CHAPTER 8

PRELIMINARY DESIGN FOR UPGRADING OF ASUTSUARE–AVEYIME ROAD

Chapter 8 Preliminary Design for Upgrading the Asutsuare – Aveyime Road

8.1 Justification for Upgrading the Asutsuare – Aveyime Road

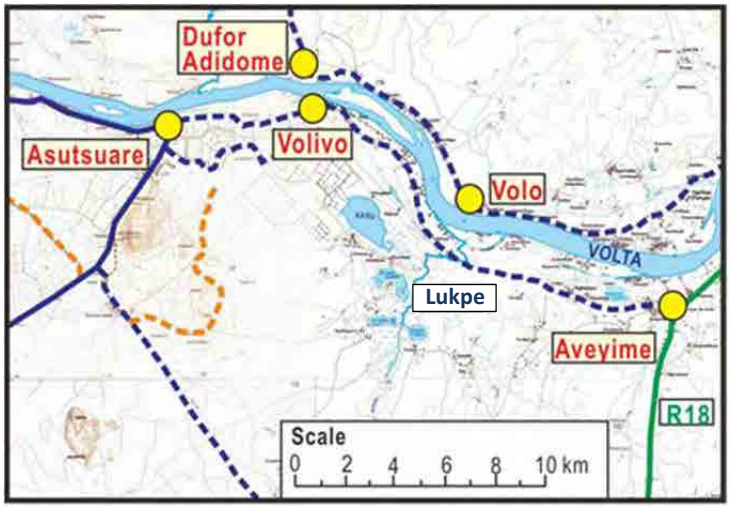
In the first phase of the Study, various positive impacts of upgrading the Asutsuare – Aveyime road were identified: 1) to connect the Green Belt area of Ghana, where there is great potential for agricultural production, particularly rice by an inter-regional standard road and thus facilitate the transportation of agricultural products, 2) to attract more investment in agricultural development along the road, in collaboration with implementation of the APGIP scheme, and 3) to provide direct access between the Eastern Corridor and N1 along the Volta River.

In view of these positive impacts, the Study Team considered that it is worth carrying out the F/S on upgrading the Asutsuare–Aveyime road.

8.2 Preliminary Design of Road

8.2.1 Road Category

According to the GHA, the category of feeder road Asutsuare–Aveyime will be changed in part to an inter-regional road connecting Somanya and N1 via Akuse, Asutuare, and Aveyime after the improvement is completed. The existing feeder road Asutsuare–Aveyime is a gravel road about 6.0 m wide for 24 km. This road passes through the centres of Asutsuare, Volivo and Aveyime townships.



Source: Study Team

Figure 8-1 Location of Asutsuare–Aveyime Road

8.2.2 Horizontal and Vertical Alignment

(1) Design Geometric Standard

After the completion of upgrading, the Asutsuare – Aveyime road will be categorised as an inter-regional road (trunk road) from the current feeder road. Thus, the design geometric

standard is based on the Road Design Guide of Ghana shown in Table 8-1.

The design speed of this road, which lies entirely on flat terrain, was set at 80 km/h based on the Road Design Guide. The proposed horizontal alignment basically follows the centreline of the existing unpaved road, which has been confirmed by the GHA, not only for economic reasons but also to minimise the resettlement of houses and other commercial buildings, and to reduce the impact on existing and future agricultural development schemes. On the other hand, the existing road alignments of sections passing through or beside the townships or communities of Asutsuare, Atrobinya, Volivo and Aveyime differ greatly from the design standard for the design speed of 80 km/h. According to the results of detailed site investigation and topographical survey, the Study Team noted that communities have formed along the existing road, especially in Aveyime Township, and that there are many bend sections in this area. Therefore, the Study Team proposes that the design speed for such sections be decreased to 50 km/h or less.

- Design speed for normal sections: 80 km/h
- Design speed in Aveyime Township: 40 to 50 km/h
- Design speed in other townships: 50 km/h

Table 8-1 Design Geometric Standard

Item		Values			
Design speed (km/h)		80	60	50	40
Minimum curve radius (m)	Desirable	420	220	150	100
	Absolute	230	130	85	50
Radius not requiring transition (m)		580	330	230	150
Minimum curve length (m)	IA > = 7	140	100	80	70
	IA = 2	500	350	300	250
Minimum transition length (m)		44	33	28	22
Curve radius where super elevation is unnecessary (m)		3,500	2,000	1,300	800
Standard gradient (%)		4	5	6	7
Maximum length for gradient (m)		5 (600m)	6 (500m)	7 (500m)	8 (400m)
		6 (500m)	7 (400m)	8 (400m)	9 (300m)
		7 (400m)	8 (300m)	9 (300m)	10 (200m)
K value		30	14	8	4

Source: Road Design Guide of Ghana

(2) Existing Cross Drainage Facilities to be Considered

There are several existing cross drainage facilities to be considered for the preliminary design for upgrading of the Asutsuare–Aveyime road listed in Table 8-2.

Table 8-2 Existing Cross Drainage Facilities between Asutsuare and Aveyime

Station		Existing Drainage Facilities	Remarks
1	No.0+520	B12.0 H1.0	Open drain (KIP)
2	No.0+718	B4.5 H1.0	Open drain (KIP)
3	No.1+747	Pipe D900 @1 L=5.5	
4	No.2+450	Pipe D900 @1 L=5.5	
5	No.3+540	Pipe D900 @1 L=5.5	
6	No.3+920	Pipe D900 @1 L=5.5	
7	No.6+550	Pipe D900 @1 L=5.5	
8	No.8+310	Pipe D900 @1 L=5.5	
9	No.8+950	Pipe D900 @1 L=5.5	
10	No.9+264	Pipe D900 @1 L=5.5	
11	No.9+350	Pipe D900 @1 L=5.5	
12	No.10+300	Pipe D900 @1 L=5.5	
13	N0.14+784	Box B2.5 H3.3 @2 W=10.4m	Lupu River
14	No.15+405	Pipe D900 @2 L=9.1m	
15	No.17+710	Pipe D1700 @2 L=11.8m	Newly built instead of one at No.17+870
16	No.17+720	Pipe D1800@4 L=11.8m	No functioning
17	No.17+932	Pipe D600 @2 L=8.8m	
18	No.18+750	Pipe D900 @1 L=14.8m	
19	No.18+990	Box B1.0 H1.0 @1 L=6.4m	
20	No.21+294	Box B1.0 H1.0 @1 L=6.4m	
21	No.20+937	Box B1.0 H1.0 @1 L=6.4m	
22	No.21+297	Box B1.0 H1.0 @1 L=6.4m	
23	No.21+350	Box B1.0 H1.0 @1 L=6.4m	
24	No.21+658	Box B1.0 H1.0 @1 L=6.4m	
25	No.22+204	Box B1.0 H1.0 @1 L=8.1m	
26	No.22+281	Box B1.0 H1.0 @1 L=6.4m	

Source: Study Team

(3) Crossing Existing Roads to be Considered

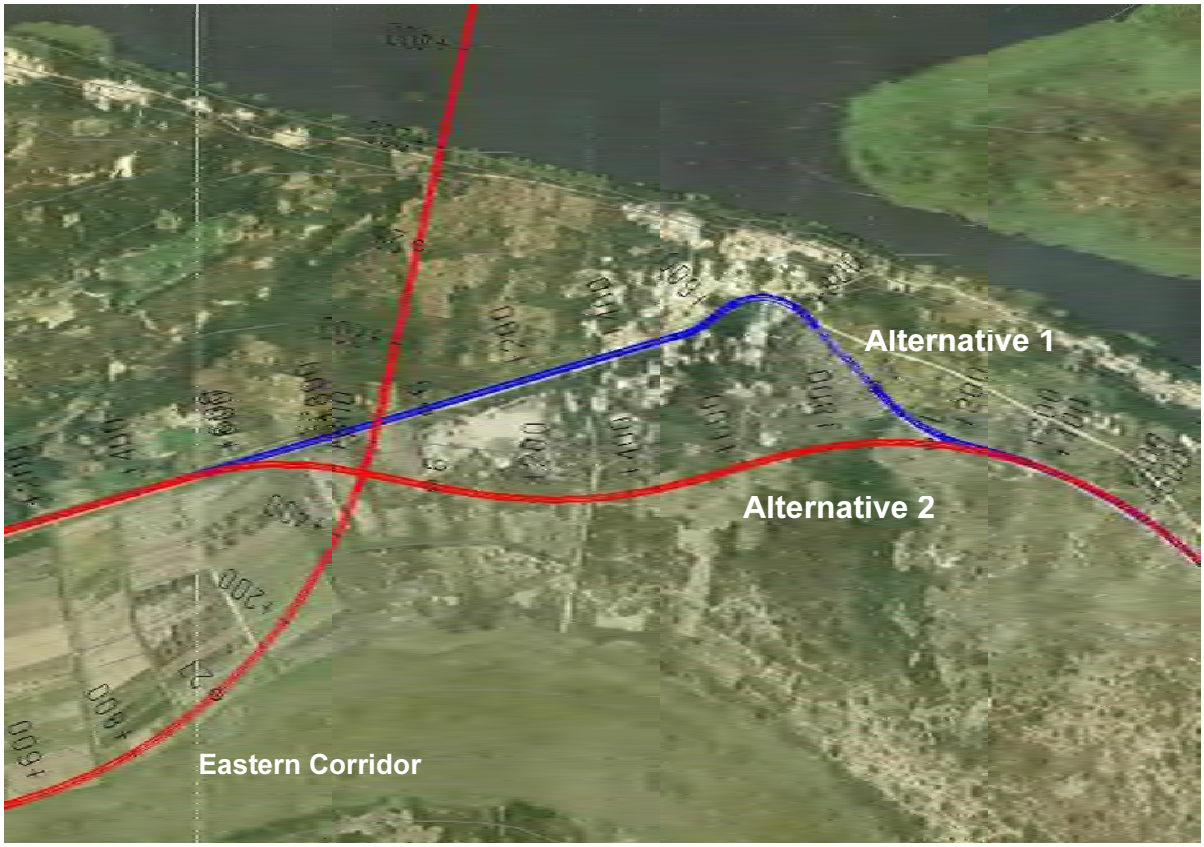
There is no classified cross road other than minor gravel feeder roads.

(4) Comparison of Horizontal Alignment

Although the centreline of the road to be upgraded between Asutsuare and Aveyime basically follows the existing centreline, the Study Team compared the existing alignment (Alternative 1) and a bypass alignment (Alternative 2) around Volivo Township because it would be possible to construct a bypass route to south part of the township to avoid the residential area as shown in Table 8-3.

A bypass route would improve traffic functions as an inter-regional road by applying a radius of curvature corresponding to the design speed of 80 km/h and would increase traffic safety by improving the intersection angle with the Eastern Corridor. It would also reduce the risk of accidents impact on the living environment and construction cost. Thus, the Study Team recommends a bypass alignment (Alternative 2).

Table 8-3 Comparison of Alignments in Volivo Township



Item	Alternative 1 (Blue line)		Alternative 2 (Red line)	
Route (Station)	Following the existing road passing through the residential area (5 km+450 to 7 km+350)		Shifting to the south of Volivo Township to bypass the residential area (5 km+450 to 7 km+200)	
Alignment	R = 120m (50 km/h) Less smooth traffic		R = 600m, 1000m (80 km/h) More smooth traffic	+
Intersection angle with Eastern Corridor	60° Minimum standard		83° Greater traffic safety	+
Traffic accidents	High risk due to passing through the residential area and in front of a school		Low risk	+
Impact on living environment	Direct influence of noise and exhaust gas		Indirect influence of noise and exhaust gas	+
Impact on regional economy	Direct impacts	+	Indirect impacts	
Construction cost (Ratio)	US$1.5 million (1.07)		US$1.4 million (1.00)	+
Evaluation	**1 +**		**5 +**	
	As Alternative 2 is advantageous as an inter-regional road.			

Source: Study Team

8.2.3 Pavement Design

(1) Design Approach

a) Design Criteria

The Ghana Pavement Design Manual presents methods for the pavement design of new roads and rehabilitation of existing ones. This manual is an adaptation of the AASHTO design manual (1993) for local conditions. Thus, the pavement design is examined based on the Ghana

Pavement Design Manual and the AASHTO Design Manual.

b) Type of Works

The Asutsuare–Aveyime road (No. 00 +000 to No. 24 +105) will be upgraded from the existing unpaved road (W=6m) to the paved road (W=11.3m).

c) Design Period

The performance period of a pavement is from the time of construction until the pavement needs to be reconstructed or rehabilitated. It can also be considered as the length of time that it takes for the pavement to deteriorate from its initial serviceability to its terminal serviceability.

The design period (analysis period) is 20 years, from the year of starting traffic service in 2016 to the project development target year of 2036.

(2) Design Conditions

a) Design Traffic

The design traffic for the pavement design is based on the forecast of traffic demand shown in Table 8-4. ADT on the Asutsuare–Aveyime road is 4,216 vehicles per day in 2016 and 5,339 in 2036.

Table 8-4 Design Traffic on the Asutsuare–Aveyime Road

Vehicle Type	2016	2036
	ADT (vehicles per day)	
Passenger Car/Pick-up	1,716	2,397
Minibus	1,478	1,183
Bus	371	370
Medium truck	234	246
Heavy truck	225	515
Trailer	189	621
Others	3	7
Total	**4,216**	**5,339**

Source: Study Team

b) Design ESAL

Design ESAL is calculated based on the design traffic and 80 kN LEF, which is set taking into account the weighted average by type of vehicle running on the trunk road networks in Ghana. The design ESAL for the Asutsuare–Aveyime road is 13.884 E6 shown in Table 8-5.

c) Subgrade Strength (Design CBR)

Subgrade strength defined by the design CBR is calculated based on the results of CBR testing of this upgrading section by the Study Team as follows:

PIT-3 13% (CBR testing)
PIT-4 26% (CBR testing)
PIT-5 15% (CBR testing)
PIT-6 10% (CBR testing)
Design CBR 9% (= 9.0%)

Table 8-5 Design ESAL for the Asutsuare–Aveyime Road

Type	Design Traffic	Load Equivalency Factor	Design ESAL
Passenger Car/Pick-up	7,441,037	0.0600	446,527
Minibus	4,837,384	0.0387	187,207
Bus	1,355,867	0.2120	287,498
Medium truck	875,948	0.7833	686,129
Heavy truck	1,287,833	5.4362	7,000,918
Trailer	1,340,447	3.9346	5,274,163
Others	23,046	0.0600	1,383
Total			**13,883,825**

Source: Study Team

d) Resilient Modulus

Resilient modulus test was carried out in order to determine the effective road soil M_R for the Asutsuare-Aveyime Road by the Study Team with the cooperation of the GHA. From the results of calculation based on the Ghana Pavement Design Manual, the effective road soil M_R obtained 19 Mpa which is equivalent to 2,740 psi

f) Structural Number

The basic formula for the pavement structural number to determine flexible pavement thickness is as follows. The structural number of each section is shown in Table 8-6.

$$\log_{10}(W_{18}) = Z_R \times S_o + 9.36\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2-1.5}\right]}{0.4 + \frac{1094}{(SN+1)^{5.19}}} + 2.32\log_{10}(M_R) - 8.07$$

where:

W_{18} : Number of 80 kN single axle load applications
Z_R : Standard normal deviation corresponding to selected reliability
S_O : Overall standard deviation
SN : Structural number
ΔPSI : Design serviceability loss
M_R : Roadbed soil resilient modulus (psi)

Table 8-6 Structural Number for the Asutsuare–Aveyime Road

Item		Value
W_{18}	Number of 80 kN single axle load applications (million ESAL)	13.884
R	Reliability level (%)	95
Z_R	Standard normal deviation corresponding to selected reliability	-1.645
S_O	Overall standard deviation	0.45
CBR	California Bearing Ratio (%)	9
M_R	Roadbed soil resilient modulus	2,740
P_O	Initial serviceability	4.5
P_T	Terminal serviceability	2.5
ΔPSI	Design serviceability loss	2.0
SN	**Structural Number**	**7.07**

Source: Study Team

(3) Pavement Thickness

a) Minimum Pavement Thickness

The minimum pavement thickness is shown in Table 8-7.

Table 8-7 Minimum Pavement Thickness for the Asutsuare–Aveyime Road

ESAL	Minimum Thickness, mm (in)		
	Asphalt Concrete	Aggregate Base	Sub-base
50,001 - 150,000	50 (2.0)	150 (6.0)	150 (6.0)
150,000 - 1,000,000	50 (2.0)	150 (6.0)	150 (6.0)
1,000,000 - 2,000,000	50 (2.0)	200 (8.0)	200 (8.0)
2,000,000 - 5,000,000	76 (3.0)	200 (8.0)	200 (8.0)
5,000,000 - 9,000,000	102 (4.0)	200 (8.0)	200 (8.0)

Source: Ghana Pavement Design Manual

b) Strength Coefficient

Asphalt concrete wearing a = 0.44
Asphalt concrete binder a = 0.34
Base course (crushed stone) a = 0.14
Cement stabilised sub-base a = 0.28
Subbase a = 0.13

c) Pavement Structure

The Structural Number (SN) is equal to the structural number indicative of the total pavement thickness required, and is given by:

$$SN = a_1 d_1 + a_2 d_2 + a_3 d_3 m_3$$

where:

a_i : i^{th} layer coefficient
d_i : i^{th} layer thickness (inches)
m_i : i^{th} layer drainage coefficient

d) Recommended Pavement Thickness

Option 1 is recommended for the pavement thickness for economic reasons as well as greater durability against the weather thanks to its higher impermeability and strength of sub-base course.

Table 8-8 Recommended Pavement Thickness for the Asutsuare–Aveyime Road

Item	Option 1	Option 2
Asphalt Concrete Wearing	5cm	5cm
Asphalt Concrete Binder	5cm	5cm
Base Course	35cm	25cm
Cement Stabilised Sub-base Course	-	20cm
Sub-base Course	71cm	39cm
SN	7.10 > 7.07…OK	7.12 > 7.07…OK
Cost (ratio)	US$ 47.40 /m^2 (1.00)	US$ 58.73 /m^2 (1.24)
Evaluation	**Recommended**	

Source: Study Team

8.2.4 Road Drainage

a) Planned Facilities

The inner sizes of planned facilities such as road culverts are determined taking into account

the following:

- Compare the inner sizes of existing facilities with the minimum requirement of facilities, and then adopt the planned facilities as shown in Table 8-9.
- Secure an inner size of planned box culverts of at least B1.0 H1.0 and planned pipe culverts of at least D900 considering efficiency of maintenance works.

Table 8-9 Planned Culverts for the Asutsuare–Aveyime Road

Station		Existing Facilities	Minimum Requirement	Planned Facilities	Remarks
1	No.0+520	B12.0 H1.0 (open)	Box B3.1 H2.3	Box B3.1 H2.3	Newly
2	No.0+718	B4.5 H1.0 (open)	Alignment sifted	No required	Filled
3	No.1+747	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
4	No.2+450	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
5	No.3+540	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
6	No.3+920	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
7	No.6+550	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
8	No.8+310	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
9	No.8+950	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
10	No.9+264	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
11	No.9+350	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
12	No.10+300	Pipe D900 @1	Pipe D900 @1	Pipe D900 @1	Newly
13	N0.14+850	Box B2.5 H3.3 @2 W=10.4m	Box B2.5 H3.3 @2	Box B2.5 H3.3 @2	Newly
14	No.15+405	Pipe D900 @2 L=9.1m	Pipe D900 @2	Pipe D900 @2	Newly
15	No.17+710	Pipe D1700 @2 L=11.8m (New),	Pipe D1700 @2	Pipe D1700 @2	Extension
16	No.17+720	Pipe D1800@4 L=11.8m (Old)	-	No required	Removal
17	No.17+932	Pipe D600 @2 L=8.8m	Pipe D900 @2	Pipe D900 @2	Newly
18	No.18+750	Pipe D900 @1 L=14.8m	Pipe D900 @1	Pipe D900 @1	Newly
19	No.18+990	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
20	No.20+294	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
21	No.20+937	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
22	No.21+350	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
23	No.21+658	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
24	No.22+174	B1.0 H1.0 @1 L=8.1m	Box B1.0 H1.0	Box B1.0 H1.0	Newly
25	No.22+281	B1.0 H1.0 @1 L=6.4m	Box B1.0 H1.0	Box B1.0 H1.0	Newly

Source: Study Team

8.2.5 Intersection Design

The Volivo Intersection is a new intersection with four arms where the Eastern Corridor and the Asutsuare–Aveyime road cross. The new Volivo Intersection will be opened to traffic in 2016. It is recommended to introduce roundabout at this intersection for ensuring proper traffic handling as mentioned in Chapter 7.

8.2.6 Traffic Safety and Management

(1) Traffic Safety and Management

a) Guardrails

Guardrails are required where there is a high embankment of more than 4 m and at other necessary sections. Since the height of the embankment between Asutsuare and Aveyime is less

than 2 m, guardrails are not required in terms of embankment height.

b) Road Signs and Markings

Appropriate pavement markings are provided to control traffic movement, and to warn and guide motorists and pedestrians. Generally, a broken guiding line is provided as a centreline where the sight distance is adequate. Where the sight distance is inadequate, a continuous full marked centreline is provided. Edge line markings are also provided on both sides of the road.

The following road signs are placed in appropriate locations:

- Danger Warning signs such as Hump Ridge, Pedestrian Crossing, Road Crossing and Traffic Signals
- Regulatory signs such as Maximum Speed Limit
- Information signs such as direction of destination at proper locations

c) Pedestrian Crossing

In large settlements where pedestrians cross the road, apart from the mandatory speed limit sign of 50 km/h, pedestrian crossing points are indicated by zebra stripes and signs.

d) Traffic Calming Measures

The speed of vehicles travelling through populated areas is likely to be one of the most important safety issues. Because one of the main problems will be conflict between vehicles and pedestrians, pedestrian crossing points should be separated from through traffic. This should be done by using speed humps and/or a raised carriageway with pedestrian crossings. Humps should be used on roads with speed limits of 50 km/h or less through town or village areas with many pedestrians on roads. It is recommended that humps should be constructed as trapezoidal humps (4.0 m in width and 75 mm in height) at pedestrian crossings.

e) Bus Bays

Bus bays are provided along the proposed road where necessary such as around Asutsuare, Volivo and Aveyime.

8.3 Implementation Programme for Upgrading the Asutsuare – Aveyime Road

8.3.1 Construction Method and Material/Equipment Procurement

(1) Timing of Construction

Annual rainfall of the project site is approximately 600 mm and monthly rainfall during rainy season from May to September is approximately 100 mm. Under this situation, implementation of major works such as earth works and pavement works should be considered to avoid rainy season.

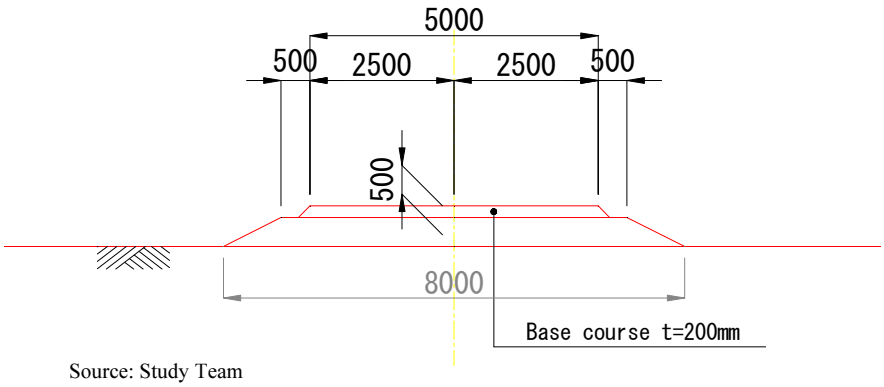
(2) Quality Management of Concrete Works

The project site is tropical climate. Under such warm temperature, there are possibilities to drop slump value of concrete mixtures and bring rapid moisture evaporation, which result in deteriorating concrete quality. Thus, it is recommended to use hot weather concrete in aspects of

quality management of concrete works.

(3) Traffic Control during under Construction

Proposed alignment between Asutsuare and Aveyime basically follows the existing centerline. Although there could be less traffic flows during under construction, it is required to secure proper traffic during under construction by providing detours as shown Figure 8-2.



Source: Study Team

Figure 8-2 Typical Cross Section of Detour

(4) Relocation and Removal

There are some sections to be set electric poles and lines on roadsides. There are possibilities that they are obstacles to constructing the proposed road. Relocation and removal of the existing electric poles and lines are needed if electric poles are within the road width.

(5) Procurement of Construction Materials and Equipment

Same contents as discussed in Chapter 7 (7.4.2).

8.3.2 Implementation Schedule

(1) Construction of Sections

Total road length is 24.1 km, which is no needed to divide sections. Implementation schedule is considered construction period of three years from 2014 to 2016 as same as the construction of the road between Asutsuare Jct. and Asikuma Jct.

(2) Construction Schedule

Overall construction schedule of upgrading the Asutsuare – Aveyime road is shown in Table 8-10.

Table 8-10 Implementation Schedule of Upgrading the Asutsuare – Aveyime Road

Description	1st Year												2nd Year												3rd Year											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25	27	28	29	30	31	32	33	34	35	36
Selection of Consultant																																				
Detailed Design																																				
Tender Process for Contractor																																				
Road Works																																				
- Mobilization & Preparatory Works																																				
- Construction of Detour																																				
- Earthworks																																				
- Pavement Works																																				
- Drainage Works																																				
- Road Apparatus Works																																				

Source: Study Team

CHAPTER 9
PRELIMINARY COST ESTIMATION

Chapter 9 Preliminary Cost Estimation

As this Chapter includes information related to the tender process, it will not be made public until the tender process is completed.

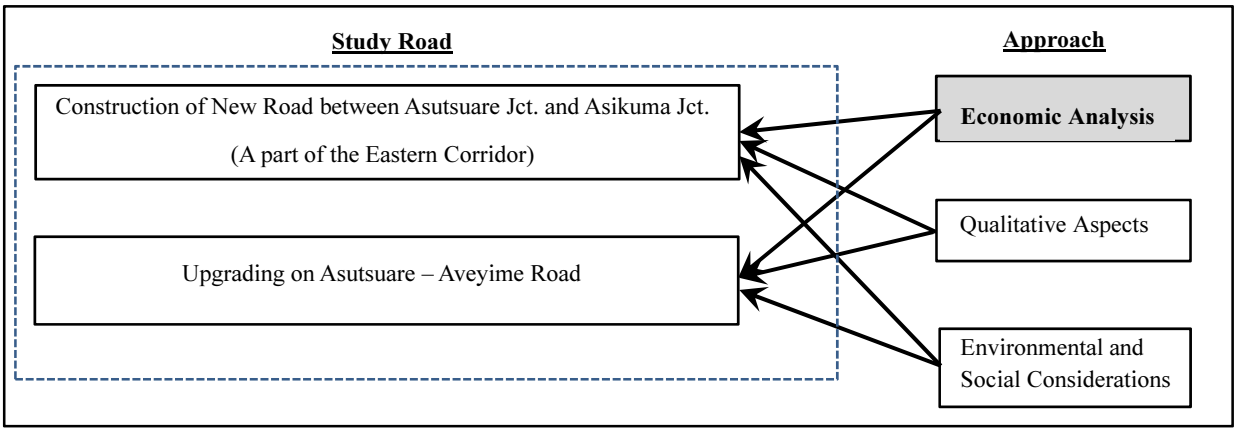
CHAPTER 10
ECONOMIC ANALYSIS

Chapter 10 Economic Analysis

10.1 Methodology for Economic Analysis

10.1.1 Methodology by HDM-4 Model

The project evaluations on both the construction of the new road between Asutsuare Jct. and Asikuma Jct. on the Eastern Corridor and upgrading of the Asutsuare – Aveyime road were carried out from three points of view: i) Economic Analysis, ii) Qualitative Aspects and iii) Environmental and Social Considerations. Of these evaluations, this chapter describes the economic analysis.



Source: Study Team

Figure 10-1 Project Evaluation Approach

In order to analyse the economic feasibilities of the projects, the economic analysis was conducted by using the "Highway Development and Management model (HDM-4)", which was produced by the WB and is widely used for economic evaluation and other studies to support decision-making by implementing agencies. This model is based on a comparison of costs and benefits under two scenarios: "With the project" and "Without the project". All costs and benefits are valued in monetary terms and expressed in economic prices. The results are expressed in terms of Economic Internal Rate of Return (EIRR) and Net Present Value (NPV).

10.1.2 Opportunity Cost of Capital and Discount Rate

The opportunity cost of capital, which is used as the cut-off ratio to judge the economic viability of projects and as the discount rate to calculate NPV, is set at 12.0% in accordance with the indication by the WB. This rate is commonly used for development projects in Ghana.

10.1.3 Economic Benefits

Economic benefits are directly generated from a project in general. In the Study, those quantitative benefits were defined as i) Savings in Road User Costs, ii) Savings in Maintenance Costs and iii) Induction of agricultural development. The expected benefits produced by this project are described below.

(1) Savings in Road User Costs

Savings in road user costs mainly consists of travel time and vehicle operation costs, which are incorporated in economic benefits in this study.

a) Savings in Travel Time Cost

The new road will connect Asutsuare Jct. to Asikuma Jct. and consequently allow vehicles to move faster due to the high-standard road design as an international corridor. In addition, the new bridge across the Volta River will enable freight trucks with long trips to divert from the Central Corridor to the Eastern Corridor, which is impassable for heavy vehicles at present due to deterioration of the Adomi Bridge. Furthermore, upgrading of the Asutsuare – Aveyime road will also shorten the travel time due to the use of high-performance asphalt pavement with a smooth surface.

The savings in vehicle Travel Time Cost (TTC) were calculated in comparison with the time values under the two scenarios, “With the Project” and “Without the project”. The applied traffic models are described in Chapter 10.2.2.

b) Savings in Vehicle Operating Cost

Vehicle Operating Cost (VOC) will also decrease as a result of the road surface improvement and use of shorter routes. The VOC in each scenario was estimated in consideration of fuel, oil, and tyre consumption and other relevant items. Consequently, the saving in VOC for the respective scenarios.

(2) Decrease in Road Agency Cost

The development of the proposed new Eastern Corridor is expected to cause traffic to divert from the central corridor and will lead to a decrease in road maintenance frequency and cost on the central corridor and to an increase in maintenance cost on the Eastern Corridor. The savings/additional costs are included as benefits or costs within the model. Road agency costs including project and maintenance costs under each scenario on the defined road network are estimated and compared in the study.

(3) Induction of Agricultural Development

The soil along the new road section between Asutsuare Jct. and Asikuma Jct. is good for cultivation. In particular, 25,000 ha. of arable land with Vertisols soil, which is one of the best soils for cultivation, on the northern side of the Volta River has not been developed mainly due to the lack of an access road to transport agricultural products, as described in Section 2.7.1. Since private companies are interested in this area, if a new bridge is constructed, economic benefits arising from agricultural development in this area can be considered as one of the benefits for the economic evaluation.

10.2 Assumptions and Calibration

10.2.1 Basic Assumptions

The analysis period of the projects was determined to be 20 years plus the construction period of the respective projects. Both roads are assumed to be opened to traffic in 2016 following the

construction period of three and two years. The basic assumptions of each project are shown in the table below.

Table 10-1 Basic Assumptions

Item	Construction of New Road between Asutsuare Jct. and Asikuma Jct.	Asutsuare – Aveyime Road
Project Type	New Construction	Upgrading
Cost Estimation Year	2012	2012
Construction Period (Years)	3	2
Construction Start Year	2013	2014
Construction End Year	End of 2015	End of 2015
Open to Traffic	2016	2016
Number of Links	With: 10, Without: 9	1
Main Difference of Scenarios	With: Network including the new road Without: Network excluding the new road	With: Paved Road Without: Gravel Road

Source: Study Team

10.2.2 Calibration

Pavement and traffic conditions are affected by many factors such as climate and traffic loading. Therefore, calibration was done to identify actual conditions in Ghana by considering the following factors.

(1) Climate

Pavement performance is greatly affected by climate, especially temperature and rainfall. To calibrate the climate condition, meteorological data from 2002 to 2011 at Ho and Akuse Meteorological Stations were analysed and climate factors to be applied were defined as shown in Table 10-2.

Table 10-2 Applied Climate Aspects

Item	Akuse	Ho	Ave.	Applied
Mean Monthly Precipitation (mm)	79.04	114.69	96.865	97
Mean Temperature (ºC)	28.60	27.87	28.235	28
Maximum average (ºC)	32.95	32.35	32.65	33
Minimum average (ºC)	23.6	22.95	23.275	23
Avg. temperature range (ºC)	4.675	4.7	4.6875	5
Days with temperature >32ºC	23	2	12.5	13

Source: Study Team based on data provided by Ghana Meteorological Agency

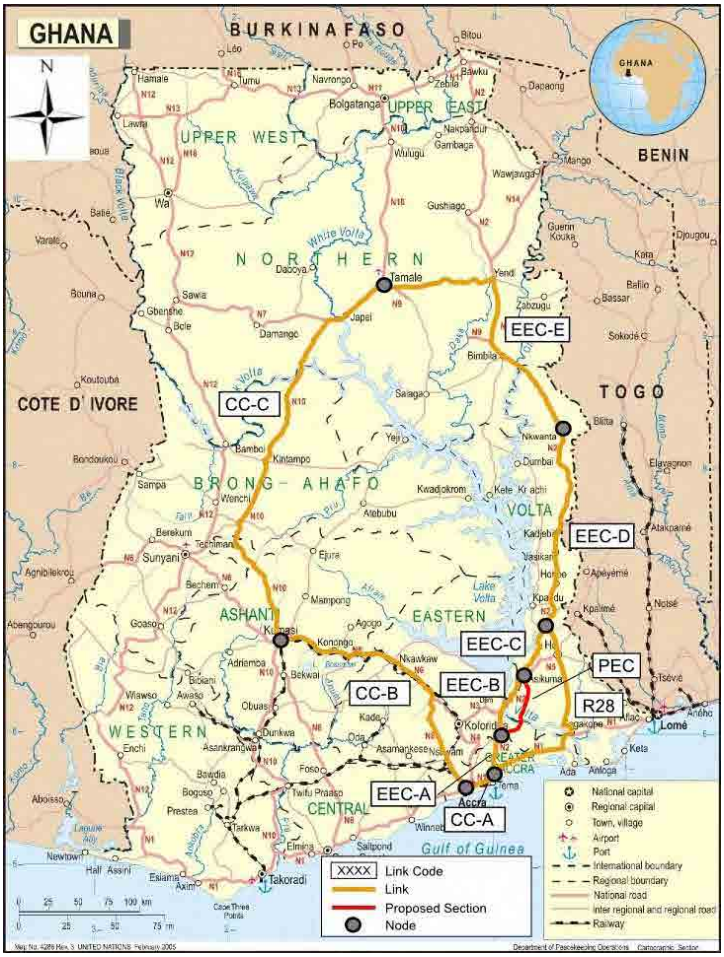
(2) Road Network

a) Analysis of the Proposed New Eastern Corridor

According to the traffic demand forecast described in Chapter 4, the characteristics of traffic on the proposed new Eastern Corridor (PEC) were identified. This traffic is mostly generated by the diversion of heavy vehicles from the central corridor (CC) and the R28 route via N1 (R28) as well as the diversion of light vehicles from the Asutsuare Jct. – Asikuma Jct. section on the existing Eastern Corridor (EEC-B) in addition to the two routes.

In consideration of the traffic aspects, the road network for economic analysis on the proposed new Eastern Corridor was determined as shown in Figure 10-2. Data of the links such as road length and condition are set based on “Road Condition Registry 2011” and are

calculated using the weighted average method. The settings for each link are shown in Appendix 8.



Source: Study Team

Figure 10-2 Road Network for the Proposed New Eastern Corridor Economic Analysis

b) Analysis of the Asutsuare – Aveyime Road

The road network used for the analysis is the Asutsuare – Aveyime section with a length of around 24 km. The study investigated the difference in benefits and costs caused by upgrading the road surface from gravel to asphalt pavement.

(3) Traffic Volume

a) Analysis of Proposed New Road between Asutsuare Jct. and Asikuma Jct.

While the traffic demand forecast was carried out on the road network including almost all roads in the study area and trunk roads outside the study area, the road network for this HDM-4 is limited in order to identify the differences in benefits and costs caused by the new road development only. Therefore, traffic volumes on the respective links were determined based on the results of traffic demand forecasts for both the “with” and “without” project cases as well as the estimated traffic diversion from the CC, EEC-B and R28 routes to PEC.

The traffic volumes used for the analysis are summarized in the following table.

Table 10-3 Summary of Traffic Volumes Used for Economic Analysis (Proposed New Road between Asutsuare Jct. and Asikuma Jct.)

Unit: Vehicles/day

Link	Without-Project Scenario			With-Project Scenario	
	2013	2016	2036	2016	2036
EEC-A	8,856	9,134	11,263	12,544	18,085
EEC-B	8,856	9,134	11,263	4,381	7,182
EEC-C	3,664	3,758	4,458	7,168	11,280
EEC-D	5,640	5,956	8,712	8,127	12,495
EEC-E	1,428	1,590	3,557	3,761	7,340
CC-A	2,483	2,631	4,560	461	777
CC-B	2,483	2,631	4,560	461	777
CC-C	2,483	2,631	4,560	461	777
R28	3,693	4,019	7,189	2,780	4,150
PEC	N/A	N/A	N/A	8,163	10,903

Note 1: N/A is Not Applicable

Note 2: Some of the above numbers do not precisely coincide with the results of traffic demand forecasts due to the difference in scope of the target network.

Note 3: The same traffic volume is applied to the three CC sections in order to investigate the impact caused only by traffic diversion from the Central Corridor to the new road between Asutsuare Jct. and Asikuma Jct.

Source: Study Team

b) Analysis of Asutsuare – Aveyime Road

It is assumed that construction of the new bridge across the Volta River will increase the traffic volume from the without-project scenario to the with-project scenario. In consideration of the assumption and the purpose of the analysis, which is to investigate the difference by pavement type, traffic volume on this section for the economic analysis was set based on the "With the project" case in the traffic demand forecast.

Table 10-4 Summary of Applied Traffic Volume (Asutsuare – Aveyime Road)

Unit: Vehicles/day

Section	With-Project Scenario	
	2016	2036
Asutsuare – Aveyime	4,216	5,339

Source: Study Team

(4) Economic Unit Cost of Vehicles

The market prices of items related to vehicle fleets have been collected through interviews with automobile dealers, fuel stations, workshops and the GHA. These prices, considered as financial prices, were converted into economic prices. Firstly, transfer items such as taxes and import duties were subtracted from the financial prices. Secondly, the prices were multiplied by a conversion factor by type of item. The Standard Conversion Factor (SCF) of 0.9603 described in the following section was applied to products such as new vehicles and tyre replacement costs. The values of passenger working time and non-working time were based on the numbers in the ORIO project conducted in 2012. Cargo holding value was estimated using import/export amount and volume, inflation rate and deposit interest rate in Ghana.

The financial and economic unit costs of vehicles are summarized in Table 10-5 and Table 10-6, respectively.

Table 10-5 Summary of Vehicle Fleet Unit Costs (Financial)

No.	Vehicle Category	Representative Vehicle	New Vehicle (US$, no tyres)	Replacement Tyres (US$)	Fuel (US$/ltr)	Lubricants (US$/ltr)	Maintenance Labour (US$/h)	Crew Wages (US$/h)
1	Cars/Taxis	Nissan Sunny	14,772.53	143.62	0.92	5.54	1.84	0.09
2	Pick-up	Nissan Pickup 2.7	20,906.38	373.40	0.92	5.54	1.84	0.09
3	Small Bus	Nissan Urvan 3.0	39,158.94	185.27	0.92	5.54	1.15	0.52
4	Med. Bus	Nissan Civilian	78,938.30	356.17	0.94	3.47	1.15	0.78
5	Large Bus	Nissan Civilian	78,938.30	356.17	0.94	3.47	1.15	0.78
6	Light T.	Mercedes Benz	87,537.55	257.07	0.94	3.47	1.15	0.95
7	Medium T.	Mercedes Benz	87,537.55	257.07	0.94	3.47	1.15	0.95
8	Heavy T.	Mercedes Benz	121,716.17	666.38	0.94	3.47	1.15	1.09
9	L. Semi T.	Mercedes Benz	171,405.11	666.38	0.94	3.47	1.61	1.09
10	H. Semi T.	Mercedes Benz	171,405.11	666.38	0.94	3.47	1.61	1.09
11	Truck T.	Mercedes Benz	171,405.11	666.38	0.94	3.47	1.61	1.09
12	Others	Mercedes Benz	187,293.51	728.14	0.94	3.47	1.61	1.09

No.	Vehicle Category	Representative Vehicle	Annual Overhead	Annual Interest (%)	Passenger Working time (US$/h)	Passenger Non-Working Time (US$/h)	Cargo Holding Value (US$/h)
1	Cars/Taxis	Nissan Sunny	400	27	0.5	0.125	0
2	Pick-up	Nissan Pickup 2.7	400	27	0.5	0.125	0
3	Small Bus	Nissan Urvan 3.0	500	27	0.34	0.085	0
4	Med. Bus	Nissan Civilian	700	27	0.34	0.085	0
5	Large Bus	Nissan Civilian	700	27	0.34	0.085	0
6	Light T.	Mercedes Benz	700	27	0.34	0.085	0.10
7	Medium T.	Mercedes Benz	700	27	0.34	0.085	0.10
8	Heavy T.	Mercedes Benz	800	27	0.34	0.085	0.30
9	L. Semi T.	Mercedes Benz	800	27	0.34	0.085	0.50
10	H. Semi T.	Mercedes Benz	800	27	0.34	0.085	0.50
11	Truck T.	Mercedes Benz	800	27	0.34	0.085	0.50
12	Others	Mercedes Benz	800	27	0.34	0.085	0.30

Source: Study Team

Table 10-6 Summary of Vehicle Fleet Unit Costs (Economic)

No.	Vehicle Category	Representative Vehicle	New Vehicle (US$, no tyres)	Replacement Tyres (US$)	Fuel (US$/ltr)	Lubricants (US$/ltr)	Maintenance Labour (US$/h)	Crew Wages (US$/h)
1	Cars/Taxis	Nissan Sunny	11,600.40	119.93	0.42	4.15	1.84	0.09
2	Pick-up	Nissan Pickup 2.7	16,384.50	311.81	0.42	4.15	1.84	0.09
3	Small Bus	Nissan Urvan 3.0	30,787.71	154.71	0.42	4.15	1.15	0.52
4	Med. Bus	Nissan Civilian	61,964.14	297.42	0.55	2.60	1.15	0.78
5	Large Bus	Nissan Civilian	61,964.14	297.42	0.55	2.60	1.15	0.78
6	Light T.	Mercedes Benz	68,829.63	214.67	0.55	2.60	1.15	0.95
7	Medium T.	Mercedes Benz	68,829.63	214.67	0.55	2.60	1.15	0.95
8	Heavy T.	Mercedes Benz	95,487.31	556.46	0.55	2.60	1.15	1.09
9	L. Semi T.	Mercedes Benz	134,343.59	556.46	0.55	2.60	1.61	1.09
10	H. Semi T.	Mercedes Benz	134,343.59	556.46	0.55	2.60	1.61	1.09
11	Truck T.	Mercedes Benz	134,343.59	556.46	0.55	2.60	1.61	1.09
12	Others	Mercedes Benz	146,796.59	608.03	0.55	2.60	1.61	1.09

No.	Vehicle Category	Representative Vehicle	Annual Overhead	Annual Interest (%)	Passenger Working time (US$/h)	Passenger Non-Working Time (US$/h)	Cargo Holding Value (US$/h)
1	Cars/Taxis	Nissan Sunny	400	12	0.5	0.125	0
2	Pick-up	Nissan Pickup 2.7	400	12	0.5	0.125	0
3	Small Bus	Nissan Urvan 3.0	500	12	0.34	0.085	0
4	Med. Bus	Nissan Civilian	700	12	0.34	0.085	0
5	Large Bus	Nissan Civilian	700	12	0.34	0.085	0
6	Light T.	Mercedes Benz	700	12	0.34	0.085	0.10
7	Medium T.	Mercedes Benz	700	12	0.34	0.085	0.10
8	Heavy T.	Mercedes Benz	800	12	0.34	0.085	0.30
9	L. Semi T.	Mercedes Benz	800	12	0.34	0.085	0.50
10	H. Semi T.	Mercedes Benz	800	12	0.34	0.085	0.50
11	Truck T.	Mercedes Benz	800	12	0.34	0.085	0.50
12	Others	Mercedes Benz	800	12	0.34	0.085	0.30

Note 1: Tax on fuel is based on data for 2005.
Note 2: The same data are used for some categories due to the limitation of data availability.
Source: Study Team based on data collected through interviews.

(5) Maintenance Unit Cost

The HDM-4 model can compute lifecycle costs on the designated network in accordance with road conditions or assigned schedules. The maintenance unit costs were provided by the GHA and converted into economic costs with the conversion factor of 0.85 given by the MRH. The unit costs and intervention criteria of maintenance are shown in Table 10-7.

Table 10-7 Unit Costs and Intervention Criteria of Maintenance

Item	Unit	Intervention	Financial		Economic
			Unit Cost (GHS)	Unit Cost (US$)	Unit Cost (US$)
Unpaved Road Maintenance					
Grading	km	Once a year	3,322.2	1,767.1	1,502.1
Spot Gravel	m^3	Gravel thickness < 100 mm	19.4	10.3	8.8
Gravel Resurfacing	m^3	Gravel thickness < 50 mm	19.4	10.3	8.8
Paved Road Maintenance					
Crack Sealing	m^2	Wide structural cracking > 10%	5.69	3.0	2.6
Pothole Patching	m^2	No. of holes/km > 10	34.07	18.1	15.4
Overlay @ 50mm	m^2	IRI* = 8 and total carriageway cracked > 5%	N/A	72.2	61.3
Reconstruction	km	IRI = 12 and total carriageway cracked > 5%	N/A	1,464,832	1,245,107

* IRI = International Roughness Index

Note 1: Exchange Rate US$ 1=GHS 1.88, Conversion factor from financial to economic cost is 0.85 based on factor provided by Ministry of Roads and Highways.

Note 2: The unit costs of overlay and reconstruction are based on actual projects in Ghana and their exchange rates were set at the rates as of the contract dates.

Source: Study Team based on the unit cost data 2012 provided by the GHA.

10.2.3 Project Cost in Economic Value

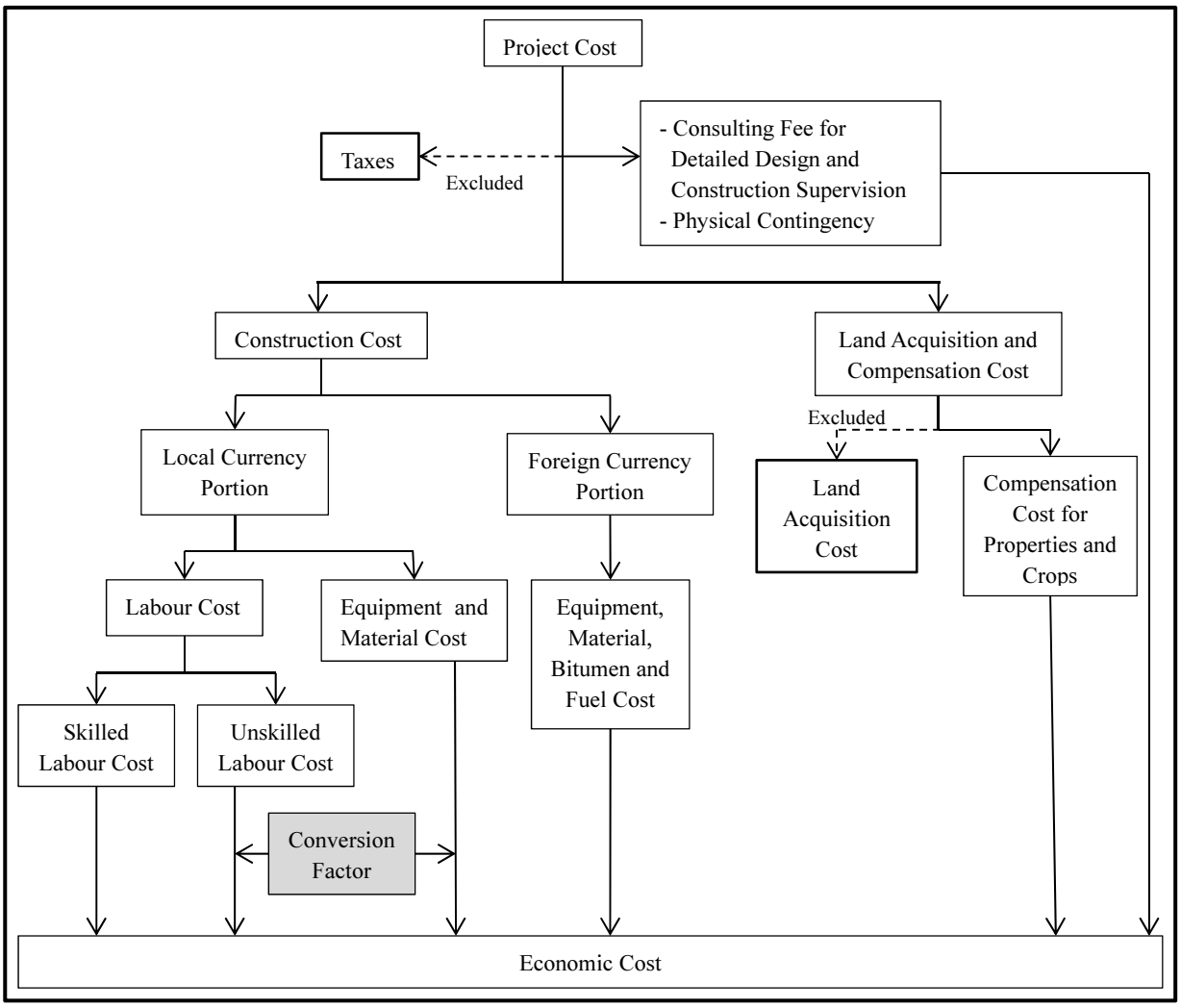
(1) Classification of Project Cost

The construction cost is defined as the project cost in this HDM-4 analysis. Since the project cost prepared by a cost estimator is expressed in financial prices, it should be converted into the economic price to conduct the economic analysis. The construction cost consists of four main categories: civil work cost, land acquisition cost, taxes and other costs such as consultancy and engineering fees and physical contingency. The structure of road agency costs is shown in Figure 10-3.

The civil work cost is divided into the local currency portion (LCP) and the foreign currency portion (FCP), the shares of which are approximately 70% to 30% in this project. Furthermore, the LCP is classified into labour cost and equipment and material costs, the proportions of which were estimated at 50% and 50%. This machine and material cost contains some irrelevant elements for economic activities, therefore, the SCF was applied to the costs in order to convert to economic costs. Meanwhile, labour cost can be separated into skilled and unskilled labour costs. Only the unskilled labour portion, which is around 20% in the study, is to be converted by using a conversion factor, while the skilled labour cost can be used in the analysis without conversion. The land acquisition cost is made up of land, property and resettlement assistance costs. Within these three items, the land cost was subtracted from the project cost since land

itself does not affect economic activity whereas property does. The structure of the project cost is shown in Figure 10-3.

Each procedure of conversion is described in the following sections.



Source: Study Team

Figure 10-3 Structure of Project Cost

(2) Exclusion of Transfer Items and Price Escalation

Taxes, customs duties, loan interest, government subsidies, etc. are not inherent cost items accrued by the project. These items are called transfer items and should be excluded from the project cost. For instance, VAT of 12.5% and National Health Insurance Levy (NHIL) of 2.5% are deducted from the local currency portion. The other portions are also transfer items subtracted from the estimated financial costs if included.

The estimation of the project cost includes inflationary cost elements which are expected to be incurred during the construction period. These elements are excluded in the economic analysis since these are external factors for the project.

(3) Conversion Method from Financial to Economic Cost

a) Equipment and Material Costs

The equipment and material costs within the local currency portion should be converted into

economic prices because these prices are distorted due to the inefficient markets and limited information in the country. Consequently, they do not reflect international market prices. The distorted prices are adjusted by applying the SCF, which is set at 0.9603 in the Study. The SCF is calculated using the following formula:

$SCF = (M + X) / \{(M + Tm) + (X – Tx + Sx)\}$

where,

M: Imports (CIF Price: Cost Insurance Free)

X: Exports (FOB Price: Free On Board)

Tm: Import Taxes

Tx: Export Taxes

Sx: Import Subsidies

b) Unskilled Labour Cost

While the skilled labour price is generally determined under full free-market principles, the price of unskilled labour is distorted due to the lack of liquidity of workers. For example, the surplus of workers caused by the high rate of unemployment or potential unemployment can decrease the unskilled labour rate in economic value. However, the actual market rate is usually higher than the economic value since the rate is elevated by the social environment such as the minimum wage regulation and disproportionate existence of supply. Therefore, the actual wage rate of unskilled labour should be revaluated to be the opportunity cost in the economic analysis.

Although there is no recent data on the unemployment rate in Ghana, the average rate from 2001 to 2005 was 12% according to Trading Economics[28]. Meanwhile, the average labour participation rate from 2000 to 2009 was 74.5% which means a labour non-participation rate of 25.4%. Considering the situation, the current unemployment rate in Ghana is assumed at 15% in this study. As a result of the unemployment assumption and bibliographic survey, the conversion factor of unskilled labour from financial to economic price is set at 0.8.

c) Land Acquisition Cost

The land uses along the study road were categorised into three types: agricultural, residential and no-use. In this economic analysis, all the land costs were excluded from the land acquisition cost since land itself does not contribute to economic activities. Agricultural land was evaluated as the gross revenues of products which were to be the opportunity cost of the land. Regarding residential land, the cost of property was utilised for the economic value of the land. No-use land was excluded from the land acquisition cost since only land transactions are assumed to occur.

(4) Economic Cost of the Project

The economic cost of constructing the proposed new road between Asutsuare Jct. and Asikuma Jct., and upgrading the Asutsuare – Aveyime road were calculated in light of the

[28] http://www.tradingeconomics.com/

above-mentioned categorisation and conversions based on the project cost estimates.

10.2.4 Agricultural Development Value

(1) Target Land

The target land for agricultural development following construction of the proposed new road between Asutsuare Jct. and Asikuma Jct. was determined to be 25,000 ha, as described in Section 2.7.1

(2) Development Value

The estimated benefit per year was incorporated in the benefits in the economic analysis. The following assumptions were applied in this study:

- All target land is used for cultivating cassava
- 50% of earnings is the benefit

The estimated agricultural development value arising from construction of the proposed new road between Asutsuare Jct. and Asikuma Jct. is shown in Table 10-8.

Table 10-8 Agricultural Development Value

Crop	Average Yield	Production Amount	Unit Price per MT	Harvest Revenue per Year	Harvest Revenue per Year	Benefit Ratio	Estimated Benefit per Year
Unit	MT/ha	MT	GHS/MT	GHS/Year	US$/Year	%	US$/Year
Cassava	15.78	394604.55	223.57	88,221,739	46,926,457	50.0%	23,463,229

Source 1: Major Crops of Average Yield in Volta Region from Production Estimates 2011, MoFA
Source 2: Nominal Weighted Average Rural Wholesale Price (GHS) Per MT in 2010 from Agriculture in Ghana Facts and Figure 2010 issued by MoFA
* US$ 1 = GHS 1.88

10.3 Results of Economic Analysis

10.3.1 Construction of the New Road between Asutsuare Jct. and Asikuma Jct.

In running the HDM-4 model, all economic values were computed by scenario. The cost stream comparison is summarized in Table 10-9.

The road agency costs were estimated to reduce significantly because of the diversion of traffic from the Central Corridor to the Eastern Corridor, thus reducing the maintenance cost on the Central Corridor, whereas maintenance costs on other roads increased slightly over the study period. The decrease in road user costs was also computed, especially from 2021 when the average roughness of the entire network of the “with-project” case was lower than that of the “without” case except for 2027 and 2028.

The EIRR including agricultural development benefits is determined to be 26.1% while the EIRR without the benefit is 19.6%, both of which exceed the cut-off ratio of 12%. The NPV of the project, which is the monetary value of the net costs subtracted from the net benefits, is estimated to be US$ 273.57 million at a discount rate of 12%.

Table 10-9 Summary of Cost Stream Comparison on the Proposed New Road between Asutsuare Jct. and Asikuma Jct.

(Unit: US$ million)

Year	Increase in Road Agency Costs		Decrease in Road User Costs		Net Benefits	Development Benefit	Net Benefits including Development Benefit
	Capital	Recurrent	VOC	TTC			
2013	41.65	0.00	0.00	0.00	-41.65	0.00	-41.65
2014	70.63	0.00	0.00	0.00	-70.63	0.00	-70.63
2015	70.63	0.00	0.00	0.00	-70.63	0.00	-70.63
2016	0.00	0.00	15.82	1.19	17.01	23.46	40.47
2017	0.00	0.00	19.50	0.82	20.32	23.46	43.78
2018	0.00	0.00	19.58	0.21	19.78	23.46	43.24
2019	0.00	0.00	16.60	-0.62	15.98	23.46	39.44
2020	187.47	-1.45	11.26	-1.65	-176.41	23.46	-152.95
2021	0.00	-1.44	126.51	4.61	132.56	23.46	156.02
2022	-74.77	-0.76	124.58	5.52	205.62	23.46	229.08
2023	-112.70	0.29	88.39	2.49	203.29	23.46	226.75
2024	0.00	0.10	59.60	1.66	61.15	23.46	84.61
2025	43.69	-0.05	62.87	1.18	20.41	23.46	43.87
2026	-382.85	2.47	101.78	4.25	486.40	23.46	509.86
2027	30.07	3.77	-57.59	-4.32	-95.75	23.46	-72.29
2028	168.76	1.41	-38.18	-4.31	-212.66	23.46	-189.20
2029	112.70	1.47	47.70	1.13	-65.34	23.46	-41.88
2030	0.00	1.11	121.56	4.36	124.80	23.46	148.26
2031	-21.57	1.37	118.78	5.04	144.03	23.46	167.49
2032	0.00	0.84	107.78	5.20	112.14	23.46	135.60
2033	-74.77	-0.76	109.68	5.63	190.84	23.46	214.30
2034	65.26	0.90	60.37	0.23	-5.57	23.46	17.89
2035	30.07	-0.52	110.11	4.11	84.67	23.46	108.13
2036	-224.99	1.45	135.19	6.29	365.02	23.46	388.48
TOTAL	-70.70	10.20	1,361.87	43.01	1,465.38	492.66	1,958.04
				EIRR	19.62%	EIRR	26.13
				NPV@12%	147.30	NPV@12%	273.57

Source: Study Team

10.3.2 Upgrading on Asutsuare – Aveyime Road

The HDM-4 model was run for the scenario of upgrading from gravel to paved road. The cost stream comparison is summarized in the table below.

A significant decrease in road user cost is expected due to the difference of road surface roughness. The roughness on the upgraded paved road fluctuated between 2 and 8 in International Roughness Index (IRI) while that on the non-upgraded gravel road ranged from 18 to 21.

The EIRR of the project was estimated to be 51.5% over the cut-off ratio of 12%. The NPV at 12% was US$ 66.29 million.

Table 10-10 Summary of Cost Stream Comparison on Asutsuare – Aveyime Road

(Unit: US$ million)

Year	Increase in Road Agency Costs		Decrease in Road User Costs		Net Benefits
	Capital	Recurrent	VOC	TTC	
2014	7.55	-0.05	0.00	0.00	-7.49
2015	13.76	-0.06	-1.52	-0.41	-15.63
2016	0.00	-0.06	11.41	2.38	13.84
2017	-0.19	-0.05	11.81	2.44	14.49
2018	0.00	-0.06	10.20	1.99	12.24
2019	0.00	-0.06	11.96	2.40	14.41
2020	-0.19	-0.05	12.34	2.46	15.05
2021	0.00	-0.06	10.58	2.02	12.66
2022	0.00	-0.06	12.31	2.42	14.79
2023	-0.19	-0.01	12.63	2.48	15.32
2024	0.00	0.05	10.76	2.04	12.75
2025	0.00	-0.06	12.58	2.44	15.08
2026	-0.19	-0.01	12.89	2.50	15.59
2027	0.00	0.05	10.91	2.06	12.92
2028	0.00	-0.02	12.79	2.44	15.25
2029	-0.19	0.05	13.08	2.48	15.71
2030	0.00	0.02	11.05	2.03	13.06
2031	0.00	0.02	13.00	2.38	15.36
2032	-0.19	0.03	13.32	2.39	15.88
2033	10.87	-0.06	11.11	1.91	2.20
2034	0.00	-0.06	16.62	2.54	19.23
2035	-0.19	-0.05	17.14	2.61	19.99
2036	-2.15	-0.06	15.01	2.20	19.41
TOTAL	28.68	-0.62	261.96	48.22	282.12
				EIRR	51.50%
				NPV@12%	66.29

Source: Study Team

10.3.3 Sensitivity Analysis

Sensitivity analyses were performed for both projects to determine the effect of possible changes in parameter values on the economic viability. The considered parameters and extent of their variations are shown in Table 10-11.

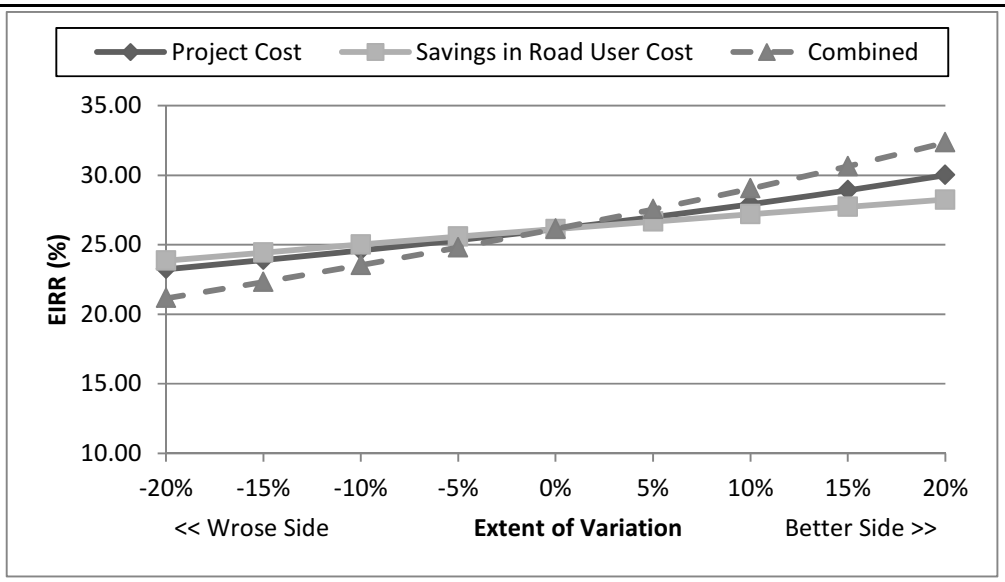
Table 10-11 Parameters and Extent of Variation for Sensitivity Analysis

	Worse Side	Better Side
a) Project Cost	+20%	-20%
b) Savings in Road User Cost	-20%	+20%
c) Combined	a: +20%, b: -20%	a: -20%, b: +20%

Source: Study Team

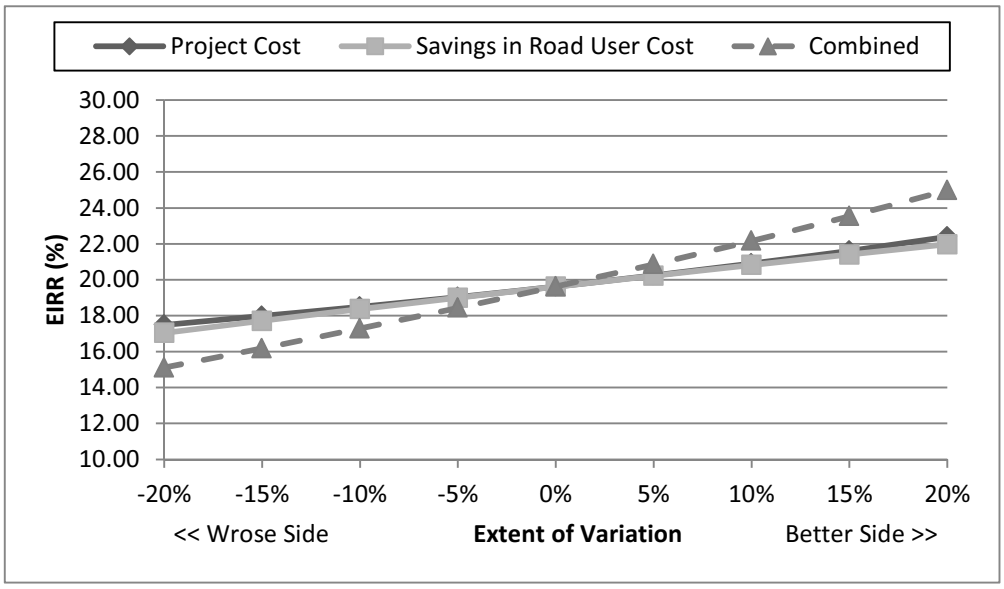
(1) Construction of New Road between Asutsuare Jct. and Asikuma Jct.

The results of sensitivity analysis both including and excluding agricultural development benefits are shown in Figure 10-4 and 10-5, respectively.



Source: Study Team

Figure 10-4 Results of the Sensitivity Analysis (Inc. Agricultural Development Benefits)



Source: Study Team

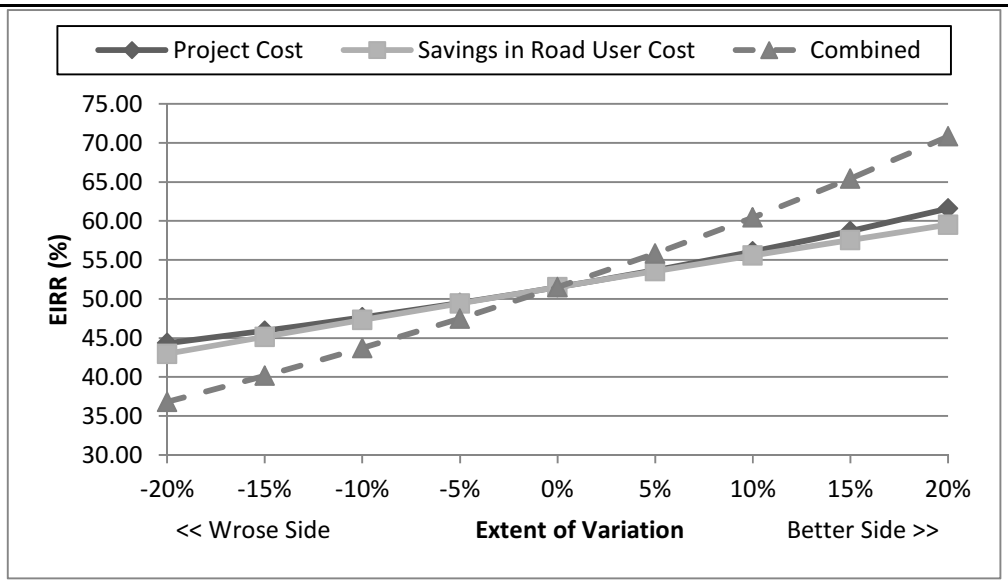
Figure 10-5 Results of the Sensitivity Analysis (Exc. Agricultural Development Benefits)

The impact on EIRR by variation in project cost is slightly greater than that in road user costs, the extent of which is -2.9% to +3.9%. In the combined case, the EIRR of the worst scenario is 21.2% and that of the best scenario is 32.3% while the base case is 26.1%. The EIRRs without agricultural development benefits change from 15.1% to 25.0% in the combined case while the base case is 19.6%.

Therefore, EIRRs were expected to remain higher than the cut-off ratio of 12% under all the cases set above.

(2) Upgrading on Asutsuare – Aveyime Road

The results of sensitivity analysis on the upgrading in the Asutsuare –Aveyime road project are shown in Figure 10-6.



Source: Study Team

Figure 10-6 Results of the Sensitivity Analysis in Upgrading Project

The variation of two factors causes a larger impact on EIRR than the new construction project which considers the effects on the surrounding road network. In the combined case, the difference was between -14.7% and +19.3% under this study scenario while the base case is 51.5%. However, EIRRs in all cases far exceed the cut-off ratio of 12%.

CHAPTER 11

ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

Chapter 11 Environmental and Social Considerations

Regarding Ghanaian policies and Japanese ODA policies, Chapter 11 gives the initial evaluation of the proposed project with the "JICA Guidelines for Environmental and Social Considerations, April 2010" (JICA Guideline) for JICA's further consideration of assistance.

11.1 Legal Framework for Environmental and Social Considerations

11.1.1 National Legal Framework

(1) The constitution of the Republic of Ghana

The same as any country, the constitution of the Republic of Ghana (1992) is the basis of all laws and regulations in Ghana. It is comprised of 26 chapters and the following chapters in particular govern all laws and regulations related to environmental and social considerations in Ghana. Considering any aid programme, the following chapters shall be respected and taken into account including common and/or customary laws and traditional practices. Some of them such as chieftaincy are unfamiliar for Japanese.

Chapter 5. FUNDAMENTAL HUMAN RIGHTS AND FREEDOMS

20. Protection from Deprivation of Property

(1) No property of any description or interest in or right over any property shall be compulsorily taken possession of or acquired by the State unless the following conditions are satisfied.
  (a) the taking of possession or acquisition if necessary in the interest of defence, public safety, public order, public morality, public health, town and country planning or the development or utilization of property in such a manner as to promote the public benefit; and
  (b) the necessity for the acquisition is clearly stated and is such as to provide reasonable justification for causing any hardship that may result to any person who has an interest in or right over the property.

(2) Compulsory acquisition of property by the State shall only be made under a law which makes provision for:
  (a) the prompt payment of fair and adequate compensation; and
  (b) a right of access to the High Court by any person who has an interest in or right over the property whether direct or on appeal from other authority, for the determination of his interest or right and the amount of compensation to which he is entitled.

(3) Where a compulsory acquisition or possession of land effected by the State in accordance with clause (1) of this article involves displacement of any inhabitants, the State shall resettle the displaced inhabitants on suitable alternative land with due regard for their economic well-being and social and cultural values.

26. Cultural Rights and Practices

(1) Every person is entitled to enjoy, practice, profess, maintain and promote any culture, language, tradition or religion subject to the provisions of this Constitution.

(2) All customary practices which dehumanise or are injurious to the physical and mental well being of a person are prohibited.

Chapter 6. THE DIRECTIVE PRINCIPLES OF STATE POLICY

36. Economic Objectives

(6) The State shall afford equality of economic opportunity to all citizens; and, in particular, the State shall take all necessary steps so as to ensure the full integration of women into the mainstream of the economic development of Ghana.

(7) The State shall guarantee the ownership of property and the right of inheritance.

(8) The State shall recognise that ownership and possession of land carry a social obligation to serve the larger community and, in particular, the State shall recognise that the managers of public, stool, skin and family lands are fiduciaries charged with the obligation to discharge their functions for the benefit respectively of the people of Ghana, of the stool, skin, or family concerned and are accountable as fiduciaries in this regard.

(9) The State shall take appropriate measures needed to protect and safeguard the national environment for posterity; and shall seek cooperation with other states and bodies for purposes of protecting the wider international environment for mankind.

(10) The State shall safeguard the health, safety and welfare of all persons in employment, and shall establish the basis for the full deployment of the creative potential of all Ghanaians.

37. Social Objectives

(1) The State shall endeavour to secure and protect a social order founded on the ideals and principles of freedom, equality, justice, probity and accountability as enshrined in Chapter 5 of this Constitution; and in particular, the State shall direct its policy towards ensuring that every citizen has equality of rights, obligations and opportunities before the law.

(2) The State shall enact appropriate laws to ensure -

(b) the protection and promotion of all other basic human rights and freedoms, including the rights of the disabled, the aged, children and other vulnerable groups in development processes.

(3) In the discharge of the obligations stated in clause (2) of this article, the State shall be guided by international human rights instruments which recognize and apply particular categories of basic human rights to development processes.

39. Cultural Objectives

(1) Subject to clause (2) of this article, the State shall take steps to encourage the integration of appropriate customary values into the fabric of national life through formal and informal education and the conscious introduction of cultural dimensions to relevant aspects of national planning.

(2) The State shall ensure that appropriate customary and cultural values are adapted and developed as an integral part of the growing needs of the society as a whole; and in particular that traditional practices which are injurious to the health and well-being of the person of the person are abolished.

Chapter 21. LANDS AND NATURAL RESOURCES

All clauses under the following section are particularly important and directly related to environmental and social considerations. Detailed descriptions are given in the following sections of Environmental Policy Framework (11.1.2) and Involuntary Resettlement Policy Framework (11.1.3).

Public Lands

257. Public Lands and other Public Property

258. Lands Commission

260. Regional Lands Commission

264. Tenure of Office of Members of Land Commission

265. Independence of Lands Commission

Stool and Skin Lands and Property

268. Parliamentary Rectification of Agreements Relating to Natural Resources

Protecting Natural Resources

268. Parliamentary Rectification of Agreements Relating to Natural Resources

269. Natural Resources Commissions

Chapter 22. CHIEFTAINCY

270. Institution of Chieftaincy

(1) The institution of chieftaincy, together with its traditional councils as established by customary law and usage, is hereby guaranteed.

(2) Parliament shall have no power to enact any law which-

(a) confers on any person or authority the right to accord or withdraw recognition to or from a chief for any purpose whatsoever; or

(b) in any way detracts or derogates from the honour and dignity of the institution of chieftaincy.

277. Definition of Chief

In this Chapter unless the context otherwise requires, "chief" means a person, who, hailing from the appropriate family and lineage, has been validly nominated, elected or selected and enstooled, enskinned or installed as a chief or queen mother in accordance with the relevant customary law and usage.

(2) Relevant National Legal Frameworks for Environmental and Social Considerations

Considering the environmental legal frameworks in Ghana, the Environmental Protection Agency Act (Act 490), 1994 is considered as the principal environmental law in Ghana. Act 490 comprises two parts: Part one: Environmental Protection and Part Two: Pesticide Control and Management. Part One covers: 1) establishment of EPA, 2) enforcement and control of environmental protection, 3) national environment fund, and 4) administration of EPA. Under 2) enforcement and control of environmental protection, the following four articles define the

obligations of environmental protection and give the EPA power to ensure environmental protection.

Article 12. Environmental impact assessment: requirement to conduct environmental impact assessment (EIA) and EPA's power to control other governmental bodies' issuance of licences, permits, approvals or consent for activities under their jurisdiction without environmental consideration,

Article 13. Enforcement notice: EPA's power to prevent or stop any activities posing a serious threat to the environment or to public health as well as impose penalty fines and/or imprisonment for those who violate the EPA's enforcement notice,

Article 14. Powers of Minister: enforcement of EPA's enforcement notice (Article 13) and assurance of its enforcement with the police and other responsible agencies,

Article 15. Environment protection inspectors: appointment of environmental protection inspectors and their power to inspect relevant activities without any obstacle as well as offenders' liabilities of fines and imprisonment for violations.

Under the power of Act 490, the EPA has the principal authority for enforcing environmental protection in Ghana. Presently, the EPA is one of the core departments and agencies under the Ministry of Environment Science and Technology (MEST) and advises the GoG on all matters concerning the environment.

Based on the EPA's "Ghana Legal Environmental information, the EPA categorises legal frameworks for environmental matters into the following ten groups. The groups of acts and regulations particularly related to the proposed road projects are listed in Table 11-1. Some of the important acts listed in Table 11-1 are briefly described in this section and Environmental Assessment Regulations (LI 1652 and LI 1703) and Land related legislations are separately described in the following section.

As a part of its commitments to the international community, Ghana participates in 43 international conventions or protocols including amendments and has applied them to its legal frameworks. Some of the most relevant conventions and protocols concerning the environment for the proposed road development and improvement projects are shown in Table 11-2.

In addition to the EPA Act 490, some of the most relevant legislations related to the proposed road projects are shown as follows.

a) Wetlands Management (RAMSAR Sites) Regulations, 1999

As the national response to the enforcement of the "Convention on Wetlands of International Importance Especially as Waterfowl Habitat", the Wetlands Management Regulations designate six Ramsar Sites: 1) Muni-Pomadze, 2) Densu Delta, 3)Sakumo, 4) Songor, 5)Keta Lagoon Complex, and Owabi Wildlife Sanctuary (Figure 11-1).

Table 11-1 Groups of Environmental Legislation in Ghana

1. Air Pollution (+ 1 regulation) • Environmental Protection Agency Act, 1994 (Act 490)
2. Coastal & Marine Environment (+ 1 act) • Fisheries Act, 2002 • Wetlands Management (RAMSAR Sites) Regulations, 1999
3. Energy and Mineral Resources (10 acts)
4. Flora and Fauna (+ 7 acts) • Economic Plants Protection Act, 1979 • Timber Resource Management Regulation Act, 1998 • Tree and Timber Act, 1974 • Timber Resource Management Regulations, 1998 • Wild Animals Preservation Act 1961 (Act 43)
5. Human Development and Settlement (+ 23 acts) • Concessions Act, 1939 • Concessions Act, 1962 • Town and Country Planning 1945 (Cap 84)
6. Hazardous Substances/Chemicals (1 act)
7. Land Management (+ 2 acts) • Lands Commission Act, 1994 • Lands Miscellaneous Provision Act, 1963 • Land Planning and Soil Conservation Act, 1953 • Land Registry Act, 1962 • Lands (Statutory Wayleaves) Act, 1963 • Land Title Registration Act, 1986
8. Noise Control (no specific act or regulation)
9. Solid Waste Management (+ 3 acts) • Environmental Assessment Regulations 1999, (LI 1652)
10. Water Management and Pollution (+ 3 acts) • Environmental Protection Agency Act, 1994 (Act 490) Part I & II • Rivers Act, 1903 • Water Resources Commission Act, 1996 (Act 522)

Source: Ghana EPA < http://www.epa.gov.gh/ghanalex/acts/index.html >

Table 11-2 Groups of Environmental Legislation in Ghana

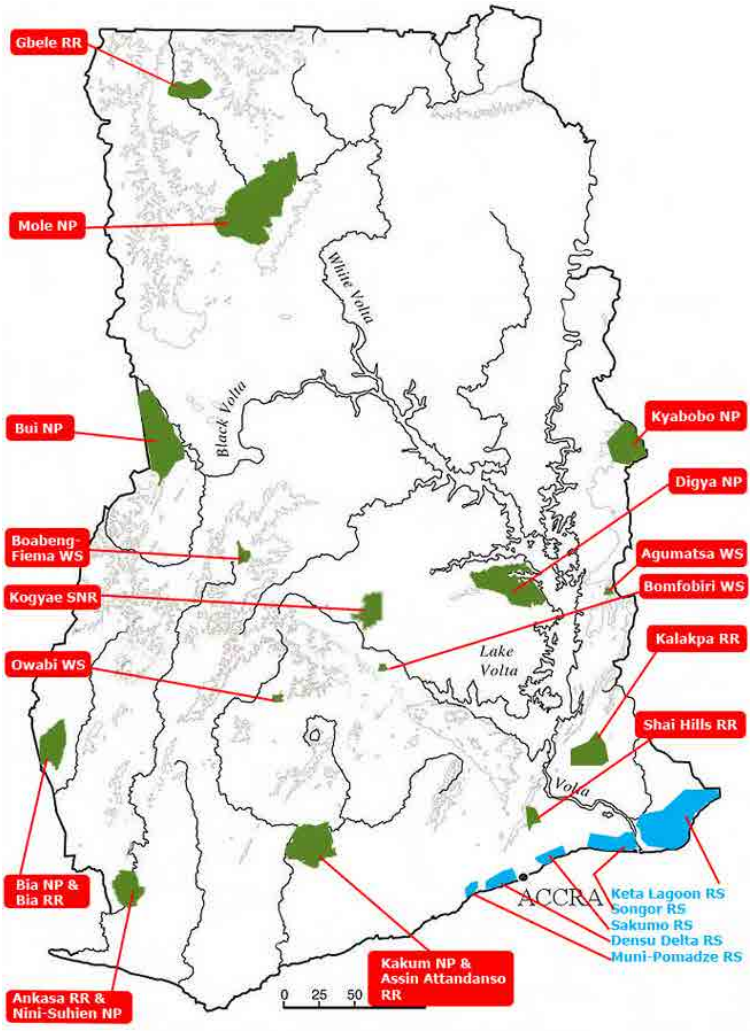
Convention/Protocol	Date of Accession/ Ratification
African Convention on the Conservation of Nature and Natural Resources, 1969 *Ghana is yet to ratify the Revised version of this Convention which is yet to come into force.	17 May, 1969
Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971	22 February, 1988 (Ac)
Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration, Geneva, 1977	27 May, 1986

Source: Ghana EPA < http://www.epa.gov.gh/ghanalex/multilateral/index.html>

The regulation regulates activities in the Ramsar Sites and principally prohibits any activities in designated “Core area of Ramsar Sites.” The regulation also designates fines and imprisonment for offences against the Wetland Management Regulations.

b) Criminal Code (Act 29) Section 296-297, 1960

Act 29 prevents the accumulation and exposure of filth and refuse of all kinds and the prohibition of activities, which may endanger public health or cause damage to lands, crops, cattle or goods. Any project activities that pose a danger to health and safety would be infringing on this law.



RS: Ramsar Site,

NP: National Parks

RR: Resource Reserves

WS: Wildlife Sanctuaries

Source: Ghana Wildlife Division <http://www.wildlifeghana.com/wildlifeMain/map.html>

Figure 11-1 Protected Wildlife Areas in Ghana

c) Water Resources Commission Act 522, 1996

Act 522 provides for the preparation of comprehensive plans for the regulation, utilisation, conservation, development and improvement of water resources and develops a policy framework for water resources management in the country. Act 522 also grants rights to exploit water resources.

d) Wildlife Reserve Regulations (LI 710), 1971

LI710 sets the creation of wildlife reserves and prohibition of water pollution within reserves. LI710 would be particularly relevant where the road passes through or near a Game Reserve-protected area (Figure 11-1).

e) Local Government Act 462, 1994

Act 462 sets the responsibilities of District Assemblies for the development, improvement and maintenance of human settlements and the environment at the district and local levels. Act 462 also assigns the Assemblies' responsibilities for the management and maintenance of the

roads within their respective jurisdiction.

f) Town and Country Planning Cap 84, 1945

Cap 84 rearranged the functions and power of town and country planning from the Town and Country Planning Board to the Minister (presently the Minister of Environment, Science and Technology(MEST)) and local governments in 1945. Cap 84 gives the principal roles and power to the designated authorities to plan district layout plans, protection and preservation of amenities, and public services such as drainage, roads, refuse disposal, sewerage and water supply.

(3) Environmental Assessment Regulations LI 1652, 1999 and (Amendment) LI 1703, 2002

Environmental Assessment Regulations, 1999 (LI 1652) and its amendment in 2002 (LI 1703) are the fundamental guidelines for environmental impact assessment in Ghana for all activities that could potentially have an impact on the environment and society. As specified by the EPA Act 490 and said regulations, the EPA is responsible for giving guidance on the whole EIA process, issuing environmental permits and certifications, and monitoring the environmental impacts of the permitted activities. LI 1652 is considered as the primary guideline for any EIA as LI 1703 only revised the fees and charges for environmental permits and certificates in 2002. LI 1652 comprises three parts, Part I: Environmental Permit, Part II: Preliminary Environmental Report and Environmental Impact Statement, Part III: Miscellaneous Provisions, and five schedules, supplemental specifications and forms (Table 11-3).

As LI 1652 focuses on actual activities rather than policy or master plan development, the strategic environmental assessment (SEA), a widely-used management tool for policy making and large-scale area development, is not specified in LI 1652 or any other legislation at this moment. However, the GoG adopted the SEA in public policy processes in the GPRS II. Details of the SEA are described in the following section.

a) Environmental Permit

Under LI 1652, it is required to acquire an environmental permit from the EPA for 30 major activities (specified in schedule 1) before the commencement of construction or such activities. After the initial evaluation by the EPA, some projects are required to conduct an EIA. It is mandatory for 17 activities specified in Schedule 2 to conduct an EIA and acquire approval for the EIA before acquiring the environmental permit. Highway and road construction is one of the 17 activities listed in Schedule 2 and so an EIA is mandatory in Ghana. Detailed procedures and requirements of the EIA are described in the following section.

The proponent of a project requiring an environmental permit is required to pay three different fees: 1) environmental processing charges, 2) permit fees, and 3) environmental certificate fee to obtain an environmental permit and environmental certificate. Detailed fees and charges are listed in schedule 2A, 2B, and 2C of LI 1703. If a project's total development cost exceed US$ 10 million, the required fees and charge are:

Table 11-3 Contents of Environmental Assessment Regulations LI 1652, 1999

PART I - ENVIRONMENTAL PERMIT
1. Undertaking requiring registration and issuance of environmental permit
2. Existing undertakings
3. Environmental impact assessment
4. Application for environmental permit
5. Initial assessment by screening of application
6. Screening report
7. Registration and issuance of environmental permit
8. Fees for and publication of grant of environmental permit
PART II PRELIMINARY ENVIRONMENTAL REPORT AND ENVIRONMENTAL IMPACT STATEMENT
9. Preliminary environmental report
10. Environmental impact statement
11. Scoping report
12. Draft terms of reference
13. Action on scoping report
14. Matters to be addressed in environmental impact statement and publication of notice of environmental impact statement
15. Advertisement of scoping notice
16. Consideration and review of environmental impact statement and publication of notices of environmental impact statement
17. Public hearing
18. Review of environmental impact statement after public hearing
19. Finalisation of environmental impact statement and granting of environmental permit
20. Period for determination of an application
21. Validity of environmental permit
22. Requirement for an environmental certificate
23. Funds for reclamation
24. Environmental management plan
PART III MISCELLANEOUS PROVISIONS
25. Submission of annual environmental report
26. Suspension, cancellation or revocation of permits and certificates
26. Complaints by aggrieved persons
27. Gazette publication
28. Offenses and penalties
29. Interpretation
Schedule 1 (Regulation 1(1)) undertakings requiring registration and environmental permit for agricultural related services
Schedule 2 (Regulation 3) undertakings for which environmental EIA is mandatory
Schedule 3 (Regulation 15 (2)) EIA) scoping notice (application header page form)
Schedule 4 (Regulation 16) the environmental impact statement (EIS) (header page form)
Schedule 5 (Regulation 30 (2)) environmentally sensitive areas

Source: Environmental Assessment Regulations 1999 (LI 1652)

1) environmental processing fee: 25% of 0.1% of the total development cost or 25% of US$ 50,000 whichever is the smaller, with upfront payment
2) permit fees: 75% of 0.1% of the total development cost or 25% of US$50,000 whichever is the smaller
3) environmental certificate fee: GHS 3,000 (GHS30 million)

In the case of a public project, permit fees/approval fees are exempt.

Once the EPA grants the environmental permit, the EPA must publish it in the Gazette and the mass media within 3 months of the date of issue of the permit. Presently, on the EPA web site (EPA home/EPA Publications), some environmental impact statements (EIS) and final EIA reports can be accessed under sub categorises such as Environmental Audit and Assessment, Oil and Gas. <http://www.epa.gov.gh/index.php?option=com_docman&Itemid=73>

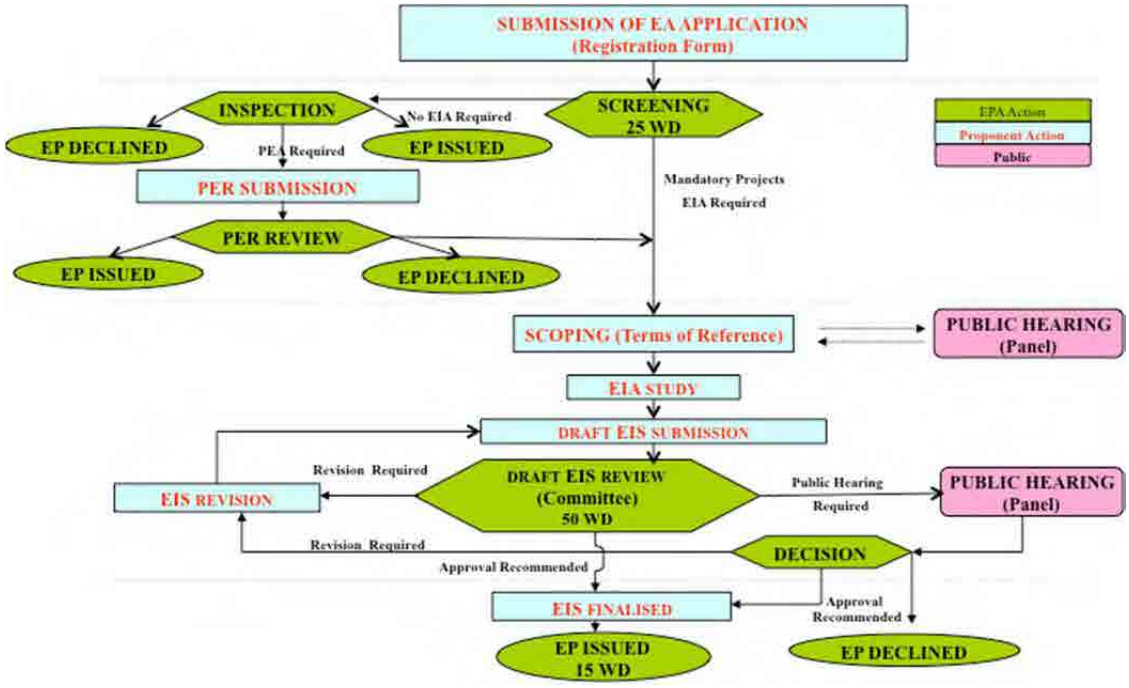
b) EIA Process

As described above, an EIA is mandatory for 17 types of activity classified as environmentally critical and an Environmental Permit (EP) is required. The construction of roads and highways is one of these critical undertakings and therefore an EIA and EP are mandatory for the proposed project. The Figure 11-2 illustrates the EIA and process of acquiring a permit. In the case of the road and highway projects, the procedures for an EIA and responsible entities are as follows.

Table 11-4 Procedure of EIA and Responsible Entity

Item	EPA	MRH/GHA
Registration		X
Screening		X
Preliminary Environmental Assessment (PEA)		X
Scoping Report/Terms of Reference (TOR)	X	
Environmental Impact Assessment (EIA)		X
Public Notices and Public Hearing		X
Review of Environmental Impact Statement (EIS: the EIA report)	X	X
Environmental Permitting and Certification	X	
Environmental Management Plan (EMP)		X
Annual Environmental Report (AER)		X

Source: Study Team



EIA: Environmental Impact Assessment
EIS: Environmental Impact Statement
PER: Preliminary Environmental Report
PEA: Preliminary Environmental Assessment
EA: Environmental Assessment
EP: Environmental Permit
PH: Public Hearing
WD: Working Days for Review
Source: GHA

Figure 11-2 The EIA Procedure in Ghana

c) Contents of Environmental Impact Statement (EIS)

Regulation 12 (Draft terms of reference) and Regulation 14 (Matters to be addressed in environmental statement) give general guidelines for the EIS (Tables 11-5 and 11-6).

Table 11-5 Frameworks of Environmental Impact Statement (Terms of Reference)

1. A description of the undertaking (projects/activities)
2. An analysis of the need for the undertaking
3. Alternatives to the undertaking, including no undertaking
4. Matters on site selection including a statement of the reasons for the choice of the proposed site and whether any other alternative site was considered
5. An identification of existing environmental conditions including social, economic and other aspects of major environmental concern
6. Information on potential, positive and negative impacts of the proposed undertaking from the environmental, social, economic and cultural aspects in relation to the different phases of development of the undertaking
7. The potential impact on the health of people
8. Proposals to mitigate any potential negative socio-economic, cultural and public health impacts on the environment
9. Proposals to be developed to monitor predictable environmental impact and proposed mitigating measures
10. Contingency plans existing or to be evolved to address any unpredicted negative environmental impact and proposed mitigating measures
11. Consultation with members of the public likely to be affected by the operation of the undertaking
12. Maps, plans, tables, graphs, diagrams and other illustrative material that will assist with comprehension of the contents of the environmental impact statement
13. A provisional environmental management plan
14. Proposals for payment of compensation for possible damage to land or property arising from the operation of the undertaking
15. An indication whether any area outside Ghana is likely to be affected by the activities of the undertaking
16. Changes in social, cultural and economic patterns relating to the undertaking
17. Vehicle traffic generation and potential for increase in road accidents

Source: Regulation 12 Draft terms of reference, Environmental Assessment Regulations 1999 (LI 1652)

Table 11-6 General Guidelines on Impact Statements in EIA

1. Concentrations of pollutants in environmental media including air, water and land from mobile or fixed sources
2. Any direct ecological changes resulting from such pollutant concentrations as they relate to communities, habitats, flora and fauna
3. Alteration in ecological processes such as transfer of energy through food chains, decomposition and bio-accumulation which could affect any community, habitat or species of flora or fauna
4. Ecological consequences of direct destruction of existing habitats from activities such as dumping of waste and vegetation clearance and fillings
5. Noise and vibration levels
6. Odour
7. Vehicle traffic generation and potential for increase in road accidents
8. Changes in social, cultural and economic patterns relating to the undertaking
9. Decline in existing or potential use of valued resources arising from matters referred to in items (1) to (4) above
10. Direct or indirect employment generation
11. Immigration and resultant demographic changes
12. Provision of infrastructure such as roads, schools and health facilities
13. Local economy
14. Cultural changes including possible conflict arising from immigration and tourism
15. Potential land use in the area of the proposed undertaking

Note: Impact statements for pre-construction, construction, operation, decommissioning and post-decommissioning phases are required.

Source: Regulation 14 Matters to be addressed in EIS, Environmental Assessment Regulations 1999 (LI 1652)

d) Information Disclosure and Involvement of Stakeholders

Regulation 15 (Advertisement of scoping notice), Regulation 16 (Considerations and review of EIS and publication of notices of EIS) and Regulation 17 (Public hearing) define the requirements for information disclosure and involvement of stakeholders to improve the EIS. The applicant/proponent of the EIS project is required to:

1) give notice of the projects/activities to the relevant Ministries, government departments and organisations and the relevant Metropolitan, Municipal or District Assembly,

2) advertise in at least one national newspaper and a local newspaper around the proposed project sites, and

3) make the scoping report available for the general public in the locality of the proposed project sites.

Once the applicant of an EIA submits the draft EIS, the EPA will direct it to sector Ministries, government departments and organisations of relevance to the proposed projects. The EPA will publish for 21 days a notice of the EIS in the mass media and also post it at appropriate place. Any comments and suggestions from the general public, relevant public agencies, organisations, NGOs, Metropolitan, Municipal and District Assemblies and local communities shall be accepted by the EPA.

Apart from the applicant's public hearing, the EPA shall hold a public hearing in case of:

1) great adverse public reaction to the commencement of the proposed undertaking,

2) dislocation, relocation or resettlement of communities,

3) extensive and far-reaching effects on the environment according to the EPA's evaluation.

e) Objection Procedures

In order to ensure the stakeholders' rights to raise objections, Regulation 27 (Complaints by aggrieved) defines the objection procedures for those (Complainant) having objections against the EPA's decisions or actions. A Complainant shall directly submit a complaint in writing to the Minister of Environment and Science, within 30 days of the EPA's decision or action. It shall:

1) state the issues objected to,

2) have attached a copy of the decision objected to, and

3) have attached all documents relevant for considering and making a decision on the complaint.

A general outline of the procedures is shown in Table 11-7.

f) Strategic Environmental Assessment (SEA)

The EPA and the National Development Planning Commission (NDPC[28]) initiated a Strategic Environmental Assessment (SEA) process in 2003 as one of several crosscutting studies for GPRS. From 2004 to 2005, the SEA was instrumental in the process of developing the GPRS II.

[28] The National Development Planning Commission is a body created by articles 86 and 87 of the 1992 Constitution of the Republic of Ghana and established by Acts 479 and 480 (1994) of Parliament with the mandate to advise the President on development planning policy and strategy.

Then, the GoG formally adopted[29] SEA in 2005 as a strategic instrument of "Public policy management and public sector reforms" in the GPRS II.

Table 11-7 Objection Procedures for EPA's Decision or Action

1. A complainant submits a complain to the Minister of Environment and Science.
2. Within 14 days, the Minister shall appoint a panel composed of representatives from each of:
   - Ministry of the Environment and Science not below the rank of Director
   - Attorney-General's Department not below the rank of Senior State Attorney
   - Ministry with responsibility for the undertaking
   - two persons specialising in the relevant field of the undertaking concerned
3. The Minister shall refer the complaint to the panel and the panel shall give a fair hearing to all parties and determine the issue as it considers appropriate.
4. After hearing from all the parties, the panel may
   - alter the decision of the EPA
   - request the EPA to make a decision on the application where applicable within a specified period
   - give any other orders as it considers necessary
5. The panel shall determine the matter and report to the Minister within 60 days from the Minister's request to the panel. The proceedings of the panel shall be fully documented together with reasons for the panel's decision.

Source: Regulation 27 Complaints by aggrieved, Environmental Assessment Regulations 1999 (LI 1652)

In order to address the inconsistent consideration of the environment in public policy processes, the GoG decided to institutionalize the mainstreaming of sustainable development principles and to use the SEA in public policy processes. Although there are few descriptions of the SEA in the GPRS, it is clearly stated[30] in 2010 in the GoG's medium-term national development policy framework: Ghana Shared Growth and Development Agenda (GSGDA), 2010-2013.

Presently the SEA's consolidated directories can be found on the EPA's SEA website (http://www.epa.gov.gh/index.php?option=com_docman&task=cat_view&gid=108&Itemid=116). Currently, there are five categories under the SEA page and reference guidelines and SEAs are accessible from the directories (Table 11-8).

Table 11-8 SEA Related Directories on EPA Website

Category	Contents
SEA District Reports	In total, 37 SEAs for all regions in Ghana except Greater Accra and Eastern region
GPRS	No references as of September 2012
Energy	Advisory note for energy sector
Final SEA	SEA Manual, SEA of the Ghana Poverty Reduction Strategy GPRS II, Advisory note
Transport	SEA Report on Transport, SEA Report on Urban Transport, Advisory note

Source: http://www.epa.gov.gh/index.php?option=com_docman&task=cat_view&gid=104&Itemid=116

Although the given SEA Manual (Table 11-8) was prepared for the GPRS, it could be considered as the main reference for SEA in Ghana. Section 5 of the manual describes the seven key aspects of sectoral- and district-level SEA:

1) Define the sector/district assembly objectives of SEA

[29] Section 5.5.5 Public Policy Management and Public Sector Reform and APPENDIX 1IC: Good Governance and Civic Responsibility / VI. Public Policy Management and Public Sector Reforms

[30] section 4.2.2 The Vision for the Environment and Natural Resource Sector (GSGDA)

2) Targets and indicators

3) Strategic action

4) Analyse strategy/plan elements and their alternatives and assess potential impacts

5) Develop and apply public consultation processes

6) Prepare SEA report and present to decision-makers

7) Proposed monitoring and evaluation

For the application of SEA in the road development sectors, the Ministry of Roads and Highways and the EPA firstly applied SEA to their RSDP in accordance with the SEA tool for the GPRS. Based on the first Transport SEA report, the MRH then used SEA to:

- Develop a tool to mainstream the environment into transport planning, linking transport planning to air quality, noise nuisance and climate change,
- Identify and develop appropriate policies, regulatory and institutional mechanisms and capacities required to ensure sound and sustainable environmental management practices within the transport sector and the integration of these mechanisms into current and future transport policies, plans and programmes in Ghana,
- Introduce strategic environmental assessment approaches to the current transportation planning processes and through that develop strategic alternatives for transport systems in Ghana.

Based on the first Transport SEA, the MRH generally considers SEA as "a key tool for ensuring sustainable development by considering economic, socio-cultural and environmental issues at the policy plan and programme levels of decision making. The institutional frameworks are also considered as an essential part of the SEA process. The general concept of SEA and transport policy making process were given in the first Transport SEA (Figure 11-3).

Strategic Decision Making Stages: Policy		Environmental Inputs: SEA
Identify aim of Transport Policy	←	• Include environmental/ sustainability issues • Identify relevant targets and indicators
↓		
Identify alternative ways to achieve aim and solve problem areas	←	• Describe environmental baseline • Identify problem areas • Propose (more sustainable) alternatives
↓		
Choose between alternatives	←	• Predict and evaluate impacts of alternative • Propose environmentally preferred alternative
↓		
Fine-tune chosen alternative	←	• Mitigate impacts of chosen alternatives • Include EIA/SEA for lower-level actions where relevant
Formal decision and announcement	←	• SEA report containing recommendations and advisory notes
↓		
Implement and monitor strategic action	←	• Establish environmental guidelines (environmental management plan) for implementation • Monitor environmental impacts of strategic action

Note: The stages are not necessarily sequential. For instance, the identification of alternatives may show that other aspects of the environmental baseline need to be analysed. Like the EIA, SEA is an iterative process.

Source: Transport SEA, EPA/Ministry of Roads and Highways

Figure 11-3 General Concept of SEA and Transport Policy-Making Process

The first Transport SEA was conducted according to the following nine steps:

- Step 1: Screening/Understanding the Context,
- Step 2: Scoping,
- Step 3: Defining the Baseline Conditions,
- Step 4: Policy Analysis,
- Step 5: Predicting Effects,
- Step 6: Developing Indicators,
- Step 7: Considering Alternatives,
- Step 8: Considering the Scope for Mitigation,
- Step 9: Monitoring and Evaluation.

Although no formalized SEA guidelines are available in Ghana at present, the GoG is likely to apply SEA where it is effective and desirable to coordinate the stakeholders and to define appropriate policies followed by actual projects or programmes in a timely manner.

(4) The State Lands Act 1962 (Act 125 as Amended) and Relevant Legislations

a) The State Lands Act 1962 (Act 125 as Amended)

This is the principal law under which private lands can be compulsorily acquired. The Law empowers the President to acquire any land for the public benefit.

The Act and its Regulation, that is, State Lands Regulation 1962 L1 230, details the mechanism and procedure for compulsorily acquiring lands. It is a mandatory requirement that a copy of the instrument of acquisition be served on any person having an interest in or possession of such lands or be affixed at a convenient place on the land and be published three times in a newspaper circulating in the district where the land is situate.

The Act emphasises the payment of compensation to the victims of acquisition made under the Act. The basis of the said Compensation should be either the market value or replacement value. Costs for disturbance and incidental expenses or other damage suffered are to be considered in awarding compensation.

One critical limitation of the Act is that not much premium has been given to the issue of public involvement in the acquisition process. Community consultations and involvement are therefore not mandatory. To ensure that implementation for the project achieves the desired results, the acquiring agency will conduct thorough consultations with all the stakeholders especially the communities that will be affected, at every stage of project implementation

b) State Lands (Amendment) Act, 2000 (Act 586)

This Act amends the Act 125 as follows:

Repeal of section 3 and insertion of Determination by High Court of the right or interest of any person

i) where there is a dispute as to the right or interest being claimed

ii) where the person is dissatisfied with the compensation assessed by the Lands Commission

Substitution of Section 4 with the following: Claims of Compensation

1) ….any person with a claim, shall submit in writing within 6 months from the date of publication of the instrument to the Lands Commission:
   i) particulars of his claim or interest in the land
   ii) the manner in which his claim has been affected
   iii) the extent of damage done, and
   iv) the amount of compensation claimed and the basis for the calculation of the compensation
2) The Lands Commission shall upon receipt of the claim, cause to be assessed the payment of fair and adequate compensation by the government for the land acquired to the owner.
3) In assessing the compensation for the land, regard shall be had to:
   i) The market or replacement value of the land
   ii) The cost of disturbance or any other damage suffered
   iii) The benefits to be derived by the people of the area in which the land is situated from the use for which the land is acquired.

c) Administration of Lands Act 1962 (Act 123)

Act 123 of 1962 was enacted to facilitate the management and administration of stool lands (and other lands). The Act empowers the Minister responsible for lands to manage stool lands in accordance with the provision of the law.

By section 7 of Act 123 the President of the Republic may by Executive Instrument declare any stool land to be vested in trust and accordingly the State could administer such land as a trustee for the stool involved. In such situation the legal rights to sell, lease, collect rent, litigate and manage generally is taken away from the customary land owners and vested in the State. However, the equitable right in the land, which is the right to enjoy the benefits, is retained by the land owner.

Similarly the Act provides in section 10 that "the President may authorise the occupation and use of any land for any purpose which, in his opinion, is conducive to public welfare or the interest of the State". It is a requirement that a public notice shall be published in the Gazette giving particulars of the lands to be taken and the use to which they will be put. Persons whose interests are affected by "reasons of disturbance as a result of the authorization" so made are entitled to be paid.

The entitlements are however to be assessed by giving due consideration to the values of the land (and other losses suffered) and the benefits to be derived by the people in the area (by way of the use to which the State is going to put the land).

The difficulty of this law is that the nature of interest taken is not expressed in definite terms. Again stakeholder consultation and community involvement is not highlighted. It must be noted that the State does not normally use this section of the Act and thus occupation of lands is rarely exercised.

d) Lands Statutory Wayleaves Act 1963 (Act186)

The Lands Statutory Wayleaves Act 1963 Act 186 was enacted to facilitate the entry onto any

land for the purposes of construction, installation and maintenance of public utility works and creation of right of ways and other similar rights for such works.

Works for which right of ways may be created are "highways or works for purposes of, or in connection with any public utility works". Highways have been defined in the Act as "any road, street, path, pavement, or square and includes any bridge, or other structure associated therewith".

The Act and its accompanying Regulation, the Lands Statutory Wayleave Regulation 1964 (LI 334), provides the modalities and procedures for the acquiring statutory right of ways. Thus, the mechanism of entry for survey works and construction has been spelled out in detail. The owner/occupier is required to be given formal notification at least one week in advance about the intent to enter, and at least 24 hours prior to actual entry.

A right of way is legally established by the publication of an executive instrument. Losses and damages suffered are to be compensated for in accordance with the State's procedures for compensation. Provision has also been made for restoration of affected lands where that is possible. In assessing compensation to be paid consideration must be given to the increases of land values as a result of the installation or construction of works. The right of appeal by an aggrieved person is also provided for.

Clearly the desired issue of community consultation has not been given serious consideration. Again the provision for compensation assessment is unfair, especially the exemption from payment of compensation in cases where the land affected does not exceed 20% of the affected persons total land holding.

e) The Ghana Land Policy 1999

In 1999, the GoG put in place the above policy to serve as a broad framework and policy guidelines for land administration and utilisation.

The main objective is to provide guidelines aimed at enhancing land management systems, land use, conservation of land resources and enhancing environmental quality. All these are intended to ensure coordinated and orderly use of land, a vital resource, by present and future generations.

Ultimately, the policy seeks to give protection to proprietary rights and promote the concept of prompt payment of adequate compensation for compulsorily acquired lands and also create an enabling environment for community participation in sustained land management.

11.1.2 Environmental Policy Framework for the Proposed Project

The MRH prepared an Environmental and Social Management Framework (ESMF) with a set of the Resettlement Policy Framework (RPF) in 2007 to be used as guidelines for the "Transport Sector Development Program" (TSDP) funded by the WB focusing on "Road Sector" projects among all agencies under the MRH.

The ESMF and RPF represent statements of policy, guiding principles and procedures, as well as environmental and social safeguards, as instruments of reference for any road sector

project, compatible with all key stakeholders such as the EPA, the WB Operational Policies (OP), the MRH and the implementing Agencies.

The purpose of the ESMF and RPF is to provide the corporate environmental, social and resettlement safeguard policy frameworks, institutional arrangements and capacity required to identify and mitigate the potential safeguard issues and impacts of each sub-project. It is envisaged that preparing and using these documents/guidelines, national and local environmental and social requirements will be met, which will also be consistent with the WB's OP4.01, OP4.12 and other applicable safeguard policies.

The provisional Environmental Social Impact Assessment (ESIA) study would be conducted within the framework of the ESMF and RPF of the Road Sector. If any road project requires involuntary resettlement, the MRH requires the responsible agencies to prepare a resettlement action plan (RAP) specified by the RPF. Details of the RPF are described in the following section.

The ESMF comprises eight chapters:

1) Introduction
2) Existing Policy, Legal, and Administrative Frameworks
3) Road Sector and Infrastructure
4) The Transport Sector Policy and Programme
5) Description of Baseline Conditions
6) Potential Environmental and Social Impacts
7) Environmental and Social Mitigation Principles
8) ESMF Implementation and Management

Considering the applicability of the ESMF for the proposed project and compatibility with the Guidelines for Environmental and Social Considerations (JICA 2010), Chapters 6, 7 and 8 would be the most relevant for JICA's evaluation purpose. The extraction of key components and relevant frameworks are shown below, as well as attached in Appendix 9.

(1) Potential Environmental and Social Impacts (Chapter 6 of ESMF)

Table 11-9 Road Sector Sensitivity Screening Criteria – Environmental (Table 6.1, ESMF)

Types of Road Project (Infrastructure / Service)	Environmental Sensitivity Criteria	Screening Outcome (Level of EA)
Routine maintenance: • Patching of potholes • Light grading • Clearing of trees and bush • Cleaning of gutters, drains and culverts Periodic maintenance, minor rehabilitation and minor improvement: • Spot improvement • Repair and resurfacing short stretches of roads • Upgrading of gravel to bituminous roads Major rehabilitation: • Reconstruction of heavy degraded road section • Upgrading • A/C overlay • Repair and construction of bridges • Repair and construction of culverts and other structures Road construction Asphalt plant Bituminous plant Construction camp	**- Non-environmentally sensitive site/route, single or few component activities** Maintenance / installation / culvert, etc. projects Labour-intensive (limited use of equipment) - Impacts generally localised, less severe, and scope of impacts narrow, short-term and reversible. - Mitigations are easy to design and implement. No need to generate much primary data, especially as baseline.	Sectoral Environmental Assessment
	- Within/bordering or < 0.5 km from an area declared by law as Wildlife Conservation Areas (including National Parks, Resource Reserves, Wildlife Reserves, Strict Nature Reserves, Ramsar Sites and Wildlife Sanctuaries), or Forest Reserves or Globally Significant Biodiversity Areas	Environmental Impact Assessment
	- Within/bordering or < 0.5 km from an area constituting the natural habitat of any threatened (endangered, data deficient and vulnerable), rare or endemic flora and fauna	
	- Within/bordering or < 0.5 km from hilly area with gradient > 45 degrees and prone to erosion, rock fall, mudslide or landslide	
	- Within/bordering or < 0.5 km from an area susceptible to erosion, flooding or geological hazards (including earthquake, tremor and landslide)	
	- Within/bordering or < 0.5 km from an area constituting the head water region of a river or stream or the bank of the drainage channel of a water body	
	- Within/bordering or < 0.5 km from low-lying are acting as natural buffer against shore erosion, strong winds or storm floods	
	- Program or Plan-like Proposals ✓Many phases involved, precise locations may not yet be fully known; ✓Many activities/sub-projects (but type of sub-projects not yet fully determined); and ✓Diverse impacts affecting other sectors implementation/ construction spread over long periods.	Strategic Environmental Assessment

Source: ESMF

Table 11-10 Road Sector Sensitivity Screening Criteria - Social (Table 6.2, ESMF)

Types of Road Project (Infrastructure/ Service)	Social Sensitivity Criteria	Screening Outcome (Level of EA)
Routine maintenance: • Patching of potholes • Light grading • Clearing of trees and bush • Cleaning of gutters, drains and culverts	**Non-socially sensitive site/route, single or few component activities** - Maintenance / installation / culvert, etc. projects - Labour-intensive (limited use of equipment) - Impacts generally localised, less severe, and scope of impacts narrow, short-term and reversible. - Mitigations are easy to design and implement. - No need to generate much primary data, especially as baseline.	Sectoral Environmental Assessment
Periodic maintenance, minor rehabilitation and minor improvement: • Spot improvement • Repair and resurfacing short stretches of roads • Upgrading of gravel to bituminous roads Major rehabilitation: • Reconstruction of heavy degraded road section • Upgrading • A/C overlay • Repair and construction of bridges • Repair and construction of culverts and other structures	**Within/bordering or < 0.20 km from** a known historical, archaeological or scientific site or infrastructure	Environmental Impact Assessment
	Within/bordering or < 0.20 km from a cultural resource or site (e.g. cemetery, sacred grove, shrine, church, mosque)	
	Within/bordering or < 0.20 km from a medical or health facility (e.g. a hospital or clinic)	
	Within/bordering or < 0.10 km from an educational or research facility	
	Within/bordering or < 0.20 km from a human settlement or community or township	
	Involving resettlement or relocation or compensation of more than 20 different persons or families	
Road construction Asphalt plant Bituminous plant Construction camp	**Program or Plan-like Proposals** ✓Many phases involved, precise locations may not yet be fully known; ✓Many activities/sub-projects (but type of sub-projects not yet fully determined); and ✓Diverse impacts affecting other sectors, implementation/ construction spread over long periods.	Strategic Environmental Assessment

Source: ESMF

Table 11-11 Environmental and Social Issues Common to Road Sector Activities and their Degree of Significance (Table 6.3, ESMF)

No.	Issues that are Common (in decreasing order)	No.	Issues that are Significant (in decreasing order)
1	Dust	1	Dust
2	Tree& vegetation removal	2	Water contamination
3	Top soil removal	3	Public safety
4	Pits/trenches near road	4	Tree& vegetation removal
5	Noise	5	Run off
6	Inadequate drains along roads	6	Pits/trenches near road
7	Road construction waste generation & disposal	7	Top soil removal
8	Induced development	8	Resettlement
9	Stream diversion / blocking	9	Compensation issues/agreement
10	Run off	10	Inadequate drains along roads
11	Compensation issues/agreement	11	Flooding
12	Flooding	12	Noise
13	Cultural concerns	13	Cultural concerns
14	Water contamination	14	Stream diversion / blocking
15	Habitat disruption	15	Road accidents
16	Road accidents	16	Forestry concerns (e.g. access)
17	Public safety	17	Wildlife concerns
18	Extensive construction (impact) corridor	18	Habitat disruption
19	Forestry concerns (e.g. access)	19	Road construction waste generation & disposal
20	Wildlife concerns	20	Archaeological losses
21	Resettlement	21	Induced development
22	Archaeological losses	22	Extensive construction (impact) corridor

Source: ESMF

Table 11-12 Common Impacts to be Addressed in Any Environmental Assessment under ESMF

1) HIV/AIDS
2) Health and Safety Impacts
   - Injuries
   - Public Health Impacts
   - Health Damage from Air Pollution
3) Water Resources Impacts
4) Landscape Alteration Impacts
5) Impacts on Soil
6) Land Acquisition and Property Loss
7) Communities and Economic Activities Impacts
8) Noise and Vibration Impacts
9) Impacts on Cultural Resources
10) Habitat Destruction and Disruption (flora and fauna impacts)
11) Waste Generation and Disposal Impacts
12) Traffic Disruption and Diversion Impacts
13) Utility Disruption Impacts

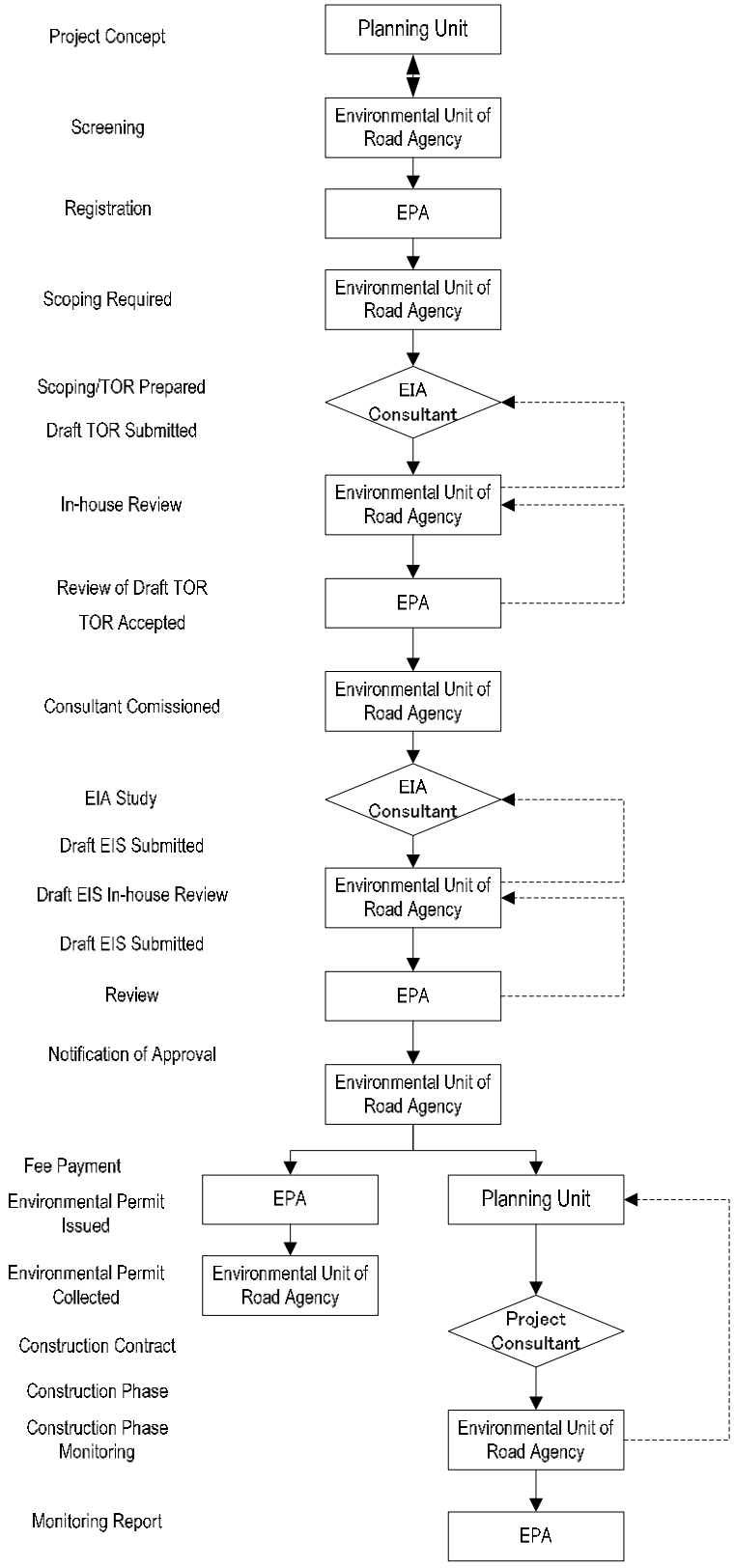
Source: ESMF

(2) Environmental and Social Mitigation Principles of the ESMF (Chapter 7 of ESMF)

Chapter 7 of the ESMF provides common mitigation measures/good practices for each common adverse impact shown in Table 11-2 as a guideline. Appendix 8 of the ESMF also summarises the potential environmental and social impacts associated with the road transport sector and common mitigation measures.

(3) ESMF Implementation and Management (Chapter 8 of ESMF)

The implementation structure of the EIA is shown in Figure 11-4.



Source: ESMF, MRH 2007

Figure 11-4 Environmental and Social Planning Management Structure for EIA

11.1.3 Involuntary Resettlement Policy Framework for the Proposed Project

(1) Legal Basis

a) Constitution of the Republic of Ghana

As shown above, the Constitution of the Republic of Ghana (1992) upholds the principle of private ownership of land. Adequate safeguards against deprivation of private property rights have been provided for, in the 1992 Constitution. Even the State's inherent powers to compulsorily acquire private property rights have been reconsidered and somewhat controlled. Article 20 of the constitution prescribes that under no circumstance should private properties be compulsorily taken unless there are important and justifiable grounds for such acquisition, which invariably must be in the public interest.

It is expressly provided in Article 20 that "No property of any description or interest in or right over any property shall be compulsorily taken possession of or acquired by the State unless the following conditions are satisfied" (cf. 8.1.1 (1) Chapter 5. Fundamental Human Rights and Freedoms). An important provision in the constitution includes the giving back of lands to the owners when such lands are not used for the purpose for which they were compulsorily acquired in the public interest.

b) The State Lands Act 1962 (Act 125 as Amended), State Lands (Amendment) Act (Act 586)

This is the principal law governing the acquisition of land in Ghana. All state agencies are required to follow the procedures specified in the latest acts. (The Land Commission and Land Valuation Boards are to be reorganized in the near future.)

(2) Resettlement Policy Framework (RPF)

The resettlement Policy Framework (RPF) was originally developed and used for the TSDP funded by the WB in 2007. As a result, the RPF is fully compatible with the WB's involuntary resettlement policy (WB OP4.12). Presently, the RPF is the sole resettlement policy framework for any project under the MRH. The RPF aims to continuously improve the nation's rural and urban road network with sustainably, environmentally, and socially sound ways. This objective will be met through improved road maintenance as well as a rehabilitation and construction programme.

MRH is responsible for formulating policies and overall strategies on roads and vehicular transport. The GHA, DFR and DUR are the organisations under the MRH which actually implement the road policies. The GHA is responsible for 14,900 km of roads about 65% of which are gravel roads. The current project falls within the jurisdiction of the GHA.

Specifically, the Road Sector Policy seeks to:

- Achieve sustainable improvements in the performance of trunk, feeder and urban roads and road transport services in all regions of Ghana.
- Strengthen the capabilities for management and implementation in the Road Sector.

- Establish management systems that will ensure the upgrading and preservation of an improved road system and the use thereof in an environmentally, socially and financially sustainable fashion.

The development of the N-2 road project by the GHA and JICA is expected to involve some land take for expansion and for new alignment (in areas where there is no existing road). Much of the land take will involve community and individual property and Ghana laws provide that involuntary acquisition of private property must be done in accordance with laid-down statutory procedures. In the area of land administration one of the critical policies of the GoG is that fair and adequate compensation is paid or in alternative resettlement assistance is provided for eligible people who for the sake of national interest, have to surrender their interest in land or landed properties to the State for development.

a) Principles Governing the Resettlement Policy Framework

The principles of the RPF on the MRH and its agencies are summarised as follows:

1) Involuntary resettlement should be avoided where possible; where population displacement is unavoidable, it should be minimized by exploring all viable project options.
2) Persons affected by land acquisition and facing relocation or loss of incomes associated with a change in land use due to the project should be given compensation so that they can improve or at least maintain their former standard of living.
3) The estimation of the compensation cost and/or benefit should be based on an appropriate method so that the cost of land and other properties taken and demolished are accounted for. This will ensure that the living standards of project-affected persons are maintained or raised to a substantial level.
4) Project-affected persons should be given full information on the qualification (eligibility), mode of compensation, plan for restoring production income, and the project's progress and be involved in the enforcement of resettlement arrangements (community participation).
5) The land and/or property affected should be taken only when the PAPs are satisfied with the compensation arrangements.
6) The implementing agency should supervise the resettlement activities including the payment of compensation as well as monitoring and evaluation

b) Comparison of Ghanaian laws with WB Policies

As the RPF adopted the WB's operational policies, there are no differences between the RPF and the WB's operational policies. For reference, Ghanaian laws and the WB's operational policies are compared in Table 11-13.

c) Categories of Land in Ghana

As a road project, the N-2 development triggers the RPF which spells out the various interests and titles to particular pieces of land that may be impacted as well as the different laws on land that come into focus.

Table 11-13 Comparison of Ghanaian Laws with WB Policies (Table 1, RPF)

Topic	Ghanaian Laws	WB Policy Requirement
Timing of compensation payment	Prompt	Prior to displacement and relocation
Calculation of compensation	Fair and adequate	Full replacement cost
Squatters	No provision, they are deemed not to be eligible	Are to be provided supplementary assistance
Resettlement	In situations where inhabitants have to be displaced, the state is to resettle all on "suitable land with due regard for their economic well being and social and cultural values"	Affected persons who are physically displaced are to be provided with residential housing, or housing sites, or as required, agricultural sites…at least equivalent to their old site. Preference to be given to land-based resettlement for displaced persons whose livelihoods are land-based.
Resettlement Assistance	No specific provision with respect to additional assistance and monitoring	Affected persons are to be offered support after displacement, for a transitional period
Information and consultation	The owner/tenants on the land must be formally notified at least one week in advance of the intent to enter, and be given at least 24 hours notice before actual entry.	Displaced persons and their communities …are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in the planning, implementation and monitoring of resettlement
Grievances	Formal and informal mechanisms and formal access to court of law.	Appropriate and accessible grievance mechanisms to be established.

Source: Study Team

Five main interests in land are discussed in the RPF as follows:

1) Allodial Title

2) Customary Freehold

3) Customary Tenancies

4) Common Law Freehold

5) Leasehold

1) Allodial Title

In the Ghanaian context, this is the highest interest capable of being held in land. The allodial title is customarily communally owned and is generally held or vested in stools or skins. In some traditional areas, it is held by clans, families or individuals. Being generally in the form of communal interest in land it accrues to the entire community and is administered by the recognised traditional authority. The owner of the allodial title has complete and absolute freedom to use and dispose of the land only subject to the restrictions, limitations or obligations as may be imposed by the general laws of the country.

The mode of acquisition of the allodial title is by: discovery by hunters or pioneers of the stool etc. of unoccupied land and subsequent settlement thereof and use by the subject; conquest, purchase or gift.

2) Customary Freehold

The customary freehold is an interest or title which a member of the larger community which holds the allodial title acquires in the communal land. It is an interest which is held as of right by virtue of being a member of the community. It is of indefinite duration and thus potentially

subsists forever.

The member who holds such interest has the right of beneficial occupation and unfettered use (also subject to the laws of the country). Upon death, the interest devolves on his/hers successors in title ad infinitum. This interest prevails throughout the country including the allodial title from which it was derived. The customary freehold may however be terminated by the occurrence of any of the following: failure of successors; compulsory acquisition by the State; sale or gift by owner; or abandonment or forfeiture in rare circumstances where, for example, the holder denies the absolute title as the allodial owner.

3) Customary Tenancies

These are lesser interests in land and are created by the holder of the allodial title or customary freehold (or common law freehold). These types of tenancies are by nature share-cropping arrangements. They are quite common in Ghana and occur when a tenant-farmer gives a specified portion of the farm produce to the land owner at each harvest time in consideration for use of the land. The two popular tenancy arrangements are the 'Abusa' and 'Abunu' schemes.

There are other forms of customary tenancies in which the consideration from the tenant is not sharing of crops but cash or a combination of crops and money. The customary tenancy is in this category.

4) Common Law Freehold

This is an interest held for an indefinite period. It is derived from the rules of common law. The holder of this interest has the right of beneficial occupation and may be subject to the laws of land use in any manner.

This type of freehold is created only by express grant. The grantor may thus impose terms on the grantee provided such terms are reasonable and not contrary to public policy or unconscionable. Currently, the laws of the land forbid non-Ghanaians from acquiring freehold in lands in Ghana.

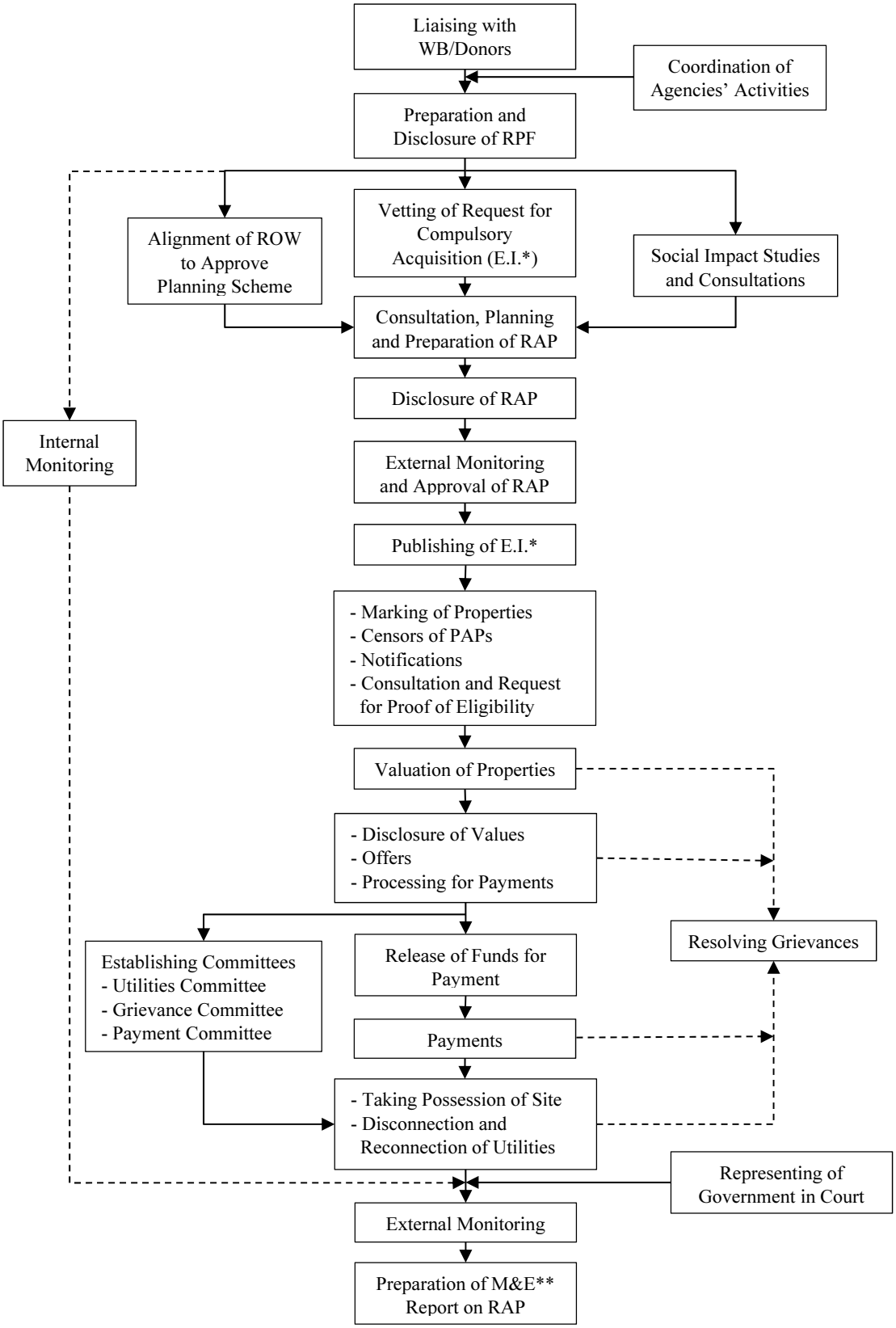
5) Leasehold

This type of interest is also a creation of the common law and not Ghanaian customary law. It is an interest in land for a specified period. The leasehold may be granted by the allodial holder in respect of lands in which no conflicting interest exists; or by a customary freeholder; or by a common law freeholder.

In Ghana, leasehold may be for a maximum duration of 99 years. (Again, non-Ghanaians can only acquire leases of up to 50 years.) Various terms and conditions may be imposed by the grantor including the payment of rent as consideration for the grant.

d) Land Acquisition Process

The Land Acquisition Process is shown in Figure 11-5.



*E.I.: Executive Instrument - Vetting of Request for Compulsory Acquisition, **M&E: Monitoring and Evaluation
Source: Resettlement Policy Framework, MRH, 2007.

Figure 11-5 Land Acquisition Process in Ghana

e) Eligibility of Entitlement

As RPF adapted all the conditions of the WB's operational policies in addition to the legal frameworks in Ghana, eligibility and entitlement are identical to those of WB OP4.12. Tables 11-13 and 11-14 show the principal guidelines of eligibility and entitlement.

In the case of affected persons with no formal or recognized legal rights, the RPF adopted alternative means including:

- Affidavit signed by landlords and tenants,
- Witnessing or evidence by recognized traditional authority, customary heads, community elders, family heads and elders and the general community.

Table 11-14 Type of Loss and Eligible Persons (Table 2, RPF)

Type of Loss	Eligible persons
Loss of Land (Urban or Rural)	Various interests and rights – allodial title holders, freeholders, leaseholders, tenants, licensees
Loss of Structure	Various interests and rights – freeholders, leaseholders
Business Losses - Loss of business income - Loss of business goodwill - Loss of rent income - Loss of wage income - Loss of fees from trainees or apprentices	 - Business owners/operators - Business owners/operators - Landlords/Lessors - Business employees/attendants - Trainers/persons offering apprenticeship job training
Loss of Business, Residential or Industrial Accommodation or Room	- Residential/commercial/industrial tenants - Owners of buildings during the reinstatement period
Loss of location for temporary structure	- Owners of temporary structures
Loss of training or apprenticeship	- Apprentices/Trainees
- Loss of economic or perennial trees - Loss of food crops - Loss of grazing land	Various rights and interest holders – Sharecroppers, Licensees, Lessees

Source: RPF

f) Monitoring and Evaluation

In order to ensure the enforcement of the RPF and relevant safeguard measures, the RPF adopts: 1) internal monitoring, 2) external monitoring, and 3) completion audit.

1) Internal monitoring: internal monitoring will be undertaken by the MRH and its agencies. The frequency of monitoring will be defined in the resettlement action plan (RAP).
2) External monitoring: external monitoring will be done by the EPA (national and regional offices). In addition, the involvement of NGOs will be considered in the external monitoring.
3) Completion audit: A completion audit will be done to evaluate the design and its implementation and effectiveness of the mitigation measures. The audit will verify the initial plan in the RAP, all physical inputs delivered, and all services provided and evaluate their desired effects. The baseline conditions of the PAP before the project will be used as the basis for restoring their socio-economic situation to tat after the resettlement. The completion audit will take place after all RAP activities have been completed.

Table 11-15 Entitlement Matrix (Table 3, RPF)

Type of Loss	Eligibility Criteria	Entitlement
Loss of Land (Urban or Rural)	Various interests and rights – allodial title holders, freeholders, leaseholders, tenants, licensees	Compensation – Capital Market Value of Asset
Loss of Structure	Various interests and rights – freeholders, leaseholders	Compensation – Capital Market Value of Asset
Business Losses - Loss of business income - Loss of business goodwill - Loss of rented income - Loss of wage income - Loss of fees from trainees/ apprentices	 - Business owners/operators - Business owners/operators - Landlords/Leasers - Business employees/attendants - Trainers/Persons offering - Apprenticeship job training	Supplementary Assistance based- - Average net monthly profit - Monthly rent passing - Equivalent of rent advance to be refunded - Monthly wages earned - Training fees to be refunded Calculated for a specific period taking into consideration the reinstatement period.
Loss of Business, Residential or Industrial Accommodation or Room	- Residential/commercial/industrial tenants - Owners of buildings during the reinstatement period	Supplementary Assistance based: - Comparable open market rent for alternative accommodation based on specific period (reinstatement period) - Transportation rates for the transfer of chattels or movable properties
Loss of location for temporary structure: - expense for moving structure - Loss of utility service line	Owners of temporary structures Squatters	Supplementary Assistance based on: - Transportation rates for the transfer of structures - Disconnection of utility service lines at old site - Reconnection of utility service lines at new site
Loss of training or apprenticeship	- Apprentice/Trainee	Comparable fees for alternative training
- Loss of economic or perennial trees - Loss of food crops - Loss of grazing land	Various rights and interest holders – Sharecroppers, Licensees, Lessees	Open market value for assessed crops/plants

Source: RPF

11.1.4 Comparison of JICA Guidelines for Environmental and Social Considerations and Ghanaian Policy

(1) JICA Guidelines for Environmental and Social Considerations

The GoJ has clear policies on ODA with sustainable means. As the principal aid agency of the GoJ, JICA drew up “new” guidelines for environmental and social considerations in 2010 after the merge of the former aid agency, JICA, and the former government bank, the Japan Bank for International Cooperation (JBIC) in 2008. JICA evaluates any programme under JICA technical cooperation, ODA loan, or grant aid to confirm the compatibility of Japanese ODA policies and to give advice on necessary actions if the requested assistance programme or projects need further considerations to meet Japan’s policies.

Following are extracts of JICA’s environmental policy and objectives of the “JICA Guidelines for Environmental and Social Considerations, April 2010” (JICA Guideline).

a) JICA Environmental Policy

As stated in the "Law on General Rules of Japan International Cooperation Agency," JICA's mission is to "contribute to the promotion of international cooperation and to the sound development of Japan and the international socioeconomy by contributing to the development or reconstruction of the economy and society, or economic stability of overseas regions which are in the developing stage," particularly to global environmental protection in compliance with environmental laws and regulations. Furthermore, in order to prevent and reduce negative environmental impacts that result from JICA's activities, JICA will utilize an environmental management system and shall work continuously to improve it. The system will be based on the following policies:

1) Promotion of environmental measures through international cooperation activities
2) Promotion of activities for general environmental awareness
3) Promotion of environmentally friendly activities within JICA offices and other JICA facilities
4) Compliance with environmental laws and regulations

This Environmental Policy will be communicated to all employees and personnel who work in or on behalf of JICA, and also be publicized (1st November, 2008).
http://www.jica.go.jp/english/our_work/social_environmental/policy/index.html

b) JICA Guideline Objectives

The objectives of the guidelines are to encourage Project proponents, etc. to have appropriate consideration for environmental and social impacts, as well as to ensure that JICA’s support for and examination of environmental and social considerations are conducted accordingly. The guidelines outline JICA’s responsibilities and procedures, along with its requirements for project proponents etc., in order to facilitate the achievement of these objectives. In doing so, JICA endeavours to ensure transparency, predictability, and accountability in its support for and examination of environmental and social considerations.

In order to avoid unnecessary complexity and efforts to understand Japan’s specific environmental and social safeguard policies for those willing to use JICA’s assistance, the JICA Guideline is designed to be compatible with the most common guidelines: the WB Operational Policies (WB OPs). In addition, internationally recognized standards, international treaties & declarations, and good practices of developed nations are also referred to where necessary.

When JICA recognizes significant inferiorities of the laws and regulations applied to the proposed programme/project, JICA encourages project proponents to make further considerations and commitments to mitigate the adverse impacts in a regionally and/or internationally reasonable manner. For loan aid, grant aid, and technical cooperation programme/projects, JICA takes the outcomes of its environmental reviews and proponents’ further commitments to environmental and social considerations into account when it makes a decision on assistance. If appropriate environmental and social considerations are not

undertaken, JICA may not undertake loan aid, grant aid, or technical cooperation projects.

JICA's seven most important principles for the JICA Guideline are summarised in Table 11-16.

Table 11-16 JICA's Seven Most Important Principles for the JICA Guideline

1) Attention to a wide range of impacts	The types of impacts addressed by JICA cover a wide range of environmental and social issues.
2) Application of the JICA Guideline from an early stage to a monitoring stage	JICA applies a Strategic Environmental Assessment (SEA) when conducting Master Plan Studies etc., and encourages project proponents, etc. to ensure environmental and social considerations from an early stage to a monitoring stage.
3) JICA's responsibility for accountability for assistance	JICA ensures accountability and transparency when implementing cooperation projects.
4) Stakeholders' participation	JICA incorporates stakeholder opinions into decision-making processes regarding environmental and social considerations by ensuring the meaningful participation of stakeholders in order to consider environmental and social factors and to reach a consensus accordingly. JICA replies to stakeholders' questions. Stakeholders who participate in meetings are responsible for what they say.
5) Information disclosure	JICA itself discloses information on environmental and social considerations in collaboration with project proponents, etc., in order to ensure accountability and to promote the participation of various stakeholders.
6) Enhancement of organizational capacity	JICA makes efforts to enhance the comprehensive capacity of organizations and operations in order for project proponents etc., to have consideration for environmental and social factors, appropriately and effectively, at all times.
7) Serious attempts at promptness	JICA addresses requests to accelerate the implementation of projects while undertaking environmental and social considerations.

Source: JICA

The requirements of the JICA Guideline are shown in Appendix 10.

Useful links:

The new "JICA guidelines for environmental and social considerations"	http://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/guideline100326.pdf
References (Screening Form, Environmental Checklists, Monitoring Form)	http://www.jica.go.jp/english/our_work/social_environmental/guideline/ref.html
The new "Objection Procedures"	http://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/objection100326.pdf
Frequently Asked Questions (FAQs) and JICA's answers	http://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/faq.pdf
JICA Environmental and Social Considerations portal	http://www.jica.go.jp/english/our_work/social_environmental/index.html

(2) Comparison of JICA Guidelines and Ghanaian Policies

Since the National Environmental Frameworks was prepared and optimised based on the WB's Environmental Policy Framework, there is no contravention of the JICA Guidelines. Hence, the Resettlement Policy Framework (2007) prepared by the MRH is used in the Study.

11.2 Preliminary Impact Assessment of the Proposed Alternatives

11.2.1 Description of Proposed Project

As a critical section development of the Eastern Corridor (Figure 11-6), GoG's high priority route development under the Road Sector Medium-Term Development Plan, MRH requested JICA's support:

- To select the optimum route, with a new bridge across the Volta River, among alternative routes between Asutsuare Jct. and Asikuma Jct. on the Eastern Corridor (N-2), and to confirm the viability of the road and bridge construction project,
- To confirm the viability of the upgrading the Asutsuare - Aveyime road

Source: Study Team

Figure 11-6 Major Transport Corridors and Gateway Ports

As the response to the request, the Study Team conducted a comprehensive study to cover the requested objectives in the southeast regions of Ghana namely Greater Acura Region, Eastern Region, and Volta Region (Figure 11-7). Outline of the proposed two projects are shown in Table 11-17 below.

(1) The Construction of Road between Asutsuare Jct. and Asikuma Jct. (red line in Figure 11-7)

- Section one: Upgrading the existing feeder road between Asutsuare Jct. and Asutsuare town, and construction of new road the intersection of the existing regional road and the south approach of the new bridge across the Volta River.
- Section two: The new bridge across the Volta River.
- Section three: Construction of new road from the north approach of new bridge across the Volta River to Asikuma Jct. with a medium span bridge across the Alabo River.

(2) Upgrading of Asutsuare – Aveyime Road (green line in Figure 11-7)

- Upgrading the existing feeder road between Asutsuare town and Aveyime to the inter-regional road with/without a small bypass

Source: Study Team

Figure 11-7 Environmental Study Area and Proposed Projects

to avoid township(s) with a shot span bridge adjacent to east end of Asutsuare town to cross a small canal.

Table 11-17 Project Outline

(1) Project Name	Feasibility Study on the Eastern Corridor Development Project in Eastern Accra, Volta, and Eastern Regions
(2) Project Purpose	i) Construction of a new road between Asutsuare Jct. and Asikuma Jct., including a new bridge across the Volta River ii) Upgrading the existing Asutsuare – Aveyime road (feeder road)
(3) Target Road (Figure 11-7)	i) New road between Asutsuare Jct. and Asikuma Jct.: 67km ii) Asutsuare - Aveyime road: 24km
(4) Right of Way (ROW)	i) 90m: National road (Asutsuare Jct. - Asikuma Jct.) ii) 60m: Inter-regional road (Asutsuare town to Aveyime town)
(5) Bridge	i) New road between Asutsuare Jct. and Asikuma Jct.: A long span bridge across the Volta River and some short span bridges across the Alabo River and irrigation canals (number is depending on the location of alignment) ii) Asutsuare – Aveyime road: one shot span bridge across a small canal adjacent to east end of Asutsuare town
(6) Project Affected District	Dangme West, Greater Accra Regions North Tongu, Volta Regions Asuogyaman, Eastern Regions
(7) Responsible Authorities	MRH, GHA

Source: Study Team

11.2.2 Baseline of Natural and Social Environment in the Study Area

The followings summarises the baseline of natural and social environment in the Study Area, while details are attached in Appendix 11.

(1) Project Area of Influence

a) Construction of New Road between Asutsuare Jct. and Asikuma Jct.

The project road traverses three districts, namely Dangme West in the Greater Accra Region, North Tongu in the Volta Region and Asuogyaman in the Eastern Region. The main townships along the road include Asutsuare, Osuwem, Dufor Adidome, and Asikuma.

b) Upgrading of Asutsuare – Aveyime Road

The project road traverses two districts, namely Dangme West and Asuogyaman in the Eastern Region. There are only three main townships along the project road, Asutsuare, Volivo and Aveyime.

Table 11-18 Main Towns in Proposed Project Area

Region	District	District Capital	Main Township on Road
Greater Accra	Dangme West	Dodowa	Asutsuare, Volivo, Osuwem
Eastern	Asuogyaman	Atimpoku	Asikuma
Volta	North Tongu	Adidome	Aveyime, Dufor Adidome

Source: Study Team

c) Overview of Land Use and Livelihoods

In general along the proposed road projects, the land use of existing road and proposed alignments are:

- Food crop farms, mainly cassava and rice

- Cash crop farms, mainly oil palm, mango, woodlots, and banana plantations
- Cattle grazing fields (mostly north of the Volta River between Dufor Adidome and Asikuma Jct.)
- Natural or original vegetation

Other livelihoods specifically related to the Volta river are:

- Aquaculture in the Volta River (very limited but popular)
- Shell mining for white paint raw material or construction material
- Canoe ferries offering transport services

(2) Profiles of Potentially Affected Districts

Profiles of potentially affected districts are summarised below.

a) Dangme West District

- The Dangbe West is part southeast coastal plain of Ghana, which encompasses the project area, is one of the hottest and driest parts of the country and rainfall is generally very low with most of the rains, very erratic in nature.
- In the area forms the central portions of the Accra plains, the relief is generally gentle and undulating, a low plain with heights not exceeding 70 m. The plains are punctuated in isolated areas by a few prominent inselbergs, isolated hills, outliers and knolls scattered erratically over the area.
- At present, the area is widely used for the cultivation of rice, sugar cane and vegetables.
- The very seasonal nature of most of the streams caused by high temperatures and equally high insolation levels have encouraged the construction of a number of artificial dams and ponds of varying size, used for irrigation and for watering of livestock.
- The predominance of rural population is reflected in the occupational distribution, with agriculture being the main occupation.
- The district has about 252 km of road network, of which 40% is paved and the rest are feeder roads. Major towns in the district including Dodowa, Prampram, Asutsuare, Dawhenya, Afienya, Dorymu, Old Ningo, Kordiabe, New Ningo and Agomeda have electricity. A total of 18 towns have access to piped water, with the remaining towns depending on wells, boreholes and other sources.

b) North Tongu District

- The mean temperature is 27º C and the maximum and minimum vary from 22º C to 33º C. respectively. The average annual rainfall varies from 900mm to 1100mm with more than 50 per cent of it falling in the major season.
- North Tongu is dominantly medium to moderately coarse textured alluvial soils along the Volta River. These soils are also very difficult to cultivate because they have low water holding capacity. They are however, suitable for rice, sugarcane, maize and vegetable cultivation under irrigation.

- The main form of land use in the project area is agriculture. The land is mainly used for the cultivation of food crops and cattle rearing.
- In the rainy season, these streams overflow their banks, causing damage to roads and farms. Sources of water for domestic use are pipe borne, boreholes, streams and wells.
- The road network in the district is in a poor state, although efforts are being made to improve roads and make them more motorable. The current supply of hydroelectric power is limited to Adidome, Akyemfo, Battor, Mepe, Mafi Kumase Asiekpe and Juapong.

c) Asuogyaman District

- This part of the project area in this the Asuogyaman district lies within the Dry Equatorial Climate Zone which experience substantial amount of precipitation.
- The low lying areas along the Volta Lake, the soil type falls within the Savannah Greisol and Aluviosols. Because of its structure, the soil is liable to temporary flooding in times of high water levels. Its nutrients status is moderate but to ensure sustained yield of crops it requires the use of fertiliser.
- The project road traverses a number of farming villages and towns in this district and the main form of land use is agriculture.
- Sources of water for domestic use are pipe borne, boreholes, streams and wells.
- Crop farming is predominant, with maize, cassava, plantain, vegetables and yam being the major crops. Fishing in Lake Volta is an important economic activity along the 141 km shoreline.
- The Ghana Water Company supplies piped water to towns and villages along the major trunk road and the Volta River Authority supplies water to Akosombo. Other towns and villages depend on deep wells, hand-dug wells and streams.

(3) Water Quality

- Water sampling and analysis was conducted. There are no indicators exceeding EPA guideline values.

(4) Air and Noise Quality

- Air quality sampling was conducted at the representative locations of proposed two projects. Results shows presently all sampling locations are below the EAP guide line for residential area.
- Generally, the noise levels recorded at the various locations along the projects were low.

(5) Flora and Fauna

a) Flora

- The predominant vegetation type found in this South is of the short grass savannah interspersed with shrubs and short trees, a characteristic of the Sub- Sahelin type. The vegetation is dense along the Volta River and along the stream basins.

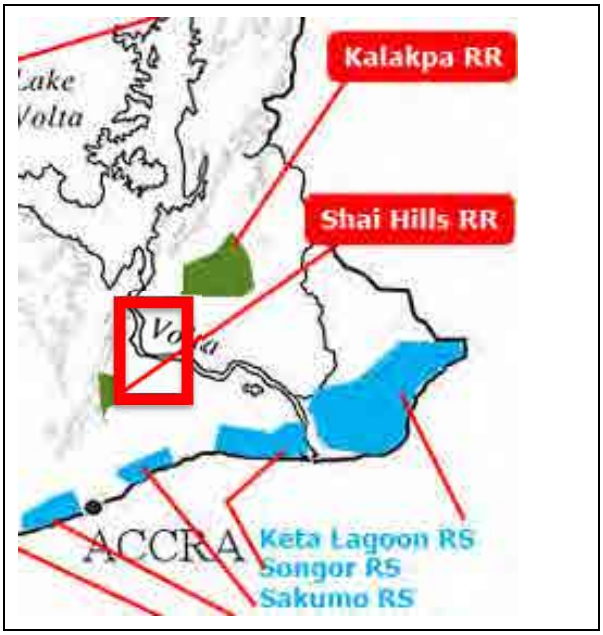
b) Fauna

- Harvesting of trees for lime and charcoal production in the area and also poaching activities has caused wildlife, which included elephants, antelopes, monkeys, hogs etc to flee left for other reserves close to the project area. Partridges are however still common in the area.

(6) Environmentally Sensitive Area around Proposed Project Area

Figure 11-8 shows the location of proposed projects (red square) and environmentally sensitive areas. Proposed project does not affect the sensitive area but are located adjacent to Shai Hills resource reserve (RR) and Kalakpa RR.

Presently Shai Hills RR is well managed by Ghana Wildlife division and attracts eco tourists. On the contrary, due to the limited access to the Kalakpa RR, it has been left with minimal care. Table 11-19 shows a summary of the two adjacent protected areas.



Source: Ghana Wildlife Division
<http://www.wildlifeghana.com/wildlifeMain/map.html>

Figure 11-8 Protected Wildlife Areas around Proposed Project Area

Table 11-19 Summary of Adjacent Protected Areas

	Shai Hills Resource Reserve	Kalakpa Resource Reserve
Objectives	• The area contains habitats which are managed to provide conditions essential to the well-being of selected species for the sustained production of wildlife products (meat, timber, pasture, fruits, honey, and other non-timber forest products). • The areas are used for cultural practices, tourism, and trophy hunting. • Conservation priorities involve the manipulative management of species and their habitats to ensure the protection and propagation of the target species, including introduced indigenous and exotic species. • Management is to be conducted in such a way as to preserve the areas' natural aspect as far as possible. • Other forms of land use compatible with these goals are allowed. • These areas may be managed by a central authority or, through agreement, by other levels of government, special trusts, or local community institutions as appropriate under the overall supervision of the Wildlife Division (WD) of Ghana Forestry Commission.	
Authority	WD	Ho District, Volta Region supported by WD
Designation	L.I. 710-WILDLIFE RESERVES REGULATIONS, 1971	L.I. 1022-WILDLIFE RESERVES (AMENDMENT) REGULATIONS, 1975
Type of RR	Woodland Savannah	Coastal Savannah
Reference	www.fcghana.org/library.php?id=22	www.moongateassociates.com/documents/KalakpaFinal.pdf

Source: WD of Ghana Forestry Commission, Ghana Forestry Commission, Ghana Country Environmental Analysis (WB, 2006)

11.2.3 Scope of the Project Impacts and Term and Reference of Environmental and Social Survey

Expected impacts of the selected alternative in the previous section are summarized in Tables 11-20 and 11-21.

Table 11-20 Scope of the Project Impacts

(Construction of New Road between Asutsuare Jct. and Asikuma Jct.) (1)

Category		Environmental Items	Stages			Remarks
			p	c	o	
Environmental	**1**	Air pollution	D	C -	C -	P: No relevant activities are expected. C: Temporal impacts are expected from the construction activities and construction machineries and trucks. O: Compared to the existing few impacts condition, continuous impacts are expected from the passing vehicles.
	2	Water pollution	D	C -	D	P: No relevant activities are expected. C: Temporal impacts are expected form the high turbidity runoff from construction sites and bridge construction site in the river. Also, temporal impacts are expected from construction camps in case of improper treatment. O: No impacts are expected.
	3	Soil pollution	D	B -	D	P: No relevant activities are expected. C: Temporal impacts are expected from construction wastes. O: No impacts are expected.
	4	Waste	D	B -	C	P: No relevant activities are expected. C: Temporal impacts are expected from construction activities and construction camps. O: No impacts are expected.
	5	Noise and vibrations	D	C -	C -	P: No relevant activities are expected. C: Temporal impacts are expected from construction activities. O: continuous impacts are expected from the passing vehicles.
	6	Ground subsidence	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	7	Odors	D	B -	D	P: No relevant activities are expected. C: Temporal impacts are expected from wastes and sewage water of construction camp in case of improper treatment. O: No impacts are expected.
	8	Sediment	D	B -	D	P: No relevant activities are expected. C: Temporal impacts (erosion/deposit) are expected from bridge construction. O: No impacts are expected.
Natural Environment	**9**	Protected areas	D	D	D	P: No relevant activities are expected. C: No impacts are expected in the adjacent two protected area. O: No impacts are expected in the adjacent two protected area.
	10	Ecosystem	D	C -	D	P: No relevant activities are expected. C: Permanent impacts are expected by land clearance for new route construction. No impacts are expected for existing sections. O: No impacts are expected.
	11	Hydrology	D	B -	D	P: No relevant activities are expected. C: Permanent impacts are expected by bridge construction. O: After the initial impacts, no further impacts are expected.
	12	Topography and geology	D	C -	D	P: No relevant activities are expected. C: Permanent impacts are expected by new route construction. O: After the initial impacts, no further impacts are expected.
Social Environment	**13**	Resettlement	C -	C -	D	P: Limited resettlements are expected before the construction. C: Some safeguards/further assistance are expected after the resettlement. O: No further impacts are expected.
	14	Poverty group	C -	C +	B +	P: Poverty group are expected in PAPs. Special attention might be required for income restoration plan. C: Temporal income opportunities are expected relevant to the construction work. O: Improvement of accesses to social eservices, markets and new job opportunities led by new route construction are expected.
	15	Ethnic minorities and indigenous peoples	D	D	D	P: Small communities having unique tradition led by traditional chiefs are common in Ghana. No special attentions are necessary. C: No special attentions are necessary. O: No special attentions are necessary.
	16	Working conditions	B -	B +	A +	P: Limited business, particularly street benders, are required to relocate C: Temporal construction work and additional commodity sales are expected during construction. O: New job opportunities led by the new agricultural development in the region.
	17	Land use and natural resources	B -	B -	A +	P: Some farmers and oyster shell miners are required to relocate for ROW clearance. C: Permanent impacts are expected to supply construction materials in the region. O: Commercial farming activities are expected in the cattle field or non used land area.

Table 11-20 Scope of the Project Impacts

(Construction of New Road between Asutsuare Jct. and Asikuma Jct.) (2)

Category		Environmental Items	Stages			Remarks
Social Environment	**18**	Water use/rights	D	C -	C -	P: No relevant activities are expected. C: Temporal impacts are expected from high turbidity water by bridge construction. O: Continuous impacts are expected from the runoff.
	19	Existing social infrastructures and services	D	B +	A +	P: No social infrastructures and services are expected in ROW. C: Limited but additional social services for construction works may improve the access to such services. O: Accessibilities to the necessary social infrastructures and services will be improved.
	20	Local government and its function	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	21	Imbalance of damages and benefits	D	D	B -	P: No relevant activities are expected. C: No imbalance are expected. O: Some imbalance are expected due to expected new agricultural development activities and connectivity to the new route.
	22	Interest opposition	D	D	D	P: No impacts are expected. C: No impacts are expected. O: No impacts are expected.
	23	Cultural heritage	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	24	Landscape	D	B -	A +	P: No impacts activities are expected. C: Temporal/permanent change are expected from construction work. O: new bridge could be new land mark/tourist spot of the area.
	25	Gender	D	D	B +	P: No impacts are expected. C: No impacts are expected. O: Some skill job opportunities rather than common activities are expected from new farm development projects and other businesses.
	26	Rights of child	D	D	D	P: No impacts are expected. C: No impacts are expected. O: No impacts are expected.
	27	Transmittal diseases, HIV/AIDS	D	B -	B -	P: No relevant activities are expected. C: Spread of transmittal diseases brought by immigrant workers are expected without proper safety management program. O: Spread of transmittal diseases through relevant services and visitors are expected without proper safety management program.
	28	Occupational health and safety	D	B -	D	P: No impacts are expected. C: Continuous attention is necessary throughout the construction work. O: No relevant activities are expected.
Others	**29**	Accidents	D	B -	B -	P: No impacts are expected. C: Accidents relevant to construction work, traffic are expected. O: Occasional traffic accidents are expected due to the high speed traffic.
	30	Trans-boundary impacts and/or climate change	D	D	D	P: No relevant activities are expected. C: No impacts are expected. O: No impacts are expected.

Notes- p: planning stage, c: construction stage, o: operation stage

A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses) D: No impact is expected.

Source: Study Team

Table 11-21 Scope of the Project Impacts (Upgrading of Asutsuare – Aveyime Road) (1)

Category		Environmental Items	Stages			Remarks
			p	c	o	
Environmental	**1**	Air pollution	D	C -	C +	P: No relevant activities are expected. C: Temporal impacts are expected from the construction activities and construction machineries and trucks. O: Reduction of dust is expected due to the paved road.
	2	Water pollution	D	C -	D	P: No relevant activities are expected. C: Temporal impacts are expected form the high turbidity runoff from road improvement work. Also, temporal impacts are expected from construction camps in case of improper treatment. O: No impacts are expected.
	3	Soil pollution	D	B -	D	P: No relevant activities are expected. C: Temporal impacts are expected from construction wastes. O: No impacts are expected.
	4	Waste	D	B -	D	P: No relevant activities are expected. C: Temporal impacts are expected from construction activities and construction camps. O: No impacts are expected.
	5	Noise and vibrations	D	C -	C -	P: No relevant activities are expected. C: Temporal impacts are expected from construction activities. O: Continuous impacts are expected from the more frequent passing vehicles.
	6	Ground subsidence	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	7	Odors	D	B -	D	P: No relevant activities are expected. C: Temporal impacts are expected from wastes and sewage water of construction camp in case of improper treatment. O: No impacts are expected.
	8	sediment	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: no impacts are expected.
Natural Environment	**9**	Protected areas	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	10	Ecosystem	D	C -	D	P: No relevant activities are expected. C: Permanent impacts are expected by land clearance for new reroute at Volivo. No impacts are expected for existing sections. O: No impacts are expected.
	11	Hydrology	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	12	Topography and geology	D	D	D	P: No relevant activities are expected. C: No impacts are expected. O: No impacts are expected.
Social Environment	**13**	Resettlement	C -	C -	D	P: Limited resettlements are expected before the construction. C: Some safeguards/further assistance are expected after the resettlement. O: No further impacts are expected.
	14	Poverty group	C -	C +	B +	P: Poverty group are expected in PAPs. Special attention might be required for income restoration plan. C: Temporal income opportunities are expected relevant to the construction work. O: Improvement of accesses to social eservices, markets and new job opportunities led by new route construction are expected.
	15	Ethnic minorities and indigenous peoples	D	D	D	P: Small communities having unique tradition led by traditional chiefs are common in Ghana. No special attentions are necessary. C: No special attentions are necessary. O: No special attentions are necessary.
	16	Working conditions	B -	B +	A +	P: limited business, particularly street benders, are required to relocate C: Temporal construction work and additional commodity sales are expected during construction. O: New job opportunities led by the new agricultural development in the region.
	17	Land use and natural resources	B -	B -	B +	P: Some farmers and oyster shell miners are required to relocate for ROW clearance. C: Permanent impacts are expected to supply construction materials in the region. O: Commercial farming activities are expected in or connected area.

Table 11-21 Scope of the Project Impacts (Upgrading of Asutsuare – Aveyime Road) (2)

Category		Environmental Items	Stages			Remarks
			p	c	o	
Social Environment	**18**	Water use/rights	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	19	Existing social infrastructures and services	D	B+	A+	P: No social infrastructures and services are expected in ROW. C: Limited but additional social services for construction works may improve the access to such services. O: Accessibilities to the necessary social infrastructures and services will be improved.
	20	Local government and its function	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	21	Imbalance of damages and benefits	D	D	D	P: No relevant activities are expected. C: No imbalance are expected. O: No imbalance are expected.
	22	Interest opposition	D	D	D	P: No impacts are expected. C: No impacts are expected. O: No impacts are expected.
	23	Cultural heritage	D	D	D	P: No relevant activities are expected. C: No relevant activities are expected. O: No relevant activities are expected.
	24	Landscape	D	B-	D	P: No impacts activities are expected. C: No impacts activities are expected. O: No impacts activities are expected.
	25	Gender	D	D	B+	P: No impacts are expected. C: No impacts are expected. O: Some skill job opportunities rather than common activities are expected from new farm development projects and other businesses.
	26	Rights of child	D	D	D	P: No impacts are expected. C: No impacts are expected. O: No impacts are expected.
	27	Transmittal diseases, HIV/AIDS	D	B-	B-	P: No relevant activities are expected. C: Spread of transmittal diseases brought by immigrant workers are expected without proper safety management program. O: Spread of transmittal diseases through relevant services and visitors are expected without proper safety management program.
	28	Occupational health and safety	D	B-	D	P: No impacts are expected. C: Continuous attention is necessary throughout the construction work. O: No relevant activities are expected.
Other	**29**	Accidents	D	B-	B-	P: No impacts are expected. C: Accidents relevant to construction work, traffic are expected. O: Occasional traffic accidents are expected due to the higher spped vehicles and motorcycles.
	30	Trans-boundary impacts and/or climate change	D	D	D	P: No relevant activities are expected. C: No impacts are expected. O: No impacts are expected.

Notes- p: planning stage, c: construction stage, o: operation stage
A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses) D: No impact is expected.
Source: Study Team

Based on the above scope of impacts, IEE level environmental survey is conducted, especially to clarify the extent of negative impact for unknown items "C."

11.2.4 Result of Environmental and Social Environmental Survey

The identification of the potential impacts and the search for appropriate mitigation has been confirmed with the projects' aspects where impacts from this project will be similar to those experience under many similar to projects throughout Ghana and the particular concerns of the local communities that have been consulted.

From baseline information gathered at the fieldwork phase and issues that transpire during the consultation with stakeholders, the impacts of the project particularly during the construction phase are assessed on the following (details are attached in Appendix 11):

- Water Resources
- Soil Erosion and Sedimentation
- Air Quality
- Noise and Vibrations
- Expropriation of farmlands and Forest Reserves
- Establishment of Borrow pits
- Flora and Fauna
- Construction Waste
- Construction Camps
- Employment and Income
- Gender Issues
- Road Safety, Accidents and Comfort
- Vehicle Operation Costs

11.2.5 Assessment of the Impacts

Based on the environmental and social environmental survey above, assessment of the proposed projects are summarised in Tables 11-22 and 11-23.

Table 11-22 Project Impacts (Construction of New Road Between Asutsuare Jct. and Asikuma Jct.) (1)

Category		Environmental Items	Scoping			Impact Assessment			Remarks
			p	c	o	p	c	o	
Environmental	1	Air pollution	D	C-	C-	D	B-	B-	c: Due to the limited economic activities, it is confirmed that baseline of the proposed project area is very clean. Temporal impacts are expected from the construction activities. o: Compared to the existing few impacts condition, continuous impacts are expected from the passing vehicles.
	2	Water pollution	D	C-	D	D	B-	D	c: Turbidity of the Volta river is very low. Construction of bridge is likely to generate high turbidity runoff. Within a construction camp for another N-2 section, wastewater is well managed by the contractors supervised by GHA environmental auditors. With GHA's supervision, wastewater from construction camp shall not contaminate residential water use.
	3	Soil pollution	D	B-	D	D	B-	D	c: Limited impacts are expected from construction wastes. With GHA's supervision, impacts on soil shall be limited to the road construction area.
	4	Waste	D	B-	C	D	B-	B	c: Temporal impacts are expected from construction activities and construction camps. o: Minor impacts are expected from passing vehicles such as food and package litter, rubbish, and burst tyres. Minor impacts are also expected from the new residents along the new road.
	5	Noise and vibrations	D	C-	C-	D	B-	B-	c: Temporal impacts are expected from construction activities. o: Compared to present no traffic condition, base line would be changed to the common highway environment in Ghana.
	6	Ground subsidence	D	D	D	D	D	D	N/A
	7	Odors	D	B-	D	D	D	D	c: Based on the GHA's another construction site situation, odor shall not be expected neither construction site nor camps.
	8	Sediment	D	B-	D	D	B-	D	c: Due to the fast river flow, sedimentation is not expected. However, erosion of the river bank shall be carefully monitored during the construction.
Natural Environment	9	Protected areas	D	D	D	D	D	D	p/c/o: Although the proposed project is located between two protected area (Shai Hills RR and Kalakpa RR), few negative impacts are expected due to the present condition of isolation by the existing road networks and the stable and strong flow of the Volta River.
	10	Ecosystem	D	C-	D	D	B-	D	c: No virgin land is impacted. No significant eco system will be impacted.
	11	Hydrology	D	B-	D	D	B-	D	c: The effect of the bridge bases shall be negligible. Effects of the construction equipment during the bridge construction shall be monitored.
	12	Topography and geology	D	C-	D	D	B-	D	c: Especially, new route construction through two hills at Oswem community, minor topographical modification would be required. The impact is expected to be minimal.
Social Environment	13	Resettlement	C-	C-	D	B-	B-	D	p: 19 immovable buildings are fully or partially affected by the ROW (90m) acquisition. two movable property, container bender shops are fully affected by ROW. Requirement of the relocation is less than two hundreds PAPs. c: Cash compensation is common and preferred by PAPs. Land is also available for compensation adjacent to the project sites.
	14	Poverty group	C-	C+	B+	B-	B+	B+	p: It is confirmed that project affected communities are generally low income communities, but it is common situation in rural communities in Ghana. Without special request from the PAPs, special attention might not be required for income restoration plan. c: Resettlement assistances for low income group are quite common practices for GHA, so compensation and follow up shall not be issue. Job opportunities related construction are likely to provide temporal income as well as on the job training for skill labours. o: Improvement of accesses to social eservices, markets and new job opportunities led by new route construction are expected.
	15	Ethnic minorities and indigenous peoples	D	D	D	D	D	D	N/A

Table 11-22 Project Impacts (Construction of New Road Between Asutsuare Jct. and Asikuma Jct.) (2)

Category		Environmental Items	Scoping			Impact Assessment			Remarks
			p	c	o	p	c	o	
	16	Working conditions	B-	B+	A+	B-	B+	A+	p: Very limited number of street venders are confirmed to be affected under present ROW. Some farm lands are also affected, but none of the farmers are required to relocate for farming. The impact of the land acquisition could be also compensated by higher yield farming practices. c: Temporal construction work and additional vender opportunities are expected for construction workers during construction period. o: New job opportunities/skilled and unskilled labour jobs would be available along the proposed project. Capacity development/skill training for such opportunity for locals would greatly increase the chances for locals. However, after the bridge construction, river-crossing operators using canoes will be required to relocate their crossing area or change occupation utilising new job opportunities. Necessary support for relocation and occupational training shall be provided.
Social Environment	**17**	Land use and natural resources	B-	B-	A+	B-	B-	A+	p: Even farm land, farmers tend to prefer farm land to cash for the compensation as very limited impact by the ROW for each farmer. It is easy for oyster shell miners to get another concession from adjacent land owners or authorised persons, who are most likely to be the chief of the community. c: The impacts of rock and sand sources shall be carefully assessed during the detailed design stage. o: Commercialized farming would greatly improve the productivities of the land use in the region.
	18	Water use/rights	D	C-	C-	D	B-	D	c: Due to the fast river flow, the impact of the bridge construction shall be limited without impacts on residential water use. However, the impacts greatly depend on the location of the bridge bases and construction methodologies. Practical monitoring plan shall be considered during the detailed design stage. o: Due to the abundant water flow in the Volta river, it is unlikely to impact the water quality of the river by runoff.
	19	Existing social infrastructures and services	D	B+	A+	D	B+	A+	c: Limited but additional social services for construction works may improve the access to such services. o: The new road would greatly improve the access to the better services within the communities as well as some central facilities in Tema or Accura.
	20	Local government and its function	D	D	D	D	D	D	N/A
	21	Imbalance of damages and benefits	D	D	B-	D	D	B-	o: Some communities would easily attract agribusinesses and others may have difficulties to attract agribusinesses simply due to commercial viabilities. Good strategies for regional deployment and land use plan shall be well designed to avoid large imbalance within the communities.
	22	Interest opposition	D	D	D	D	D	D	N/A
	23	Cultural heritage	D	D	D	D	D	D	N/A: Because there is no recognised cultural heritage in and around the project area, no impacts are expected throughout the project cycle.
	24	Landscape	D	B-	A+	D	B-	A+	c: Temporal/permanent change are expected from construction work. o: New bridge could be new land mark/tourist spot of the area.
	25	Gender	D	D	B+	D	D	B+	o: There are no segregation between male and female in the project area. However, education level shows that educational levels are generally higher for male. Some of the reason would be traditional customs taking care of cooking and giving birth in very young age. Expected new skill labour may promote/lead new work style for female labours in the region.
	26	Rights of child	D	D	D	D	D	D	N/A
	27	Transmittal diseases, HIV/AIDS	D	B-	B-	D	B-	B-	c: Spread of transmittal diseases brought by immigrant workers are expected without proper safety management program. As it is common in Ghana, implementation of educational safety programme shall not be difficult in Ghana. NGO's are available fro all project affected districts for such purpose. o: Even after the construction work, many visitors are expected through the constructed new road. Local communities' continuous awareness programme would be effective.
	28	Occupational health and safety	D	B-	D	D	B-	D	c: Continuous attention is necessary throughout the construction work.

Table 11-22 Project Impacts (Construction of New Road Between Asutsuare Jct. and Asikuma Jct.) (3)

Other	**29**	Accidents	D	B-	B-	D	B-	B-	c: Accidents relevant to construction work, traffic are expected. o: Due to the bad condition of the roads, motorcycles are quite common in the project site. However, some of the driver do not have a licence and very poor skill to avoid accidents. It is highly recommendable to improve such drivers skills to avoid accidents.
	30	Transboundary impacts and/or climate change	D	D	D	D	D	D	N/A

Notes- p: planning stage, c: construction stage, o: operation stage
A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)
D: No impact is expected.
Source: Study Team

Table 11-23 Project Impacts (Upgrading of Asutsuare – Aveyime Road) (1)

Category		Environmental Items	Scoping			Impact Assessment			Remarks
			p	c	o	p	c	o	
Environmental	**1**	Air pollution	D	C-	C+	D	B-	B+	c: Due to the limited economic activities, it is confirmed that baseline of the proposed project area is very clean, except dusts from gravel roads. Temporal impacts are expected from the construction activities. o: Compared to the existing dusty condition, air quality shall be improved by paved road even with expected additional traffics.
	2	Water pollution	D	C-	D	D	B-	D	c: Temporal impacts are expected form the high turbidity runoff from road improvement work. Within a construction camp for another N-2 section, wastewater is well managed by the contractors supervised by GHA environmental auditors. With GHA's supervision, wastewater from construction camp shall not contaminate residential water use.
	3	Soil pollution	D	B-	D	D	B-	D	c: Limited impacts are expected from construction wastes. With GHA's supervision, impacts on soil shall be limited to the road construction area.
	4	Waste	D	B-	C	D	B-	D	c: Temporal impacts are expected from construction activities and construction camps.
	5	Noise and vibrations	D	C-	C-	D	B-	B-	c: Temporal impacts are expected from construction activities. o: Compared to present no traffic condition, base line would be changed to the common interregional road environment in the region.
	6	Ground subsidence	D	D	D	D	D	D	N/A
	7	Odors	D	B-	D	D	D	D	c: Based on the GHA's another construction site situation, odor shall not be expected neither construction site nor camps.
	8	Sediment	D	D	D	D	D	D	N/A
Natural Environment	**9**	Protected areas	D	D	D	D	D	D	p/c/o: Although the proposed project is located adjacent to the protected area (Shai Hills RR), few negative impacts are expected due to the present condition of isolation by the existing road networks and active farming along the Shai Hills RR.
	10	Ecosystem	D	C-	D	D	B-	D	c: No virgin land is impacted. No significant eco system will be impacted.
	11	Hydrology	D	D	D	D	D	D	N/A
	12	Topography and geology	D	D	D	D	D	D	N/A
Social Environment	**13**	Resettlement	C-	C-	D	B-	B-	D	p: 10 immovable buildings are fully or partially affected by the ROW (60m) acquisition. 7 movable properties, container bender shops are fully or partially affected by ROW. Also, one tomb would be fully affected by ROW. Requirement of the relocation is less than 200 PAPs. c: It is confirmed that cash compensation is common and preferred by PAPs. Land is also available for compensation adjacent to the project sites.
	14	Poverty group	C-	C+	B+	B-	B+	B+	p: It is confirmed that project affected communities are generally low income communities, but it is common situation in rural communities in Ghana. Without special request from the PAPs, special attention might not be required for income restoration plan. c: Resettlement assistances for low income group are quite common practices for GHA, so compensation and follow up shall not be issue. Job opportunities related construction are likely to provide temporal income as well as on the job training for skill labours. o: Improvement of accesses to social eservices, markets and new job opportunities led by new route construction are expected.
	15	Ethnic minorities and indigenous peoples	D	D	D	D	D	D	N/A
	16	Working conditions	B-	B+	A+	B-	B+	A+	p: 6 street venders are confirmed to be affected under present ROW. Some farm lands are also affected, but none of the farmers are required to relocate for farming. The impact of the land acquisition could be also compensated by higher yield farming practices. c: Temporal construction work and additional vender opportunities are expected for construction workers during construction period. o: New job opportunities/skilled and unskilled labour jobs would be available along the proposed project. Capacity development/skill training for such opportunity for locals would greatly increase the chances for locals.

Table 11-23 Project Impacts (Upgrading of Asutsuare – Aveyime Road) (2)

Category		Environmental Items	Scoping			Impact assessment			Remarks
			p	c	o	p	c	o	
	17	Land use and natural resources	B-	B-	B+	B-	B-	B+	p: Even farm land, farmers tend to prefer farm land to cash for the compensation as very limited impact by the ROW for each farmer. It is easy for oyster shell miners to get another concession for the shell mining in the community. c: The impacts of rock and sand sources shall be carefully assessed during the detailed design stage. o: Commercialized farming would greatly improve the productivities of the land use in the region. However, compared to the N-2 bypass development project, positive out puts would be limited due to limited land availability along the existing road.
	18	Water use/rights	D	D	D	D	D	D	N/A
	19	Existing social infrastructures and services	D	B+	A+	D	B+	A+	c: Limited but additional social services for construction works may improve the access to such services. o: The new road would greatly improve the access to the better services within the communities as well as some central facilities in Tema or Accura.
	20	Local government and its function	D	D	D	D	D	D	N/A
	21	Imbalance of damages and benefits	D	D	D	D	D	D	N/A
	22	Interest opposition	D	D	D	D	D	D	N/A
	23	Cultural heritage	D	D	D	D	D	D	N/A: Due to the no recognized cultural heritage in and around the project area, no impacts are expected throughout the project cycle.
	24	Landscape	D	B-	D	D	B-	D	c: Temporal/permanent change are expected from construction work.
	25	Gender	D	D	B+	D	D	B+	o: There are no segregation between male and female in the project area. However, education level shows that educational levels are generally higher for male. Some of the reason would be traditional customs taking care of cooking and giving birth in very young age. Expected new skill labour may promote/lead new work style for female labours in the region.
	26	Rights of child	D	D	D	D	D	D	N/A
	27	Transmittal diseases, HIV/AIDS	D	B-	B-	D	B-	B-	c: Spread of transmittal diseases brought by immigrant workers are expected without proper safety management program. As it is common in Ghana, implementation of educational safety programme shall not be difficult in Ghana. NGO's are available fro all project affected districts for such purpose. o: Even after the construction work, many visitors are expected through the constructed new road. Local communities' continuous awareness programme would be effective.
	28	Occupational health and safety	D	B-	D	D	B-	D	c: Continuous attention is necessary throughout the construction work.
Other	**29**	Accidents	D	B-	B-	D	B-	B-	c: Accidents relevant to construction work, traffic are expected. o: Due to the bad condition of the roads, motorcycles are quite common in the project site. However, some of the drivers do not have a licence and very poor skill to avoid accidents. It is highly recommendable to improve such drivers' skills to avoid accidents.
	30	Transboundary impacts and/or climate change	D	D	D	D	D	D	N/A

Notes - p: planning stage, c: construction stage, o: operation stage

A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses) D: No impact is expected.

Source: Study Team

11.2.6 Environmental Management Plan

In accordance with the MRH's environmental and social management framework (ESMF), followings are the expected environmental management plan.

(1) Key Responsible Players

a) Environmental Management Responsibility of the Key Agencies

Table 11-24 Environmental Management Responsibility of the Public Authorities

Responsible Agency	Responsibilities
EPA	The EPA is the agency with sole responsibility for environmental management in Ghana. The EPA will be responsible for supervision of EMP implementation specified in the EIS, and will conduct external monitoring as the regulatory agency during the construction phase.
GHA	The Environmental Management Unit (EMU) of the GHA will be the principal responsible agency of the implementation agency. The EMU will be responsible for the whole process of the EMP including legal environmental clearance, assurance of mitigation measures and monitoring. It will also be responsible for all monitoring activities throughout the project cycle including the operation phase and the completion audit.
MRH	The MRH will be responsible for supervising the GHA's project implementation including environmental management throughout the project cycle, and for evaluating the project implementation. The evaluation of EMP shall be included in the completion audit.
Land Commission	The Land Commission (LC), a state agency responsible for the management and administration of state and vested lands, is responsible for guiding area development by policy framework development and stakeholder coordination. The LC will be mainly involved in the preparation stage for the area development matters and allocation of land for mitigation measures.
Land Valuation Division	The Land Valuation Division (LVD) of the LC, formerly known as the Land Valuation Board, will be responsible for valuation of project affected properties such as land, buildings, and economic activities for evaluating compensation. The compensation valuation list from the LVD will be forwarded to the acquiring agency for payment processing.
District Assemblies	The Assemblies will be the principal representatives of the project affected persons (PAPs) as well as development of area under the jurisdiction. As representatives of the project affected communities, assembly members of district or commune level officials will be involved in the whole process of the projects throughout the project cycle.

Source: Study Team

b) Environmental Management responsibility of the Consultant

Table 11-25 Environmental Management Responsibility of the Consultant

Project Phase	No.	Consultant's Responsibilities
Design	1	Design the project the least negative environmental impact during the operational life of the road
	2	Design the project prescribing materials with the least negative environmental impact
	3	Incorporate any feasible traffic safety measures within the project design.
	4	Design environmentally friendly road drainage systems
	5	Incorporate all suitable clauses requiring the contractor to execute his work with due diligence and apply environmentally friendly methods. Such requirements must be accompanied by the necessary methods for monitoring and accompanied by the necessary methods for monitoring and enforcement. Clauses with principle contents as minimum requirement.
Implementation	6	The Consultant will supervise and enforce the Contractors performance on all environmental requirements included in the Contract Documents.
	7	The engineer will monitor the overall environmental impact of the projects and recommend additional mitigation measures for implementation when deemed necessary.

Source: Study Team

b) Environmental Management Responsibilities of Contractor

Table 11-26 Environmental Management Responsibilities of Contractor

Project Phase	No.	Contractor's Responsibilities
Mobilisation	1	Ensure that the management as well as site managers and foremen are well informed about all environmental issues of the project.
	2	Ensure that all site managers and foremen trained in environmentally friendly construction methods
	3	Ensure that all equipment mobilised fulfil the environmental requirements of the of the contracts
	4	Properly establish, operate and rehabilitate construction camps.
	5	Obtain necessary approvals for all borrow pits
	6	Establish a waste management plan covering all types of wastes.
Project Execution	7	Apply environmental requirement and construction methods.
	8	Ensure occupational health and safety of all workers and visitors to the site at any time.
	9	Fulfil all environmental requirements of the Contract Documents.
	10	Inform the Engineer if any unforeseen negative environmental impact should occur.
	11	Ensure that all affected project areas have been properly cleaned of waste, graded and re-vegetated
	12	For providing safe passage around or through his work site for all kinds of traffic.
	13	Ensure that all workers at his camp live responsibly with the communities along the road corridor
	14	Responsible for providing potable water to any community whose water source is made unwholesome due to the project activities until the water is made wholesome again.
	15	Responsible for management of all types of waste generated from construction activities, camps, quarries and borrow pits.
Demobilisation	20	Ensure that all affected project areas have been properly cleansed of waste, graded and re-vegetated.

Source: Study Team

c) The Public

The general public has no specific tasks in the environmental Management Plan, but their role is however important. The public must express their concerns of the projects not only in the preliminary designs phase but also whenever they are aware of previously unforeseen impacts or when impacts take a different order of magnitude than expected. The public have an unwritten obligation to inform the Engineer about such developments as early as possible. The public is also the target of awareness raising campaigns to mitigate the negative impacts of the project.

(2) Enforcement Mechanisms

The Contractor's responsibilities are defined in the following clauses, to be incorporated in the Contract Document.

a) General

Clause 1: The Contractor shall be responsible for familiarizing himself with all national and local legislation relating to his/her activities during the construction phase of the project.

Clause 2: The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on the Sites or off-site are carried out in conformity with statutory and regulatory environmental requirements of the Government of Ghana and the Standard Specifications, where the more stringent shall apply.

The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of project activities. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated.

b) Waste Disposal

Clause 3: The Contractor shall at all times maintain all sites under his control in a clean and tidy condition and shall provide appropriate and adequate facilities for the temporary storage so as to avoid the unnecessary accumulation of waste;

Clause 4: The Contractor shall be responsible for the safe transportation and disposal of all waste generated as a result of his activities in such a manner as will not give rise to environmental pollution in any form, or hazard to human or animal health. In the event of any third party being employed to dispose of waste, the Contractor shall be considered to have discharged his responsibilities under this clause only when he has demonstrated that the transportation and disposal arrangements have not given rise to pollution or will give rise to health hazard;

Clause 5: The Contractor shall be responsible for the provision of adequate sanitary facilities for his workforce and that of his sub-contractors. The contractor shall not allow the discharge of any untreated sanitary waste to groundwater or any surface watercourse. The Contractor shall provide details of sanitary arrangements to the Engineer for approval after satisfying himself that the proposed facilities are adequate and are unlikely to pollute water resources.

c) Water Resources

Clause 6: All water and other liquid waste products shall be collected and disposed of at locations on site or off site and in a manner that shall not cause nuisance or pollution.

Clause 7: The Contractor shall take all reasonable measures, at all sites under his control, to prevent spillage and leakage of materials likely to cause pollution of water resources. Such measures shall include, but not be limited to the provision of bunds around fuel and oil storage facilities, and oil and grease traps in drainage systems associated with vehicle and plant washing serving and fuelling areas. Prior to locating of such facilities, the Contractor shall submit details of pollution prevention measures to the Engineer for approval.

d) Replanting of trees

Clause 8: The Contractor shall exercise great effort during the Construction phase to minimize the number of trees to be felled along the road. Four trees of the same species should be planted for every tree felled along the road.

e) Restoration of Borrow Pits

Clause 9: The Contractor shall be responsible for ensuring that any gravel or together borrow pits, working areas and the like are regarded and covered with topsoil or a suitable bio-engineered product to ensure their natural regeneration. This shall be to the satisfaction of the Engineer.

f) Transport of Materials

Clause 10: The Contractor shall ensure that his vehicles do not cause a safety hazard, noise, dust or disturbance to local inhabitants.

g) Traffic Management and Safety during Construction

Clause 11: The contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock needing to pass through the works.

Clause 12: The Contractor shall provide, erect and maintain on the site and at such positions on the approaches, traffic signs and traffic control signals necessary for the direction and control of traffic. The signs shall be reflectorised or adequately illuminated at night in a manner approved by the Engineer and kept clean and legible at all times. The Contractor shall reposition, cover or remove signs as required during the various stages of implementation.

Clause 13: The Contractor shall take reasonable precautions to keep the roads clear of any spillage or materials from his operation to the satisfaction of the Engineer. The Contractor without delay shall clear any spillage.

Clause 14: All vehicles and plant operated by the contractor or his sub-contractors shall at all times be maintained in accordance with the original manufacture's specifications and service manuals, with particular regard to the control of noise and diesel particulate emissions. The Engineer shall have the right to require the contractor to replace or rectify any vehicle or plant, which in his opinion causes excessive noise or emits smoke within 2 days of the contraction being so notified.

h) Noise and Air Pollution

Clause 15: The Contractor shall consider noise as an environmental concern in his planning and during execution of the works.

Clause 16: All vehicles and plant operated by the contractor or his sub-contractors shall at all times be maintained in accordance with the original manufacture's specifications and service manuals, with particular regard to the control of noise and diesel particulate emissions. The Engineer shall have the right to require the contractor to replace or rectify any vehicle or plant, which in his opinion causes excessive noise or emits smoke within 2 days of the contraction being so notified.

Clause 17: The Contractor shall take all necessary measures to ensure that operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking into account all applicable environmental requirements. When operating close to residential area sensitive areas such as schools or medical facilities the Contractor's working hours shall be limited to daylight hours.

Clause 18: The Contractor shall employ dust suppression measures such as watering to minimize dust pollution.

i) Health and Safety Provisions

Clause 19: The Contractor shall ensure as far as practicable that the health, safety and welfare

of employees and all other persons on site are secured and protected from hazards created by the Project. The Contractor shall prepare and implement a Health and Safety Plan (HSP), which shall be approved by the Engineer. The HSP shall address, but shall not be limited to, the following:

- Site security, including securing of excavations, hazardous materials, etc.
- Confined space safety procedures
- Excavation and trenching safety measures
- Emergency response plans
- First Aid including facilities, equipment and materials
- On-Site safety publicity
- Safety Training Program for Contractor's (and Sub Contractor's) personnel
- Personal Protective clothing and safety equipment (PPE)
- HIV/-AIDS awareness programme
- Health and safety monitoring and reporting

(3) Staffing Requirement

As part of the construction team of the contractor, an Environmental/Safety Officer is also required. The Environmental/Safety Officer (ESS) will be an employee of the Contractor appointed to monitor and review the on-site environmental and social management plan and implementation of the Environmental Management Plan (EMP). The ESS shall be on site daily throughout the duration of the project construction. The ESS's responsibilities will include the following:

- Assist Contractor in ensuring that the necessary environmental authorizations and permits are obtained;
- Maintain open and direct lines of communication between the Employer, Contractor, Consultant and relevant institutions with regard to environmental matters;
- Undertake regular site inspections of all construction areas with regard to compliance with the EMP.
- Monitor and verify adherence to the EMP at all times and verifying that environmental impacts are kept to a minimum;
- Take appropriate action if the specifications are not followed;
- Assist the Contractor in finding environmentally responsible solutions to problems;
- Undertake and monitor environmental awareness training for all new personnel coming onto site;
- Ensure labour protection equipment is of good quality and is available on site at all times;
- Advise on the removal of person(s) and/or equipment not complying with the specifications;
- Recommend the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP;

- Implement works permit system and ensure the permit conditions for work are followed strictly;
- Keep detailed records of all site activities that may pertain to the environment.
- Undertake a continual review of the EMP and recommending additions; and
- Compile a final audit report regarding the EMP and its implementation during the construction period, after completion of the contract and submitting this report to the Employer.

(4) Training Requirements

There will be a training programme in place for all categories of workers and communities along the project corridors. Construction workers will be taken through safety induction as well as lectures on environmental issues just before commencement of work and follow periodically. Community option leader will also be sensitised through focus group discussion and public lectures.

The Environmental, health and Safety personnel will also require some specialist training in fire safety techniques and first aider will be contacted for such training. Operatives who will undertake sensitive duties such as working from a height, confined spaces, areas near schools and health facilities will be given specialist training in order to avert any environmental damage or accidents. Refresher training programmes will be undertaken periodically after training needs assessment have been conducted. It is expected that operatives after such training programmes will acquire the necessary environmental and safety skills to apply in carrying out their duties.

a) Initial Induction Course

All workmen shall be required to attend a safety induction course prior to undertaking any work in connection with the Works

b) Periodic Training Courses

Periodic safety courses shall be conducted for all Contractor's employees and subcontractor's employees including all operatives and staff involved in supervision and management not less than once every six months. Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works.

(5) Monitoring

Environmental monitoring ensures that the impacts have been accurately predicted and that mitigation measures are being implemented as planned and has the assumed effects. The monitoring exercise will ensure that the remedial actions recommended in the assessment are incorporated in the project and maintained throughout the operation life where appropriate. It will also identify additional remedial measures and corrective measures or redesign remedial measures if they are not sufficiently effective during the construction phase and operation phase. Based on the ESMF, the EMU of the GHA is responsible for supervising the GHA's activities and jurisdiction. However, due to the limited availability of EMU officers and GHA budget, it is recommended to conduct a "post environmental evaluation" by the EMU at the time of the

MRH/GHA's completion audit and when required during the operation phase (see Tables 11-27 and 11-28, and Appendix 15). Operational phase monitoring shall be defined in the following detailed design stage to meet the donor's loan policies; it is outlined in Section 11.2.8 below.

11.2.7 Construction Phase Monitoring Enforcement

All major stakeholders in the project have a monitoring responsibility of some kind. However, only the Supervising Engineer, the Ghana Highway Authority's Environmental Unit, The EPA, and the Contractor are allocated specific and formal monitoring obligations. Traffic Police, Health Authorities and other public authorities will automatically monitor some of the effects of the project during their daily work.

Periodic interview with the beneficiaries of the projects will also be undertaken to assess their opinions about the effect of the implementation of the project.

11.2.8 Enforcement of Operation Phase Monitoring

Due to the limited availability of EMU officers and GHA budget, it may not be practical to maintain the construction phase monitoring during the operation phase. Based on the present practices for other donor projects, it is practical to continue monitoring by a "post environmental evaluation", periodical field observation by maintenance department officials, and environmental monitoring by the EMU when required.

Based on the ESMF and RPF, the GoG conducts a completion audit to check that all aspects of the projects are properly implemented, including environmental and social considerations. As the responsible authority of the GHA's environmental supervision, the EMU shall be responsible for the environmental monitoring at the completion audit. After the completion of the construction, the Maintenance Division of the GHA will take responsibility for physical maintenance of the roads. Therefore, it is reasonable for the GHA to continue the operational phase periodical monitoring through the Maintenance Division's physical monitoring and maintenance work. If there is evidence of potential impacts reported by the maintenance department or a claim, the EMU shall conduct additional environmental monitoring to address the concerns and confirm the potential impacts. Based on the EMU's evaluation, the GHA shall take necessary actions to comply with the environmental permits of the proposed projects.

11.2.9 Public Consultation

As the first public announcement of the GHA/MRH's intention to construct the road between Asutsuare Jct. and Asikuma Jct. and upgrade the existing Asutsuare – Aveyime road, the GHA conducted initial public consultations to describe the back ground and objectives of the proposed projects at Asutsuare on 10th September and at Juapong on 11th September, 2012. As the GoG is going to reach a conclusion on whether to proceed with the proposed projects after this JICA study, the public consultation was conducted mainly to raise public awareness and make preliminary preparations for EIS screening by the GHA.

Table 11-27 Summary of Monitoring Responsibilities and Output

Party Responsible	Parameters to be Monitored	Output
EPA	- Overall Environmental Performance of the Project	- Instructions to contractor and the Engineer
GHA Environment Unit	- Overall Environmental Performance of the Project - Community relations - Payment of appropriate compensation	- Monthly environmental reports
Consultant	- Construction methods and materials - Environmental management of construction sites - Implementation of mitigation measures for air, water, soil, traffic, occupational health and safety, trees etc. - Environmental management of construction camps - Environmental management of borrow pits and quarries - Contractors waste management - Staged rehabilitation of impact areas - Community relations - Environmental performance of contractors equipment - Accidents (traffic, spills etc.) - Environmental performance of mitigation measures	- Monthly environmental reports. - Incident reports as and when required (spills, accidents and the like)
Contractor	- Environmental performance of equipment and plants - Implementation of interim and permanent mitigation measures - Occupational health and safety measures - Base camp management - Air quality - Accidents of any kind	- Maintenance records - Accident reports - Mitigating actions e.g. sprinkling of water, traffic signs, safety barriers
Traffic Police	- Traffic nuisances - Traffic safety measures - Traffic accidents	- Police reports and instructions to contractor
Health Authorities	- Change of frequency of diseases - Occurrence of new diseases in the area	- Health reports.
Local Communities	- Negative environmental impacts - Social disturbance	- Complaints to contractor and supervising engineer

Source: Study Team

Table 11-28 Required Monitoring Items

Environmental Item	Frequency	Parameter	Location	Responsibility
Ambient Noise*	Daily	・ Frequency of disturbance to settlement. ・ Requirement for sound barrier as required	・ Construction site ・ Adjacent settlement	Consultant
Ambient Air Quality*	Monthly test	・ Amount of dust generated ・ Requirement for spraying roads to control dust ・ Items (SO_2, NO_2, CO, TSP, PM_{10})	・ Construction site communities	Consultant
Effluent Water Quality*	Quarterly	・ Water quality of effluents and construction sites' runoff ・ Items (pH, TSS, TDS, BOD, COD, T-N, T-P, mineral oil, oil)	・ Work camp drainage ・ Construction site drainage	Consultant
Sedimentation and erosion	Daily, as required	・ Condition of erosion and sediments by visual check	・ Construction site ・ Borrow pits ・ Cleared land ・ Water channels ・ Volta River banks	Consultant
Natural protected areas	Weekly	・ Field investigation of protected area and surrounding	・ Natural Protected Area	Consultant Forestry Commission
Auxiliary project component	Daily	・ Road traffic and associated issues by visual check	・ Road corridor	Consultant
Waste Management	Daily	・ Generation, transportation, final disposal, onsite treatment by visual check	・ Construction site, camp	Consultant
Occupational health and safety	Daily	・ Provision of appropriate personal protective equipment by visual check ・ Appropriate signage by visual check	・ Construction site, camp	Consultant GHA, as required basis

Note: * - Standards for noise, air quality, and water quality shall be referred to Appendix 13 of Recommended Monitoring Items and Standards for Environmental Quality Monitoring

Source: Study Team

Due to the initial stage of the project development and wide range of the project area, only important public representatives (district chief executives), district and commune level assembly persons, opinion leaders, and chiefs of the project affected areas were officially invited to attend the consultations. However, due to the increasing interest and demand among the communities, the number of attendants was 328 at Asutsuare and 376 at Juapong, including the general public.

Presentations were given in English and two local languages to maintain the accountability of the projects, although English is one of several official languages in Ghana. The meetings started with presentations on the issues and need for road construction by the GHA, followed by the background and objectives of the JICA Study, draft results of the JICA Study including the procedures used to select the routes and conceptual designs of roads and bridges. After the general description of the projects, the initial findings of the environmental and social environmental impact studies were presented.

After all the presentations, the GHA accepted opinions from attendants; most of the initial responses to the public opinions were given by some members of parliament from the area, MRH, and GHA officials. In general, attendants were in agreement with the proposed projects and were keen to see the proposed projects actually go ahead. A summary of each public consultation is attached in Appendix 13.

11.3 Abbreviated Resettlement Action Plan of the Proposed Project

11.3.1 Summary of the Projects and Need of Involuntary Resettlement

After the selection of a desirable route for the F/S, social impact study was conducted for abbreviated resettlement action plan (ARAP) development in accordance of MRH's involuntary resettlement policy framework (RPF).

Based on the GHA's new road development regulation, ROWs are set to 90m for the national highway (Asutsuare Jct. - Asikuma Jct.) and 60m for the inter-regional road (Asutsuare - Aveyime road).

11.3.2 Summary of Legal Framework

(1) Summary of Legal Framework

The MRH has clear policies for both environmental and social impact-ESMF and involuntary resettlement-RPF. Though both ESMF and RPF were originally developed for the TSDP funded by the WB in 2007, MRH and its agencies mandatory apply those policy frameworks for any road sector project. GHA is likely to apply RPF for the proposed project unless JICA disagree with its application. For the comparison purpose, following section shows the JICA's inventory resettlement policy. Since both MRH's RPF and JICA's are fully compatible with WB involuntary resettlement policy (WB OP4.12), RPF and JICA Guideline shall be compatible each other.

(2) JICA's Policy on Involuntary Resettlement

Table 11-29 JICA Involuntary Resentment Policy

I.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
II.	When population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.
III.	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.
IV.	Compensation must be based on the full replacement cost[31] as much as possible.
V.	Compensation and other kinds of assistance must be provided prior to displacement.
VI.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.
VII.	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. when consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.
VIII.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.
IX.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.
	The above principles are complemented by World Bank OP 4.12, since it is stated in JICA guidelines that "JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies". Additional key principles based on World Bank OP 4.12 are as follows.
X.	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 or others who wish to take advantage of such benefits.
XI.	Eligibility of benefits include the PAPS who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPS who do not 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.
XII.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.
XIII.	Provide support for the transition period (between displacement and livelihood restoration.
XIV.	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.
XV.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, an abbreviated resettlement plan is to be prepared.

Source: Appendix 1: Environmental and Social Consideration Required for Intended Projects (JICA Guideline)

11.3.3 Methodology of Socioeconomic Survey

(1) Studies Undertaken for RAP

For the assumptions underpinning this RAP, several studies and activities were carried out which comprised of the following:

- Assessment of project documents
- Census and socio-economic survey
- Institutional identification and capacity assessment of agencies
- PAP asset inventory and valuation
- Primary data collection

[31] Description of "replacement cost" is as follows.

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 similar or better than those 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 labour and contractors' fees, plus the cost of any registration and transfer taxes.

- Data collation and analysis

(2) Assessment of Project Documents

A number of documents were obtained from various organizations and other government agencies. These documents helped to set the project within the relevant background. They included the following:

- Resettlement Policy Framework by Ministry of Transportation
- The 1992 Constitution
- State Lands Act (1962) Act 125
- Administration of Lands Act (1962) Act 123
- Public Conveyance Act (1965)
- Lands Statutory Wayleaves Act (1963) Act 186

(3) Population and Housing Census and Socioeconomic Survey

Population and Housing Census: The GoG conducted a population and housing census in 2010 and has been processing the results. As of September 2012, only a summary report of the final results was available for the general public. The summary report covers both population and housing census results at the regional level and the appendix includes the population at the district level. With the support of the GSS, the Study Team could obtain the population and selected socioeconomic data at the district level to understand the principal structure of the project affected area.

Socioeconomic Survey: A listing of all persons who own land, structures or live and work in the road corridor was undertaken along the two main routes, namely: the N2 also known as the Eastern Corridor and the feeder road from Asutsuare township to Aveyime. In terms of project impact, these are the people likely to lose shelter, business premises and suffer other intangible losses. Data gathered included photographs of PAPs, bio-data, level of education, nationality, ethnicity, religion and status as well as activity in relation to the road.

(4) Institutional identification and capacity assessment of agencies

Institutions that had roles to play in the resettlement were identified and their capacities were assessed through a study of earlier works and a rapid appraisal done by the RAP team.

(5) PAP Asset Inventory and Valuation

In order to establish the extent of PAPs' losses, an asset inventory and valuation has been prepared: the inventory details which structures will be partly or completely demolished or will need to be relocated. In addition, it specifies ownership and other vital information.

(6) Primary Data Collection

In addition to the secondary sources of data, the census, socio-economic survey and the consultations involved a combination of several methods of social research such as Focus Group Discussions (FGDs), in-depth/key informant interviews as well as interviews with individual PAPs.

(7) Data Collation and Analysis

The qualitative data from the FGDs and other consultations were manually analysed while the quantitative data analysis was done using the Statistical Package for Social Scientists (SPSS) and Microsoft Excel. The following measures were added:

- Separate census questionnaires were administered to specific categories of PAPs.
- Photographing PAPs with their names indicating the census data collection
- Assignment of unique identification numbers for each PAP within the ROW
- Connecting PAPs to specific structures
- Relating employers to their employees
- Marking of pictures using PAP names and unique identification numbers for enhanced authentication.

11.3.4 Scope of Resettlement Impact

As described above regarding the methodology of the socioeconomic survey, the scope of resettlement impacts is considered based on the updated population and housing census in 2010 as well as socio economic survey by the Study Team and potential impacts of the proposed projects. Summaries of the Population and Housing Census, and socio economic survey are shown in this section. Details of the census and socioeconomic survey results are attached in Appendix 14.

(1) Summary of Population and Housing Census

The following are the key findings of the 2010 population census for the purpose of understanding the socioeconomic setup for the project affected area (Dangbe West District in Greater Accra Region, North Tongu District in Volta Region, and Asuogyaman District in Eastern Region): 1) population, 2) ethnicity, 3) religion, 4) educational level, and 5) economic activities.

Populations of Dangbe West District, North Tongu District and Asuogyaman District were 122,836, 149,188, and 98,046 respectively. The ratio of urban to rural population was roughly 1 to 2 in all districts.

Ethnicity balance of the Greater Accra Region and Eastern Region showed similar ethnicity, headed by Akan (40% or 51%) followed by Ga-Dangbe (18 or 27%) and Ewe (20 or 19%), respectively. That of the Volta Region was headed by Ewe (74%) followed by Gurma (11%).

Religion in all districts was dominated by Christianity (roughly 80-90%), headed by Pentecostal/Charismatic followed by Protestant, Catholic, and other Christian. The three highest shares after Christianity were No religion, Islam and Traditional, with between 3% and 8%.

Educational level was similar in all district, but Asuogyaman District. Showed slightly lower numbers of those who had never attended school, for both males and females. In all districts, primary school was the most common educational level for males followed by junior high school and never attended school, while the majority of females had either never attended school or only attended primary school. Based on the census data, there was no critical gender

segregation in the project area.

Economic activity status was similar among all district and there was no major difference between males and females. The employed status showed the highest proportion (63-68%) followed by not active (29-32%) and unemployed (3-5%). Regarding economic activities by industry, agriculture, forestry and fishery accounted for the highest number in all districts, followed by manufacturing, construction, wholesale/retail, transportation and other services.

(2) Summary of Socioeconomic Survey and Potential Impacts

a) New Road Construction between Asutsuare Jct. and Asikuma Jct.

Based on the proposed ROW (90m), potential project affected households were identified in the preliminary survey, and interviewees and some representative groups such as youths and females were selected with the assistance of commune level assembly men/women. In total, 210 respondents (132 males and 78 females) were interviewed. As the proposed ROW minimised the involuntary resettlement of businesses and residents, the majority of respondents/PAPs were farmers (80%) followed by services (6%), artisans (5%), traders (4%), office workers (2%), and others (3%).

Regarding the potential impacts of land acquisition at this basic design stage, one house (near Asikuma Jct.) will be fully affected by construction of the new road. Another 18 immovable buildings (storages and huts), two movable properties/kiosks and containers/vendor shops will be fully or partially affected by the ROW (90 m) acquisition. Due to the bridge connection between Volivo (south/right bank of the Volta River) and Dufor Adidome (north/left bank of the Volta River), roughly 20 full-time or temporary river canoe operators (all male) will be required to relocate their operation location or change their occupation. All operators used to be fishermen before the Kpong Dam was constructed, but then converted to canoe operators due to sharp decline in fish catches.

Table 11-30 Potentially Affected Properties
(New Road between Asutsuare Jct. and Asikuma Jct.)

Affected Properties	Male	Female	Total
	Number	Number	Number
House	1	0	1
Storage/hut	10	8	18
Farm	99	55	154
Container	1	1	2
Kiosk	1	1	2
Other Land	1	3	4
Wooden Shed	0	1	1
Fish Pond	2	1	3
Total	116	70	186**

Notes: * multiple ownership included

** Unless the ENTIRE DISPLACED PAP is fewer than 200, the category of the project would be B and would require ARAP (WB OP4.12) (cf. paragraph 25). A draft resettlement plan that conforms to this policy is a condition of appraisal (see Annex A, paragraphs 2-21) for projects referred to in paragraph 17(a) above. However, where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower(see Annex A, paragraph 22). The information disclosure procedures set forth in paragraph 22 apply.

Source: Study Team

Based on the interviewed PAPs, the majority (70.4%) prefer cash compensation followed by replacement of building (25.3%), farmland to farmland (1.5%), combination of cash and building (1.5%), entire relocation (1.0%), and not sure at this moment (0.5%). Due to the lack of income opportunities and traditional land management practices by local chiefs, people in general prefer to take cash compensation and acquire other properties given by the local chiefs.

b) Upgrading the Asutsuare – Aveyime Road

The same as for new road construction, interviewees and some representative groups were selected based on the proposed ROW (60m) assisted by commune level assembly men/women. In total, 112 respondents (72 males and 50 females) were interviewed. In order to avoid community level resettlement, the ROW is set to the minimum required by inter-regional road standard (13.3m) at Asutsuare township and Aveyime township. In order to avoid major separation of a community by an inter-regional level road, a diversion is proposed to avoid Volivo town and its ROW is set to 60 m within farmland. The majority of respondents/PAPs were farmers (57%) followed by traders (20%), artisans (10%), office workers (5%), services (2%), and others (7%). Regarding the potential impacts of land acquisition at this basic design stage, 9 houses (in Aveyime township) will be fully affected by upgrading the existing road. Another 9 immovable buildings (storages and huts) and 7 movable properties (container/vendor shops) will be fully or partially affected by the ROW (60 m or 13.3 m) acquisition.

Table 11-31 Potentially Affected Properties* (Asutsuare – Aveyime Road)

Affected Properties	Male	Female	Total
	Number	Number	Number
House	5	4	9
Farm	45	26	71
Container/Kiosk	1	6	7
Fence wall	0	1	1
Wooden Structure	3	1	4
Total	73	50	113

Note: * multiple ownership included
Source: Study Team

Based on the interviewed PAPs, the majority (77.0%) prefer cash compensation followed by replacement of building (13.9%), entire relocation (6.6%), and farmland to farmland (2.5%). Due to the lack of income opportunities and traditional land management practices by local chiefs, people in general prefer to take cash compensation and acquire other properties given by the local chiefs.

11.3.5 Recommendable Compensation and Resettlement Assistance

(1) Organizational Procedures for the Delivery of Entitlements

Two main public institutions are involved as far as the organizational procedures for the delivery of entitlements on this RAP is concerned. These are the GHA and Land Valuation Division (LVD). The identification of the ROW was done by the GHA while the analysis of structures affected was done by the Consultant's Valuer. The LVD as the statutory body

mandated by the GoG to take care of acquisition on its behalf will again identify and assess the values of the structures before work on the road commences.

In addition to developing valuation procedures for assessing compensation values, the consultant has developed and prepared an Implementation Plan. The Implementation Plan is to help achieve a successful implementation of the resettlement operations. The consultant has undertaken the following activities to attain the goal of successful RAP implementation:

- Preparation of a census register for the PAPs
- Conduct of Socio- economic survey
- Categorization of PAPs by activity and location
- Assessment of properties by type and location
- Preparation of an entitlement Matrix
- Preparation of an Implementation Plan

The population census and socio-economic surveys conducted identified the locations of potential PAPs by communities. The data was gender disaggregated and it also categorized PAPs according to their activities.

(2) Eligibility Criteria

Eligibility will be based on the category of losses suffered as at the cut-off date (which in this case {end of field survey). The category of losses suffered will be identified through the various interests and rights derived from customary laws, common law and international conventions. Eligible persons are presented in the Entitlement Matrix below.

(3) Proof of Eligibility

The GHA and LVD will consider various forms of evidence as proof of eligibility. The proof of eligibility will cover:

Affected persons with formal legal rights, documented in the form of land title registration certificates, leasehold indentures, tenancy agreements, rent receipts, building and planning permits, business operating licenses, and utility bills, among others will be eligible. However unprocessed/unregistered formal legal documents will not bar eligibility. Procedures for confirming authenticity of any such documents are established in this RAP. These affected persons may include house owners and owners of residential plots with no formal or recognized legal rights. The criteria for establishing non-formal, undocumented, unrecognized claims to eligibility are one's (PAP's) presence on the corridor during the PAP census survey.

The entitlement matrix captures all affected parties, the characteristics of the impact, and the types of compensation/reinstatement due them (Table 11-28). Categories in the table overlap because those being offered re-instatement fall into several groupings and the groupings tend to overlap. For instance, some of the owners of permanent and temporary structures own land as well. Again, some of the business operators also own property such as land or structures.

(4) Compensations for the Various Categories of PAPs

a) Property Owners

The project ROW will be compared against the gazetted road reservation; those within the road reservation, who constitute legitimate title holders, will receive the replacement value for their land in the form of land of the same value or cash of the same value, depending on the title holders' preference and availability of such land. All including those within the reserve will be compensated for any civil improvements. All PAPs who own permanent structures shall be entitled to compensation for their structures at replacement cost based on existing market values. Owners of temporary structures will also receive moving allowance. This category of PAPs has been listed in the Property Impact Assessment compiled by the consultant.

b) Residential Tenants and Farmland Tenants

As compensation for losing their residential accommodation because of the project, PAPs in this category will receive one year's rent. This amount is to enable the tenants find alternative places that are similar to what they are losing.

c) Business Operators who Own Structures

Business operators who own permanent structures will receive compensation for the structure as well as compensation for lost business profits for 6 months. In the case of temporary structures, the owners will be paid for the cost of relocating the structures and not the structures themselves. Occupational training shall be provided if necessary for the recovery of business or recovery of income level in another occupations. The necessary training fees shall be paid, and the necessary allowance shall be calculated for a specific period taking into consideration the reinstatement period.

d) Business Operators who Do Not Own Structures

Business operators such as artisans, metal fabricators etc., who do not have structures, will receive moving allowance to remove their chattels from the road corridor. Occupational training shall be provided if necessary for the recovery of business or recovery of income level in another occupations. The necessary training fees shall be paid, and the necessary allowance shall be calculated for a specific period taking into consideration the reinstatement period.

e) Petty Traders

Petty traders sell a wide range of items on table-tops, racks, mats and under umbrellas and canopies within the corridor. They usually move backwards from the road while road construction is underway and then move back into the available spaces after construction is completed. As there is little constraint on available space for business relocation during and after construction, petty traders are not eligible for any compensation.

f) River Canoe Operators

Canoe operators will receive a moving allowance to relocate their operation locations. Otherwise, occupational training shall be provided if necessary for the recovery of business or recovery of income level in another occupation such as a taxi/commuter driver. The necessary

training fees shall be paid, and the necessary allowance shall be calculated for a specific period taking into consideration the reinstatement period.

g) Fish Pond/Aqua Farm

Fish pond/aqua farm owners and tenants will receive temporary compensation to maintain their current fish production level if the construction activities negatively impact fish yield. As contractors are required to avoid contamination of drinking water and other sensitive businesses, aqua farms are unlikely to be damaged. However, fish yield shall be monitored before and during construction for the purpose of environmental management and impact assessment.

11.3.6 Institutional Responsibility for Implementation and Procedures and Grievance Procedures

(1) Institutional Responsibility for Implementation

a) GHA

The GHA is a semi-autonomous body with a responsibility for the provision and management of trunk roads. It was originally established in 1974 as the organisation responsible for the development and administration of the entire national road network. Since GHA Act of December 1997, its role is limited to the administration, control, development and maintenance of trunk roads and related facilities subject to the policies of the MRH.

The GHA has an Environmental Management Unit (EMU) stationing three environmental officers/engineers that have oversight on environmental and social issues of the sector and EMU has direct responsibility for resettlement operations.

b) Lands Commission

This is the state agency charged primarily with the management and administration of state and vested lands. It is responsible for advising on policy framework for development of particular areas so as to ensure that development of such areas is coordinated. The functions of the Commission are spelt out in Article 258 of the 1992 Constitution and the Lands Commission Act (Act 483) 1994.

The Commission's role in the area of compulsory acquisition is that it serves as a Member/Secretary to the site selection committee, a technical committee that considers request for compulsory acquisition by state agencies and recommends its acceptance or otherwise.

The proprietary plan covering the site to be acquired is plotted by the Commission in the government records. Also recommendation on the acquisition is processed by the Commission for the approval of the Minister responsible for lands, before an executive instrument would be issued and gazetted.

c) Land Valuation Division

Formerly known asthe Land Valuation Board (LVB), the Land Valuation Division (LVD) of the Lands Commission was formally set up in 1986 to perform functions related to valuation of various properties for specified purposes.

Table 11-30 Entitlement Matrix for Proposed Projects

Category	SUB-Category	Type of Loss	Compensation for Structure	Compensation for Loss of Other Assets	Compensation for Loss of Income	Moving Allowance	Type of Compensation
Agricultural land/ Customary land/ forestry	Owners of Assets/Property	Plants/Crops Structure/ Location for Structure	Replacement cost for immovable facilities	Pay full market value of Trees, Perennial Crops, Food Crops Pay full replacement cost for resettlement of movables	Where applicable	Coverage of total transport expenses for the removal of chattels	Assets to Cash with Open Market Value Compensation for demolished structures or civil improvement
	Owners of Land (agricultural lands)	Land	Compensation for land at replacement cost based on prevailing market price	-	Where applicable	-	Land to Land or Land to Cash Compensation for lost parcel of land at replacement cost based on open market capital value (land law and related regulations)
	Tenants (farming)	Rental Land	Assistance for relocation to new location of similar type	With or without documents, he/she shall be paid compensation to enable to relocation to a place of similar standard	-	Coverage of total transport expenses for the removal of chattels	Compensation for disturbance.
Residents/House/ Land owners	Owners of structures	Structure/Location for Structure	Replacement cost for immovable facilities	Pay full replacement cost for resettlement of movables	Where applicable	Coverage of full cost for the total transport expenses for the removal of chattels	Compensation for demolished structures or civil improvement
	Owners of Land (residential plots)	Land	Compensation for land at prevailing market price	-	Where applicable	-	Land to Land or Land to Cash Compensation for lost parcel of land at replacement cost based on open market capital value (land law and related regulations)
	Tenants (Residential & Business)	Rental Accommodation	Relocation to New location of similar type	With or without documents he/she will be paid compensation to enable him/her to relocate to a place of similar standard		Coverage of full cost for the total transport expenses for the removal of chattels	Compensation for disturbance. One year rent advance for same type of accommodation
Business	Artisans	Business location	-	Pay full cost of removal and fixing of movables	Payments in lieu of business profits while relocating - six months	Coverage of full cost for the total transport expenses	Compensation for demolished structures or civil improvements OR compensation for relocation of structures
	Large Company/Formal business						
	Trader-large Concern						
	Trader-medium						
	Trader-small						
Petty Trader	Petty trader	None	None	None	None	None	None

Source: Study Team

The LVD is accordingly the statutory agency responsible for the processing of compensation claims on compulsory acquisitions. The LVD will be assisted by GHA to identify and reference permanent and temporary structures and determine compensation values. The compensation valuation list from the LVD is forwarded to the acquiring agency for processing for payment.

d) Metropolitan, Municipal and District Assemblies

The Assemblies play a significant role in the implementation of resettlement schemes and also serve as media for public education and community consultations. Some of the administrative structures of the Assemblies, that is, offices of the Assemblyman and the Unit Committees are normally used to inform and educate people in the project area about the intended projects, their impact and proposed mitigation measures. The Assembly members also act as witnesses for making payment of Supplemental Assistance to PAPs.

e) Town and Country Planning Department (TCPD)

The Department was set up, among others, to ensure that developments are done in an orderly manner and that land use is maximized. It is responsible for the preparation of layouts for towns and cities. It also vets and approves layouts from prospective developers (especially private estate developers) and specifies all reservations based on projected land use plans. The TCPD receives applications for development permits, vets them and recommends their approval or otherwise. The TCPD ensures that the ROW is implemented according to the approved planning schemes on each road.

f) EPA

The EPA was established by the Environmental Protection Agency Act of 1994 (ACT 490). The EPA was charged with the duty of prescribing standards and guidelines relating to environmental protection and/or pollution. The Agency may by notice in writing direct any developer carrying on any project to submit an EIA covering the project. The Environmental Assessment Regulation of 1999 has listed the developments that require clearance with the EPA. Development of road network is one of the undertakings that require the issuance of environmental permit before construction can be done.

g) Utility Agencies

The Utility companies that are likely to play a role in the resettlement schemes are: the Electricity Company of Ghana (ECG); Telecommunication companies and Ghana Water Company Limited (GWCL). These agencies at the appropriate times will disconnect and reconnect PAPs to their services before and after relocation as the case may be. Special consideration has to be given to PAPs so that they are not treated as usual applicants for services to their new places.

h) Attorney General's Department

The Attorney General's Department has redress mechanisms in place for aggrieved persons. Affected persons who are not satisfied with compensation due them are empowered by the constitution to seek redress in the court of law. When this happens, the Attorney General's

Department represents the government in the court's proceedings. The Attorney Generals Department is also responsible for drafting the Executive Instrument for acquiring the needed land for the project.

(2) Operational Procedures

The procedures to be followed for land acquisition and compensation of persons adversely affected by the project will be guided by the Resettlement Policy Framework of the MRH as highlighted in the Table 11-31.

(3) Grievance Procedures

Grievance Procedures have been prepared as a guide for handling all grievances that will occur during the implementation of the RAP.

Grievance Committees will be set up in each affected district. Each committee will have nine members. The members will be one representative each from GHA, EPA, TCPD, DA, GPRTU, Ghana Union of Traders' Associations (GUTA) and three (3) PAPs.

A grievance from a PAP will be reported to the committee either in writing or be recorded by the secretary of the committee.

A complainant is allowed to procure the services of an independent valuer at no cost to the PAP, who would help that person determine an acceptable compensation. This can be presented to the committee as a grievance.

The grievance committee will investigate the compensation complaints as follows:

- Determine if they are PAPs entitled to reinstatement using the database available or if necessary, visit their location and determine if they fall within the ROW.
- Using components applied in the Entitlement matrix to determine compensation/ reinstatement assess if PAP has been adequately compensated.

The Grievance Committee will investigate the reinstatement complaints as follows:

- Determine if they are PAPs entitled to reinstatement using the database available, or if necessary visit their location and determine if they fall within the ROW.
- Determine if the appropriate reinstatement due to the particular category of PAP has been given. For those who do not qualify for particular options they are demanding, explain the basis for giving that particular option.

The Grievance Committee will investigate the complaints concerning processes as follows:

- Determine location and type of activity complainant is involved in using the data base available or visits their business location to determine if their complaint has merit.
- Take into account any special circumstances that require consideration such as extreme incapacitation.
- Where time allotted to vacate corridor is inadequate, the committee will recommend additional time which will meet the principle of reasonableness and consider as appropriate the PAP's particular situation, construction needs and applicable compensation.

Table 11-31 Operational Procedures of Land Acquisition and Responsible Authorities

No.	Activity	Responsibility	Common Timeframe
1	Liaising with Donors	MRH/Agencies	1 month
2	Coordination of Activities of Agencies	MRH/ PPD	3 months
3	Preparation and Disclosure of RAP	GHA/Assemblies	2 – 4 months
4	Alignment of ROW to approved planning scheme	GHA/TCPD	2 weeks
5	Vetting of request for compulsory acquisition of land	Lands Commission/Ministry of Land, Forestry and Mines, Regional Coordinating Office	3 months
6	Social Impact studies (conduct social impact assessment and property impact studies)	GHA through Consultants	2 – 4 months
7	Internal Monitoring	MRH/GHA	Throughout RAP preparation and implementation – 1 year
8	Consultations, planning and Preparation of RAP	GHA	3 months
9	Disclosure of RAP	GHA/MRH/Assemblies	2 weeks
10	External Monitoring and Approval	EPA, NGO, Donors	1 year
11	Gazette/Publishing of E.1	Lands Commission, Attorney General's Office, Ministry of Land, Forestry and Mines	6 months
12	- Marking of affected properties - Inventory of affected properties - Notifications - Request for proof of eligibility - Consultations	GHA, LVD, Local Assembly	6 months
13	Valuation of Properties	LVD, GHA	3 months
14	Establishing of Committees - Utilities Committee to conduct an inventory of properties with utility services - Grievance Committee establish Procedures for dispute resolutions - Payment Committee establish payment modalities	GHA/Utility companies GHA/MRH/ LVD GHA/MRH/LVD	4 months
15	Disclosure of values. Making of offers Processing for payments	GHA/MRH LVD	4 months
16	Release of funds for payment	Ministry of Finance and Economic Planning, GHA/MRH	6 months
17	Payments	Payment Committee (GHA/MRH, LVD)	3 – 4 months
18	Grievance and dispute resolutions	Grievance Committee (GHA/MRH/LVD)	3 – 6 months
19	Taking possession of site	GHA	2 months
20	Disconnect and reconnection of utilities	Utility Committee (GHA, Utility Companies)	6 months
21	External Monitoring	EPA, NGO, Donors	1 year
22	Representing government for any law court redress cases	MRH/GHA, LVD, Attorney General's Office	1 year
23	Preparation of Monitoring and Evaluation Report of RAP and Disclosure	GHA/MRH, EPA	2 months

Source: study team

The Committee will communicate their proposed solution to the complainant and will also forward to GHA Resettlement Office the complaint, the outcome of investigations and their recommendations.

PAPs that are entitled to compensation or additional compensation will receive their entitlements from GHA Accounts Section on the recommendation of the Grievance Committees.

Complaints that relate to the quantum of compensation will be referred to the Land Valuation Division with the accompanying independent valuation report clearly stating the assumptions and rates used to arrive at compensation claims. The independent valuer of the Complainant would be invited to meet the Land Valuation Division on an agreed date to resolve the issues involved in the disagreement. After negotiations the LVD would communicate their recommendations to the Resettlement Office which would in turn inform the claimant of the outcome.

If the LVD recommends payment of the claim, then the Resettlement Office would ensure that it is done before the structure under review is demolished.

Whenever a complainant's claim cannot be resolved satisfactorily, GHA will procure the services of an arbitrator to mediate between the complainant and LVD. It is only after this mediation has failed that a claimant can then exercise the option of going to Court, as provided under Section 20 under Chapter 5 of the Constitution of the Republic of Ghana.

11.3.7 Common Timeframe of Land Acquisition and Resettlement

Consultants/valuers of the GHA will calculate the level of compensation for all assets and prepare inventories of losses in a property impact assessment (PIA). Then, the LVD will undertake its own valuation and validate the value of the assets to be compensated before the actual mitigation measures are implemented. A summary of the key procedures after the RAP preparation is shown below.

(1) Disclosure of RAP

The GHA (Head Office) will disclose the RAP through the news media, the MRH website and inform the PAP through the EPA official in order to publicize the resettlement activity to the public and other stakeholders. In addition, hard copies of the RAP document will be placed in the offices of GHA (head office and relevant assemblies), for public viewing throughout the period of construction of the project.

(2) Setting up of Resettlement Office

GHA will set up a resettlement office within the existing Environmental unit to oversee resettlement activities on the Arterial roads prior to the commencement of project implementation.

(3) Formation of Grievance Committee (GC)

The GHA will prepare a TOR for the Grievance Committee (GC) specifying the number, membership, sitting days. The Grievance Committee membership has been defined in section

11.3.6 (3) above.

(4) Payment of Compensation

LVD will process the compensation for the PAPs and GHA will pay them after GHA has finished processing the necessary documentation. Government of Ghana will deliver the payment through GHA and MLGRDE.

- PAPs due for compensation or additional compensation shall receive their entitlements through the GHA.
- Complaints regarding the amount of compensation to be given for structures shall be referred from the GC to the LDV. A meeting shall be set up between the complainant and his/her valuer and the LDV where the independent valuer shall be required to state the rationale and rates used to arrive at the compensation claim. After the negotiations with the LDV shall forward its decision to the Grievance Committee who shall inform the complainant.
- Once the LDV recommends payment, the GHA shall ensure that payment has been effected before the structure in question is demolished.
- Whenever a complainant's claim cannot be resolved to his/her satisfaction, the GHA shall engage a mediator who shall mediate between the complainant and the LDV. When this mediation fails then the complainant can resort to legal action.

11.3.8 Monitoring Plan

The GHA will supervise the Implementation Program and ensure the timely execution of project activities. To enable GHA effectively undertake the monitoring, a Resettlement Office will be set up at the beginning of the implementation period to coordinate the various facets of the resettlement. Personnel for this office will be drawn from the Environmental Unit of the GHA.

(1) Monitoring Objectives

Objectives of the Monitoring Program are to ascertain that the principles and the specific requirements of the RAP are fully implemented. The monitoring shall ensure that:

- PAPs are successfully relocated to avoid and reduce impoverishment.
- Difficulties facing relocated PAPs at new locations are identified and addressed.
- Record of experiences is kept for future reference.

(2) Monitoring and Evaluation Phase

GHA shall oversee the general monitoring of the RAP by means of both internal and external checks to ensure optimum performance. The internal Performance Monitoring Milestone will afford GHA the chance to judge physical progress against indicators as set out in the Table 11-32.

Table 11-32 Internal Performance Milestone

Indicator Type	Milestone
Input	Notification to PAPs of the deadline for moving out of ROW
	Public meetings held
Output	PAPs in business/residences relocated
Outcome	Grievance redress PROCEDURES established and operational
	Monitoring results produced

Source: Study Team

(3) Internal Monitoring and Supervision

Internal monitoring of the resettlement operations will be undertaken by GHA following the schedules in the RAPs. The day-to-day field supervision will be the responsibility of the GHA Resettlement Office. A record of activities shall be captured in the Monthly and Quarterly Progress Reports (QPR), which are subject to review by MRH. The Resettlement Office will continuously take stock, discuss reports received and assess solutions proposed. Their activities should ensure that the resettlement is successfully implemented. Regular Quarterly Reports shall be produced and submitted to MRH. GHA would bear cost of monitoring.

(4) External Monitoring

Based on the MRH/GHA's RPF, external monitoring will also be conducted by the EPA as well as NGOs familiar with local communities and involuntary resettlement matters. The EPA will conduct the external monitoring as a part of its responsibility to assure the protection of the environment and social safeguards. By common practices, the EPA defines the requirements and contents of the external monitoring as a part of the approval procedures of the EIA. All costs of the EPA's external monitoring shall also be included in the project costs.

On the contrary, there are no specific legal documents defining NGOs' external monitoring except limited descriptions in the RPF. However, due to mistrust in compensation activities for public works in the past, there is a strong demand that the government's activities be monitored by a third-party indirect stakeholder. The MRH/GHA adopted external monitoring by NGOs as a part of its accountability commitment for the RPF in 2007. Once the GHA starts the EIA procedures after the proposed project is formally approved by the GoG, the GHA will assign reliable NGO(s) based on the recommendations of the assigned EIS consultants, environmental officers of the GHA, and other local representatives such as district chief representatives.

(5) Monitoring Indicators

As a means of effectively reporting on the RAP implementation, the following indicators will be watched during project implementation as indicated in Table 11-33.

Table 11-33 Monitoring Indicators

Activity	Monitoring Indicator	Means of Verification
Ascertain arrangements for relocating PAPs	Demolition/removal of structures; disconnection of utility services; closure of businesses	Monitoring completed; report submitted
Supervise relocation	PAPs relocated or being assisted; assistance offered	PAPs traced to new locations; report submitted
Meetings with PAPs to find out any likely difficulties encountered at new locations	PAPS settled; businesses restarted	Interaction completed; problems identified; solutions suggested; report submitted
Follow-up meetings and visits to see how problems at new location can be resolved	PAPS settled; businesses restarted	Interaction completed; problems identified; solutions suggested; report submitted
Determine how far the livelihoods of PAPs have been restored	Business on-going; restored or better	Turnover/sales/profit figures submitted as proof; report submitted

Source: Study Team

(6) Post-Project Evaluation

a) Objectives of the Evaluation

In addition to the periodic evaluation that will be carried out during the planned project period, an audit will be done upon project completion. The audit will

- Appraise the extent of the achievements of the resettlement activities.
- Gauge the satisfaction level of re-located persons.
- Measure the progress of persons who have been relocated.
- Assess the sufficiency of the planned actions carried out.

The following methods shall also be employed to achieve the above objectives:

- Public Forum
- Completion audit of available PAPs

b) Public Forum/Consultation

Quarterly meetings shall be held with all PAPs. Extensive use of the print and electronic media will ensure that as many PAPs as possible will attend. The meetings are expected to mobilize as many PAPs as possible and give a common voice to affected persons.

c) Completion Audit

An audit will be done to determine whether the efforts to restore the living standards of the affected population have been properly designed and executed. This completion audit will verify that all physical inputs earmarked in the RAP have been delivered and all services provided. The audit will also evaluate if the mitigation actions prescribed in the RAP have had the desired effect. The baseline conditions of the affected parties before the relocation will be used as a measure against their socio-economic status after the resettlement.

Questionnaires will be administered to as many PAPs as can be contacted. In addition to the indicators used in the baseline survey, the questionnaires will also identify issues such as:

- Extent of recovery of business

- Structures being used for business
- Any expansion or shrinkage
- Problems encountered
- General perception of relocation

To be effective, the completion audit will take place after all RAP activities have been completed including development initiatives, but before the financial commitments to the program are finished. This will allow the flexibility to undertake any corrective action that the auditors may recommend before the project is completed.

11.3.9 Estimated Cost of Resettlement and Source of Funding

(1) Estimated Cost of Resettlement

Based on the RPF of the MRH/GHA, the resettlement cost shall cover resettlement and compensation cost, relocation and transfer, income restoration plan, and administration costs (Table 8, Chapter 8 of RPF). At the stage of the F/S of the proposed projects, the resettlement costs are not accurately estimated due to the approximate boundary of the ROW. Based on the best available information and assumed centreline of existing roads, the Study Team and its local experts estimated the expected costs of land and other asset compensation without the cost of the income restoration plan as shown below.

Table 11-34 Estimated Values of Project Affected Assets

Land Use Type	Quantity (1,000 m^2)	Value (1,000 GHS)
New Road Construction between Asutsuare Jct. and Asikuma Jct.		
Residential	4.3	144
Agriculture	560	1,733
No active use/Community land/Forest	5,343	4,788
Total	5,906	6,665
Upgrading on the Existing Asutsuare – Aveyime road		
Residential	1.0	56
Agriculture	4.7	14
No-active use/Community land/Forest	1,275	1,103
Total	1,281	1,173

Source: Study Team

As a result of the above socioeconomic survey and PAPs' primary preference for compensation, compensation in the form of cash for assets would be dominant at the actual negotiation stage. However, due to high expectations that construction/upgrading of roads will lead to new business opportunities, the PAPs seemed interested in new business opportunities with occupational training commonly included in the income restoration plan of RAP/ARAP. During the following detailed design stage, it is recommended to develop a reasonable and practical income restoration plan to match the expected economic activities led by the proposed projects and PAPs' interests and capabilities.

(2) Source of Funding

The source of funding shall be defined after the proposed projects are officially approved by the MRH and GoG. For the GHA's projects in general, the GoG is responsible for the costs of

involuntary resettlement. The MRH will be responsible for securing budget, and the MoFEP will be responsible for releasing the budget from the national account.

Considering JICA's assistance for the proposed projects, official development assistance loans would be the most suitable option from among the other programmes (technical cooperation project, grant aid, citizen participation, public private partnership, and emergency disaster relief). Based on Japanese ODA policy, items such as land acquisition and compensation, taxes and duties, and administration costs of the executing agency are not eligible for ODA loan financing (Chapter V, Operational Guidance on the Preparation for Japan's ODA Loan Projects). Thus, the GoG will be required to secure budget for the resettlement. The general conditions of Japanese ODA loans are available on JICA's web sites: .

• Official Development Assistance Loans	http://www.jica.go.jp/english/our_work/types_of_assistance/oda_loans/index.html
• Operational Guidance on the Preparation for Japan's ODA Loan Projects	http://www.jica.go.jp/english/our_work/types_of_assistance/oda_loans/oda_op_info/guidance/index.html

CHAPTER 12
OVERALL EVALUATION

Chapter 12 Overall Evaluation

12.1 Overall Evaluation of Projects

12.1.1 Results of Economic Evaluation

(1) Construction of the New Road between Asutsuare Jct. and Asikuma Jct.

In light of the sensitivity analysis in Chapter 10, the construction of the new road between Asutsuare Jct. and Asikuma Jct. is feasible, with an overall EIRR of 26.1% in the "Base Case" scenario and 21.2% in the worst-case scenario. Furthermore, the EIRR in worst case without agricultural development benefit still remained at 15.1%.

In all cases including the improbable worse case condition, the project remains economically viable with EIRRs well above cut-off mark of 12%.

The new construction project can therefore be recommended for implementation.

(2) Upgrading of Asutsuare–Aveyime Road

In case the proposed new eastern corridor is opened, the upgrading of Asutsuare–Aveyime section is feasible returning an overall EIRR of 51.5% under the "Base Case" scenario and 36.8% in worst case scenario.

In all cases including the improbable worse case condition, the project remains economically viable with EIRRs well above cut-off mark of 12%.

The upgrading project is therefore recommended for implementation on condition that the proposed new road between Asutsuare Jct. and Asikuma Jct. is opened.

12.1.2 Qualitative Benefits

(1) Construction of the Road between Asutsuare Jct. and Asikuma Jct.

As described in Section 2.7.1, construction of the bridge across the Volta River as well as the new road between Asutsuare Jct. and Asikuma Jct. will not only generate indirect economic benefits from daily cultivation by local farmers, but also attract large-scale agricultural investment, particularly in the northern part of the Volta River, where about 25,000 ha. of arable land with rich Vertisols soil for farming are mostly unused at present due to the lack of a road to major markets. Construction of the new road between Asutsuare Jct. and Asikuma Jct. will thus generate both qualitative and quantitative benefits for the national economy from new agricultural development.

(2) Upgrading of Asutsuare–Aveyime Road

The Asutsurare–Aveyime road is a feeder road with a gravel surface at present: there is no paved road connecting Asutsuare and Aveyime, where cultivation of agricultural products, particularly rice production, is predominant. In addition, the APGIP scheme is planned to be implemented in the near future and agricultural production is expected to increase along the Asutsurare–Aveyime road. Upgrading of this road will thus facilitate the transportation of agricultural products along the Volta River, which is another qualitative benefit of the Project.

12.1.3 Environmental and Social Considerations

(1) Construction of the Road between Asutsuare Jct. and Asikuma Jct.

The new road to be constructed between Asutsuare Jct. and Asikuma Jct. will not pass through populated areas and will thus require very limited resettlement and cause few impacts on noise, air quality and vibration for local residents. Also, construction of the new Volta Bridge will not affect aqua-cultural activities in the Volta River. In addition, at the public consultation meeting, none of the stake-holders raised any objections to the construction of this road.

Thus, construction of the new road between Asutsuare Jct. and Asikuma Jct. will not cause major negative impacts on the environment or lives along the road.

(2) Upgrading of Asutsuare – Aveyime Road

Upgrading of the Asutsuare – Aveyime road will cause some negative impacts for those living in Aveyime, where some resettlement (less than 10 houses) will be necessary due to the upgrading. On the other hand, upgrading of this road will generate positive impacts for people along the road by providing better access to farm lands and easy transportation of agricultural products.

Thus, upgrading of the Asutsuare – Aveyime road will not cause major negative impacts provided those affected are appropriately compensated.

12.1.4 Indicators for Post Project Evaluation

According to the Terms of Reference for this study, the indicators at 3 years later after the route openings are estimated based on the results of computation with HDM-4 model. Since the traffic opening year on both study roads are assumed to be in 2016, indicators were aimed at the conditions in 2019. The indicators for post project evaluation in 2019 are shown in Table 12-1

Table 12-1 Expected Indicators in 2019

Indicator	Unit	Construction of New Road between Asutsuare Jct. and Asikuma Jct.	Upgrading of Asutsuare – Aveyime Road
Average Daily Traffic	Vehicles/day	8,510	4,339
Savings in Road User Cost	US$ million	6.02	14.63

Source: Study Team based on the calculation with HDM-4 model

12.2 Overall Evaluation

The Study Team has analysed the feasibility of two projects: 1) construction of the road between Asutsuare Jct. and Asikuma Jct. and 2) upgrading of the Asutsuare – Aveyime road, in terms of technical, economic, regional development, environmental and social considerations.

As a result, both projects are considered feasible for implementation at an early stage.

CHAPTER 13

CONCLUSIONS AND RECOMMENDATIONS

Chapter 13 Conclusions and Recommendations

13.1 Conclusions

13.1.1 Major Findings in the Study Area

During the course of the Study, the Study Team carried out data collection, site investigations, surveys of traffic, natural conditions, and environmental and social conditions, and discussions with MRH and GHA officials, as well as stakeholders at the first Workshop on the alternative road alignments prepared by the Study Team.

The major findings in the Study Area as well as the Eastern Corridor related to the development of a part of the Eastern Corridor between Asutsuare Jct. and Asikuma Jct., and upgrading of the Asutsuare – Aveyime Road are as follows:

(1) Road Network in the Study Area

- The road network in the Study Area consists of four national roads, five regional roads and several feeder roads. However, the weak network in the area of N1, N2, and R28 is still hindering agricultural development, particularly to the north of the Volta River.
- The existing N2 has several problems, such as passing through various townships with speed limits, commercial activities encroaching on the carriageway, and expanding urban area, and the Adomi Bridge with its restriction on the gross weight of freight vehicles.
- While the GHA is going to rehabilitate the Adomi Bridge starting early next year, R28 between Sogakope and Ho will be the only trunk road (regional road) available for heavy vehicles, even though the GHA will provide a ferry service across the Volta River.
- There are two feeder roads connecting east to west along both sides of the Volta River, but both of them are gravel roads and not suitable for transporting agricultural products by large freight vehicles.
- The Asutsuare – Aveyime road is expected to play an important role as an inter-regional road, after the existing road has been improved and the APGIP has been implemented to develop more paddy fields.
- There is only one track connecting N2 and R28 on the northern side of the Study Area and it is almost impossible to drive on this track during the rainy season.

(2) Present Situation of Eastern Corridor

- The Eastern Corridor between Brewaniase and Bawku is a gravel road in poor or fair condition and it is difficult even for 4 x 4 vehicles to pass during the rainy season.
- The worst sections of the Eastern Corridor are between Bimbla and Yendi, followed by Nkwanta – Bimbla, Brewaniase – Nkwanta, and Nakpanduri – Garu Natinga sections.
- The GoG has already started upgrading 45 km of section from Asikuma Jct. with GoG funds. The MRH is the executing agency as well as supervisor (Project Management Unit) for this project, while the GHA is not involved in this project. Earth-works for widening the carriageway have been carried out.

- The EU approved the contract for upgrading th Brewaniase–Nkwanta section in July 2012 and the contractor (Burkina) has already started the topographical survey.
- The MRH and GHA carried out the engineering study for construction of the Nkwanta–Yendi road and completed it in December 2011. Based on this study, the MRH has already started upgrading the Nkwanta–Domanko section (50 km) with assistance from the GoC. The same as the previous section, the MRH is the executing agency as well as the supervisor.
- When upgrading of the section up to Yendi is completed, many vehicles using the Central Corridor may divert to the Eastern Corridor, as the regional road between Tamale and Yendi is a paved road in good condition.

(3) Regional Development

- The southern side of the Volta River is a part the Southern Green Belt, where the soil is suitable for cultivation and KIS (an irrigation scheme) exists, and this area has become one of the best lands for producing good-quality rice and some cash crops.
- The GoG plans to implement the APGIP to irrigate more land to accelerate paddy field development also on the south side of the Volta River.
- Two large-scale agricultural development schemes are under way by foreign companies to cultivate crops for export and food crops and vegetables for the domestic market.
- On the northeastern side of the Volta River, there are more than 25,000 ha of arable land with Vertisols soil (black cotton), which is highly suitable for medium- and large-scale agricultural development. This arable land, however, has not been developed due to the lack of access roads to transport products for export or to a market.
- Besides the Akosombo Dam, there is potential for tourism in the Study Area, including for eco-tourism, however, the poor access roads prevent the development of these potential tourism resources.

(3) Environmental and Social Considerations

- According to the results of the baseline survey for environmental and social considerations, the development of new roads will not cause significant negative environmental and social impacts, unless a new road passes through the centre of a community.
- Improvement of the Asutsuare – Aveyime road will require resettlement in Aveyime and Volivo townships, but the number of affected houses and shops is limited.
- Disturbance of the present agricultural land and agricultural development schemes will generate negative social impacts.

13.1.2 Workshops

(1) The First Workshop

The first Workshop was held on 18th May 2012, inviting various stakeholders to discuss the priorities of alternative routes for selecting the highest priority route. However, the Workshop was unable to select a particular alternative for the feasibility study. Therefore, the Study Team

and the GHA held further discussions for selecting the highest priority route for the feasibility study. At the meeting held on 1st June, 2012, the GHA finally agreed to select Alternative 4 for the F/S.

(2) Second Workshop

The second Workshop was held on 26th October 2012, inviting various stakeholders to discuss the contents of the Draft Final Report and some comments were made by the participants. These comments were reflected in preparing the Final Report.

13.1.3 Conclusions

- Based on the results of the Study, the Study Team prepared several alternative road alignments for the development of a part of the Eastern Corridor between Asutsuare Jct. and Asikuma Jct., together with four possible locations for alternative bridge sites.
- The Study Team presented these alternatives with the results of a first screening evaluation to the working group meeting in the GHA, and four alternative routes to the south of the Volta River and one alternative route to the north of the Volta River were selected for further study in the first phase of the Study. After discussion with the Study Team as well as in the internal meetings, the GHA selected Alternative 4 as the highest priority route for the preliminary design in the second phase of the Study.
- Based on the selected route for the F/S, the Study Team carried out more detailed natural condition surveys, and carried out the preliminary design and cost estimation for construction of the road between Asutsuare Jct. and Asikuma Jct., including a new bridge across the Volta River.
- The Study Team also carried out the preliminary design and cost estimation for upgrading the Asutsuare–Aveyime road, which will be converted from a feeder road to an inter-regional road.
- The Study Team then carried out an economic analysis of the above two projects, using the HDM-4 model. The results of this analysis indicated that construction and upgrading of both projects are technically and economically feasible.
- These two projects will also contribute to regional development, particularly for the agricultural sector.
- The Study Team also supported the GHA in holding two public consultation meetings at Asutsuare and Juapong and no objections to the project plan were raised.
- The GHA carried out the Road Safety Audit and minor modifications to the road design were recommended (see Appendix 16). Thus, the Study Team modified the road design according to these recommendations.

13.2 Necessary Items for Project Financed by Japanese Yen Loan

13.2.1 Present Procurement System in the GHA

All processes of procuring consultants and contractors are in accordance with the Public

Procurement Act, 2003 (Act 663).

(1) Procurement of Consultant

The Planning Division of the GHA is responsible for selecting a consultant for the study.

(2) Procurement of Contractor

- The Contract Division of the GHA is responsible for selecting a contractor. In many cases, several contractors are invited to participating in the bidding process.
- Contractors are classified by category and class (Class 1 to 4 and Category A, B, C and S) and eligible contractors are called to participate in the bidding process according to the type of work and contract amount.
- Pre-qualification (PQ) is used mainly for international competitive biddings (ICB).
- The GHA has experience of both local competitive biddings (LCB) and ICB.

13.2.2 System of Japanese Yen Loan

Generally speaking, there are two types of Yen Loan System.

(1) Ordinary Yen Loan

- Condition: Untied
- Interest rate: 1.4% (for Ghana) (FY 2012)
- Repayment period: 25 years
- Grace period: 7 years

(2) Special Term for Economic Partnership (STEP)

- Condition: Tied with Japanese company
- Interest rate: 0.2% (for Ghana) (FY 2012)
- Repayment period: 40 years
- Grace period: 10 years

13.3 Execution, Operation and Maintenance of the Project

13.3.1 Project Executing Agency

Generally speaking, national roads, inter-regional roads and regional roads are under the responsibility of the GHA and the GHA becomes the project executing agency for road construction and improvement projects. However, there is an exception that the MRH is the executing agency as well as the supervisor for the ongoing project on the Eastern Corridor between Asikuma Jct. and Hohoe, and Nkwanta and Damanko for an unknown reason.

The GoG will make the final decision on the executing agency of the Project. However, it is desirable for the GHA to be the executing agency of the Project, because of the construction of a long bridge across the Volta River, as well as new construction of 67 km of road.

13.3.2 Operation and Maintenance of the Project

In order to carry out effective and adequate maintenance on the Project roads, the Study

Team recommends that the GHA outsource maintenance works to private enterprises with resources from the Road Fund. The priorities for routine and periodic maintenance should be identified by using the road database system of the GHA.

13.4 Recommendations

Recommendations for the Eastern Corridor Development Project, including construction of the new road between Asutsuare Jct. and Asikuma Jct, and upgrading of the Asutsuare–Aveyime road, are as follows:

- It is recommended for the MRH and the GHA to share the outcome of the Study with development partners for possible financial assistance for the Project.
- When the financial source is determined, the GHA should carry out the EIA to obtain the environmental permit and to start land acquisition to secure ROW.
- For the construction of the new bridge across the Volta River, the GHA should establish a special bridge unit to supervise the long span cable-stayed bridge, which will be the first experience in Ghana and to transfer the technology of long span bridge construction to Ghanaian engineers.
- The GHA should improve the Asutsuare – Akuse Jct. and Aveyime – Tefle (N1) prior to upgrading the Asutsuare – Aveyime road to ensure maximum utilization of the Project road.
- It is recommended for the GoG to carry out traffic safety education in schools and communities in order to teach local residents, particularly pupils and elderly people, about the dangers associated with high-speed vehicles which will pass through their communities.