an explanation on how do we get an interchange and on and off ramp. The project also goes thru the National Economic Development Authority o NEDA. NEDA is very strict when it comes to the government's project if it has economic development. The interchanges are based on the needs. One thing they consider is the high traffic count in the area. If there is high traffic in the area, that is when they plan to put up an interchange. It depends with DPWH if they will see that it is economical to construct an interchange. I told Mayor that if you have a study to show that there is high volume here then they might allow it. In the future they might put additional structure if they see that there is an increase in the demand to go to CLLEX. We will relay your concern in La Paz and Zaragoza regarding off and on ramp. DPWH will decide on that and based on the recommendation of our Study Team Leader.

	Inquiry and Opinion	Response
28 July 2011, La Paz	The land that I bought doesn't have a land title, just a deed of sale. Where will the land payment go?	Deed of sale is enough proof that you can have the payment. You just need to have it registered first.
	If box culverts will be used for irrigation, will our farm lands be broken because there is a strong flow of water and houses beside the irrigation will sink?	We have informed the Highway engineer who designed the road to put a control in the equalizer to control the flow of water. We can put another blockage to avoid direct impact to the land.
	Are the trees planted going to be paid? Will the trees planted be paid?	All trees especially fruit bearing trees will be paid according to the price issued by Department of Agriculture. But only few are covered by the law.
29 July 2011, Aliaga	Since there will be two interchanges in Aliaga, there is a possibility that there is an increase in traffic in the municipal roads of Aliaga. Our concern is the maintenance of the existing roads.	According to the traffic study, the main volume of vehicles will pass thru the expressway. Maintenance for provincial roads will come from the provincial funds.
	We are requesting if you can pay us little bit higher so that we can buy and transfer to another area where we can work.	According to JICA guidelines, they allow land for land as replacement for the land to be affected. According to the Assessor's office, they are having an update to give way to higher prices on land acquisition
	It is better to move the alignment near the Talavera river so that Bibiclat and Aliaga will be safer from flood. At the same time it will be cheaper for the government since DPWH is already paying those affected with the dike.	We will suggest to the team Leader if we can have the alignment moved near the dike.
29 July 2011 Zaragoza	Suggested that the CLT holders will settle their balances so that DPWH will just coordinate with them.	The total loan payable will be deducted to the total payment to be received by the owner.

Characteristics of Consultation Meeting Attendants

Total number of stakeholder attended to the consultation meetings is 357 people; of which 71% are male and 29% are female. About 37% (132/357) of the attendants expressed opinions and concerns in the meetings and feed backs were given by the Study Team.

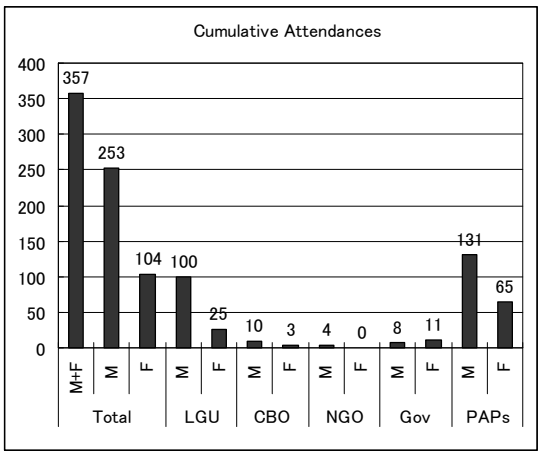


Unit: Persons

Source: Study Team (2011)

FIGURE 9.7.4-1 TOTAL ATTENDANCES AND PARTICIPATION TO DISCUSSIONS

Beak down of types of participants is shown in the graphs stated below (Figure 9.7.4-2). Note, often two parts of meetings were held in one LGU; one for PAPs and another for the rest of stakeholders so that PAPs' concerns were able to be collected intensively. 125 people out of the 357 attendants are LGU, of which 28% (100 people) are male and 7% (25people) are female relative to total number of the attendants.



Unit: Persons

Source: Study Team (2011)

Legend: M=Male, F=Female, M+F=Sum of male and female, LGU=Local government unit, CBO=Community based organization, NGO=Non-governmental organization, Gov.=Government functions, PAPs=Project Affected Persons

FIGURE 9.7.4-2 OVERALL ATTENDANCES

Total attendants to the two meetings held in Aliaga is 151 people (123 people are male, and 28 are female) of which 85 are PAPs. LGUs (Municipality of Aliaga and barangays), CBO(Community Based Organization), NGOs, and Government functions sent 52 people, 6 people, 4 people, and 4 people respectively to the two meetings. Elderly people, farmers, and women's sector are examples of various concerning parties that participated the meetings.

Meetings in Cabanatuan City hosted total of 45 people; of which 32 are male and 13 are female. Equal numbers of male and female (10 each) PAPs, 2 CBO members, and 6 LGU members attended to the PAPs consultation meeting. Inquiries from elderly people and women as well as farmers were obtained and discussed.

Total of 18 people attended the meeting in Tarlac, of which 12 people were male and 6 people were female. Number of PAPs participated the discussion is 2 people. Ten people from the LGU (5 male, 5 female), five from CBO, and one from the government also attended to the meeting.

Total attendants of the two meetings held in La Paz is 63 people; of which 56 people are PAPs, 40 people are male, and 23 are female. LGUs (Municipality of La Paz and barangays) and Government functions sent 15 people, and 2 people respectively to the two meetings. Elderly people, farmers, and women are examples of various concerning parties that participated the meetings.

In Zaragoza, total of 54 people attended to two meetings; of which 39 people, 15 people, and 27 people are male, female, and PAPs respectively. LGUs and government function sent 24 people and 3 people respectively.

Table 9.7.4-1 summarizes types of attendants to all the stakeholder meetings (excluding project team members and its associates).

TABLE 9.7.4-1 TYPES OF ATTENDANTS

Types of attendants		Aliaga		Umagan Aliaga	Cabanatuan		Tarlac	La Paz		Zaragoza		Total
		7/25	7/29	8/6	7/26(1)	7/26(2)	7/27	7/27	7/28	7/28	7/29	
Total	M+F	44	107	26	17	28	18	12	51	23	31	357
	M	34	89	7	14	18	12	9	31	18	21	253
	F	10	18	19	3	10	6	3	20	5	10	104
LGU	M	25	18	1	14	6	5	8	5	15	3	100
	F	7	2	0	3	0	5	2	0	5	1	25
CBO	M	2	1	0	0	2	5	0	0	0	0	10
	F	2	1	0	0	0	0	0	0	0	0	3
NGO	M	4	0	0	0	0	0	0	0	0	0	4
	F	0	0	0	0	0	0	0	0	0	0	0
Gov	M	3	0	0	0	0	1	1	0	3	0	8
	F	1	0	9	0	0	0	1	0	0	0	11
PAPs	M	0	70	6	0	10	1	0	26	0	18	131
	F	0	15	10	0	10	1	0	20	0	9	65

Legend: M=Male, F=Female, M+F=Sum of male and female, LGU=Local government unit, CBO=Community based organization, NGO=Non governmental organization, Gov.=Government functions, PAPs=Project Affected Persons

Unit: Persons

Source: Study Team (2011)

In the meetings people who need a special attention participated in discussion and expressed their concerns and worries freely. Examples of the participants are shown in **Table 9.7.4-2**.

TABLE 9.7.4-2 EXAMPLES OF ATTENDEES WHOM SPECIAL ATTENTION MUST BE PAID TO

Aliaga


PAP/Elder farmer


Women's sector


PAP/Elder farmer

Cabanatuan


PAP/Elder farm


FISCAP* member


PAP/Farmer/Woman

*FISCAP=Federation of Senior Citizen's Association of the Philippines

La Paz


PAP/Elder farmer


PAP/Farmer/Woman


PAP/Farmer/Woman


PAP/Elder farmer

Zaragoza


PAP/Farmer/Elder


PAP/Farmer/Woman


PAP/Farmer/Elder

Umagan Aliaga


PAPs


PAP/Farmer


PAPs

Source: JICA Study Team (2011)

Types of concerns

Types of concerns and worries expressed and discussed in the stakeholder meetings are summarizes in table below. Total of 132 concerns were brought up to the meetings. Most concerned issue is regarding to “ownership, compensation”; 33 counts or 25% of the issues were about amount of compensation that is determined based on ownership of real properties. Next most concerned issue is involuntary relocation; 18 counts or 14% of the issues discussed were about how, when and where to be relocated.

PAPs and non-PAPs have different level of and focus to their concerns. As for a concern about loss of agricultural lands; PAPs concern loss of their lands/source of income and compensation for it which directly impact their lives while non-PAPs and LGUs concern loss of tax income and food security which does not directly impact their life.

LGUs officials brought up “Local Conflict of Interest”(2%), such as alternation of interchange locations, economical benefits to specific LGUs, and inclusion of existing roads to maintenance scheme, “utilization of local resources(location of fill material)”(1%), “air pollution”(1%), “traffic congestion” (1%), and “flood”(9%; partially a concern of PAPs as well). The rest of the concerns (86%) were mostly brought up by PAPs which are all related to land acquisition/compensation and relocation matters.

TABLE 9.7.4-3 SUMMARY OF CONCERNS

Concerns	Frequency (count)
Utilization of Local Resources	1
Social Institution	1
Social Infrastructure	1
Air Pollution	1
Traffic Congestion	1
Responsible party for relocation and compensation	2
Property Tax	2
Poor	2
Local Economy such as Employment	3
ROW	4
Land Use	4
Water Use, Water Rights	5
PAPs life	6
Process	8
Local Conflict of Interests	9
Flood	9
Land acquisition	10
Farm Land	12
Involuntary Resettlement	18
Ownership, compensation	33
Total number of inputs	132

Source: JICA Study Team (2011)

While some of concerns were heard, explained by the Study Team, and understood, some requests are left for further discussion such as alternation of CLLEX alignment. Such drastic change of project design is crucial for wellbeing of affected society if necessary. These unsolved concerns must be considered and agreed upon carefully in the detailed design stage.

9.8 RECOMMENDATION

9.8.1 EIS

- Include obligation of priority employment of PAP and barangay residents below poverty line in the project contract with the selected contractor by DPWH during construction and the selected concessionaire during Operation and Maintenance Stage.
- In case of Reconsignment, a private entity that is in charge of the Project should require subcontracting company submission of their detail implementing structure; chart, schedule, member etc.
- All cost for Environmental Management including monitoring cost and follow up cost should be included the tender price (or it should be include the TOR).
- Contractor should take out a policy in Contractor's All Risk Insurance as remarked ANNEX

A on previous EIS.

- DPWH should update LARRIPP and compensation/entitlement amount stipulated in it should be amended.

9.8.2 RAP

- PMO-PJHL of DPWH should start discussion with concerned LGUs and PAPs to decide the most appropriate relocation sites which are acceptable by PAPs as early as possible. If development of relocation sites is needed, DPWH shall develop the sites utilizing the project fund.
- Any fee short to JICA's requirement for relocation is included in construction cost as stated in LARRIPP CHAPTER 2 sectionE.2.e and f (pp8).
- Compensation of agricultural land for those who cultivate Hacienda's land and customary possessed land must be discussed and agreed with the LGU.
- Project specific RAP Implementation Framework must be prepared in D/D Stage before construction stage.
- Ensure a priority employment opportunity of PAPs who lives on farming whose base is the land lost for ROW/the project from the company that operate and maintain CLLEX.
- Monitor and ensure fair and just compensation and relocation have been done to all PAPs with full consensus before CLLEX construction tender is out by quarterly monitoring activities which is mandate for DPWH.

9.9 ECC STATUS

The original ECC based on the alignment recommended by 2010 FS was issued by EMB on March 30, 2010. With the amendment of the alignment recommended by this study, DPWH requested EMB the amendment of ECC on August 12, 2011.

EMB issued the amendment of ECC on November 2, 2011.

CHAPTER 10
PROJECT IMPLEMENTATION PLAN

10.1 IMPLEMENTATION STRATEGY

Two options were studied in the previous Chapters of this Report. Two Options were compared hereunder in order to select the appropriate option as the implementation strategy.

1) Traffic Level of CLLEx

Traffic level of CLLEx is not so high, thus two (2) options were studied as follows;

Phase I : Tarlac – Cabanatuan Section

Option – 1 : Stage Development
- Initially 2-lane with overtaking lane.
- Then, widened to 4-lane.

Option – 2 : Full Development
- Four (4) lane construction

TRAFFIC LEVEL OF PHASE-I SECTION

	Option - 1			Option - 2		
	Traffic Volume (veh/day)	Level of Service	Volume / Capacity Ratio	Traffic Volume (veh/day)	Level of Service	Volume / Capacity Ratio
2017 :	11,221	D	0.37	12,630	A	0.17
2020 :	12,967	D	0.43	14,255	A	0.19
2025 :	14,979	D	0.49	16,959	A	0.23
2030 :	17,340	E	0.57	20,177	A	0.27
	• Appropriate LOS to be attained will be C. • Year LOS becomes E is 2029. • Widening to a 4-lane expressway is proposed to be completed by the end of **2025**.			• The highest LOS is achieved.		

Phase II : Cabanatuan – San Jose Section

TRAFFIC LEVEL OF PHASE-II SECTION
2 - LANE

	Traffic Volume (veh/day)	Level of Service	Volume / Capacity Ratio
2017 :	7,288	C	0.24
2020 :	8,122	C	0.27
2025 :	9,452	D	0.31
2030 :	11,000	D	0.37
	• LOS will not reach to E before 2040. • 2-lane expressway **with overtaking lane** will be sufficient for traffic flow for Phase-II.		

2) Project Cost (2011 prices)

Phase I : Tarlac – Cabanatuan Section

PHASE-I : TARLAC – CABANATUAN SECTION

Unit: Million Pesos at 2011 prices

Option - 1			Option - 2		
Total Project Cost :		**14,199.85 Million P (1.00)**	**Total Project Cost :**		**13,457.18 Million P (0.95)**
GOP	:	10,309.85 (1.00)	GOP	:	12,774.96 (1.24)
Local Fund	:	1,998.08 (1.00)	Local Fund	:	2,216.34 (1.11)
Yen Loan	:	8,311.77 (1.00)	Yen Loan	:	10,558.62 (1.27)
Private	:	3,890.00 (1.00)	Private	:	682.22 (0.18)
Compared to Option -2 :			**Compared to Option – 1:**		
Additional Private Fund = 3,207.78 M			Additional GOP Fund = 2,465.11 M		
Total project cost is higher by 742.67 M			Additional Local Fund = 218.26 M		
			Additional Yen Loan = 2,246.85 M		

Source: JICA Study Team

Phase II : Cabanatuan – San Jose Section

Estimated based on 2010 FS; 2-lane with overtaking lane (Million Pesos at 2011 prices)

Civil Work Cost	:	10,444.9 Million Pesos
Physical Contingency (5%)	:	522.2 Million Pesos
Engineering Services	:	1,447.6 Million Pesos
Land Acquisition	:	888.6 Million Pesos
Administrative Cost	:	1,119.2 Million Pesos
Total	**:**	**14,422.5 Million Pesos**

3) Economic Evaluation

Phase I : Tarlac – Cabanatuan Section

ECONOMIC EVALUATION : PHASE-I SECTION

Option - 1	Option - 2
Economic IRR = 20.6 %	Economic IRR = 19.4 %
NPV = 3,522.5 Million Pesos	NPV = 3,093.4 Million Pesos
B/C Ratio = 1.51	B/C Ratio = 1.39

Source: JICA Study Team

Both options are economically viable.

Phase II : Cabanatuan – San Jose Section

Economic viability of this section was studied focusing on what year is the most appropriate for traffic opening.

Opening Year	Economic IRR (%)
2017	13.5
2018	14.0
2019	14.5
2020	14.9
2021	15.2
2022	15.6
2023	15.9
2024	16.3
2025	16.6

Phase II will be economically viable after year 2021. Thus, opening year of Phase II (2-lane with overtaking lane) was targeted to be **year 2022**.

Phase I + II (CLLEX as a whole)

ECONOMIC EVALUATION : PHASE I + PHASE II

Phase I : Option- 1 (2 lane to 4 lane) **Phase II : 2- lane with overtaking lane**	**Phase I : Option-2 (4-lane)** **Phase II : 2-lane with overtaking lane**
• Phase I 2-lane Opening Year = 2017 • Phase I 4-lane Opening Year = 2026 • Phase II 2-lane Opening Year = 2022	• Phase I 4-lane Opening Year = 2017 • Phase II 2-lane Opening Year = 2022
Economic IRR = 18.0 % NPV = 3,352.7 Million Pesos B/C Ratio = 1.30	Economic IRR = 17.4 % NPV = 2,923.7 Million Pesos B/C Ratio = 1.24

Source: JICA Study Team

4) PPP Scheme

Phase I : Tarlac – Cabanatuan Section

Option-1 : Stage Development (Initially 2-lane ⟶ Widen to 4-lane)		**Option-2 : Full Development (4-lane from the Beginning)**	
Government	**Private**	**Government**	**Private**
• ROW Acquisition • Design & Build of 2-lane Expressway (Yen Loan)	• Installation of toll collection facility • O & M (2-lane) • Design, Build and Finance Widening (2 to 4-lane) • O & M (4-lane) • Pay lease fee to the Government (or Toll revenue sharing between GOP and the Private)	• ROW Acquisition • Design & Build of 4-lane Expressway (Yen Loan)	• Installation of toll collection facility • O & M (4-lane) • Pay lease fee to the Government (or Toll revenue sharing between GOP and the Private)

Phase I + Phase II (CLLEX as a whole)

Option - A	**Phase I : Option- 1 (2 lane to 4 lane)** **Phase II : 2- lane with overtaking lane**	
	Private • Installation of toll collection facility • O & M • Pay lease fee to the Government	**Private** • Design, Build and Finance with GFS funding • O & M
Option - B	**Phase I : Option-2 (4-lane)** **Phase II : 2-lane with overtaking lane**	
	For Phase II Government • ROW Acquisition • Provide GFS (about 50% of design and construction cost)	**Private** • Design, Build and Finance with GFS funding • O & M
Option - C	**Phase I : Option-2 (4-lane)** **Phase II : 2-lane with overtaking lane**	
	For Phase II Government • ROW Acquisition • Design and Build with Yen Loan	**Private** • Installation of Toll Collection Facility • O & M • Pay lease fee to the Government

5) Financial Evaluation

Phase I : Tarlac – Cabanatuan Section

Option - 1	Option - 2
• O & M Period : 34 years • Lease fee shall be an equivalent amount to Yen Loan Repayment • Equity : Debt = 3 : 7 • Short term loan : Considered • WACC = 9.64 % • Financial Evaluation Result Project IRR = 3.51 % IRR for SPC = 11.59 % Equity of IRR = 17.22 % Government IRR = 2.74 %	• O & M Period : 34 years • Lease fee shall be an equivalent amount to Yen Loan Repayment • Equity : Debt = 3 : 7 • Short term loan : Considered • WACC = 9.64 % • Financial Evaluation Result Project IRR = 3.54 % IRR for SPC = 17.46 % Equity of IRR = 24.10 % Government IRR = 2.73 %
• **Financially Viable**	• **Financially Viable**

Note:
Project IRR = IRR when all costs including ROW cost are funded by the Private.

Phase I + Phase II (CLLEX as a whole)

Option – A : Phase I : Option - 1 (2 lane to 4 lane) Phase II : 2- lane with overtaking lane, by Yen Loan	• Financial Evaluation Result Project IRR = 3.65 % IRR for SPC = 14.0 % Equity of IRR = 21.0 % Government IRR = 2.7 % • **Financially Viable**
Option – B : Phase I : Option-2 (4-lane) Phase II : 2-lane with overtaking lane, by Private with max. GFS	• Financial Evaluation Result Project IRR = 3.65 % IRR for SPC = 9.97 % Equity of IRR = 12.28 % (Less than 15%) Government IRR = 2.25 % • **Financially Not Viable**
Option – C : Phase I : Option-2 (4-lane) Phase II : 2-lane with overtaking lane , by Yen Loan	• Financial Evaluation Result Project IRR = 3.65 % IRR for SPC = 17.84 % Equity of IRR = 23.68 % Government IRR = 2.75 % • **Financially Viable**

Note:
Phase II needs to be implemented by utilizing ODA Loan.

6) Recommended Implementation Strategy

Phase I : Tarlac – Cabanatuan Section

Option-2: Full Development (Construction of 4-lane from the Initial Stage) is recommended due to the following reasons;

- Total project cost can be saved by 742.67 Million Pesos at 2011 price level due to the following;
  - In case of Option-1, during widening stage, some works done during the initial stage must be removed and constructed again, i.e. double investment is required for pavement works, embankment works, center median works, etc.
  - For the long bridge, wider 2-lane bridge is required at the initial stage in consideration of broken down vehicle on the bridge.
  - Option-1 needs additional consultancy cost and construction supervision during widening stage.

- Even though an overtaking lane is provided during the initial stage under Option-1, possibility of traffic accidents is higher than Option-2. Also during widening stage, possibility of traffic accidents will become higher due to the construction work along the expressway in operation.

- The project requires high embankment. Uneven settlement of embankment between embankment built at the initial stage and embankment built during widening stage will be expected.

- On the part of the private sector, 3.89 Billion Pesos (at 2011 price level) required for the widening stage under Option-1 is not required but only 0.68 Billion Pesos is required under Option-2, which will greatly reduce investment risks. Thus more investors will be interested in the project.

Phase II : Cabanatuan – San Jose Section

- Economic analysis shows that Phase II will be economically viable sometime in 2021, thus implementation of Phase II should target around that year.

- Financial analysis suggests that the project should be financed by ODA. The Government should target to secure ODA loan sometimes in year 2015.

10.2 IMPLEMENTATION SCHEDULE

Implementation Schedule is shown in **Table 10.2-1.**

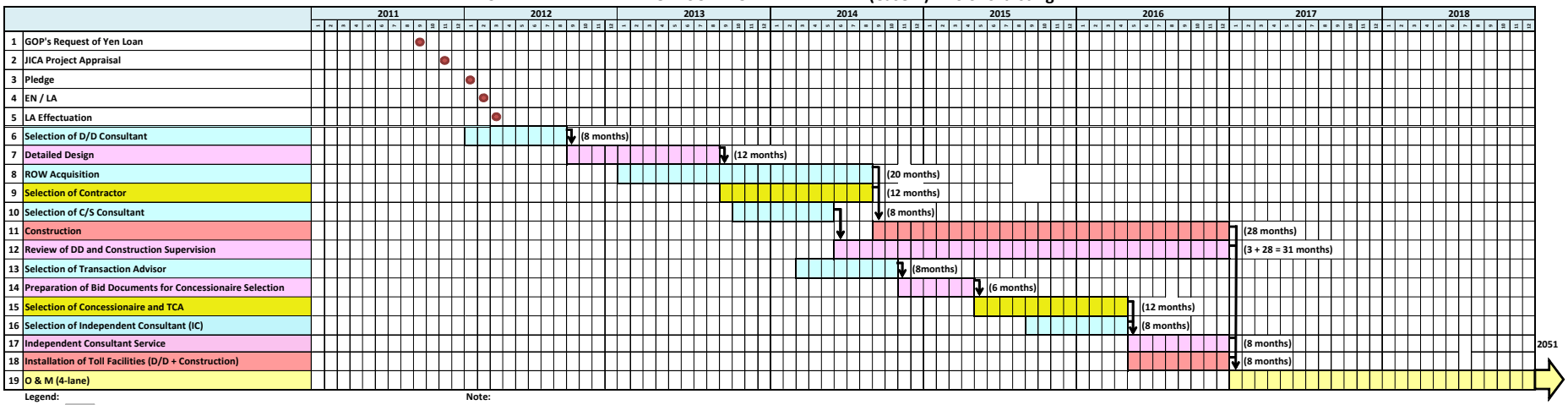
Two cases are shown in table;

Case-1: This is the case when the selection of the detailed design (D/D) consultant and the construction supervision (C/S) consultant is separately undertaken.

Case-2: This is the case when the detailed design (D/D) consultancy services and construction supervision (C/S) consultancy services are combined, and one group of consultant for D/D and C/S is selected.

TABLE 10.2-1 IMPLEMENTATION SCHEDULE

CLLEX IMPLEMENTATION SCHEDULE : 4-LANE (Case-1) : No Shortlisting

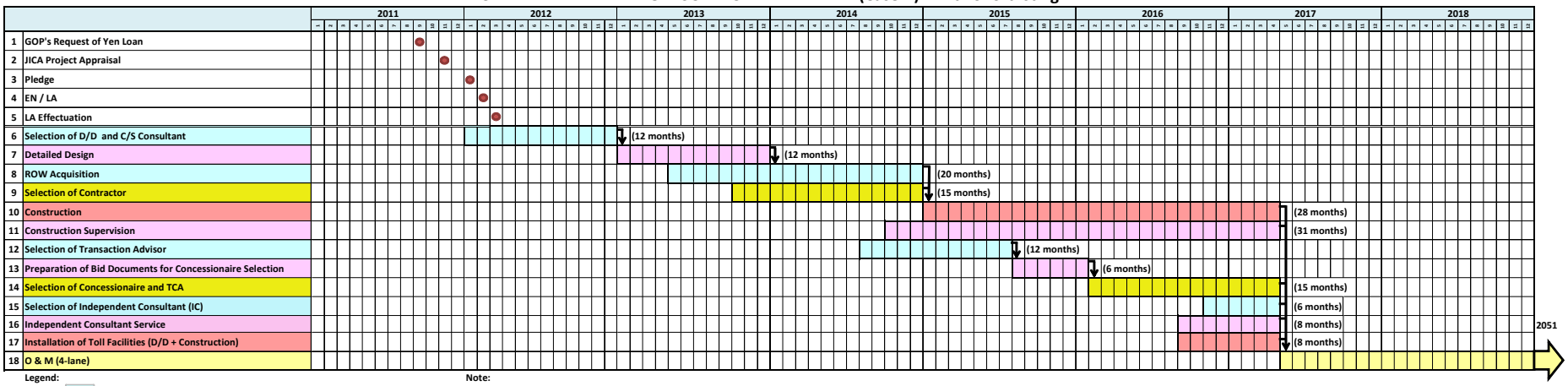


Legend:
- : GOP
- : GOP with Consultant
- : Consultant
- : Private
- : O & M by Private

Note:
D/D and C/S Consultant are separately procured.

October 12, 2011

CLLEX IMPLEMENTATION SCHEDULE : 4-LANE (Case-2) : With Shortlisting



Legend:
- : GOP
- : GOP with Consultant
- : Consultant
- : Private
- : O & M by Private

Note:
The same D/D and C/S Consultant.

10.3 CONSTRUCTION EXECUTION PLAN

10.3.1 Civil Work Contract Package

The project is divided into 2 packages considering of construction cost and scale of works. Location of boundary for package I and package II is decided at **STA.11+179 Bridge of behind of abutment** based on above consideration, and shown in **Figure 10.3.1-1**.

Table 10.3.1-1 shows the major quantities by contract package.

TABLE 10.3.1-1 MAJOR QUANTITIES BY CONTRACT PACKAGE

Items		Unit	Quantity		
			Package 1	Package 2	Total
1.00	Earthworks				
1.10	Unsuitable Excavation	cu.m	270,017.60	547,489.00	817,506.60
1.20	Embankment from Barrow Material	cu.m	1,745,999.00	2,475,169.12	4,221,168.12
2.00	Subbase and Base Course				
2.10	Aggregate Subbase Course	cu.m	179,347.89	203,469.00	382,816.89
2.20	Crushed Aggregate Base Course	cu.m	59,916.00	123,120.31	183,036.31
2.30	Cement Treated Base Course	cu.m	33,982.00	68,575.70	102,557.70
3.00	Surface Course				–
3.10	Bitumimous Concrete Binder Course (t=50mm)	sq.m	235,266.90	478,260.07	713,526.97
3.20	Bitumimous Concrete Surface Course (t=50mm)	sq.m	238,445.00	368,856.73	607,301.73
4.00	Bridge Structure				
4.10	Concrete Piles Cast in Drilled Holes (Ø1200mm)	l.m	8,550.00	756.00	9,306.00
4.20	Reinforcing Steel, Grade 60 (Bridge)	kg	11,313,203.10	6,466,185.50	17,779,388.60
4.30	Structural Concrete Glass AA for Deck Slab	cu.m	8,555.80	963.10	9,518.90
4.40	Structural Concrete Glass AA for Abutment	cu.m	4,706.80	2,973.10	7,679.90
4.50	Structural Concrete Glass AA for Box Culvert	cu.m	27,650.80	47,505.00	75,155.80
4.60	AASHTO Girder Type V, L=33.5m	each	344.00	12.00	356.00
5.00	Drainage and Slope Protection Structure				
5.10	RCPC (Ø1200mm)	l.m	3,354.00	5,766.00	9,120.00
5.20	Grouted Riprap Class A (Slope Protection)	cu.m	21,479.00	6,212.00	27,691.00
5.30	Grouted Riprap Class A (Side Ditch)	cu.m	19,971.00	36,642.00	56,613.00
5.40	Single Metal Beam Guardrail	l.m	21,474.00	42,949.00	64,423.00
5.50	Double Metal Beam Guardrail	l.m	9,679.00	19,121.00	28,800.00
5.60	Fencing	l.m	23,553.00	41,182.00	64,735.00
6.00	Miscellaneous Structures				
6.10	Warning Sign	each	32.00	52.00	84.00
6.20	Regulatory Sign	each	56.00	92.00	148.00
6.30	Reflectorial Thermoplastic Pavement Marking	sq.m	17,018.00	30,061.00	47,079.00

Table 10.3.1-2 shows the civil work cost by contract package

TABLE 10.3.1-2(1) CIVIL WORK COST OF PACKAGE-1

Unit: Million Pesos at 2011 Price

		Package 1			
		Foreign Cost	Local Cost	Tax	Total
A	Facilities for Engineer	15.10	17.90	4.59	37.59
B	Other General Requirements	27.42	39.88	9.47	76.77
C	Earthworks	627.68	912.99	216.83	1,757.50
D	Subbase and Base Course	109.87	159.82	37.96	307.65
E	Surface Course	178.15	259.13	61.54	498.82
F	Bridge Structure Construction	788.75	1,147.27	272.48	2,208.50
G	Drainage and Slope Protection Structures	137.14	199.48	47.38	383.99
H	Miscellaneous Structures	61.06	88.82	21.09	170.97
Total		**1,945.17**	**2,825.27**	**671.34**	**5,441.78**
I	Toll Plaza and Service Area	13.03	18.95	4.50	36.48
Grand Total		**1,958.20**	**2,844.22**	**675.84**	**5,478.26**

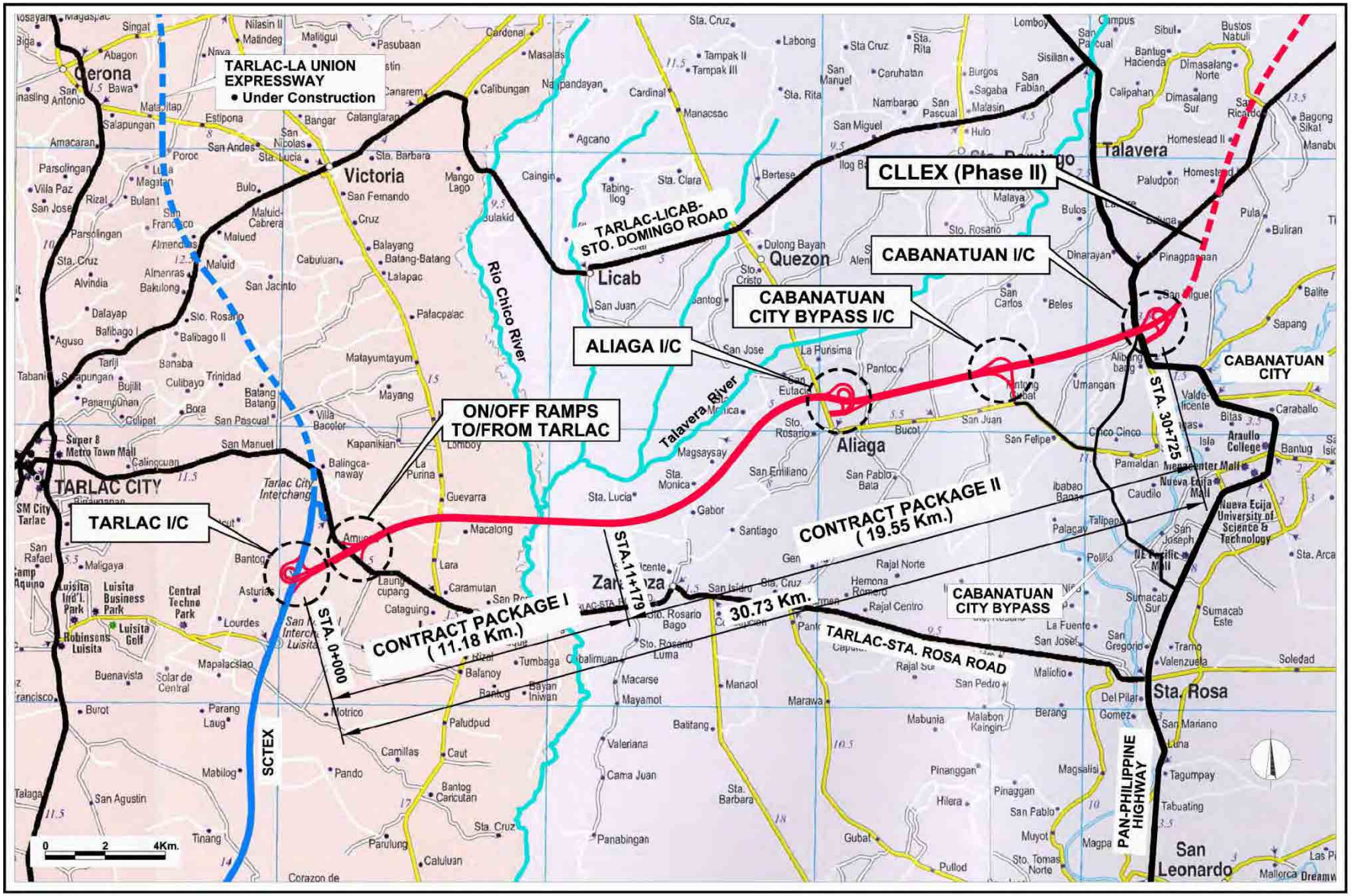


FIGURE 10.3.1-1 CONTRACT PACKAGING

TABLE 10.3.1-2(2) CIVIL WORK COST OF PACKAGE-2

Unit: Million Pesos at 2011 Price

		Package 2			
		Foreign Cost	Local Cost	Tax	Total
A	Facilities for Engineer	15.10	17.90	4.59	37.59
B	Other General Requirements	31.02	45.12	10.71	86.85
C	Earthworks	891.84	1,297.22	308.09	2,497.16
D	Subbase and Base Course	172.86	251.43	59.71	483.99
E	Surface Course	320.92	466.79	110.86	898.57
F	Bridge Structure Construction	343.46	499.58	118.65	961.69
G	Drainage and Slope Protection Structures	213.73	310.87	73.83	598.43
H	Miscellaneous Structures	126.19	183.55	43.59	353.33
Total		**2,115.11**	**3,072.46**	**730.04**	**5,917.61**
I	Toll Plaza and Service Area	206.59	300.49	71.37	578.44
Grand Total		**2,321.70**	**3,372.95**	**801.41**	**6,496.05**

TABLE 10.3.1-2(3) CIVIL WORK COST OF TOTAL (PACKAGE 1 AND PACKAGE-2)

Unit: Million Pesos at 2011 Price

		Total			
		Foreign Cost	Local Cost	Tax	Total
A	Facilities for Engineer	30.21	35.80	9.17	75.18
B	Other General Requirements	58.43	85.00	20.19	163.62
C	Earthworks	1,519.52	2,210.21	524.93	4,254.66
D	Subbase and Base Course	282.73	411.24	97.67	791.64
E	Surface Course	499.07	725.92	172.41	1,397.39
F	Bridge Structure Construction	1,132.21	1,646.85	391.13	3,170.19
G	Drainage and Slope Protection Structures	350.87	510.35	121.21	982.42
H	Miscellaneous Structures	187.25	272.36	64.69	524.30
Total		**4,060.28**	**5,897.73**	**1,401.38**	**11,359.39**
I	Toll Plaza and Service Area	219.62	319.44	75.87	614.92
Grand Total		**4,279.90**	**6,217.17**	**1,477.25**	**11,974.32**

10.3.2 Construction Execution Plan

1) Construction Schedule

Construction Schedule is shown in **Table 10.3.2-1**.

2) Major Material to be Used for the Project

Major Material to be used for the project is shown in **Table 10.3.2-2**.

3) Major Equipment to be Used for the Project

Major equipment to be used for the project is shown in **Table 10.3.2-3**.

4) Roads to be Used During Construction and Location of Contractor's Camp

Roads to be used during construction and candidate locations for contractor's camp are shown in **Figure 10.3.2-1**.

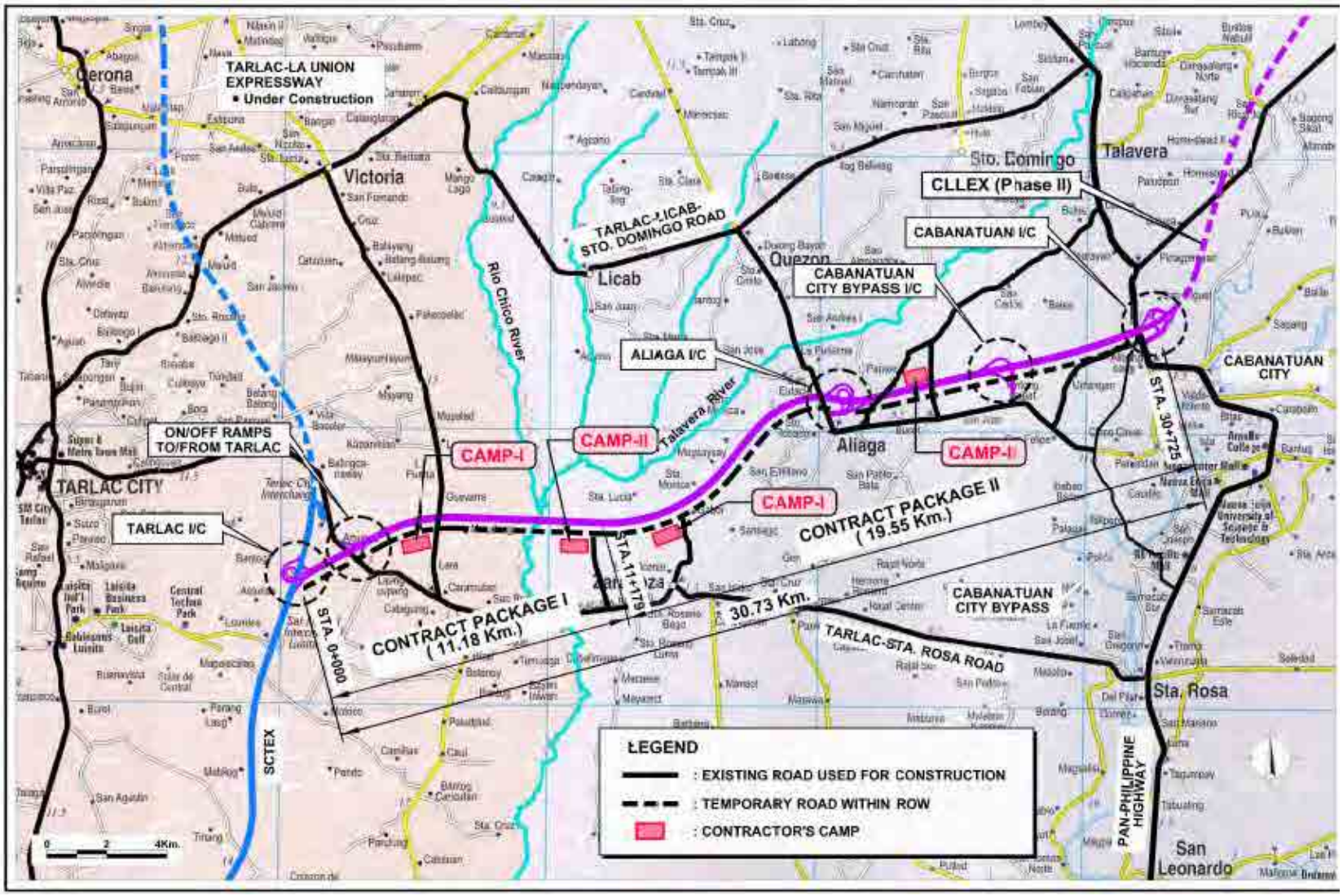
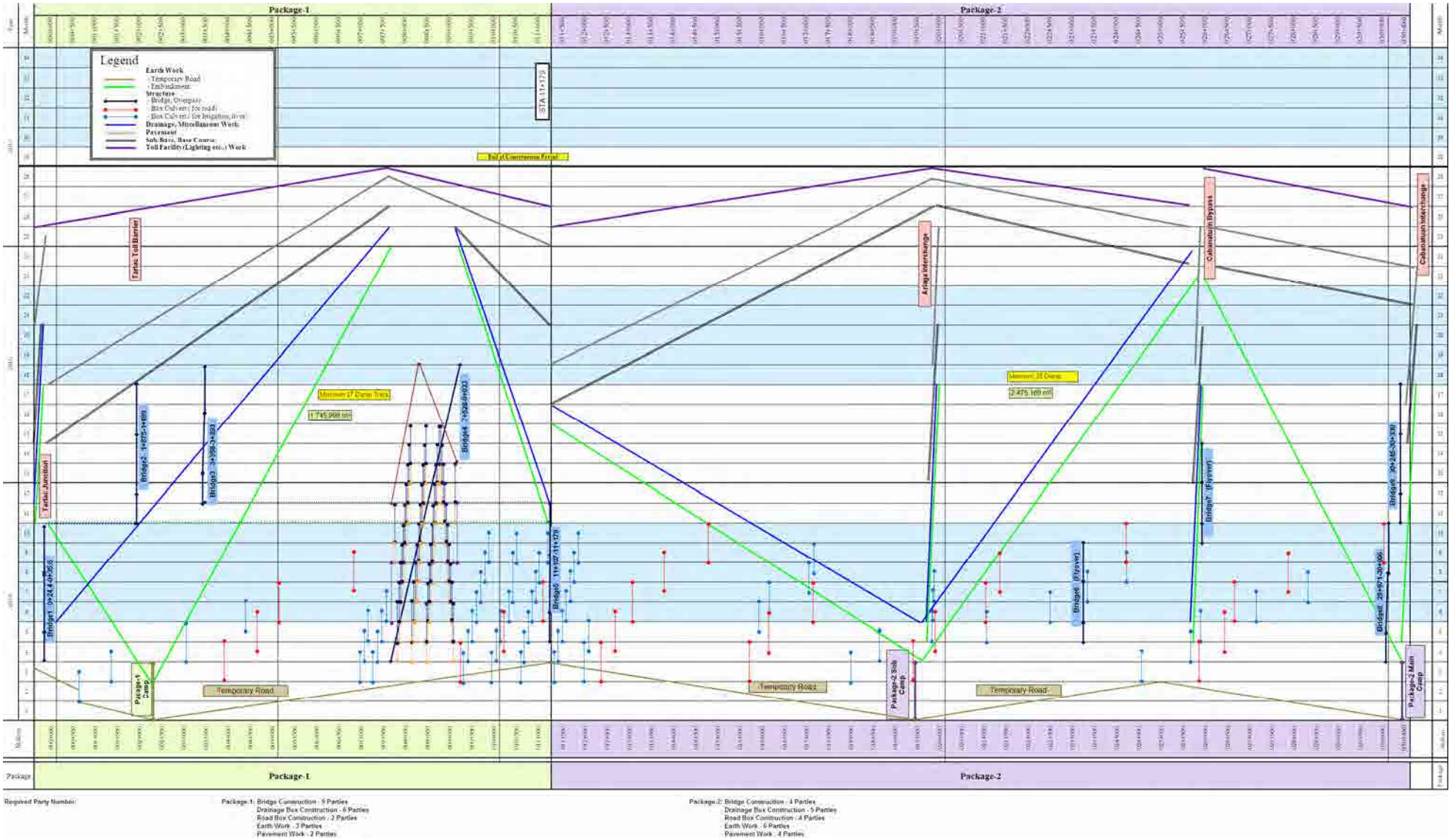


FIGURE 10.3.2-1 ROADS TO BE USED DURING CONSTRUCTION AND LOCATION OF CONTRACTOR'S CAMP

TABLE 10.3.2-1 CONSTRUCTION SCHEDULE FOR CENTRAL LUZON EXPRESSWAY



Required Party Number:

Package-1: Bridge Construction - 9 Parties
Drainage Box Construction - 6 Parties
Road Box Construction - 2 Parties
Earth Work - 2 Parties
Pavement Work - 2 Parties

Package-2: Bridge Construction - 4 Parties
Drainage Box Construction - 5 Parties
Road Box Construction - 4 Parties
Earth Work - 6 Parties
Pavement Work - 4 Parties

TABLE 10.3.2-2 MAJOR MATERIAL TO BE USED FOR CLLEX

	Material	Unit	Quantity			Remarks
			Package-1	Package-2	Total	
1	Bollow Material for Embankment	cu.m	1,745,999.00	2,475,169.12	4,221,168.12	
2	Crushed Aggregate for Base Course and Sub base Course	cu.m	273,245.89	395,165.01	668,410.90	
3	Asphalt	ton	58,661.00	105,336.00	163,997.00	
4	Bituminous Tack Coat, Emulsified Asphalt, SS-1	ton	753.40	164.49	917.89	
5	Bituminous Prime Coat, MC-701	ton	106.90	1,532.30	1,639.20	
6	Fine Aggregate for Asphalt Pavement	cu.m	5,678.00	10,197.00	15,875.00	
7	Aggregate for Asphalt Pavement	cu.m	14,196.00	25,491.00	39,687.00	
8	Cement	ton	30,646.44	21,105.36	51,751.80	
9	Fine Aggregate for Concrete	cu.m	26,220.00	18,057.00	44,277.00	
	Aggregate for Concrete	cu.m	44,948.00	53,467.10	98,415.10	
10	Reinforcing Steel, Grade 60 (Bridge)	kg	11,313,203.10	6,466,185.50	17,779,388.60	
13	DOUBLE METAL BEAM GUARDRAIL (w/Post)	l.m	9,679.00	19,121.00	28,800.00	
14	Single Metal Beam Guardrail (w/Post)	l.m	21,474.00	42,949.00	64,423.00	
15	Rolled Gutter (Median) 600mm x 200mm	l.m	4,734.00	10,998.00	15,372.00	
16	Fiber Optic	l.m	11,179.00	19,241.00	30,420.00	
17	RCPC, 610 mm dia.	l.m	1,9888.00	4,620.00	6,608.00	
18	RCPC, 1200 mm dia.	l.m	3,354.00	5,766.00	9,120.00	

TABLE 10.3.2-3 MAJOR EQUIPMENT TO BE USED FOR CLLEX PROJECT

Equipment	Capacity	Package-1	Package-2	Total Requirement Number	Remarks
Dump Track	11 ton	57	75	132	
Wheel Loder	1.53 m3	5	7	12	
Motor Grader 14G	3m/200HP	2	2	4	
Vibratory Roller	11 ton, 125 Hp	2	2	4	
Tired Roller	12.6 ton	2	2	4	
Crawler Tractor (w/Bulldozer)	D7G PS	4	4	8	
Hydraulic Excavator	1.0 m3	10	15	25	
Backhoe	0.6 m3	15	20	35	
Vibratory Plate Compactor	7 Hp	10	20	30	
Track Crane	160 ton, 300Hp	2	2	4	
Crawler Crane	60T/275Hp	4	2	6	
Drill Rig for Pile	CWV Model TRM35/31 φ1.5～2.5	4	2	6	
Concrete transit Mixer	5 m3	15	10	25	
Concrete Pump	60 yd3	2	2	4	
Concrete Plant	40m3/hr	1	1	2	
Track Mounted Crane	21-25t, 200Hp	3	3	6	
Concrete Vibrator	Gasoline type	12	8	20	
Semi Trailer	20 ton	5	5	10	
Asphalt Paver	4.7 m, 112 Hp	2	2	4	
Asphalt Distributor	5 ton	2	2	4	
Asphalt Plant	60 t/hr	1	1	2	
Lane Marker	8 ton Track	1	1	2	
Ultrasonic Examination Equipment at site		1	1	2	

10.4 CONSULTANCY SERVICES

The following Consultancy Services are required for the Project;

- Detailed Design and Tender Assistance for Selection of Civil Work Contractor
- Construction Supervision
- Tender Document Preparation and Tender Assistance for Selection of Concessionaire for Operation and Maintenance (Transaction Advisory Services)

1) Detailed Design and Tender Assistance for Selection of Civil Work Contractor

Major Scopes of work for the Consultancy Services are as follows;

- Engineering Surveys (topographic survey, soils/material survey, geotechnical survey)
- Detailed Design including toll collection facility
- Preparation of Pre-qualification and Tender Documents
- Parcellary Survey
- Preparation of RAP
- Assist DPWH in Tendering

2) Construction Supervision

- Construction Supervision
- Keep and compile all records including material test results, inspection results, problem encountered, etc. which shall be a part of tender documents for selection of an O & M concessionaire.
- Prepare an asset register including condition assessment.

3) Tender Document Preparation and Tender Assistance for Selection of Concessionaire for O & M (Transaction Advisory Services)

- Review of Traffic Demand Forecast
- Review of PPP Scheme including Financial Analysis
- Preparation of PQ Documents and Tender Documents
- Preparation of Tender Scheduling
- Undertaking of Investors' Forum
- Assistance of Tendering

10.5 PROCUREMENT PLAN

Consultancy services, civil work contractor and O & M concessionaire will be procured through the following method in accordance with JICA Guidelines for Procurement under Japanese ODA Loans, March 2009.

1) Consultancy Services

Consultancy services will be procured by 2 steps, Pre-qualification and Tendering, under the International Competitive Bidding (ICB). Quality-and Cost-Based Selection (QCBS) method will be adopted.

2) Civil Work Contractor

Civil work contractor will be procured by 2 steps, Pre-qualification and Tendering, under the International Competitive Bidding (ICB).

3) O & M Concessionaire

O & M concessionaire will be procured by 2 steps, Pre-qualification and Tendering, under the International Competitive Bidding, WITH either of the following bid parameter;

- Toll rate is given to bidders, and bid parameter will be the lease fee, or
- Lease fee is given to bidders and bid parameter will be the toll rate.

10.6 ORGANIZATIONAL STRUCTURE

Overall implementation organization is shown in **Figure 10.6-1**.

The implementing agency is the Department of Public Works and Highways (DPWH). The leading implementing office during the detailed design and construction will be the PMO-Philippine Japan Highway Loan (PMO-PJHL) in close coordination with PMO-Build-Operate-Transfer (PMO-BOT).

From the Concessionaire Selection Phase to O & M Phase, PMO-BOT is the implementing office.

The Central Office Bids and Awards Committee (BAC) for consultancy services is responsible for the selection of Consultant.

The Central Bids and Awards Committee (BAC) for foreign-assisted civil works projects is responsible for the selection of the civil work contractor.

The Special BAC for PPP projects is responsible for selection of the O & M concessionaire.

Selection of Consultants	Leading Implementing Office (Design and Construction Phase)	Selection of Civil Work Contractor
BAC for Consultancy Services	PMO-PJHL In coordination with PMO-BOT	BAC for foreign-assisted civil works project

DESIGN AND CONSTRUCTION PHASE

Selection of Concessionaire	Implementing Office (selection of Concessionaire and O & M Phase)
Special BAC for PPP Projects	PMO-BOT

SELECTION OF CONCESSIONAIRE AND O & M PHASE

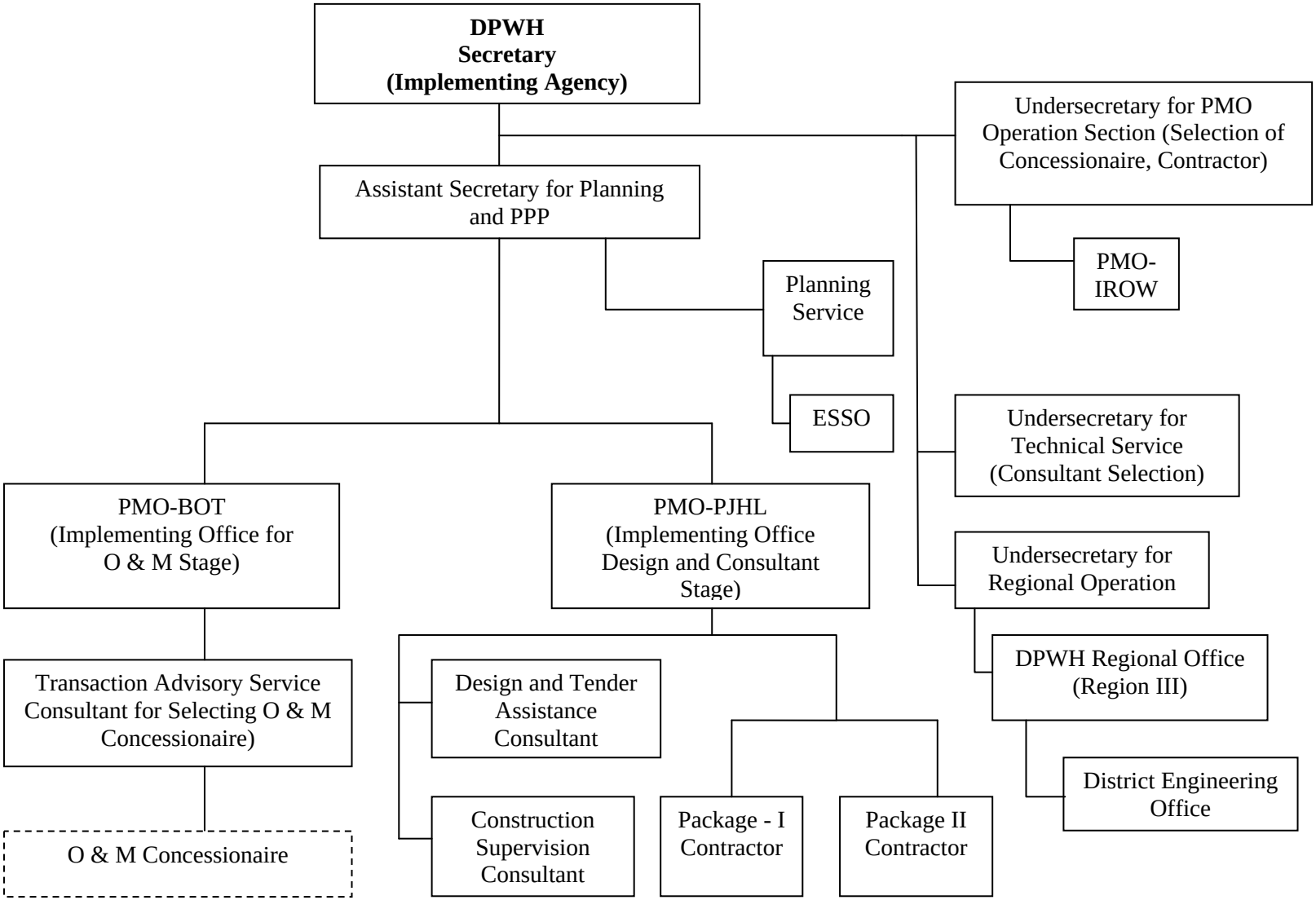


FIGURE 10.6-1 OVERALL IMPLEMENTATION ORGANIZATION

10.7 FINANCIAL PLAN

10.7.1 Project Cost

Table 10.7.1-1 shows the project cost by JICA portion and others. Total JICA portion cost is 12,810 million peso which is 80% of total project.

TABLE 10.7.1-1 PROJECT COST

Million Pesos (Million Yen)

Breakdown of Cost	Foreign Currency Portion			Local Currency Portion			Total		
	Total	JICA Portion	Others	Total	JICA Portion	Others	Total	JICA Portion	Others
Civil works	4,060.69	4,060.69		5,897.33	5,897.33		9,958.02	9,958.02	0.00
		(¥7,552.88)			(¥10,969.03)			(¥18,521.92)	
Price Escalation	339.21	339.21		1,224.92	1,224.92		1,564.13	1,564.13	0.00
		(¥630.93)			(¥2,278.35)			(¥2,909.29)	
Physical Contingency	220.00	220.00		356.11	356.11		576.11	576.11	0.00
		(¥409.19)			(¥662.37)			(¥1,071.56)	
Consulting Service	579.27	579.27		132.73	132.73		712.01	712.01	0.00
		(¥1,077.45)			(¥246.89)			(¥1,324.33)	
Land Acquisition	0.00			580.76		580.76	580.76	0.00	580.76
Administration Cost	0.00			165.33		165.33	165.33	0.00	165.33
VAT	0.00			1,613.33		1,613.33	1,613.33	0.00	1,613.33
Import Tax	0.00			325.28		325.28	325.28	0.00	325.28
Interest During Construction	0.00			327.79		327.79	327.79	0.00	327.79
Commitment Charge	0.00			89.67		89.67	89.67	0.00	89.67
Total	**5,199.17**	**5,199.17**	**0.00**	**10,713.26**	**7,611.10**	**3,102.16**	**15,912.43**	**12,810.27**	**3,102.16**
		(¥9,670.45)			(¥14,156.64)			(¥23,827.10)	

Note:

Physical Contingency: 5%
Foreign Exchange Rate: US$ 1 = 81.2 Yen = 43.7 Pesos
Price Escalation: Foreign – 1.6% per annum
Local – 3.8% per annum

10.7.2 Annual Fund Requirement

In accordance with the implementation schedule, the annual fund requirement was estimated as shown in **Table 10.7.2-2** and summarized below.

TABLE 10.7.2-1 SUMMARY OF ANNUAL FUND REQUIREMENT

Million Pesos (Million Yen)

Breakdown of Cost / Year	Total		
	Total	JICA Portion	Others
2011	0.00	0.00 (¥0.00)	0.00
2012	35.18	0.00 (¥0.00)	35.18
2013	276.72	157.54 (¥293.02)	119.18
2014	419.92	53.12 (¥98.81)	366.80
2015	3,865.58	3,072.96 (¥5,715.71)	792.62
2016	6,645.82	5,660.70 (¥10,528.89)	985.13
2017	4,647.06	3,865.95 (¥7,190.66)	781.11
2018	22.14	0.00 (¥0.00)	22.14
Total	**15,912.43**	**12,810.27 (¥23,827.10)**	**3,102.16**

Note:

Physical Contingency: 5%
Foreign Exchange Rate: US$ 1 = 81.2 Yen = 43.7 Pesos
Price Escalation: Foreign – 1.6% per annum
Local – 3.8% per annum

TABLE 10.7.2-2 ANNUAL FUND REQUIREMENT (1/2)

(In Million Pesos)

	2012	2013	2014	2015	2016	2017	2018	Total
1. Civil Works								
Foreign Exchange Costs				1,015.17	1,827.31	1,218.21		4,060.69
Local Costs				1,474.33	2,653.80	1,769.20		5,897.33
Tax				350.34	630.62	420.41		1,401.37
Total				**2,839.85**	**5,111.73**	**3,407.82**		**11,359.39**
2.Price Escalation								
Foreign Exchange Costs				66.55	150.94	121.73		339.21
Local Costs				237.20	544.03	443.70		1,224.92
Tax				56.37	129.28	105.43		291.08
Total				**360.11**	**824.24**	**670.86**		**1,855.21**
3.Physical Escalation								
Foreign Exchange Costs				54.09	98.91	67.00		220.00
Local Costs				85.58	159.89	110.64		356.11
Tax				20.34	37.99	26.29		84.62
Total				**160.00**	**296.80**	**203.93**		**660.73**
4.Sub-Total								
Foreign Exchange Costs				1,135.81	2,077.16	1,406.93		4,619.90
Local Costs				1,797.11	3,357.72	2,323.54		7,478.36
Tax				427.04	797.89	552.14		1,777.07
Total				**3,359.96**	**6,232.76**	**4,282.61**		**13,875.33**
5.Consulting Services								
5.1 Detailed Eng. Design Costs incl. Tender Doc.								
Foreign Exchange Costs		129.20	22.80					152.00
Local Costs		15.47	2.73					18.20
Tax		17.36	3.06					20.42
Total		**162.03**	**28.59**					**190.62**
5.2Tender Assistance								
Foreign Exchange Costs			19.12	8.20				27.32
Local Costs			3.19	1.37				4.56
Tax			2.68	1.15				3.83
Total			**25.00**	**10.71**				**35.71**
5.3 Review of D/D								
Foreign Exchange Costs				20.32				20.32
Local Costs				3.04				3.04
Tax				2.80				2.80
Total				**26.16**				**26.16**
5.4 Construction Supervision								
Foreign Exchange Costs				56.30	101.34	67.56		225.19
Local Costs				18.60	33.48	22.32		74.40
Tax				8.99	16.18	10.79		35.95
Total				**83.89**	**150.99**	**100.66**		**335.54**
5.5 Transaction Advi.Service: Bid Doc. Pre.								
Foreign Exchange Costs				14.39	33.59			47.98
Local Costs				0.83	1.93			2.76
Tax				1.83	4.26			6.09
Total				**17.05**	**39.78**			**56.83**
5.6 Transaction Advi.Service: Tender Assi.								
Foreign Exchange Costs					22.12	22.12		44.23
Local Costs					1.98	1.98		3.96
Tax					2.89	2.89		5.78
Total					**26.99**	**26.99**		**53.97**
5.7 Consultant Base Cost(5.1~5.6)								
Foreign Exchange Costs		129.20	41.92	99.21	157.04	89.67		517.04
Local Costs		15.47	5.92	23.84	37.39	24.30		106.92
Tax		17.36	5.74	14.76	23.33	13.68		74.87
Total		**162.03**	**53.59**	**137.81**	**217.76**	**127.65**		**698.83**
5.8 Price Escalation for Consultant								
Foreign Exchange Costs		4.17	2.04	6.50	12.97	8.96		34.65
Local Costs		1.20	0.70	3.83	7.67	6.09		19.49
Tax		1.34	0.68	2.38	4.78	3.43		12.61
Total		**6.71**	**3.43**	**12.71**	**25.42**	**18.48**		**66.75**
5.9 Physical Escalation for Consultant								
Foreign Exchange Costs		6.67	2.20	5.29	8.50	4.93		27.58
Local Costs		0.83	0.33	1.38	2.25	1.52		6.32
Tax		0.94	0.32	0.86	1.41	0.86		4.37
Total		**8.44**	**2.85**	**7.53**	**12.16**	**7.31**		**38.28**
5.10 Sub-Total								
Foreign Exchange Costs		140.04	46.17	111.00	178.51	103.56		579.27
Local Costs		17.50	6.95	29.05	47.31	31.91		132.73
Tax		19.64	6.75	18.00	29.52	17.96		91.86
Total		**177.17**	**59.87**	**158.05**	**255.34**	**153.44**		**803.86**

TABLE 10.7.2-2 ANNUAL FUND REQUIREMENT (2/2)

(In Million Pesos)

6.1 Land Acquisition Cost								
Foreign Exchange Costs								0.00
Local Costs		51.34	256.68	205.34				513.36
Tax		6.16	30.80	24.64				61.60
Total		**57.50**	**287.48**	**229.98**				**574.96**
6,2 Price Escalation for Land Acquisition Cost								
Foreign Exchange Costs								0.00
Local Costs		3.98	30.39	33.04				67.40
Tax		0.48	3.65	3.96				8.09
Total		**4.45**	**34.03**	**37.00**				**75.49**
6.3 Sub-Total								
Foreign Exchange Costs		0.00	0.00	0.00				0.00
Local Costs		55.31	287.07	238.38				580.76
Tax		6.64	34.45	28.60				69.69
Total		**61.95**	**321.51**	**266.99**				**650.45**
7.1 Administrative Cost								
Foreign Exchange Costs								0.00
Local Costs	21.55	22.99	22.99	22.99	22.99	22.99	7.18	143.69
Tax								0.00
Total	**21.55**	**22.99**	**22.99**	**22.99**	**22.99**	**22.99**	**7.18**	**143.69**
7.2 Price Escalation for Administrative Cost								
Foreign Exchange Costs								0.00
Local Costs	0.82	1.78	2.72	3.70	4.71	5.77	2.14	21.64
Tax								0.00
Total	**0.82**	**1.78**	**2.72**	**3.70**	**4.71**	**5.77**	**2.14**	**21.64**
7.3 Sub-Total								
Foreign Exchange Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local Costs	22.37	24.77	25.71	26.69	27.70	28.76	9.33	165.33
Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**22.37**	**24.77**	**25.71**	**26.69**	**27.70**	**28.76**	**9.33**	**165.33**
8. Total Cost(1-7)								
Foreign Exchange Costs	0.00	140.04	46.17	1,246.80	2,255.67	1,510.49	0.00	5,199.17
Local Costs	22.37	97.58	319.73	2,091.23	3,432.73	2,384.21	9.33	8,357.19
Tax	0.00	26.27	41.19	473.64	827.41	570.10	0.00	1,938.61
Total	**22.37**	**263.89**	**407.09**	**3,811.68**	**6,515.81**	**4,464.80**	**9.33**	**15,494.97**
9.Interest During Construction								
Foreign Exchange Costs	0.00	0.01	0.02	15.93	45.03	64.74		125.73
Local Costs	0.00	0.00	0.00	25.16	72.18	104.71		202.06
Total	**0.00**	**0.02**	**0.02**	**41.10**	**117.21**	**169.45**	**0.00**	**327.79**
10.Comittment Charge								
Foreign Exchange Costs	5.20	5.20	5.20	5.20	5.20	5.20	5.20	36.39
Local Costs	7.61	7.61	7.61	7.61	7.61	7.61	7.61	53.28
Total	**12.81**	**12.81**	**12.81**	**12.81**	**12.81**	**12.81**	**12.81**	**89.67**
11. GRAND TOTAL								
Foreign Exchange Costs	**5.20**	**145.25**	**51.38**	**1,267.93**	**2,305.90**	**1,580.43**	**5.20**	**5,361.29**
Local Costs	**29.98**	**105.20**	**327.35**	**2,124.01**	**3,512.52**	**2,496.53**	**16.94**	**8,612.53**
Tax	**0.00**	**26.27**	**41.19**	**473.64**	**827.41**	**570.10**	**0.00**	**1,938.61**
Total	**35.18**	**276.72**	**419.92**	**3,865.58**	**6,645.82**	**4,647.06**	**22.14**	**15,912.43**

	2012	2013	2014	2015	2016	2017	2018	Total
A. Yen Loan Portion								
Foreign Exchange Costs	0.00	140.04	46.17	1,246.80	2,255.67	1,510.49	0.00	5,199.17
Local Costs	0.00	17.50	6.95	1,826.16	3,405.03	2,355.45	0.00	7,611.10
Total	**0.00**	**157.54**	**53.12**	**3,072.96**	**5,660.70**	**3,865.95**	**0.00**	**12,810.27**

Note:

Physical Contingency: 5%

Foreign Exchange Rate: US$ 1 = 81.2 Yen = 43.7 Pesos

Price Escalation: Foreign – 1.6% per annum

Local – 3.8% per annum

CHAPTER 11
OPERATION AND EFFECT INDICATORS

11. 1 SELECTED OPERATION AND EFFECT INDICATORS

In order to enable project monitoring and evaluation on the basis of consistent indicators, operation and effect indications are introduced for ODA loan projects.

Operation and effect indicators are basically equivalent to the outcome indicators and performance indicators used by the World Bank. For this study, they are defined as follows:

1) **Operation indicators**: quantitative measure of the operational status of project.
2) **Effect indicators**: quantitative measure of the effects generated by a project.

In order to set the appropriate indicators, the following criteria should be considered.

1) **Validity**: This determine whether the set of indictors really able to measure the achievement of the project purpose.
2) **Reliability**: The set indicators data must yield the same results, regardless of how many times they are measured and regardless of who makes the measurements.
3) **Ease of access**: The indicator data set for the project must be easy to access and must not be too many, considering the cost and time required to gather them?

In view o project objective and expected effects, the following indicators were selected:

Operation and Effect Indicators		Data Collection Method
Operation Indicators	Traffic Volume of CLLEX (veh./day)	Traffic count survey
	Toll Revenue	Data collection from Operator
Effect Indicators	Traffic Congestion Rate (Volume/Capacity Rate)	Calculation based on Traffic count survey
	Travel Time Saving (veh.-hour/day)	Calculation based on Travel Time Survey
	Travel Time Cost Saving (Peso/Year)	Calculation based on Time Cost and Travel Time Survey

The project will definitely contribute to the reduction of traffic accidents. However, it is difficult to estimate present rate of traffic accidents along Expressway. It is also difficult to estimate how many traffic accidents will be reduced due to this project. Although reduction of traffic accidents is an important indicator, it is not adopted in the study due to the current non-availability of data.

11.2 TRAFFIC VOLUME OF CLLEX

Based on traffic assignment result, future traffic volumes are shown as follows.

TABLE 11.2-1 ESTIMATED TRAFFIC VOLUME OF CLLEX
(TARLAC IC ~ ALIAGA IC) 4-LANE

Unit: Vehicle/day

	Year 2017	Year 2020	Year 2030
Class-1 (Car)	9,502	10,967	15,450
Class-2 (Bus, Truck)	2,886	3,030	4,346
Class-3 (Trailer)	241	257	381
Total	12,630	14,255	20,177

11.3 TOLL REVENUE OF CLLEX

Based on future traffic demand and assumed toll rate, toll revenue is estimated.

TABLE 11.3-1 ESTIMATED TOLL REVENUE (YEAR 2020)

	Total Vehicle length of CLLEX (Veh-*km)	Assumed Toll Rate (P/km)	Revenue (Thousand Peso)
Class-1 (Car)	289,609	3.2	935
Class-2 (Bus, Truck)	82,733	6.5	534
Class-3 (Trailer)	6,837	9.7	66
Total	379,179		1,535

11.4 TRAFFIC CONGESTION RATE (V/C RATE)

If CLLEX is constructed, traffic of Tarlac-Sta. Rosa Road and Pan Philippine Highway will be reduced or maintained at present traffic level. Based on traffic assignment result, future traffic congested rate are estimated.

TABLE 11.4-1 ESTIMATED TRAFFIC CONGESTION RATE (VOLUME / CAPACITY RATE)

Road Name	Indicator	Year 2009	Year 2020
Tarlac – Sta. Rosa Road (Zaragosa)	Volume(PCU/day)	8,334	6,224
	Capacity(PCU/day)	15,000	15,000
	Volume / Capacity Rate	0.56	0.41
Pan Philippine Highway (San Leonardo)	Volume	16,867	16,939
	Capacity	20,000	20,000
	Volume / Capacity Rate	0.83	0.85

Note: Volume in year 2009 is based on traffic count survey including Tricycle and Motorbike. Volume of year 2020 is estimated by traffic assignment model. Capacity is assumed by JICA Study Team based on existing road condition.

11.5 TRAVEL TIME SAVING

If CLLEX were constructed, travel time from Cabanatuan to Tarlac or Metro Manila will be reduced. Based on the travel speed survey and the following assumptions, travel time is estimated.

- CLLEX Average Speed: 90 km/hr.

TABLE 11.5-1 ESTIMATED TRAVEL TIME

Section: Cabanatuan – Balintawak via CLLEx				
Section	Length (km)	Speed (km/h)	Travel Time (Hr:Min.)	Remarks
NLEX and SCTEX (Balintawak - SCTEX(JCT))	110	78	1:25	2009 Data
CLLEX(JCT-Cabanatuan Bypass IC)	25.9	90	0:17	Assumption
Cabanatuan Bypass IC - Cabanatuan City	7.7	42	0:11	2009 Data
		Travel Time	1:53	

TABLE 11.5-2 COMPARISON OF TRAVEL TIME

Section: Cabanatuan – Balintawak		
Route	Travel Time (Hr:Min.)	Remarks
Via SCTEX(Thru Aliaga)	2:14 (21 minutes saving)	2009 Survey Data
Via Pan-Philippine Highway	3:06 (73 minutes saving)	2009 Survey Data
Via SCTEX and CLLEX	1:53	Estimation

Based on the above travel time saving per route and traffic assignment, total travel time savings are estimated as shown in **Table 11.5-3**.

TABLE 11.5-3 MAJOR TRAVEL TIME SAVING

Section: Cabanatuan – Balintawak			
Route	Travel Time Reduction	Conversion Traffic to CLLEX (Y2020)	Travel Time Saving
Via SCTEX(Thru Aliaga) Sta. Rosa Road	21 minutes	7,100 veh/day	2,485 hours/day
Via Pan-Philippine Highway	73 minutes	2,200 veh/day	2,677 hours/day
Total			5,162 hours/day

The travel time savings presented above are only conversion traffic from Sta.Rosa road and PPH to CLLEX. There is actually other travel time savings from conversion of traffic coming from other roads to CLLEX and decongestion of ordinary roads. Since it will be difficult to quantify the whole traffic saving time at post facto evaluation, only major travel time savings are estimated.

11.6 TRAVEL COST SAVING

Travel time saving was converted to cost. Unit rate of time cost by vehicle type are as follow:

TABLE 11.6-1 UNIT TRAVEL TIME COST

Vehicle Type	**Unit Travel Time Cost(Peso/min/veh)**		**Vehicle Share**
	Year 2011	**Year 2020**	**(%)**
Passenger Car	7.18	10.05	57.2%
Jeepney	7.83	10.96	25.3%
Bus	29.36	41.10	5.8%
Truck	1.33	1.86	11.7%
Average		11.12	

Inflation rate: 3.8% per year

Source: JICA Study Team

Travel time cost saving of 2020 will be 1.26 Billion Peso / year.

*Travel time cost saving = 5126(hrs/day)*11.12 (Peso/min/veh) *60(min)*365(day)*

= 1.26 billion (Peso/year)

11.7 OPERATION AND EFFECT INDICATORS

Summarized Operation and effect indicators are shown in **Table 11.7-1.**

TABLE 11.7-1 OPERATION AND EFFECT INDICATORS

	Indicators	Road Name	Baseline (2009)	Target (2020)
Operation Indicators	Traffic Volume (vehicle /day)	CLLEX (Tarlac IC ~ Aliaga IC)	-	14,255
	Toll Revenue (Thousand Peso/day)	CLLEX		1,535
Effect Indicators	Traffic Congestion Rate (V/C Rate)	Tarlac – Sta. Rosa Road (Zaragosa)	0.56	0.41
		Pan Philippine Highway (San Leonardo)	0.83	0.85
	Travel Time (hr:min)	Cabanatuan – Balintawak		
		Via SCTEX(Thru Aliaga)	2:14	Via SCTEX and CLLEX 1:53
		Via Pan-Philippine Highway	3:06	
	Travel Time Saving (hours / day)	Due to transferred traffic from Tarlac -Sta. Rosa road and PPH to CLLEX	-	5,162
	Travel Time Cost Saving(Peso/year)		-	1.26 billion

Note: Opening Year = Year 2018