Initial Environmental Examination

Project Number: 41076-048
November 2017

PHI: Improving Growth Corridors in Mindanao Road Sector Project

(PR-07: Tampilisan to Sandayong Road, Tampilisan, Zamboanga del Norte)

Prepared by the Department of Public Works and Highways for the Asian Development Bank

ABBREVIATIONS

AASHTO	–	American Association of State Highways and Officials
ADB	–	Asian Development Bank
A&D	–	alienable and disposable
CENRO	–	Community Environment and Natural Resources Office
CNC	–	certificate of non-coverage
CO_2	–	carbon dioxide
CR	–	critically endangered
CSC	–	construction supervision consultant
DAO	–	Department Administrative Order
DBH	–	diameter at breast height
DENR	–	Department of Environment and Natural Resources
DED	–	detailed engineering design consultant
DEO	–	District Engineering Office
DOH	–	Department of Health
DPWH	–	Department of Public Works and Highways
ECA	–	environmentally critical area
ECC	–	environmental compliance certificate
ECP	–	environmentally critical project
EHS	–	environmental, health and safety
EIA	–	environmental impact assessment
EIS	–	environmental impact statement
EMB	–	Environmental Management Bureau
EMP	–	environmental management plan
EO	–	executive order
EPRMP	–	environmental performance report and management plan
ESSD	–	Environment and Social Safeguards Department of DPWH
FGD	–	focus group discussion
GHG	–	greenhouse gases
GOP	–	Government of the Philippines
GRC	–	grievance redress committee
GRM	–	grievance redress mechanism
IEC	–	information, education and communication
IFC	–	International Finance Corporation
IEE	–	initial environmental examination
IEER	–	initial environmental examination report
IUCN	–	International Union for Conservation of Nature
LGU	–	local government unit
Ncm	–	normal cubic meter
NO_2	–	nitrogen dioxide
PAGASA	–	Philippine Atmospheric Geophysical and Astronomical Services Administration
PCDG		prestressed concrete deck girder
PD	–	Presidential Decree
PEISS	–	Philippine Environmental Impact Statement System
PM	–	particulate matter
PPTA	–	project preparatory technical assistance
PR	–	project road
RA	–	Republic Act
RCBC	–	reinforced concrete box culvert
RCDG	–	reinforced concrete deck girder
RCPC	–	reinforced concrete pipe culvert

REA	–	rapid environmental assessment
RF	–	relative frequency
RMC II	–	Roads Management Cluster II
ROW	–	right of way
SPS	–	ADB Safeguard Policy Statement of 2009
TA	–	technical assistance
TSP	–	total suspended particulate
TSS	–	total suspended solids
UPMO	–	Unified Project Management Office
VU	–	vulnerable
WHO	–	World Health Organization

NOTE

In this report, "$" refers to US dollars.

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A. EXECUTIVE SUMMARY

1. The Government of the Philippines has approached the Asian Development Bank (ADB) for financial and technical support for the Improving Growth Corridors in Mindanao Road Sector Project (the project).

2. Transportation is a key sector in the Philippine economy with roads being the dominant subsector. The national road network comprises 29,630 kilometers (km), or 14% of the total road network and includes the main trunk roads, the national primary arterial roads, and national secondary roads. An efficient road subsector is crucial for the Philippines' economic growth and poverty reduction. Despite its importance to the national economy, the road subsector has not received adequate funding. Expansion or improvement of the network has been limited in recent years, and many roads deteriorate prematurely due to inadequate maintenance. Government funding for the road network has been increasing in recent years; however, about 23% of the national road network is in poor condition and in need of rehabilitation. This contributes to the rising number of road accidents in the Philippines. The increasing impact of climate change, particularly flooding, is having a negative effect on the road network. The road network in Mindanao is less developed than the national network. While 82% and 89% of the national roads in Luzon and the Visayas are paved, only 70% of the national roads in Mindanao are paved.

3. The project supports the Government of the Philippines' priorities for improvement of the country's road network and development of Mindanao.[1] It also supports the key objective of ADB's strategy for the Philippines of helping the country achieve high, inclusive, and sustainable growth.[2] The project is consistent with ADB's Strategy 2020 through its focus on improving the delivery of infrastructure services as well as investing in physical assets.[3] The project supports regional cooperation and integration by contributing to the implementation of the ASEAN Highway and BIMP-EAGA Priority Infrastructure Projects. It supports ADB's Sustainable Transport Initiative[4] by addressing climate change and road safety, and it is included in ADB's Philippines Transport Sector Assessment, Strategy, and Road Map.

4. Use of the sector loan will enable the government to achieve inclusive economic development by concentrating road improvement subprojects in Mindanao and will provide flexibility in determining the most appropriate location for subprojects given changing political and security conditions in Mindanao. The project meets all the requirements for a sector loan:[5] (i) the government has a sector development plan and the institutional capacity to implement it, (ii) its policies applicable to the sector are appropriate, and (iii) DPWH has demonstrated capacity.

5. The project is considered Category B for environment based on ADB's Safeguard Policy Statement (SPS 2009). The project will improve an estimated 300 km of national primary, secondary, and tertiary roads in Mindanao. The improvements will include paving earth roads, replacing damaged road sections, widening existing roads, adding surface overlays, and replacing and strengthening bridges. The project roads will be designed with features to strengthen resilience to climate change. Among the structural and non-structural features included are

[1] National Economic and Development Authority. 2011. *Philippine Development Plan, 2011–2016.* Manila.

[2] ADB. 2011. *Country Partnership Strategy: Philippines, 2011–2016*. Manila.

[3] ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020.* Manila.

[4] ADB. 2010. *Sustainable Transport Initiative: Operational Plan*. Manila.

[5] ADB. 2003. Sector Lending. *Operations Manual.* OM D3/BP. Manila. The project will fund water and sanitation subprojects, applying ADB's safeguards, procurement, and disbursement processes, as per OM D3.f

elevated pavement levels, enhanced slope protection, and improved maintenance of drainage structures. Road safety on these roads will be improved through road safety community awareness campaigns.

6. This initial environmental examination (IEE) was prepared in accordance with SPS 2009 for one of the subproject roads, i.e. the 17 km long PR 07 (Tampilisan-Sandayong Road). PR 07 is a 4 – 6 m wide national secondary road with gravel surface located in Tampilisan Municipality, Zamboanga del Norte Province. The IEE was undertaken to:

(i) Provide project information and relevant environmental baseline data for the project;
(ii) Assess potential environmental impacts of the project;
(iii) Identify mitigation measures to minimize negative impacts;
(iv) Provide information on the consultations undertaken and the project level grievance redress mechanism (GRM); and
(v) Develop a robust environmental management plan (EMP) which specifies mitigation and monitoring measures, institutional responsibilities and reporting requirements.

7. An environmental assessment and review framework (EARF) has been prepared to serve as a guide to ensure compliance of subprojects with the environmental assessment requirements under ADB's Safeguards Policy Statement, 2009 (SPS) and the Philippine Environmental Impact Statement System (PEISS).

8. *Project Description.* The improvement of the 17-km PR 07 will involve the following:

- Concrete paving of gravel road
- Pavement widening to 6.7 m and provision of 1.5 m shoulders following the existing alignment within a 30-m road right of way (total road width including shoulders is 9.7 m)
- Raising of road embankment
- Replacement of a 15-m steel girder bridge with a 45-m long bridge [concrete wall type, driven pile foundation, 2-column concrete pier, pre-stressed concrete deck girder (PCDG) superstructure]
- Replacement of 2 spillways (10 and 15 m long) with 2 new bridges (30 and 36 m long). The bridges will have concrete wall types, driven pile foundation, a 2-column concrete pier and reinforced concrete deck girder (RCDG) superstructure.
- Short realignments (360 m and 440 m long) within commercial/residential areas to reduce impacts on structures within the right-of-way. The farthest distance of the edge of the realigned section to the edge of the existing alignment is about 3.1 m.

9. *Existing Environmental Conditions*. Areas along PR 07 are predominantly agricultural. This road does not traverse or is near ecologically sensitive and/or protected areas. The road is characterized by a rolling terrain having level to gentle slope gradient to moderately steep slopes. Since the project road alignment has rural and agricultural setting, there are no major local sources of anthropogenic emissions. The lack of industrial development suggests that air pollution and noise sources which would normally elevate background levels are not present in the area.

10. *Anticipated Impacts and Environmental Management Plan*. As the project will involve

improvement and widening of an existing road with minor realignments, significant adverse environmental impacts are not anticipated. The roadside tree cutting requirements will largely affect fruit bearing-trees and other common species on private land as well as about 31 stands of either endangered or critically endangered species of trees that are also planted on private land. However, since none of the affected areas are within ecologically protected areas or are critical habitats/high biodiversity areas which support survival of critically endangered species, ecological impacts are not considered significant. The trees to be cut are found on roadside private lands that have been largely modified for agricultural and tree production/plantation. Vegetation loss will be compensated through replanting elsewhere of more than 500,000 tree seedlings to be contributed by the project to the country's National Greening Program administered by the Department of Environment and Natural Resources (DENR). Other potential environmental impacts related to construction activities are: (i) soil erosion and sedimentation at and near construction sites, (ii) construction noise, (iii) local air pollution due to construction activities, (iv) oil and other hazardous materials releases, (v) vehicular traffic congestion and public access disruption, (vi) hazards to the public due to construction activities, (vii) pollution and health risks arising from workers camps, (viii) occupational health and safety at work sites. Mitigation measures have been developed for the negative environmental impacts related to construction activities for inclusion in the works specifications to ensure their implementation. To mitigate negative impacts arising from the Project, an environmental management plan detailing mitigation measures, monitoring activities and responsibilities for implementation has been prepared as part of the IEE. DPWH will include the EMP in the bid and tender documents for civil works to ensure that the Project will be carried out consistent with the EMP requirements. During construction, DPWH will be assisted by a construction supervision consultant who will also undertake monitoring of the environmental performance of contractors.

11. *Information Disclosure and Consultation*. Public consultations involving affected people and local officials have been conducted during the preparation of the IEE in compliance with ADB's information disclosure and consultation requirements. The highlights of the IEE were communicated to the stakeholders through public presentation or distribution of project information materials.

12. *Grievance Redress Mechanism*. A project-specific grievance redress mechanism (GRM) will be established at the DPWH District Engineering Office (DEO) to receive, evaluate and facilitate the complaints/grievances of affected persons on the sub-project's environmental performance. This mechanism will be disclosed to the host communities prior to commencement of site works.

13. *Conclusion.* Based on the screening and assessment for potential environmental impacts, the project is not anticipated to have significant negative environmental impacts. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable manner. There is no need for a further environmental assessment study. Specifically, a full environmental impact assessment (EIA) is not warranted and the project's environmental classification as Category B is appropriate.

B. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

B1. Environmental Laws, Regulations and Guidelines in the Philippines

14. Major laws regarding the environment in the Philippines are shown in **Table 1**. These environmental-related laws were formulated under the Presidential Decree (PD) No.1151 as an environmental policy and PD No. 1152 as an environmental regulation in relation.

Table 1: Major Environmental Laws in the Philippines

Title	Contents
Presidential Decree (PD)No.1151	Environmental policy
Presidential Decree (PD)No. 1152	Environmental regulation

Source: Compiled for this PPTA

15. Major environmental laws are set out for natural resources, protection of wildlife and bio-diversity, forest resources, mining, coastal and marine, ambient air, water quality, waste and disposal, land use and resettlement, conservation of historical and cultural assets, environmental assessment, and national integrated protected area system. The laws and decrees applicable to the Project are summarized in **Table 2**.

Table 2: Environmental Laws and Decrees in the Philippines

Category	Title/Outline	
Natural Resources	Presidential Decree (PD) 1198	Requiring all individuals, partnerships or corporations engaged in the exploration, development and exploitation of natural resources or in the construction of infrastructure projects to restore or rehabilitate areas subject thereof or affected thereby to their original condition
Ambient air	Republic Act (RA) 3931	An Act creating the National Water and Air Pollution Commission (also includes definitions ad penalties related to pollution)
	PD 1181	Providing for the prevention, control and abatement of air pollution from motor vehicles and for other purposes
	PD 1160	Vesting authority in Barangay captains to enforce pollution and environmental control laws and for other purposes
	RA 8749	Philippine Clean Air Act of 1999
Water quality	RA 9275	Philippine Clean Water Act of 2004
	DENR Administrative Order (DAO) 34	Classification of water and use
Waste disposal	PD 825 (1975)	Providing penalty for improper disposal of garbage and other forms of uncleanliness and for other purposes
	PD 1152 (1977)	Philippine Environmental Code (Objective: To achieve and maintain such levels of air quality as to protect public health and to prevent to the greatest extent practicable, injury and/or damage to plant and animal life and property, and promote the social and economic development of the country)
	RA 6969 (1990)	An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for

Category	Title/Outline	
		Violations thereof, and for their Purposes
	DAO 36 Series of 2004 (DAO 04-36)	Procedural manual of DAO 92-29, a comprehensive documentation on the legal and technical requirements of hazardous waste management
	RA 9003	Ecological and Solid Waste Management Act of 2000
	DAO 01-34	Implementing Rules and Regulations (IRR) of RA 9003
Forestry/Flora	PD 705	Revised Forestry Code of the Philippines
	DENR Memorandum Order no. 05 of 2012	Uniform Replacement Ratio for Cut or Relocated Trees
	Joint Memorandum Circular No. 2, series of 2014	Guidelines for the Implementation of the DPWH-DENR-DSWD Partnership on the Tree Replacement Project
Environmental assessment	PD 1586 (1978)	Establishing an environmental impact statement system including other environmental management related measures and for other purposes
	Presidential Proclamation 2146	Proclaiming certain areas and types of projects as environmentally critical and within the scope of the environmental impact statement system established under PD 1586

Source: This PPTA

16. The Government of the Philippines (GoP) has ratified international treaties, agreements, and protocols in relation to environmental social considerations which are listed in **Table 3**.

Table 3: Philippine Environmental Agreements to the International Treaty

Title	Year
Washington Treaty Convention on the international trade in endangered species of wild flora and fauna	(1981)
Convention on biological diversity	(1993)
Framework convention on climate change	(1994)

Source: This PPTA

B2. EIA System in the Philippines

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

18. PEISS is a set of laws, regulations, administrative orders and guidelines concerned with the EIA. **Table** 4 shows some of the important laws and guidelines.

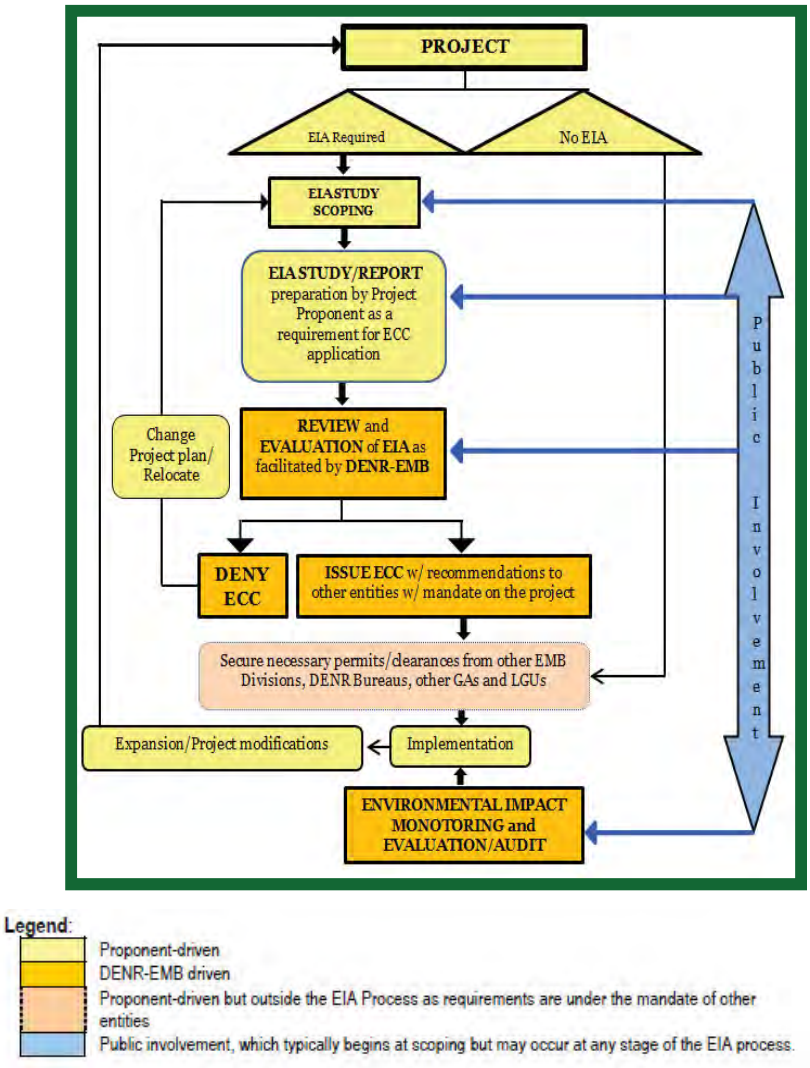
Table 4: Laws and Regulations regarding EIA in the Philippines

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

Title	Outline
Presidential Proclamation No. 2146 (1981) and No. 803 (1996)	It proclaims Environmentally Critical Projects (ECPs) to have significant impact on the quality of environment and Environmentally Critical Areas (ECAs) as environmentally fragile areas within the scope of the EIS System.
DAO 96-37 (revised to become DAO 92-21)	Devolved responsibility for EIS to the EMB-Regional Office and further strengthened the Philippine EIS System (PEISS). Placed emphasis on promoting maximum public participation in EIA process to validate the social acceptability of the Project.
DENR Administrative Order No. 30 Series of 2003 (DAO 03-30)	Revised Procedural Manual (2007): Provides for implementation of rules and regulations of Presidential Decree No. 1586, establishing PEISS. Also, provided detailed definitions of technical terms and detailed information regarding procedures, related laws and regulations.
DAO 2017-15	Guidelines on public participation under the PEISS

Source: This PPTA

19. The procedures of EIA process are shown in **Figure 1**. The process stages are categorized as: i) pre-study stage (screening and scoping); ii) EIA study stage; and iii) post-study stage (review, decision-making and monitoring).



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

Figure 1: Flow of EIA Process

20. According to PD 1586 (1978), the EIA process covers projects which are considered environmentally critical projects (ECPs) or projects in environmentally critical areas (ECAs) presumed to have significant impacts on the environment.

21. A road projects with more than 20 km-long new road construction in total is classified as Category A which requires preparation of an environmental impact statement (EIS) in order to obtain an environmental compliance certificates (ECC) from the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR). The criteria of ECPs related to the project are shown in **Table 5**.

Table 5: EIS and IEE Requirements for Road and Bridge Projects

Project Description	Covered (Required to secure ECC)			Not covered (may secure CNC)
	Category A: ECP	Category B: Non-ECP		Category D
	EIS	EIS	IEE Checklist	PD (*Part I only*)
3.4.1 Roads, new construction	NATIONAL ROAD: >= 20 km (length with no critical slope) OR >= 10 km (length with critical slope)	PROVINCIAL ROAD and OTHER TYPES OF ROADS: >= 20 km (length with no critical slope) OR >= 10 km (length with critical slope)	ALL TYPES OF ROADS: > 2 km but < 20 km, (length with no critical slope) OR > 2 km but < 10 km (length with critical slope)	<=2 km
3.4.2 Roads, widening, rehabilitation and/or improvement	None	> 50 % increase in capacity (or in terms of length/width) AND >= 20.0 km, (length with no critical slope) OR >= 10.0 km (length with critical slope)	> 50 % increase in capacity (or in terms of length/width) AND > 2 km but < 20.0 km, (length with no critical slope) OR > 2 km but < 10.0 km (length with critical slope)	> 50 % increase in capacity (or in terms of length/width) but <= 2 km increase in length
3.4.3 Bridges and viaducts (including elevated roads), new construction	>= 10.0 km	>= 5 km but < 10.0 km	> 50 m but < 5.0 km	<= 50 m Regardless of length for footbridges or for pedestrian only
3.4.4 Bridges and viaducts (including elevated roads), rehabilitation and/or improvement	None	> 50 % increase in capacity (or in terms of length/width) OR >= 10.0 km	> 50 % increase in capacity (or in terms of length/width) but < total length of 10.0 km	> 50 % increase in capacity (or in terms of length/width) but < 2 km increase in length
3.4.5 Roads-flyover/ cloverleaf/ interchanges	None	None	Regardless of length and width	None
3.4.6 Pedestrian passages	None	None	All underpass projects	All overpass projects
3.4.7 Tunnels and sub-grade roads and railways	>= 1.0 km	< 1.0 km	None	None

Source: This PPTA, based on "Revised Guidelines for Coverage Screening and Standardized Requirements, EMB Memorandum Circular 005, July 2014"

B3. ADB's Safeguard Policy Statement

22. The ADB's process of determining a road project's environment category is through accomplishment of a rapid environmental assessment (REA) checklist taking into account the type, size, and location of the proposed project. Based on SPS 2009, a project could be classified under one of the four environmental categories (A, B, C or FI) as shown in **Table 6**. PR 07 is considered Category B.

Table 6: Category Classifications on the Environment based on SPS 2009

Category	Application
A	Projects with potential for significant adverse environmental impacts that is irreversible, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
B	Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. Impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for Category A projects. An initial environmental examination (IEE) is required.
C	Projects likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications are still reviewed.
FI	Projects are classified as category FI if they involve investment of funds to or through a financial intermediary. Where the FI's investment have minimal or no adverse environmental risks. The FI project will be treated as category C. All other FI's must establish and maintain an environmental and social management standard must comply with the environmental safeguards requirements specified in SPS 2009 if the FI's subprojects have the potential for significant adverse environmental impacts.

Source: ADB Safeguard Policy Statement (June 2009)

C. DESCRIPTION OF THE PROJECT

C1. Overview

23. The Government of the Republic of the Philippines requested the Asian Development Bank (ADB) to provide Technical Assistance (TA) to prepare the Improving Growth Corridors in Mindanao Road Sector Project. This project supports the Government of the Philippines' priorities for improvement of the country's road network and development of Mindanao, including the government's agenda for Mindanao in the Philippines Development Plan (PDP) 2011-2016. This project extends ADB's long standing assistance in Mindanao with a recent focus on the road sector including institutional development and now improving national roads for inclusive growth.

24. Mindanao is the second largest island in the Philippines, with a population of nearly 25 million people. Despite being rich in natural resources, Mindanao has the highest poverty incidence of the Philippines' three island groups (Luzon, Visayas, and Mindanao), with a rate of 39%,[6] due in large part to civil conflict and low economic growth. Although significant development has occurred in recent years, a number of infrastructure targets in the government's Mindanao 2000 plan have not been achieved, due to the lack of coherent plans, inadequate government financial resources, and underinvestment, especially by the private sector.[7]

25. The road network in Mindanao is less developed than the national network. While 82% and 89% of the national roads in Luzon and the Visayas are paved, only 70% of the national roads in Mindanao are paved.[8] This is compounded by a wider set of issues such as constrained growth of regional economic corridors through Mindanao and reduced support to regional cooperation and integration, as well as the lack of the necessary physical, institutional and governance capacity to support the full delivery of a quality national road network.

26. The impact of the project will be improved mobility, connecting accessibility and safety, and reduced poverty in the project area. The outcome will be reduced transport cost and improved accessibility. Transport on and investment in the national road network will become more efficient. The increased efficiency will be measured by reductions in travel time, vehicle operating costs, and road accident rates; improvements in the road surface condition; and improvements in governance in the transport sector and in DPWH's assessment, communications and administration capabilities. The Project's impact will be an accessible, affordable and safe road network in the project area.

27. This IEE was prepared in accordance with SPS 2009 covering the 17-km PR-07 (Tampilisan-Sandayong Road) located in Tampilisan Municipality, Zamboanga del Norte Province.

C2. Location

28. Road PR 07 is located in Region IX or the Zamboanga Peninsula Region found in the western part of Mindanao (**Figure 2**). Also shown in Figure 2 are other road sections planned for improvement under the proposed sector loan.

[6] A1DB. 2010. Making a Difference in Mindanao. Manila.
[7] MinDA. 2011. Mindanao 2020 Peace and Development Framework Plan 2011-2030.
[8] By December 2014, 76% of national roads in Mindanao were paved (DPWH).

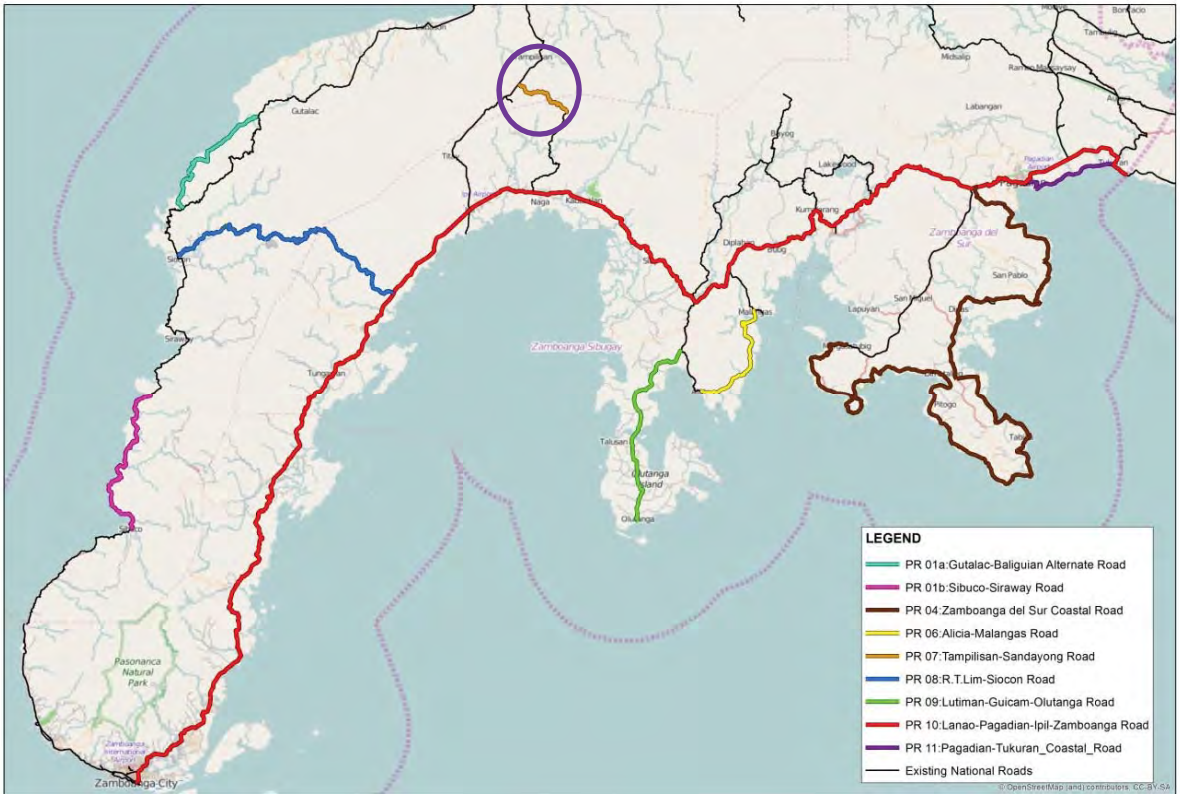


Figure 2: Location of PR 07 (encircled) and other Subproject Roads

C3. Proposed Improvement Works

29. The 17-km PR 07 Tampilisan-Sandayong Road is a 4 – 6 m wide national secondary road with gravel surface. The detailed design of the proposed improvements was completed in October 2016. Road improvements to be undertaken are as follows:

- Concrete paving of gravel road
- Pavement widening to 6.7 m and provision of 1.5 m shoulders following the existing alignment within a 30-m road right of way (total road width including shoulders is 9.7 m)
- Raising of road embankment (details to be determined during detailed engineering design phase)
- Replacement of a 15-m steel girder bridge with a 45-m long bridge [concrete wall type, driven pile foundation, 2-column concrete pier, pre-stressed concrete deck girder (PCDG) superstructure]
- Replacement of 2 spillways (10 and 15 m long) with 2 new bridges (30 and 36 m long). The bridges will have concrete wall types, driven pile foundation, a 2-column concrete pier and reinforced concrete deck girder (RCDG) superstructure.
- Short realignments (360 m and 440 m long) within commercial/residential areas to reduce impacts on structures within the right-of-way. The farthest distance of the edge of the realigned section to the edge of the existing alignment is about 3.1 m.

30. As the rivers crossed by the bridges are not used for navigation, only the requirements for river flood discharge capacity and flood level freeboard will need to be satisfied.

C4. Basic Design of Project Road

C4.1 Selection of Design Elements

31. One of the chief best practice set of design standards practiced worldwide is the "Policy on Geometric Design of Highways and Streets, 2001, AASHTO". This set of standards is also recommended to adopt as design standards for Philippine national highways by "Highway Safety Design Standards Manual – Part 1: Road Safety Design Manual, 2012, DPWH".

32. Design speed is used to determine individual design elements, such as stopping sight distance and horizontal curvature. The combination of a design traffic volume and a topography condition, namely flat topography, rolling topography, and mountainous topography, leads to determination of design speeds of roads. A design speed determines corresponding horizontal minimum radius, vertical maximum gradient, super elevation, and sight distances. Topographic conditions will be decided for each section of the project roads.

33. Other elements are less related to design speed, such as pavement and shoulder width and clearances to walls and traffic barriers. Typically, an arterial road warrants a higher design speed than a local road. A road located in flat terrain warrants a higher design speed than one in mountainous terrain.

34. The design elements for PR 07 are summarized below:

- Design average daily traffic: 400-1000
- Topographic condition: rolling
- Design speed: 60 km/hr
- Classification of road for design: national secondary
- Minimum radius: 130 m
- Maximum grade 6%
- Lanes: 2 x 3.35 m/6.7 m
- Shoulders: 1.5 m (each side)
- Right-of-way: 30 m

C4.2 Climate Change Adaptation

35. It is most effective to design and construct a climate resilient road than retrofitting at a later stage when problems appear. Using climate projections to evaluate future requirements instead of basing on historic climate patterns is significantly more cost effective. The DPWH requires incorporation of the following criteria to upgrade design standards as adaptation to climate change. The following adaptation measures will be included in the project design, as appropriate, to make the project road more resilient to climate change impacts:

- Road pavement: improvement of road surface and subsurface drainage systems and raise of pavement levels
- Road drainage: increase size of side drains, consider alternative drain section, increase water retention capacity of drains, use of water capture and storage retention ponds
- Culverts and cross drainage pipes: increase capacity of hydraulic structures, increase the number of cross drains, use apron rather than catch pit at pipe entrance to avoid clogging by debris, downstream protection of outlets to reduce

scouring
- Bridges: review design storm return periods, raise bridge if freeboard in inadequate, reinforce bridge piers and abutments at risk from scouring, provide retention dams upstream to reduce flood flows

36. Other adaptation measures to be implemented for the project are shown below:

37. Single–Span Bridge to Replace Multi-section Box Culvert. It is often observed that the debris of broken tree branches and bamboo are clogging river sections and causing flooding in the vicinity. Appropriate cleaning work can remove this kind of problem. However, the basic issue here is placing a wall at the middle of the river obstructing the free flow of river water. Designing a bridge with longer spanning and high vertical clearance makes this road a climate resilient road.

38. Green Planting along Road. Green planting along road sides not only provides a shade shelter for travelers, but also strengthens the ground around the road with roots. They also protect the road from flood water by preventing the water flow from hitting the road directly. Plants also prevent scouring by flood water. Furthermore, plants enhance aesthetic appearance of the road and also have a very valuable function of purifying the air contaminated by exhaust fumes and absorbing CO_2 to reduce the threat of greenhouse effect. However, pursuant to Department Order No. 73 Series of 2014, which Prohibit Uses within the Right-of-way of National Roads; trees, shrubs and plant boxes are considered obstructions that are needed to be removed within the right-of-way of all national roads.

39. If planted correctly on roadsides, trees and other vegetation will not serve as an obstruction but rather create ecological (climatic amelioration, check in air and noise pollution, check in soil erosion and reduce water logging, moderating the effects of wind and incoming radiation) and aesthetical (shade and ornamentation) benefits if proper species of trees are planted. In addition to the benefits of planting trees on roadsides are: it enhances the visual experience of the travelers along the road, it will also define the RoW and highlights the sharp horizontal curves of the road during night time, screen unsightly view from the road as well as the roadside communities from air and noise pollution, prevents the glare from the incoming vehicles, and it will compensate for the trees proposed to be cut during road widening and improvement.

40. In order to avoid the trees being an obstruction, trees to be planted on the roadside should possess the following characteristics: a) mixture of small to medium trees along roadsides to screen the glare from vehicles, b) trees that provide aesthetic benefits such as flowering trees, c) trees should also be evergreen trees that do not have substantial leaf fall so that will avoid the nuisance of falling leaves, d) trees with beautiful leaf color, shape and arrangement and e) should be economic trees that may be harvested on maturity and will generate revenue in the near future. Also proper planting spaces should be observed. It is recommended that trees should be planted at least 6 meters away from the edge of shoulder or 1 meter away from the toe of embankment whichever is higher. Some of the recommended species are banaba, katmon, bani, ilang-ilang, alibangbang, banuyo, dita and molave; all are native species in the Philippines.

C5. Road Safety

41. During the PPTA, a review was carried out on the project road safety measures for incorporation into the design. These measures were based on a road safety audit in Western Mindanao aimed to identify potential road safety hazards and to incorporate measures in the detailed design to improve safety aspects of the project. The road safety audit followed the key criteria of the ADB Road Safety Audit for Road Projects (2003).

42. The PPTA Road Safety team discussed these findings to determine the potential safety risks and found that most of defects are observed across Western Mindanao. A series of suggested measures were identified for consideration to help avoid or mitigate safety issues. Problems related to geometric design will be solved by following DPWH design standards. Measures considered in the detailed design are shown in **Table 7**.

Table 7: Summary Road Safety Measures

No.	Problem	Design Measure
1	Road signs and pavement markings	Setting up warning and guide signs, arrow marks and providing delineation lines clearly along every road.
2	No light signal	Providing traffic signals at key intersections
3	Poor pavement without delineation	Improvement of the quality of pavement and provide delineation or pavement markings.
4	Stalls and residential houses beside the road	Removal of stalls to help reduce obstructions and encroachment
5	Small vertical crest with poor sight distance	Improving vertical curves to suit safe design criteria/requirement
6	Sharp curve and insufficient chevron signs	Installation of chevron signs where required and speed limit signs. Improvement of the vertical alignment to provide sight distance requirement
7	Dangerous side ditches close to road	Setting up guardrails between the road and ditches
8	Parking along the carriageway	Prohibiting of the use of carriageway as parking to ensure safe, efficient and smooth vehicular flow
9	No warning sign in construction sites	Installation of advance warning signs on construction sites so the drivers can get advance information beforehand
10	Slope-slide prone zone	Planting of grass and installing the necessary slope protection facilities. Conduct of geotechnical investigation to determine the most appropriate slope protection structures
11	No guard rails at high embankments and steep side slope	Installation of guard rails on all locations with embankment height exceeding 2.0m
12	Block-type guard-walls stones	Changing to guard rails, which function to guide a deviating vehicle back to the lane.
13	Y-type intersection	Changing a crossing angle of 2 roads at merging section to more than 70 degree. Improve intersection layout; provide proper “channelization”
14	Shortage of sight distance	Moving hazards: trees, fences, poles etc. Improve the horizontal and vertical alignment.
15	No pedestrian crossing	Installation of pedestrian crossing. Sidewalks and bicycle lanes and pedestrian crossings. The roads beside or in the vicinity of schools or markets will be located/designed away from schools and markets as much as possible.

Source: This PPTA. NB: In the PPTA workshop held on 29 April 2015, participants of a road safety discussion group suggested to add a few more recommendations in addition to the above: first, road safety education for students and local residents, and second, widening of shoulder of 1.5m (minimum) for emergency, provision of turn-outs/lay-bys.

D. DESCRIPTION OF THE ENVIRONMENT

D1. Land Environment

D.1.1 Topography and Slope

43. PR 07 is characterized by a rolling terrain having level to gentle slope gradient (0%-8% slope: 5.7 km) gradient) to moderately steep slopes (8%-15%: 11.4 km).

D.1.2 Land Use

44. PR 07 land uses are perennial crop (55.87%), annual crops (36.16%), built-up (6.22%), grassland (1.08%) and shrubs (0.70%).

D.1.3 Geology

45. The island of Mindanao is characterized by a complex geologic setting manifested by the presence of several arc terrains. As a part of an island arc system, the island consists mainly of two blocks: the island-arc-related eastern-central Mindanao block and the continental Zamboanga Peninsula, which contains several ophiolitic bodies and mélanges (Yumul et. al., 2004). In Zamboanga Peninsula the oldest rocks are likely to be the Upper Jurassic-Cretaceous serpentinized ultramafics, schists, gneiss and quartzites now exposed in southwest Zamboanga (Santos-Ynigo, 1953; Paderes and Miranda, 1965). Notably the southwest Zamboanga ultramafics correlate with the basement serpentinized peridotites found in east-central Zamboanga. The hydrothermally-altered strata of the Sindangan Volcanics are considered the oldest volcanics. Overlying the Sindangan Volcanics are shale and sandstone intercalated with thin basaltic flows and limestone lenses formed during Eocene.

46. Three main physiographic-structural units have been recognized in Mindanao Island (Corpuz, 1992). The first unit trends N-NNW and comprises the Pacific Cordillera, Mindanao Central Cordillera and Agusan-Davao Basin. The second unit trends NW and includes the Tiruray-Daguma Range and Cotabato Basin. The third unit encompasses the NE-trending Zamboanga Peninsula and Sulu Islands, where the oldest rocks are probably Upper Jurassic-Cretaceous serpentinized ultramafics, schists, gneiss and quartzites (Santos-Ynigo, 1953).

D2. Climate and Meteorology

D.2.1 Climate

47. Seasons are not very pronounced but relatively dry from November to April and wet during the rest of the year. The northeast monsoon prevails during November to February while the southwest monsoon occurs during the months of June to October. The rain period starts in June and last up to November while the period from January to May is relatively dry. December and April may be considered transition months. According to the Corona's Classification of Climate, Zamboanga Del Norte falls under Category Type III[9]. Zamboanga Peninsula is one of the locations in the Philippines that is least frequently visited by typhoons since the region is away

[9] Type III: No very pronounced maximum rain period, with a short dry season lasting only from one to three months, either during the period from December to February or from March to May. This climate type resembles type I since it has a short dry season.

from the typhoon belt area of the country.

D.2.2 Rainfall

48. The southwest monsoon is the main rainfall-causing weather system of the area. Tropical cyclones seldom, if not rarely, cross the project area. The rainy season in the area occurs from June to November while the rest of the year is relatively dry. The month of October is the wettest, with a monthly average rainfall of 178.9 mm. The month of February, on the other hand is the driest, with a mean monthly rainfall of 43.7 mm. The average annual rainfall recorded based on 30 years of data is 1266.5 mm. Based on the climatological extremes of PAGASA, the highest rainfall amount, as of 2010, is 199 mm in October 2001 with a minimum rainfall amount of 88.9 mm occurring in May 1990. These rainfall amounts are not that notable compared to the rainfall data gauged by other stations in Mindanao.

D.2.3 Temperature

49. For a period of 30 years (1981-2010), the average annual maximum temperature in the region is 36.9^{o}C occurring in April 22, 1987, with the average minimum amt. of 15.6^{o}C computed in Feb. 27, 1995.

D.2.4 Relative Humidity

50. Relative humidity is a measure of the amount of moisture in the atmosphere relative to the saturation condition of the air at the same temperature and pressure. The mean annual relative humidity in the area is as high as 83% occurring in the months of July and October. The least humid condition for the area is in summer month of March with an average amount of 78%.

D.2.5 Wind

51. The prevailing wind is west southwest with an annual average wind flow of 2 m/s occurring the whole year through.

D3. Water Resources

52. The province is blessed with surface and ground water resources, such as springs, creeks, rivers and deep wells for agricultural and domestic uses. The surface water resources of Zamboanga del Norte may be differentiated into two types. The first type accounts for the vast ocean from its western and northern spheres, which are Sulu Sea and Bohol Sea, respectively, and the other type accounts for the inland water sources. PR 07 is located inland in the Municipality of Tampilisan. The major rivers in the province are shown in **Table 8**.

Table 8: Major Rivers by City/Municipality in Zamboanga del Norte

City/ Municipality	Name of River	Flow (cu. m/sec)		Condition Maximum Flood Level	Extent of Flooding	Drainage (/km)	
Dipolog	Dipolog	60.0	Fair	3.00 m	1.00 m	0.90 m	
Dapitan	Dapitan	60.0	Fair	3.00 m	1.00 m	0.90 m	
Leon Postigo	Bacungan	40.0	Fair	2.00 m	0.80 m	1.225	Low
	Polandoc	65.0	Fair	1.50 m	1.00 m	1.15	Low drainage density river basin
Katipunan	Dicayo	61.0	Fair	2.00 m	1.20 m	0.90	High drainage density river basin
	Taga	51.0	Fair	1.50 m	0.80 m	1.33	Low drainage density river basin
Manukan	Manukan	58.0	Fair	2.50 m	0.80 m	0.84 m	
Roxas	Dohinob	52.5	Fair	3.50 m	0.05 m	0.0875	High drainage density river basin
	Dohinob Diut	51.0	Fair	2.50 m	1.00 m	1.25	High drainage density river basin
	Tanglan	48.0	Fair	2.00 m	0.5 m	0.84	High drainage density river basin
Sindangan	Nipaan	45.0	Fair	1.50 m	0.4 m	1.142	High drainage density river basin
	Talinga	60.0	Fair	2.50 m	0.7 m	1.154	High drainage density river basin
	Ingin			2.00 m	0.8 m	1025	High drainage density river basin
	Piao			2.00 m	0.55 m	0.90 m	High drainage density river basin
	Manil			1.95 m	1.00 m	1.25 m	High drainage density river basin
Labason	Patawag			1.90 m	0.75 m	1.20 m	Low drainage density river basin
Salug	Salug			2.00 m	0.75 m	1.17 m	Low drainage density river basin
Siocon	Siocon			1.20 m	1.20 m	0.90 m	

Source: DPWH, Dipolog City

D4. Air Quality and Noise

53. There is no available secondary data quality and noise in the project area. Due to security risks, primary data collection/field sampling was not undertaken. However, since the project road alignment has rural and agricultural setting, there are no major local sources of anthropogenic emissions. Both sides of the project road are predominantly occupied by crop lands (92%) and the remaining areas are made up of settlements (6.2%) and grassland/shrub land (about 1.8%). Further, the lack of industrial development suggests that air pollution and noise sources which would normally elevate background levels are not present in the area. As such, it expected that the average ground level concentrations of sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulate matter (PM10) will not exceed the values in the International Finance Corporation (IFC) guidelines (EHS Guidelines of April 2007) which are 20 µg/Ncm, 40 µg/Ncm, and 20 µg/Ncm, respectively.

D5. Biological Resources

D5.1 Flora Species

54. As mentioned earlier, land use along PR 07 is predominantly agriculture. This road does not traverse or is near ecologically sensitive and/or protected areas. Results of the tree inventory based on the detailed design show that there are 10,494 roadside trees that will need to be cut inside the 30-m right of way (**Appendix** 1**).** Of these, 30 stands consisting of 29 Para rubber trees (*Hevea brasiliensis)* and 1 mahogany (*Swietenia macrophylla*) are on public land. The rest (10,464) are planted trees on private land. A total of 31 stands belonging to six species are considered either endangered or critically endangered based on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species 2017 and/or The National List of Threatened Philippine Plants (NLTPP) under DENR Administrative Order No. 2007-01. Of these 6 species, however, only three are considered endangered or critically endangered based on NLTPP (see **section E2.8** for details).

55. To determine the existing condition of vegetation along the alignment, three 20 m x 20 m sampling plots were established. All the sampling sites were agricultural areas with aggregates of perennial crops as shown in **Table 9**.

Table 9: Sampling Sites for Terrestrial Resources Surveys in PR 07

Sampling plot	Ecosystem/Land use	Coordinates
1	Agricultural, aggregates of perennial species	7°38'50.47"N 122°55'30.42"E
2	Agricultural, planted with perennial crops	7°42'28.01"N 122°52'1.53"E
3	Agricultural, aggregates of perennial crops	7°46'53.17"N 122°47'50.32"E

56. Density and Relative Density. Density is defined as a measurement of number of individuals within a specific area. This is computed by counting the number of any given species over the area of a sample plot. It is the degree of compactness of a species. It can be used for the thickness description of a particular species, extent regeneration and the extent of standing biomass or ground cover. Relative density is the percentage of one species based on the total plant density.

57. Based on the computed density and relative density of the four sampling plots **(Table 10)**, the agricultural crop, corn (*Zea mays*), has the highest density and relative density of 1,875 and 25.95%. Of the planted trees, para rubber tree (*Hevea brasiliensis*) had the highest density and relative density of 281.25 and 3.89%, respectively.

Table 10: Density and Relative Density Distribution of the 29 identified species in the sampling plots along PR 07

Species Name	Scientific Name	Family	Density	Relative Density
Corn	*Zea mays*	POACEAE	1,875.00	25.95%
Kilob	*Dicranopteris linearis* (Burm.f.) Underw.	GLEICHENIACEAE	1,562.50	21.63%
Kudzo	*Pueraria montana*. Lobata	FABACEAE	712.50	9.86%
Blue Fern	*s*(Fee) C. Chr.	LOMARIOPSIDACEAE	500.00	6.92%
Cogon	*Imperata cylindrica* (L.) Beauv.	POACEAE	487.50	6.75%
Cassava	*Manihot esculenta* Crantz	EUPHORBIACEAE	331.25	4.58%
Para Rubber	*Hevea brasiliensis* (HBK.) Muell.-Arg.	EUPHORBIACEAE	281.25	3.89%
Dilang Butiki	*Centrocema pubescens* Benth.	FABACEAE	256.25	3.55%
Pakong Gubat	*Diplazium esculentum* (Retz.) Sw.	WOODSIACEAE	218.75	3.03%
Mahogany	*Swietenia macrophylla* King	MELIACEAE	168.75	2.34%
Uoko	*Mikania cordata* (Burm.f.) B. L. Rob.	ASTERACEAE	156.25	2.16%
Malasambong	*Veronia vidalii* Merr.	ASTERACEAE	112.50	1.56%
Acacia	*Acacia auriculiformis* A. Cunn.ex Benth.	FABACEAE	87.50	1.21%
Kakauate	*Gliricidia sepium* (Jacq.) Kunth ex Walp.	FABACEAE	87.50	1.21%
Banana	*Musa sapientum* L.	MUSACEAE	81.25	1.12%
Napier	*Pennisetum purpureum*	POACEAE	81.25	1.12%
Makahiyang Lalaki	*Biophytum sensitivum* (L.) DC.	OXILADACEAE	37.50	0.52%
Narra	*Pterocarpus indicus* Willd.	FABACEAE	37.50	0.52%
Payang-payang	*Flemingia strobilifera* (L.) Roxb. ex W. Aiton	FABACEAE: FABOIDEAE	31.25	0.43%
Nangka	*Artocarpus heterophyllu*s Lam.	MORACEAE	18.75	0.26%
Marang Banguhan	*Artocarpus odoratissimus* Blanco	MORACEAE	18.75	0.26%
Coconut	*Cocos nucifera* Linn	ARECACEAE	18.75	0.26%
Gmelina	*Gmelina arborea* Roxb.	LAMIACEAE	12.50	0.17%
Mangga	*Mangifera indica* L.	ANACARDIACEAE	12.50	0.17%
Alas-as	*Pandanus luzoniensis Merr*	PANDANACEAE	12.50	0.17%
Pakong Buwaya	*Cyathea contaminans* (Wall. & Hook.) Copel	CYATHEACEAE	6.25	0.09%
African Tulip	*Spathodea campanulata* P. Beauv.	BIGNONIACEAE	6.25	0.09%
Duhat	*Syzygium cumini* (L.) Skeels	MYRTACEAE	6.25	0.09%
Talisai	*Terminalia catappa* L.	COMBRETACEAE	6.25	0.09%

58. Species Frequency and Relative Frequency. Frequency is defined as the percentage of total sampling plots or quadrats containing at least one individual of a given species. It does not matter how many individuals of species occur in each plot since a single occurrence carries the same weight (i.e., one) as a multiple occurrence. Relative frequency is the percentage of one species based on the total plant frequency. Based on the computed frequency and relative frequency **(Table 11)**, there are three species which has the highest value of 0.75 and 6.67% namely; Pueraria montana, a climbing plant; *Hevea brasiliensis* (HBK.) and *Swietenia macrophylla*, which are both planted trees. None of the identified species are considered endangered or critically endangered.

Table 11: Frequency and Relative Frequency Distribution of the 29 identified species in the sampling plots along PR 07

Species Name	Scientific Name	Family	Frequency	Relative Frequency
Kudzo	*Pueraria montana*. Lobata	FABACEAE	0.75	6.67%
Para Rubber	*Hevea brasiliensis* (HBK.) Muell.-Arg.	EUPHORBIACEAE	0.75	6.67%
Mahogany	*Swietenia macrophylla* King	MELIACEAE	0.75	6.67%
Blue Fern	Cyclopeltis crenata (Fee) C. Chr.	LOMARIOPSIDACEAE	0.50	4.44%
Cogon	*Imperata cylindrica* (L.) Beauv.	POACEAE	0.50	4.44%
Cassava	*Manihot esculenta* Crantz	EUPHORBIACEAE	0.50	4.44%
Dilang Butiki	*Centrocema pubescens* Benth.	FABACEAE	0.50	4.44%
Acacia	*Acacia auriculiformis* A. Cunn.ex Benth.	FABACEAE	0.50	4.44%
Kakauate	*Gliricidia sepium* (Jacq.) Kunth ex Walp.	FABACEAE	0.50	4.44%
Banana	*Musa sapientum* L.	MUSACEAE	0.50	4.44%
Napier	*Pennisetum purpureum*	POACEAE	0.50	4.44%
Narra	*Pterocarpus indicus* Willd.	FABACEAE	0.50	4.44%
Mangga	*Mangifera indica* L.	ANACARDIACEAE	0.50	4.44%
Corn	*Zea mays*	POACEAE	0.25	2.22%
Kilob	*Dicranopteris linearis* (Burm.f.) Underw.	GLEICHENIACEAE	0.25	2.22%
Pakong Gubat	*Diplazium esculentum* (Retz.) Sw.	WOODSIACEAE	0.25	2.22%
Uoko	*Mikania cordata* (Burm.f.) B. L. Rob.	ASTERACEAE	0.25	2.22%
Malasambong	*Veronia vidalii* Merr.	ASTERACEAE	0.25	2.22%
Makahiyang Lalaki	*Biophytum sensitivum (L.) DC.*	OXILADACEAE	0.25	2.22%
Payang-payang	*Flemingia strobilifera (L.) Roxb. ex W. Aiton*	FABACEAE: FABOIDEAE	0.25	2.22%
Nangka	*Artocarpus heterophyllu*s Lam.	MORACEAE	0.25	2.22%
Marang Banguhan	*Artocarpus odoratissimus* Blanco	MORACEAE	0.25	2.22%
Coconut	*Cocos nucifera* Linn	ARECACEAE	0.25	2.22%
Gmelina	*Gmelina arborea* Roxb.	LAMIACEAE	0.25	2.22%
Alas-as	*Pandanus luzoniensis* Merr	PANDANACEAE	0.25	2.22%
Pakong Buwaya	*Cyathea contaminans* (Wall. & Hook.) Copel	CYATHEACEAE	0.25	2.22%
African Tulip	*Spathodea campanulata* P. Beauv.	BIGNONIACEAE	0.25	2.22%
Duhat	*Syzygium cumini* (L.) Skeels	MYRTACEAE	0.25	2.22%
Talisai	*Terminalia catappa* L.	COMBRETACEAE	0.25	2.22%

D5.2 Fauna Species

59. Two sampling plots were established for the fauna survey as shown in **Table 12**.

Table 12: Sampling Plots for Fauna Survey along PR 07

Sampling Plots	Ecosystem/Land use	Coordinates
1	Agricultural area planted with Para Rubber and mahogany trees	7°57'39.87"N 122°40'37.07"E
2	Shrub land with some tree crops-mango and coconut	7°56'39.86"N 122°43'28.04"E

60. During the field sampling, only bird species were noted in the area. There are no endangered or critically endangered species of fauna within the locality. A total of 11 bird species comprised of 43 individuals were observed. The dominant species are the Eurasian Tree sparrow and Asian Glossy Starlings with a population of 14 and 10, respectively. All of the birds observed are native species and thrive in different environments such as grasslands, lowlands, agriculture areas and shrub lands. Likewise, almost all of the species are under least concern category except for the white breasted wood swallow which is not evaluated with reference to the International Union of Conservation for Nature (IUCN). The biodiversity composition and evenness using the Shannon-Weiner index (H') and Pielou's index (J') reveals a computed value of 1.988 and 0.829, respectively. These values suggest that the road section has a very low biodiversity index with very high species evenness.

Table 13: Terrestrial Fauna observed within the PR 07 road section

Sampling Location	Species Common Name	Scientific Name	No. of individuals	Conservation Status (IUCN)
1. Tampilisan Zamboanga Del Norte	Asian Glossy Starlings	*Aplonis panayensis*	10	Least concern species
	Chestnut Munia	*Lonchura malacca*	4	Least concern species
	Eurasian Tree Sparrow	*Passer montanus*	9	Least concern species
	Pied Fantail	*Rhipidura javanica*	1	Least concern species
	White Breasted Wood Swallow	*Artamus leucocrynchus*	3	Not evaluated
	Subtotal		**27**	
2. Tampilisan Zamboanga Del Norte	Asian Palm Swift	*Cypsiurus balasienses*	2	Least concern species
	Blue Throated Bee eater	*Merops viridis*	1	Least concern species
	Cattle Egret	*Bubulcus ibis*	3	Least concern species
	Chestnut Munia	*Lonchura malacca*		Least concern species
	Eurasian Tree Sparrow	*Passer montanus*	5	Least concern species
	Large Billed Crow	*Corvus macrorhynchos*	1	Least concern species
	White Collared King Fisher	*Halcyon chloris*	2	Least concern species
	Zebra Dove	*Geopeliastriata*	2	Least concern species
	Subtotal		**16**	
	TOTAL		**43**	

D6. Socioeconomic Resources

D.6.1 Population

61. Dipolog City is the capital city of the province and the seat of provincial government of Zamboanga del Norte. Among the cities and municipalities of the province, Dipolog City is the largest growing city, with a total population count of 113,118 in 2007 census. Its population shared about 12.47 percent to the total provincial population and with a density of 469 persons per square kilometer. 2007 Census on Population also indicated that among cities in Region IX, Dipolog ranked second in terms of population size and land area, and second (2nd) in terms of population density. In Zamboanga del Norte, Dipolog City remained the largest locality in terms of population. Other large city/municipalities are Sindangan, Dapitan City, Siocon, Katipunan and Labason. Total population share of these six (6) cities/municipalities to the provincial total was 43.62 percent. The rest of the municipalities, from seventh largest municipality down to the smallest accounted about 56.38 percent to the provincial total. The top 6 populated cities/municipalities in census year 2007, showed different trends based on the two census periods of 2000 and 2007.

62. Among these 6 cities/municipalities, Dipolog, Siocon and Labason showed an increasing trend in population shares, while decreasing trend was observed for the other three

municipalities/cities. As such, these decreasing trends indicated that the population was clustering towards Dipolog City, Siocon and Labason because of the availability of opportunities and resources. Moreover, population shares of the rest of the twenty-one (21) municipalities, for two census periods in 2000 and 2007, showed opposing trends. Increasing trends of population shares were indicated in the Municipalities of Sibuco, Sirawai, Baliguian, Tampilisan, Jose Dalman and Mutia. Decreasing population shares were also noted in the Municipalities of Rizal, Sibutad, La Libertad, Piñan, Polanco, Sergio Osmeña, Pres. Roxas, Manukan, Siayan, Leon Postigo, Salug, Godod, Liloy, Kalawit, and Gutalac.

63. The data on family income are taken from the National Statistics Office (NSO). The Family Income and Expenditure Survey (FIES) conducted by this office every three years. This FIES shows the actual situation of income and expenditure of consumer households in the province, region and country. The results tell us how households spend their income on goods and services, and how such expenditure pattern differs according to household characteristics such as annual income level, number of household members, and household head's age and occupation. However, the data that we have for Zamboanga del Norte started from year 1994 to 2000 only, while for Zamboanga Peninsula Region and Philippines, data available is only from 1997 and 2006.

64. Based on the 2000 latest data, the family income level of 165,942 families in the Province of Zamboanga del Norte had an estimated total income of PhP 14,454,674 or an average family income of PhP 87,107.) It was noted that seventy-six point nine (76.9) percent of the family income went to expenditures, with just enough amount left for savings. However, lower-income families were observed with negative savings because they spent more than what they earned.

Table 14: Population, Annual Population Growth Rate, Density, and Land Area in Zamboanga del Norte

City/ Municipality	Population			Population (%)			Annual Population Growth Rate		Density			Land Area	
	1995	2000	2007	1995	2000	2007	1995-2000	2000-2007	1995	2000	2007	sq. km	sq. km (%)
Dapitan City	62,997	68,178	72,792	8.17	8.28	8.02	1.71	0.91	161	175	186	390.53	5.35
Rizal	14,363	13,501	14,721	1.86	1.64	1.62	-1.32	1.20	179	169	184	80.03	1.1
Sibutad	16,295	15,635	16,439	2.11	1.90	1.81	-0.88	0.69	249	238	251	65.57	.0.90
La Libertad	7,702	7,419	7,670	1.00	0.91	0.85	-0.80	0.56	111	108	110	69.51	0.95
Mutia	8,915	9,806	12,078	1.16	1.19	1.13	2.06	2.91	121	133	164	73.58	1.01
Piñan	19,447	17,950	18,669	2.52	2.18	2.06	-1.79	0.54	207	191	199	93.75	1.28
Polanco	31,700	34,557	36,376	4.11	4.20	4.01	1.87	0.71	153	167	176	206.88	2.83
Sergio Osmeña	26,014	27,500	29,049	3.38	3.34	3.20	1.30	0.76	47	49	52	556.44	7.62
Dipolog City	50,777	99,862	113,118	11.78	12.13	12.47	2.06	2.65	376	414	469	241.13	3.3
Katipunan	37,914	37,448	40,496	4.92	4.55	4.46	-0.27	1.08	155	153	166	244.12	3.34
Pres. Roxas	31,662	33,659	35,939	4.11	4.09	3.96	1.32	0.91	154	163	174	206.25	2.82
Manukan	29,681	31,855	33,129	3.85	3.87	3.65	1.53	0.54	120	129	114	246.35	3.37
Jose Dalman	21,745	23,322	26,017	2.82	2.83	2.87	1.51	1.52	161	173	193	135	1.85
Sindangan	72,098	80,113	87,720	9.35	9.73	9.67	2.29	1.25	160	178	195	451.00	6.18
Siayan	27,950	33,074	34,588	3.63	4.02	3.81	3.67	0.92	56	67	70	494.76	6.78
Leon B. Postigo	20,728	19,550	21,195	2.69	2.37	2.34	-1.25	1.12	81	77	83	255.50	3.50
Salug	28,411	28,914	29,960	3.69	3.51	3.30	0.38	0.49	138	140	145	206.60	2.83
Godod	15,053	15,139	16,638	1.95	1.84	1.83	0.12	1.31	79	801	88	190.00	2.60
Liloy	32,417	33,702	36,948	4.21	4.09	4.07	0.84	1.28	252	262	288	128.43	1.76
Tampilisan	17,732	19,536	21,671	2.30	2.37	2.39	2.10	1.44	129	142	157	137.75	1.89
Labason	28,515	33,528	40,420	3.70	4.07	4.46	3.53	2.61	168	198	238	169.58	2.32
Kalawit	17,352	21,372	21,758	2.25	2.60	2.40	4.56	0.25	80	98	100	217.89	2.98
Gutalac	25,022	28,215	29,883	3.25	3.43	3.29	2.61	0.79	51	57	61	492.86	6.75
Baliguian	12,671	15,613	20,540	1.64	1.90	2.26	4.60	3.84	29	26	47	439.26	6.02
Sioron	28,196	32,699	41,221	3.66	3.97	4.54	3.22	3.24	56	65	82	503.20	6.89
Sirawal	22,093	16,534	20,112	2.87	1.89	2.22	-6.02	2.74	99	70	90	22.50	3.05
Sibaco	23,243	24,411	28,101	3.02	2.97	3.10	1.06	1.96	30	31	36	782.54	10.72
Provincial Total	**770,697**	**823,130**	**907,238**	**100.00**	**100.00**	**100.00**	**1.42**	**1.35**	**106**	**113**	**124**	**7,301.01**	**100.00**

Source of basic Data: NSO

D.6.2 Education

65. The literacy rate of the province is categorized into two (2): simple literacy and functional literacy. Simple literacy is the ability to write a simple message in any language, while functional literacy is the ability to read and write with comprehension, as well as, make arithmetic calculations in an expanded sense, and the possession of minimum skills needs to carry out simple functions in life and to interact with others in society.

66. Simple literacy for the past five years marked a slight increase from 93.02 percent in 2003 to 93.75 percent in 2007. On the other hand, functional literacy showed a minimal improvement from 98.02 percent in 2003 to 98.68 percent in 2007.

D.6.3 Health Services

67. Presently, there are 16 hospitals operating in the province with a total bed capacity of five hundred fifty-nine (559). Five (5) are privately-owned, ten (10) are government-owned, managed, maintained and operated by the Provincial Government of Zamboanga del Norte, and one (1) is

also government-owned, managed, maintained and operated by the national government or the Department of Health (DOH).

68. Among these 16 hospitals, the province is served with three (3) secondary or Level 2 hospitals, namely: the Zamboanga del Norte Medical Center in Dipolog City, Dr. Jose Rizal Memorial Hospital in Dapitan City, and Sindangan District Hospital in the Municipality of Sindangan. The remaining thirteen (13) hospitals are classified as primary or Level 1 hospitals, namely: Piñan District hospital, Manukan Medical and Community Hospital, Sergio Osmeña Municipal Hospital, Sibutad Municipal Hospital, Liloy Medicare and Community Hospital, Labason District Hospital, Siocon District Hospital, Dipolog Medical Center, Zamboanga del Norte Cooperative Hospital, Ospital ng Kabataan ng Dipolog, Sta. Isabel General Hospital, and Joaquin Macias Hospital.

D.6.4 Water Source

69. Currently, there are 34 Level III water supply systems operating in 18 LGUs of the province, except for the Municipalities of La Libertad, Siayan, Kalawit, Baliguian, Sirawai, Sibuco, Gutalac, Sibutad, and Salug.

70. For Level II water supply system, there are 202 operating in the province. One hundred ninety-two (192) systems are located in the rural areas, while 10 level II water systems are in the urban or poblacion areas. Level I water system is the most common source of water in rural barangays. The province has 5,773 level 1 water supply systems operating. Of this number, 4,440 or 76 percent are classified as safe sources of water.

71. In 2008, out of 159,181 households, only 144,527 or 90.79 percent have access to safe water, and the remaining 14,654 households have no access to safe water. Overall, the project area doesn't cover any significant cultural and historical sites.

E. ANTICIPATED IMPACTS AND MITIGATION MEASURES

72. Since the Project is considered environment category B, significant negative environmental impacts are not anticipated. The impact assessment was conducted for pre-construction, construction and operation phases. Results of the environmental impacts screening are summarized in **Table 15.** impact types and magnitudes are indicated for both impacts without the mitigating measures and the resulting situations when mitigating measures will be implemented. The screening table uses the symbols "+" for positive impacts and "**–** "for negative impacts. Symbols for impact magnitudes are "∆" for minor and "●" for moderate. The symbol for a minor negative impact is "∆ **–"**, while a moderate negative impact is "● **–**". The second column of the table indicates the type and magnitudes of the impacts without any mitigating measures being applied. Some impacts have already small magnitudes even without mitigations and mitigating measures are therefore no longer required. The last column of the table indicates the expected impact magnitude after applying the mitigating measures. Hence, a moderate negative impact (● **–**) will become minor (∆) after applying the mitigating measures. The discussions of each identified issue and corresponding mitigation measures are presented in the succeeding sections.

Table 15: Summary of Environmental Impacts Screening for PR 07

Environmental Impacts and Risks	Without Mitigation	With Mitigation
PRE-CONSTRUCTION PHASE (Design)		
- Encroachment on environmentally sensitive areas	n/a	n/a
- Impacts and risks to biodiversity conservation	n/a	n/a
CONSTRUCTION PHASE		
- Impacts to endangered and/or critically endangered species	Δ −	Δ
- Potential damage to archaeological and cultural assets	Δ −	Δ
- Soil erosion and sedimentation within and in the vicinity of construction sites	● −	Δ
- Noise from construction equipment	● −	Δ
- Local air pollution due to construction activities	● −	Δ
- Oil and other hazardous materials releases	● −	Δ
- Vehicular traffic congestion and public access	● −	Δ
- Hazards to public due to construction activities	● −	Δ
- Pollution and health risks due to workers camp	● −	Δ
- Occupational health and safety risks at work sites	● −	Δ
- Increased employment opportunity in work sites	● +	● +
OPERATION AND MAINTENANCE PHASE		
• Increased risk of road accidents	● −	Δ
• Increased noise levels due to increased vehicular traffic	Δ −	Δ
• Increased air pollution due to increased vehicular traffic	Δ −	Δ
• Improved accessibility	● +	● +

n/a = not applicable; Δ = minor; ● = moderate; + = positive; - = negative

E1. Pre-construction

E1.1 Encroachment on Environmentally Sensitive Areas

73. The project alignment is not within or close to environmentally sensitive areas. The existing road is located in a corridor that has been transformed already into its present agricultural landscape, grassland, shrub land, with settlements and roadside trees. The road corridor is not within undisturbed landscapes. It is also not near a mangrove area or environmentally protected areas.

E1.2 Impacts and Risks to Biodiversity Conservation

74. The issue of impacts and risks to biodiversity conservation is not applicable to this project since the road is not located in areas that have concerns on biodiversity conservation. The areas parallel to the road are not undisturbed and over the years the ecological changes due to human activities in those areas have resulted to its present predominantly agricultural landscapes.

E2. Construction

E2.1 Inadequate Disclosure of Project Information and GRM

75. To ensure that host communities are aware of the grievance redress mechanism and project implementation schedule and activities, these aspects will be communicated by the DPWH with LGU representatives of the host communities. In particular, such communication will be carried out by the Environmental Officer (EO) of the Office of the District Engineer with the support of the CSC through consultations with the municipal and barangay officials in advance of activities, when and where noise, dust and other nuisances may be expected, etc. and how affected persons can access the GRM for environmental concerns related to the project.

76. The consultation, which may be attended by other interested stakeholders, will be conducted by the EO and CSC prior to commencement of site clearing and quarterly thereafter or as agreed with the stakeholders.

E2.2 Local Air Pollution

77. Air emissions during construction mainly arise from the operation of construction vehicles and clearing of rubble and demolished bridges, operation of quarry pits and hauling of materials. Emissions from rock crushing operations, aggregate drying, concrete batching plants and hot mix plants which will be required for works in specific roads also degrade air quality. Movement of haul trucks during spoil transport will also generate dust and has the potential to affect communities located along the route towards the spoil disposal area. The problem is present wherever construction is taking place in varying degrees, but is generally not so great as to affect regional air quality; however impacts are most severe where there are communities, homes, businesses and institutional buildings in the vicinity of construction that causes local ground level air quality to deteriorate. Sensitive receptors located along the alignment of PR 07 are houses, a church and a commercial building.

78. To minimize dust and gaseous emissions during construction phase, the contractor will ensure that:

a) Regular water spraying/dampening dust emissions from disturbed soil, roadway construction surfaces and haul roads wherever there are sensitive receptors (such as houses, churches, businesses, schools, medical facilities) nearby is undertaken. Spraying will be done twice daily or at such frequency as is needed to suppress dust emission to acceptable levels.

b) Regular removal of debris and spoil piles and clean-up after completion of a section.

c) All vehicles transporting dusty materials will be tightly covered to prevent release of fugitive dust.

d) Rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) will be removed a sufficient distance (at least 500 m) from habitations and community environments including other sensitive receptors (churches, schools, medical facilities, etc.) to assure that there will be no community impacts from such activities. It is due to fine particles or offensive odor which such facilities generate often reach a point within 500m from the source under certain conditions (e.g. wind strength/direction). Establishment and

operation of these facilities must be approved by the relevant authorities (e.g., EMB-DENR, LGUs).

e) All equipment, machinery and vehicles used for the project must be well maintained to ensure proper functioning thereby minimizing contribution to air pollution.

f) For storage areas of construction materials such as sand, gravel, cement, etc. , provisions will be made to prevent materials from being blown away towards sensitive receptors.

g) Roads will be regularly cleaned to remove tracked mud, cement, etc.

h) Stockpiling of spoils near sensitive receptors will be prohibited.

i) Asphalt plants, concrete batching plants and crushing plants will be equipped with dust suppression devices such as water sprays, dust collectors, covered conveyor, etc.

j) Speed limits will be imposed on construction vehicles to minimize dust emission along areas where sensitive receptors are located.

k) Burning of all types of wastes generated at the construction sites, work camps and other project-related activities will be strictly prohibited.

l) Stockpiles of sand and aggregate greater than 20 m^3 for use in concrete mixing will be enclosed on three sides, with walls extending above the pile and two meters beyond the front of the piles.

m) Water sprays will be used during the delivery and handling of all raw sand and aggregates, and other similar materials, when dust is likely to be created and to dampen such stored materials during dry and windy weather to avoid impacts to sensitive receptors.

n) Cement and other such fine-grained materials delivered in bulk will be stored in closed containers.

E2.3 Noise

79. Noise impacts will originate from the operation of construction equipment. The range of typical noise levels in relation to distance from a construction site is shown in **Table 16**. Sensitive receptors within 100 m from the project road may be adversely affected by construction[10] noise. Noise levels due to construction activities should not exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime based on World Health Organization recommendations.

[10] For example, when a construction machine with 110 dBA of acoustic power level such as a concrete breaker operates, noise level of 70 dBA is expected to reach at 90 m far from the source, based on an authorized theoretical formulation.

Table 16: Construction Noise / Distance Relationship

Distance from Construction Site (m)	Range of Typical Noise Levels (dBA)
8	82 – 102
15	75 – 95
30	69 – 89
61	63 – 83
91	59 – 79
122	57 – 77
152	55 – 75
305	49 – 69

Source: Dept. of Transportation (USA)

80. Construction noise levels are expected to exceed WHO guidelines and would temporarily affect sensitive receptors (SRs) close to the construction zone. Along PR 07, SRs found are houses, churches, schools and a health center **(Table 17)**. **Table 18** indicates noise levels for common construction machinery.

Table 17: Sensitive Receptors along PR 07

Receptor	Location (chainage)	Approximate Distance (m) from edge of road
Residential area	Sta. 1984+000 to Sta.1984+800	1.00 to 5.00
Health Center	Sta. 1984+400	11.68
School	Sta. 1984+450	10.20
Chapel	Sta. 1984+570	3.37
Chapel	Sta. 1984+800	7.74
Residential area	Sta. 1988+600 to Sta.1989+200	1.00 to 5.00
Residential area	Sta. 1989+600 to Sta.1991+200	1.00 to 5.00
Chapel	Sta. 1990+100	13.00
Residential area	Sta. 1992+800 to Sta.1993+300	1.00 to 5.00
Residential area	Sta. 1998+400 to Sta.1998+800	1.00 to 5.00
School	Sta. 1998+700	14.00
School	Sta. 1998+770	23.16

Table 18: Construction Machinery Noise

Equipment	Noise Emission Level (dBA) at Distances (m) from Equipment										
	5	10	15	20	40	60	80	100	150	200	300
1 Bulldozer	86	80		74	68	64.5	62	60	56.5	54	50.5
2 Excavator	84	78		72	66	62.5	60	58	54.5	52	48.8
3 Loader	90	84		78	72	68.5	66	64	60.5	58	54.5
4 Land scraper	90	84		78	72	68.5	66	64	60.5	58	54.5
5 Mixing Equipment	87	81		75	69	65.5	63	61	57.5	55	51.5
6 Roller	87	81		75	69	65.5	63	61	57.5	55	51.5
7 Vibrator road roller	86	80		74	68	64.5	62	60	56.5	54	50.5
8 Backhoe			81								
9 Compactor			82								
10 Concrete mixer			85								
11 Crane (mobile)			83								
12 Generator			81								
13 Jack hammer			88								
14 Paver			89								
15 Pneumatic tool			85								
16 Pump			76								
17 Shovel			82								
18 Truck			88								

- *Source for Equipment 1-7: Initial Environmental Examination (IEE) of the Proposed Logistics development Project. Government of Mongolia. 2011.*
- *Source for Equipment 8-18: Based on Figure 1 – Construction Equipment Noise Ranges. Noise from Construction Equipment and operations, Building Equipment and Home Appliances. US-EPA. 31 December 1971.*
- *A blank field indicates no data available.*

81. Noise impacts are an unavoidable consequence of construction that will be mitigated through implementation of the following measures:

a) Limit the duration of noisy construction activities to daylight hours, whenever possible, in the vicinity of sensitive receptors.

b) In areas near houses or noise-sensitive sites, noisy equipment will not be operated during nighttime to early morning (19:00H – 06:00H).

c) Workers exposed to high noise levels will be provided with ear plugs.

d) The contractors will provide prior notification to the community on the schedule of construction activities.

e) Whenever possible, noisy equipment will be completely enclosed which can significantly reduce noise levels.

f) Any stationary equipment that produce high noise levels (e.g., portable diesel generators, compressors, etc.) will be positioned as far as is practical from sensitive receptors.

g) Construction traffic routes will be defined in cooperation with local communities and traffic police to minimize noise and nuisance.

h) Vehicle speeds will be reduced around sensitive receptors.

i) Concrete batching plants will be located at least 500 m away from sensitive receptors.

j) Temporary noise barriers will be installed along the edge of the road, as necessary, in front of sensitive receptors facing heavy construction activities.

k) Prior to undertaking noisy activities, the contractor will consult with village leaders and representatives from the religious sites and schools along the project road regarding construction schedule so as to minimize disturbance to important events such as ceremonies, examination period and the like.

E2.4 Impacts due to Spoils Disposal

82. The Project will generate spoils from road widening and replacement of concrete spillways. The spoils will consist of about 11,500 m^3 of hard rock and about 18,400 m^3 of soft rock.To ensure proper handling and disposal of such materials, prior to excavation, contractors will submit a spoils plan to concerned authorities such as LGUs and DPWH for approval. A copy of the approved plan will be submitted to ADB. The plan will show the location of proposed excavation sites, cut locations, fill and/or disposal sites for excess cut and, and disposal sites for concrete resulting from spillway demolition. The plan will include photographs of the sites and will also indicate the existing land use and capacity of the disposal site. The contractor will ensure that spoils disposal will not encroach on surface water courses, will not cause sedimentation or obstruction of stream/river flow and not cause damage to agricultural land, irrigation, densely vegetated areas, forests, properties and other productive sites.

E2.5 Impacts from Operation of Borrow Areas and Quarries

83. The Project will require embankment fill and construction materials that will be sourced from borrow pits and quarries. For commercial borrow pits and quarries, the contractor will ensure that only facilities with necessary environmental permits will be used for the project. For project-specific facilities, i.e., those that will be established and solely operated for the project, the contractor will ensure that these are covered by necessary environmental permits. Prior to operation of these facilities, the contractor will submit to the LGU and DPWH a plan showing the location/s of borrow pits and quarries to be used, as well as timeframe and mitigation measures to be implemented to rehabilitate project-specific borrow pits and quarries. The contractor will also ensure that topsoil will be properly removed, stockpiled and preserved for later use during restoration of the borrow pit. Vegetation cover will also be provided during rehabilitation of the site. Upon completion of extraction activities, quarries and borrow pits will be dewatered, signages and fences installed, as appropriate, to minimize health and safety risks.

E2.6 Erosion and Unstable Slopes

84. Soil erosion and unstable side slopes susceptible to landslides are anticipated along the alignment of PR 07 where raising of embankment is required. Impacts due to soil erosion and unstable side slopes may include: i) increased run off and sedimentation causing a increased flood hazard downstream; ii) loss of topsoil that could affect vegetation; (iii) deposition of sediments to water bodies such as rivers and streams thereby adversely water quality and aquatic organisms; iv) damage to vegetation by burying or gulling; and v) development of unsightly cuts and fills that have been riddled by uncontrolled erosion and gulling. The above impacts will be addressed through:

a) Planting of native species of trees and landscaping along the roads and embankment slopes, as appropriate.

b) Construction activities in hilly areas will be carried out intensively during dry season. However, as the area is not generally typhoon-prone, construction work during wet season is likely feasible.

c) Slope protection measures (e.g., sodding) will be implemented to avoid impacts to agricultural land and adjacent properties. Areas to be cleared of vegetation for construction will be restricted to the minimum required for immediate works.

E2.7 Deterioration of Water Quality and Soil Contamination

85. The potential sources of water pollution associated with different construction activities include excavation and filling, bore piling and pier construction for bridge works, concrete mixing, refueling facilities, and equipment maintenance. Water from concrete batching plants and casting yards is expected to be alkaline with high concentration of total suspended solids (TSS). Measures to minimize impacts to soil and water quality are as follows:

a) Control of siltation during construction will be achieved through limiting the exposure of areas prone to erosion.

b) Observing proper management of spoils by surrounding the stockpile with bund.

c) Transporting spoils immediately to final disposal sites.

d) Sodding the spoils stockpile if prolonged storage is necessary.

e) Bentonite slurry used during bridge construction will be collected and processed in a closed system and discharge into watercourses will be prohibited.

f) Spillage of bentonite in agricultural land will be cleaned immediately to prevent caking and hardening.

g) Prior to establishment and operation of concrete batching plants and casting yards, the contractor will obtain the necessary environmental permits.

h) Retention ponds with sufficient specifications/capacity will be constructed for treatment of wastewater (e.g., from washing of equipment such as mixer drums, trucks and chute, contact storm water, etc.).

i) The contractor will operate and maintain the retention ponds to ensure that effluent quality will meet applicable standards.

j) Equipment service and maintenance yards will be provided with impermeable flooring and collection sump.

k) Water tight receptacles will be provided in all the equipment maintenance shops for waste oil, oily rags, spent oil filters, solvents and oily containers.

l) Disposal of wastes contaminated with hydrocarbons will be through authorized waste handlers and recyclers.

m) Refueling and servicing of equipment will only be carried out in areas adequately equipped to collect leaks and spills.

n) Fuel and other hydrocarbons will be stored in a roofed area that has an impervious floor and bund around it.

o) Fuel storage area will be located away from water-courses, flood-prone areas and workers camps.

p) There will be availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored and used.

q) If spills or leaks of hazardous materials do occur, immediate clean-up will be undertaken.

r) Relevant construction personnel will be trained in handling of fuels/hazardous substances and spill control procedures.

s) All storage containers of hazardous materials and wastes will be properly labeled and maintained in good condition.

t) Restoration of temporary work sites will include removal and treatment or proper disposal of oil contaminated soils.

E2.8 Loss of Vegetation

86. The project will require removal of roadside trees and other vegetation (shrubs, grass, agricultural crops, etc.) to give way to road improvement and widening. The tree inventory carried out based on the detailed design shows that there are 10,494 roadside trees that will need to be cut inside the 30-m right of way (**Appendix 1).** Of these, 30 stands consisting of 29 Para rubber trees (*Hevea brasiliensis)* and 1 mahogany (*Swietenia macrophylla*) are on public land. The rest (10,464) are planted trees on private land. A total of 31 stands belonging to six species are considered either endangered or critically endangered based on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species 2017 and/or The National List of Threatened Philippine Plants (NLTPP) under DENR Administrative Order No. 2007-01. Of these 6 species, however, only three are considered endangered or critically endangered based on NLTPP.

(i) *Dipterocarpus grandifloras* (2 stands) – IUCN (critically endangered), NLTPP (not listed)

(ii) *Hopea mindanensis* (1 stand) – IUCN (critically endangered), NLTPP (critically endangered)

(iii) *Parashorea malaanonan* (2 stands) – IUCN (critically endangered), NLTPP (not listed)

(iv) *Pterocarpus indicus* (18 stands) – IUCN (vulnerable), NLTPP (critically endangered)

(v) *Shorea contorta* (4 stands) – IUCN (critically endangered), NLTPP (vulnerable)

(vi) *Vitex parviflora* (4 stands) – IUCN (vulnerable), NLTPP (endangered)

87. Only a few stands of endangered and critically endangered species of trees will be cut and these are found on roadside private lands that have been largely modified for agricultural and tree production/plantation. Since none of these areas are within protected areas or are critical habitats/ high biodiversity areas which support survival of critically endangered species, ecological impacts are not considered significant.

88. While compensation for all cut trees will be paid to affected persons consistent with the resettlement plan prepared for the project, this does not guarantee that the private land owner will replace the trees. To compensate for the loss of trees, the following will be implemented:

a) DPWH will obtain a tree cutting permit in compliance with PD 705 (Revised Forestry Code of the Philippines). No tree cutting will be undertaken without the necessary permit to be issued by the Community Environmental and Natural Resources Office (CENRO) of the DENR.

b) The tree cutting program, which will be undertaken by DPWH through a contractor, will be based on the Tree Chart to be prepared by the CENRO. The said chart will be generated through a tree inventory (also to be conducted by the CENRO) detailing the species, diameter at breast height and global positioning system (GPS) reading of each tree. The Tree Chart will also include a site development plan/road alignment plan indicating the location of each tree to be cut.

c) Marking of each tree will be carried out by the CENRO staff. Tree cutting can only be undertaken under close supervision of CENRO staff who will be present at the site throughout the duration of cutting activities. Cut trees will be turned over to the CENRO.

d) DPWH will undertake replacement of cut trees in compliance with DENR Memorandum Order no. 05 of 2012: Uniform Replacement Ratio for Cut or Relocated Trees which mandates that "*For planted trees in private and forest lands not covered under item 2.1 (i.e., private lands and forest lands exclusively established for tree plantations/timber production purposes) tree replacement shall be 1:50 while naturally growing trees on the same areas, including those affected by development projects shall have 1:100 ratio in support of the National Greening Program (NGP) and climate change initiatives of the Government*". Such tree replacement is further mandated in a Joint Memorandum Circular No. 2, series of 2014: Guidelines for the Implementation of the DPWH-DENR-DSWD Partnership on the Tree Replacement Project co-signed by the Secretaries of the DPWH, DENR and Department of Social Welfare and Development (DSWD). Based on the above ratio, it is estimated that DPWH will be required to purchase 526,000 tree seedlings to be turned over to the CENRO. The species will be determined by the CENRO. The seedlings will be distributed in various areas for replanting consistent with the NGP. Only the cost of seedlings (estimated at PhP 2.6 M or USD 52,000) will be shouldered by DPWH since the cost for replanting and maintenance will be covered under the NGP budget.

e) DPWH will ensure that one of their environment specialists and/or that of the supervision consultant will closely monitor the tree cutting activities to ensure that these will comply with the provisions of the Tree Cutting Permit and corresponding Tree Chart. As part of the semi-annual environmental monitoring report to be submitted to ADB, DPWH will report on the status of tree cutting, any issues/concerns, corresponding actions and other relevant matters.

f) To avoid unnecessary impacts to vegetation, the contractor will prohibit cutting of trees for firewood and for other uses in the Project, and will ensure that tree cutting is limited to areas as approved by the CENRO.

E2.9 Occupational Health and Safety Hazards

89. Workers will be exposed to safety hazards due to operation of heavy equipment, performance of other construction activities, etc. as well as health hazards associated with inadequate sanitation facilities and other accommodation amenities, etc. The following measures will be implemented by the contractor to minimize adverse impacts:

a) Use of personal protective equipment (PPE) such as safety shoes, safety hat, goggles, safety belt, ear protection or other garments or equipment designed to protect the wearer's body from injury will be strictly observed during construction.

b) Provision of first aid kits that are readily available to workers as well as access to or availability of a health worker to attend to any immediate health needs of workers and in case of untoward incidents.

c) Conduct orientation for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc., and prevention of HIV/AIDS and other related diseases.

d) Installation of adequate drainage in workers camps to avoid water logging/accumulation of stagnant water and formation of breeding sites for mosquitoes.

e) Provision of separate clean housing with sufficient ventilation and separate hygienic sanitation facilities for male and female workers

f) Provision of reliable supply of water for drinking, cooking and washing purposes at the workers' camps.

g) Proper collection and disposal of solid wastes within the workers'/construction camps consistent with local regulations.

h) Provision of fire-fighting equipment at the work areas, as appropriate, and at workers camps.

i) Treatment of wastewater emanating from workers camps, construction camps and other project-related activities and facilities consistent with national regulations.

j) Use of reversing signals on all construction vehicles.

E2.10 Public Health and Safety Hazards

90. Health and safety hazards may also be experienced by adjoining communities due to activities that will generate elevated noise levels and excessive dust, unsafe construction practices, etc. To protect the health and safety of host communities, the following measures will be implemented by the contractor:

a) Installation of sturdy fencing around excavation areas and construction sites.

b) Provision of proper signage and lighting at night at the periphery of the construction site to warn and direct traffic and pedestrians.

c) Deployment of security personnel in hazardous areas to restrict public access.

d) Imposition of speed limits for construction vehicles along residential areas and where there are other sensitive receptors.

e) Orientation of drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.

f) If necessary, provide safe passageways for pedestrians crossing the construction site.

g) At construction areas, provide safe access to farmland and other properties.

E2.11 Traffic Obstruction

91. The project will affect land access in a number of ways during the construction stage since civil works will be undertaken on an existing road. Hauling of construction materials through the main thoroughfares will also add to the present volume of traffic. Construction activities will require partial road closure which can cause traffic delays and unsafe conditions for vehicles and pedestrians. The contractor will implement the following to minimize impacts:

a) Provide signs advising road users that construction is in progress, particularly in areas where the project alignment crosses existing roads and where construction related-facilities are located.

b) Employ flag persons to control traffic when construction equipment is entering or leaving the work area.

c) Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.

E2.12 Accidental Discovery of Artefacts

92. In the event of unanticipated discoveries of cultural or historic artefacts (movable or immovable) in the course of the work, the contractor will take all necessary measures to protect the findings. Procedures to be followed in case of discovery of artefacts are:

a) Contractor to immediately cease operations at the site of discovery
b) Contractor to inform the CSC and Environment Officer of the Office of the District Engineer
c) CSC to relay information to DPWH,
d) DPWH to notify the National Historical Commission of the Philippines (NHCP) and/or other concerned government agencies for the next steps
e) Recommence work only after NHCP has provided official notification accordingly

E2.13 Damage to Properties

93. Local roads will be likely used to transport equipment, construction materials and spoils. Since local roads are usually unpaved and has low load bearing capacities, use of these roads by the project may result to deterioration of the roads which can cause inconvenience to the local

communities. Damage to properties such as houses, other structures, agricultural land, water supply facilities, etc. may also occur due to operation of vehicles and equipment, and construction-related activities. The contractor will implement the following measures to address such impact:

a) The contractor will immediately repair and/or compensate for any damage that it causes to properties (houses, farmlands, aquaculture ponds, irrigation canals, etc.), community facilities such as water supply, power supply, communication facilities and the like.
b) Access roads used for transport of construction materials and other construction-related activities will be maintained by the Contractor in at least in their pre-project condition for the duration of construction.

E2.14 Unanticipated Environmental Impacts

94. If any unanticipated impacts become apparent during project implementation, the DPWH will update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The updated or newly prepared documents will be submitted to ADB for review, clearance and public disclosure.

E3. Operation Phase

E3.1 Air Quality

95. The impact on air quality during operation stage depends upon traffic volume, traffic fleet including fuel type and prevailing atmospheric conditions. An unstable atmospheric condition disperses pollutants more and results in to low pollutant concentrations while stable atmospheric conditions build-up the pollution level. To assess the likely impacts on the ambient air quality due to the proposed highway project, the prediction of nitrogen dioxide (NO_2) and particulate matter (PM) concentrations have been carried out using line source dispersion modeling approach, based on Gaussian equation. The modeling for this project has been carried out using CALINE-4, line source model developed by the California Transport Department, USA. The project was conducted to predict 1-hourly increment in NO_2 and PM10 concentrations for the base year (Yr 2015) and future traffic, i.e. quinquennially Yr 2020 to Yr 2040. Since the impacts of other pollutant concentrations are considered major in this case, this study focuses on the NO_2 and PM10 dispersion, to be generated from the traffic on the improved PR 07. Input parameters for the pollutant concentration prediction for CALINE-4 include traffic volume, road geometry, emission factors, meteorological conditions (e.g. wind speed/direction, ambient temperature etc.) and receptor location (distance from the edge of the road). The predicted hourly average concentrations of NO_2 and PM10 during peak traffic are shown in **Table 19** and **Table 20**, respectively at six selected receptor locations.

96. It has been observed from the model output that when traffic volume increases, the concentration of air pollutants also increases correspondingly. However, the maximum predicted pollutant concentrations of NO_2 and PM10 which will be generated by the traffic are not considered to worsen the current ambient condition. The national ambient air quality guideline value for NO_2 is 0.2 ppm (24 hours) and 150 µg/$m^3$for PM10 (24 hours).

Table 19: NO_2 Predicted Concentrations (ppm) along PR 07

Year	Predicted NO_2 Concentration (ppm)											
	Distance from the edge of the road, m (left side)						Distance from the edge of the road, m (right side)					
	200	100	40	20	10	1	1	10	20	40	100	200
2015	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
2025	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2030	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2035	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2040	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00

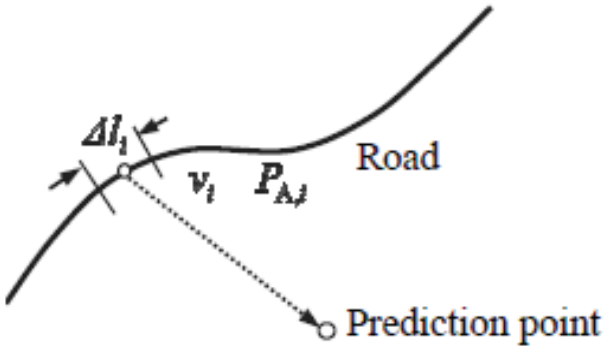
Table 20: PM10 Predicted Concentrations ($\mu g/m^3$) along PR 07

Year	Predicted PM10 Concentration ($\mu g/m^3$)											
	Distance from the edge of the road, m (left side)						Distance from the edge of the road, m (right side)					
	200	100	40	20	10	1	1	10	20	40	100	200
2015	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.4	0.3	0.3	0.2	0.1
2020	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.5	0.4	0.3	0.2	0.2
2025	0.2	0.3	0.4	0.5	0.6	0.8	0.8	0.6	0.5	0.4	0.3	0.2
2030	0.2	0.3	0.5	0.6	0.7	0.9	0.9	0.7	0.6	0.5	0.3	0.2
2035	0.3	0.4	0.5	0.7	0.8	1.1	1.1	0.8	0.7	0.5	0.4	0.3
2040	0.3	0.4	0.6	0.8	1.0	1.2	1.2	1.0	0.8	0.6	0.4	0.3

E3.2 Noise

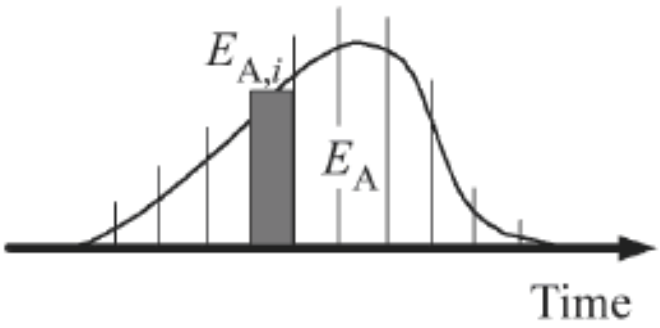
97. During operations, noise emissions from road vehicles may disturb community life and the living environment. Noise impacts from vehicles travelling along these roads are not expected to be significant due to the light traffic loads and the improved road surfaces for smooth driving.

98. The prediction model of road traffic noise, ASJ RTN-Model, computes the equivalent continuous A-weighted sound pressure level, LAeq, as described in the previous section. As the first step to calculate LAeq, the “unit pattern”, a time history of A-weighted sound pressure level at a prediction point is obtained as illustrated in **Figure 3** and **Figure 4**. Next, the unit pattern is integrated in terms of energy over the time of the passage of a vehicle to obtain the single-event sound pressure exposure level, LAeq. By applying the traffic volume NT, which means number of vehicles in T seconds, to the above value, LAeq, T is calculated by the following formula.



Source: The Acoustic Society of Japan

Figure 3: Sound Propagation from a Sound Source to a Prediction Point



Source: The Acoustic Society of Japan

Figure 4: Unit Pattern

99. As the worst case scenario, it was assumed that peak noise will be generated when one of each vehicle type is using a specific section of the road, by using the formula below:

$$L_{Aeq} = 10Log_{10}(\sum_{i=1}^{n} 10^{(Li/10)} \frac{N}{3600}) = L_{AE} + 10\log_{10} N - 35.6$$

Where:

LAeq = Predicted noise level, in dBA

Li = Rated noise rating, in dBA

N = Traffic volume per hour, in cars/h

LAE = Single-event sound pressure exposure level, in dB

100. The general flow for the calculation of road traffic noise is outlined as follows.

- The first step of the procedure is to set the road structure, the position of the source, the prediction point, the acoustical obstacles and ground surface conditions over the propagation path.
- The lane position for noise calculation is arranged one by one at the center of an each actual center lane. However, it is possible to combine two or more lanes into one hypothetical lane.

For instance, a hypothetical lane can be arranged both at the center of an up and a down lane, respectively.

- Discrete source positions are arranged. Generally the range is within ±20l (l: the shortest distance from the calculation lane to the prediction point) at an interval of l or less.
- Sound power level of the source, LWA, is set considering the running condition of the vehicle, the running speed of the vehicle and the corrections.
- The unit pattern is calculated separately by lane and by vehicle type, when one vehicle runs on the objective road.
- Time integration value of the unit pattern is calculated. The value corresponds to a single event sound exposure level, LAE. Finally, the equivalent continuous A-weighted sound pressure level, LAeq, T is calculated considering the traffic volume during the time interval as the time energy mean level.
- The calculation procedure from (A) to (F) is done by lane and by vehicle type, and the calculated values are added in energy-base in order to obtain the total noise level from the entire road at the prediction point. If necessary, structure borne noise from viaduct, attenuation due to buildings and influence by meteorological conditions are considered.

101. The model was set up and run to predict daily LAeq for the base year (Yr 2015) to Yr 2040 quinquennially, using forecasted traffic data on the improved road.

102. While predicted ambient levels exceed WHO guidelines **(Table 21)** for residential, institutional and educational areas, the increase by year 2030 at the nearest receptor along the road compared to year 2015 noise levels would be below 3 dBA **(Table 22)** which is the maximum increase (3 dBA) specified in the WHO guidelines for noise. These guidelines are set out in the International Finance Corp.-World Bank Group's Environment, Health and Safety Guidelines (2007).

Table 21: Noise Standards in General Areas (dBA)

Receptor	Daytime (7am-10pm)	Nighttime (10pm-7am)
A – residential, institutional, educational	55	45
B – industrial, commercial	70	70

Source: Guidelines for Community Noise, World Health Organization (WHO), 1999

Table 22: Predicted Ambient Noise Levels along PR 07

Year	Predicted Ambient Noise Levels (LAeq) in peak hour dB (A)									
	Distance from the edge of the road, m (left side)					Distance from the edge of the road, m (right side)				
	100	40	20	10	1	1	10	20	40	100
2015	50.7	54.4	57.1	59.6	65.5	65.5	59.6	57.1	54.4	50.7
2020	51.6	55.3	58.0	60.5	66.4	66.4	60.5	58.0	55.3	51.6
2025	52.4	56.2	58.9	61.4	67.3	67.3	61.4	58.9	56.2	52.4
2030	53.3	57.1	59.8	62.2	68.1	68.1	62.2	59.8	57.1	53.3
2035	54.1	57.9	60.6	63.0	68.9	68.9	63.0	60.6	57.9	54.1
2040	54.9	58.7	61.4	63.8	69.7	69.7	63.8	61.4	58.7	54.9

103. By 2035, the predicted increase in ambient noise at the nearest receptor along the road compared to year 2015 noise levels would be above 3 dBA. This increment exceeds the guideline for noise level increase). If necessary, to address noise impacts during the said period (i.e., by 2035); traffic calming measures, e.g., speed bumps, may be provided in areas where there are

sensitive receptors so as to further reduce noise levels from passing vehicles. Regular maintenance of pavement and traffic management especially near receptors would also further contribute to lower ambient noise levels.

E3.3 Induced Impacts

104. The Project will be carried out on an existing road and there is not likely to be any significant or abrupt change to the current pattern of movements caused by road upgrading. The project's induced impacts will be mainly positive. These benefits include improved access to social services and improved economic development opportunities.

F. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

105. Public consultations are needed to generate awareness, informed opinions/views, and suggestions/approaches. It is important that misconceptions are clarified and stakeholders are fully aware and informed about the project to eventually stimulate dynamic participation and support in the implementation of the development activities in the locality. It is important that the IEC be produced in local dialect to ensure effective understanding of the target populace.

106. The components of the IEC are the following:

- Dissemination of the outputs of the impact assessment
- Information on the project design
- Information on project implementation and monitoring

107. The proposed project has been presented to stakeholders through various consultation meetings held during the preparation of the Project. Likewise, the highlights of the IEE were communicated to the stakeholders during the PPTA through public presentation or distribution of information materials. The information included the following:

- Brief project description showing per road component.
- Potential environmental and socioeconomic issues/impacts per project phase
- Recommended mitigation and enhancement measures addressing both negative and positive impacts of the project
- Commitments/agreements and guarantees made by the proponent to comply with all the proposed measures and recommendations
- Participation of the stakeholders in project implementation

108. In complying with the requirements of ADB's Safeguard Policy Statement (SPS) (2009 and DAO 2003-30, public consultations were carried out to primarily inform the community about the proposed project and to provide opportunity to the community to participate and make clarifications on pertinent matters related to the project. The consultants conducted 2 public consultations for PR 07 **(Table 23** and **Appendix 2)**. These were attended by representatives of different sectors and organizations that will be affected by the project implementation. No significant environmental issues were brought up during the consultation besides the issue on resettlement. **Table 24** summarize the issues/concerns raised during the stakeholder's consultation and the response of the proponent. The issues and concerns raised in the other areas are similar, centering on the issue of resettlement.

Table 23: Summary Matrix of Public Consultations

DATE	VENUE	GENDER		TOTAL PARTICIPANTS
		Male	Female	
08/10/15 AM	Brgy. Situbo	25	39	114
08/10/15 PM	Brgy. New Dapitan	20	30	

109. A focus group discussion (FGD) was also carried out on June 19, 2015, at Alindahaw Hotel, Pagadian City participated by the Community of Environmental and Natural Resources Officers, Provincial Environmental Officer, and representatives from Regional Office of the Department of Environment and Natural Resources Region IX. **Table 24** summarize the output of the FGD.

Table 24: Perceived Impacts of the Proposed Road Projects

Positive Impacts	Negative Impacts
1. Increase of zonal valuation of land along highways	
2. Increase revenue collection	Influx of migrants resulting to environmental threats like solid waste build-up and shortage of health/sanitary facilities
3. Improve accessibility/transport of goods and services as hastened	Resource use becomes very high (e.g., tree cutting)
4. Facilitate environmental monitoring and supervision	
5. Improve business opportunity/tourism and trade	
6. Increase literacy rate	
7. Neutralize peace and order hotspots	
8. Eliminate “hide out” of lawless elements	
9. Environmental mitigation activity will improve	

Source: This PPTA

G. GRIEVANCE REDRESS MECHANISM

110. A subproject-specific grievance redress mechanism (GRM) will be established at the DPWH District Engineering Office (DEO) to receive, evaluate and facilitate the complaints/grievances of affected persons on the sub-project’s environmental performance. This mechanism will be disclosed to the host communities prior to commencement of site works.

111. The District Engineer will appoint an Environment Officer, and will establish the Grievance Redress Committee (GRC) to be chaired by the DPWH District Engineer. Members will include the following: (i) the contractor’s highest official at the site such as the Construction Manager or the Construction Superintendent; (ii) barangay chairperson; and (iii) environment specialist of the construction supervision consultant. For the quick filing of complaints, the DGRC will use the attached grievance intake form **(Appendix 3)**. The DEO’s Environment Officer will be responsible for registration of grievances and communication with the aggrieved party.

112. The steps to be followed in filing complaints and the procedures for redress are the following:

(i) complainant will provide the background and file the complaint verbally or in writing to the DEO, and the DEO's Environment Officer will assist the complainant in filling-up the grievance intake form;
(ii) within 2 working days, the Environment Officer, contractor's representative, and complainant will discuss if the complaint can be resolved without calling for a GRC meeting;
(iii) within 3 days of lodging the complaint, the DEO's environment officer will provide the complainant a written feedback on the process, steps and timeframe for resolving the complaint.
(iv) if the complaint cannot be resolved, a GRC meeting with the complainant will be called within 5 working days;
(v) the GRC will have 15 days to resolve the complaint;
(vi) the complainant will receive feedback from the DEO's environment officer within 5 working days after the various steps of the GRM are completed.
(vii) if unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial, administrative remedies or through concerned government agencies (e.g., Community Environment and Natural Resources Office and Provincial Environment and Natural Resources Office of DENR, Regional offices of the Environmental Management Bureau, etc.)

113. The GRC will receive, follow-up and prepare monthly reports regarding all complaints, disputes or questions received about the Project and corresponding actions taken to resolve the issues. These reports will be included in the semi-annual environmental monitoring reports to be submitted by DPWH to ADB.

H. ENVIRONMENTAL MANAGEMENT PLAN

114. The Environmental Management Plan (EMP) is the synthesis of all proposed mitigation and monitoring actions, set to a time-frame with specific responsibility assigned and follow-up actions defined. It contains all the information for the proponent, the contractor and the regulatory agencies to implement the project within a specified time-frame

115. This EMP consists of a set of mitigation, monitoring and institutional measures to be taken for the project to avoid, minimize and mitigate adverse environmental impacts and enhance positive impacts. The plan also includes the actions needed for the implementation of these measures. The major components of the EMP are:

(i) Mitigation of potentially adverse impacts;
(ii) Monitoring of EMP implementation during project implementation and operation; and
(iii) Institutional arrangements to implement the EMP.

116. The main objectives of this EMP are:

(i) To ensure compliance with ADB's applicable safeguard policies, and regulatory requirements of the Government of the Philippines;
(ii) To formulate avoidance, mitigation and compensation measures for anticipated adverse environmental impacts during construction and operation, and ensure that environmentally sound, sustainable and good practices are adopted;
(iii) To stipulate monitoring and institutional requirements for ensuring safeguard compliance; and
(iv) The project roads and relative facilities should be environmentally sustainable.

117. The identified environmental issues and corresponding mitigation measures and monitoring are provided in **Table 25** and **Table 26**.

Table 25: Environmental Mitigation Measures

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
Construction Stage				
1. Inadequate disclosure of project information and grievance redress mechanism	a) Before commencement of site clearing and civil works, the grievance redress mechanism (GRM) as well as project implementation schedule and activities will be communicated with the LGU representatives of the host communities. Such communication will be carried out through consultations with the municipal and barangay officials in advance of activities, when and where noise, dust and other nuisances may be expected, etc. and how affected persons can access the GRM for environmental concerns related to the project. The consultation will continue on a quarterly basis or as agreed with the stakeholders.	Part of Project cost	DPWH/construction supervision consultant (CSC)	Environment and Social Safeguards Division (ESSD) of DPWH/CSC
2. Improper implementation of environmental management plan (EMP)	Engage qualified environmental and safety officer who will ensure compliance with environmental statutory requirements, contractual obligations and EMP provisions	Part of bid cost	Contractor	ESSD/CSC
3. Local air pollution	a) Prior to establishment of facilities such as concrete batching plant and asphalt batching plant, the contractor will prepare a corresponding site development plan/location plan as well as an action plan to address impacts due to operation of such facilities. The plans will be reviewed and approved by the CSC and DPWH to ensure that these are consistent with the provisions of the project's environmental management plan (EMP). A copy of the plans will be submitted to ADB before establishment of the facilities.	Part of bid cost	Preparation: Contractor Review and approval: DPWH and CSC	ESSD/CSC
	b) Regular water spraying/dampening dust emissions from disturbed soil, roadway construction surfaces and haul roads wherever there are sensitive receptors (such as houses, churches, businesses, schools, medical facilities) nearby is undertaken. Spraying will be done twice daily or at such frequency as is needed to suppress dust emission to acceptable levels.	Part of bid cost	Contractor	ESSD/CSC
	c) Regular removal of debris and spoil piles and clean-up after completion of a section.	Part of bid cost	Contractor	ESSD/CSC
	d) All vehicles transporting dusty materials will be tightly covered	Part of bid	Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	to prevent release of fugitive dust.	cost		
	e) Rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) will be removed a sufficient distance (at least 500 m) from habitations and community environments including other sensitive receptors (churches, schools, medical facilities, etc.) to assure that there will be no community impacts from such activities	Part of bid cost	Contractor	ESSD/CSC
	f) Establishment and operation of rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) must be approved by the relevant authorities (e.g., EMB-DENR, LGUs).	Part of bid cost	Contractor	ESSD/CSC
	g) All equipment, machinery and vehicles used for the project must be well maintained to ensure proper functioning thereby minimizing contribution to air pollution.	Part of bid cost	Contractor	ESSD/CSC
	h) For storage areas of construction materials such as sand, gravel, cement, etc. , provisions will be made to prevent materials from being blown away towards sensitive receptors.	Part of bid cost	Contractor	ESSD/CSC
	i) Roads will be regularly cleaned to remove tracked mud, cement, etc.	Part of bid cost	Contractor	ESSD/CSC
	j) Stockpiling of spoils near sensitive receptors will be prohibited.	Part of bid cost	Contractor	ESSD/CSC
	k) Asphalt plants, concrete batching plants and crushing plants will be equipped with dust suppression devices such as water sprays, dust collectors, covered conveyor, etc.	Part of bid cost	Contractor	ESSD/CSC
	l) Speed limits will be imposed on construction vehicles to minimize dust emission along areas where sensitive receptors are located.	Part of bid cost	Contractor	ESSD/CSC
	m) Burning of all types of wastes generated at the construction sites, work camps and other project-related activities will be strictly prohibited.		Contractor	ESSD/CSC
	n) Stockpiles of sand and aggregate greater than 20 m^3 for use in concrete mixing will be enclosed on three sides, with walls extending above the pile and two meters beyond the front of the piles.	Part of bid cost	Contractor	ESSD/CSC
	o) Water sprays will be used during the delivery and handling of	Part of bid	Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	all raw sand and aggregates, and other similar materials, when dust is likely to be created and to dampen such stored materials during dry and windy weather to avoid impacts to sensitive receptors.	cost		
	p) Cement and other such fine-grained materials delivered in bulk will be stored in closed containers.	Part of bid cost	Contractor	ESSD/CSC
4. Noise	a) Limit the duration of noisy construction activities to daylight hours, whenever possible, in the vicinity of sensitive receptors.		Contractor	ESSD/CSC
	b) In areas near houses or noise-sensitive sites, noisy equipment will not be operated during nighttime to early morning (19:00H – 06:00H).		Contractor	ESSD/CSC
	c) Workers exposed to high noise levels will be provided with ear plugs.	Part of bid cost	Contractor	ESSD/CSC
	d) The contractors will provide prior notification to the community on the schedule of construction activities.		Contractor	ESSD/CSC
	e) Whenever possible, noisy equipment will be completely enclosed which can significantly reduce noise levels.	Part of bid cost	Contractor	ESSD/CSC
	f) Any stationary equipment that produce high noise levels (e.g., portable diesel generators, compressors, etc.) will be positioned as far as is practical from sensitive receptors.		Contractor	ESSD/CSC
	g) Construction traffic routes will be defined in cooperation with local communities and traffic police to minimize noise and nuisance.		Contractor	ESSD/CSC
	h) Vehicle speeds will be reduced around sensitive receptors.		Contractor	ESSD/CSC
	i) Concrete batching plants will be located at least 500 m away from sensitive receptors.		Contractor	ESSD/CSC
	j) Temporary noise barriers will be installed along the edge of the road, as necessary, in front of sensitive receptors facing heavy construction activities.	Part of bid cost	Contractor	ESSD/CSC
	k) Prior to undertaking noisy activities, the contractor will consult with village leaders and representatives from the religious sites and schools along the project road regarding construction schedule so as to minimize disturbance to important events such as ceremonies, examination period and the like.		Contractor	ESSD/CSC
5. Spoils disposal	a) Prior to excavation, contractors will submit a spoils disposal	Part of bid	Preparation:	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	plan to concerned authorities such as LGUs and DPWH for approval. The plan will show the location of proposed excavation sites, cut locations, fill and/or disposal sites for excess cut and, and disposal sites for concrete resulting from spillway demolition. The plan will include photographs of the sites and will also indicate the existing land use and capacity of the disposal site. A copy of the approved plan will be submitted to ADB.	cost	Contractor Review and approval: DPWH and CSC	
	b) The contractor will ensure that spoils disposal will not encroach on surface water courses, will not cause sedimentation or obstruction of stream/river flow and will not cause damage to agricultural land, irrigation, densely vegetated areas, forests, properties and other productive sites.	Part of bid cost	Contractor	ESSD/CSC
6. Impacts from operation of borrow areas and quarries	a) For commercial borrow pits and quarries, the contractor will ensure that only facilities with necessary environmental permits will be used for the project.	Part of bid cost	Contractor	ESSD/CSC
	b) For project-specific facilities, i.e., those that will be established and solely operated for the project, the contractor will ensure that these are covered by necessary environmental permits.	Part of bid cost	Contractor	ESSD/CSC
	c) Prior to operation of borrow pits and quarries, the contractor will submit to the LGU and DPWH a plan showing the location/s of such facilities to be used, as well as timeframe and mitigation measures to be implemented to rehabilitate project-specific borrow pits and quarries.	Part of bid cost	Preparation: Contractor Review and approval: DPWH and CSC	ESSD/CSC
	d) The contractor will also ensure that topsoil will be properly removed, stockpiled and preserved for later use during restoration of the borrow pit.	Part of bid cost	Contractor	ESSD/CSC
	e) Vegetation cover will be provided during rehabilitation of the site.	Part of bid cost	Contractor	ESSD/CSC
	f) Upon completion of extraction activities, quarries and borrow pits will be dewatered, signages and fences installed, as appropriate, to minimize health and safety risks.	Part of bid cost	Contractor	ESSD/CSC
7. Erosion and unstable slopes	a) Undertake planting of native species of trees and landscaping along the roads and embankment slopes, as appropriate.	Part of bid cost	Contractor	ESSD/CSC
	b) Construction activities in hilly areas will be carried out intensively during dry season. However, as the area is not		Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	generally typhoon-prone, construction work during wet season is likely feasible.			
	c) Slope protection measures (e.g., sodding) will be implemented to avoid impacts to agricultural land and adjacent properties. Areas to be cleared of vegetation for construction will be restricted to the minimum required for immediate works.	Part of bid cost	Contractor	ESSD/CSC
8. Deterioration of water quality and soil contamination	a) Limit the exposure of areas prone to erosion.		Contractor	ESSD/CSC
	b) Observe proper management of spoils by surrounding the stockpile with bund.	Part of bid cost		ESSD/CSC
	c) Transport spoils immediately to final disposal sites.	Part of bid cost	Contractor	ESSD/CSC
	d) Undertake sodding of spoils stockpile if prolonged storage is necessary.	Part of bid cost	Contractor	ESSD/CSC
	e) Bentonite slurry used during bridge construction will be collected and processed in a closed system and discharge into watercourses will be prohibited.	Part of bid cost	Contractor	ESSD/CSC
	f) Spillage of bentonite in agricultural land will be cleaned immediately to prevent caking and hardening.	Part of bid cost	Contractor	ESSD/CSC
	g) Prior to establishment and operation of concrete batching plants and casting yards, the contractor will obtain the necessary environmental permits.	Part of bid cost	Contractor	ESSD/CSC
	h) Retention ponds with sufficient specifications/capacity will be constructed for treatment of wastewater (e.g., from washing of equipment such as mixer drums, trucks and chute, contact storm water, etc.).	Part of bid cost	Contractor	ESSD/CSC
	i) Operate and maintain the retention ponds to ensure that effluent quality will meet applicable standards.	Part of bid cost	Contractor	ESSD/CSC
	j) Equipment service and maintenance yards will be provided with impermeable flooring and collection sump.	Part of bid cost	Contractor	ESSD/CSC
	k) Water tight receptacles will be provided in all the equipment maintenance shops for waste oil, oily rags, spent oil filters, solvents and oily containers.	Part of bid cost	Contractor	ESSD/CSC
	l) Disposal of wastes contaminated with hydrocarbons will be through authorized waste handlers and recyclers.	Part of bid cost	Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	m) Refueling and servicing of equipment will only be carried out in areas adequately equipped to collect leaks and spills.	Part of bid cost	Contractor	ESSD/CSC
	n) Fuel and other hydrocarbons will be stored in a roofed area that has an impervious floor and bund around it.	Part of bid cost	Contractor	ESSD/CSC
	o) Fuel storage area will be located away from water-courses, flood-prone areas and workers camps.	Part of bid cost	Contractor	ESSD/CSC
	p) There will be availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored and used.	Part of bid cost	Contractor	ESSD/CSC
	q) If spills or leaks of hazardous materials do occur, immediate clean-up will be undertaken.	Part of bid cost	Contractor	ESSD/CSC
	r) Relevant construction personnel will be trained in handling of fuels/hazardous substances and spill control procedures.	Part of bid cost	Contractor	ESSD/CSC
	s) All storage containers of hazardous materials and wastes will be properly labeled and maintained in good condition.	Part of bid cost	Contractor	ESSD/CSC
	t) Restoration of temporary work sites will include removal and treatment or proper disposal of oil contaminated soils.	Part of bid cost	Contractor	ESSD/CSC
9. Loss of vegetation	a) DPWH will obtain a tree cutting permit in compliance with PD 705 (Revised Forestry Code of the Philippines). No tree cutting will be undertaken without the necessary permit to be issued by the Community Environmental and Natural Resources Office (CENRO) of the DENR	Part of project cost	DPWH	ESSD/CSC
	b) Tree cutting can only be undertaken under close supervision of CENRO staff who will be present at the site throughout the duration of cutting activities.	Part of project cost	Contractor	ESSD/CSC
	c) Only trees marked based on the Tree Chart prepared by the CENRO will be cut.		Contractor	ESSD/CSC
	d) Cut trees will be turned over to the CENRO for disposal.		Contractor	ESSD/CSC
	e) In compliance with DENR Memorandum Order no. 05 of 2012: Uniform Replacement Ratio for Cut or Relocated Trees, purchase 526,000 tree seedlings (estimate only) and turn over to the CENRO.	Part of project cost (PhP 2.63 M = USD52,000)	DPWH	ESSD/CSC
	f) Ensure that one of their environment specialists and/or that of the supervision consultant will closely monitor the tree cutting activities to ensure that these will comply with the provisions	Part of project cost	DPWH/CSC	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	of the Tree Cutting Permit and corresponding Tree Chart.			
	g) As part of the semi-annual environmental monitoring report to be submitted to ADB, DPWH will report on the status of tree cutting, any issues/concerns, corresponding actions and other relevant matters.		DPWH/CSC	ESSD/CSC
	h) To avoid unnecessary impacts to vegetation, the contractor will prohibit cutting of trees for firewood and for other uses in the Project, and will ensure that tree cutting is limited to areas as approved by the CENRO.		Contractor	ESSD/CSC
10. Impacts on fauna	a) Prohibit workers from hunting wild animals.		Contractor	ESSD/CSC
	b) As much as possible, bridge works will be scheduled in dry season to minimize adverse impacts to fishery, river water quality and other aquatic resources.		Contractor	ESSD/CSC
11. Occupational health and safety hazards	a) Use of personal protective equipment (PPE) such as safety shoes, safety hat, goggles, safety belt, ear protection or other garments or equipment designed to protect the wearer's body from injury will be strictly observed during construction.	Part of bid cost	Contractor	ESSD/CSC
	b) Provision of first aid kits that are readily available to workers as well as access to or availability of a health worker to attend to any immediate health needs of workers and in case of untoward incidents.	Part of bid cost	Contractor	ESSD/CSC
	c) Conduct orientation for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc., and prevention of HIV/AIDS and other related diseases.	Part of bid cost	Contractor	ESSD/CSC
	d) Installation of adequate drainage in workers camps to avoid water logging/accumulation of stagnant water and formation of breeding sites for mosquitoes.	Part of bid cost	Contractor	ESSD/CSC
	e) Provision of separate clean housing with sufficient ventilation and separate hygienic sanitation facilities for male and female workers.	Part of bid cost	Contractor	ESSD/CSC
	f) Provision of reliable supply of water for drinking, cooking and washing purposes at the workers' camps.	Part of bid cost	Contractor	ESSD/CSC
	g) Proper collection and disposal of solid wastes within the workers'/construction camps consistent with local regulations.	Part of bid cost	Contractor	ESSD/CSC
	h) Provision of fire-fighting equipment at the work areas, as	Part of bid	Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	appropriate, and at workers camps.	cost		
	i) Treatment of wastewater emanating from workers camps, construction camps and other project-related activities and facilities consistent with national regulations.	Part of bid cost	Contractor	ESSD/CSC
	j) Use of reversing signals on all construction vehicles.		Contractor	ESSD/CSC
	k) Regular coordination with local authorities regarding project activities throughout the construction phase to reduce over-all security risks to the project.		Contractor and DPWH	ESSD/CSC
12. Public health and safety hazards	a) Installation of sturdy fencing around excavation areas and construction sites.	Part of bid cost	Contractor	ESSD/CSC
	b) Provision of proper signage and lighting at night at the periphery of the construction site to warn and direct traffic and pedestrians.	Part of bid cost	Contractor	ESSD/CSC
	c) Deployment of security personnel in hazardous areas to restrict public access.	Part of bid cost	Contractor	ESSD/CSC
	d) Imposition of speed limits for construction vehicles along residential areas and where there are other sensitive receptors		Contractor	ESSD/CSC
	e) Orientation of drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.		Contractor	ESSD/CSC
	f) If necessary, provide safe passageways for pedestrians crossing the construction site.	Part of bid cost	Contractor	ESSD/CSC
	g) At construction areas, provide safe access to farmland and other properties.	Part of bid cost	Contractor	ESSD/CSC
13. Traffic obstruction	a) Provide signs advising road users that construction is in progress, particularly in areas where the project alignment crosses existing roads and where construction related-facilities are located.	Part of bid cost	Contractor	ESSD/CSC
	b) Employ flag persons to control traffic when construction equipment is entering or leaving the work area.	Part of bid cost	Contractor	ESSD/CSC
	c) Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.	Part of bid cost	Contractor	ESSD/CSC
	a) Contractor to immediately cease operations at the site of discovery.		Contractor	ESSD/CSC

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
14. Accidental discovery of artefacts	b) Contractor to inform the CSC and Environment Officer of the Office of the District Engineer.		Contractor	ESSD/CSC
	c) CSC to relay information to DPWH.		CSC	ESSD/CSC
	d) DPWH to notify the National Historical Commission of the Philippines (NHCP) and/or other concerned government agencies for the next steps.		DPWH	ESSD/CSC
	e) Recommence work only after NHCP has provided official notification accordingly.		Contractor	ESSD/CSC
15. Damage to properties	a) The contractor will immediately repair and/or compensate for any damage that it causes to properties (houses, farmlands, aquaculture ponds, irrigation canals, etc.), community facilities such as water supply, power supply, communication facilities and the like.	Part of bid cost	Contractor	ESSD/CSC
	b) Access roads used for transport of construction materials and other construction-related activities will be maintained by the Contractor in at least in their pre-project condition for the duration of construction.	Part of bid cost	Contractor	ESSD/CSC
16. Unanticipated environmental impacts	a) If any unanticipated impacts become apparent during project implementation, the DPWH will update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The updated or newly prepared documents will be submitted to ADB for review, clearance and public disclosure.	Part of project cost	DPWH/CSC	ESSD/CSC
	b) Implement measures specified in the new or updated environmental assessment and EMP to address unanticipated environmental impacts.	Part of project cost	Contractor	ESSD/CSC
17. Need for additional environmental mitigation measures	Implement additional environmental mitigation measures, as necessary, to avoid, minimize and/or compensate for adverse impacts due to construction works and related activities performed by the contractor.	Part of bid cost	Contractor	ESSD/CSC
Operation Stage				
1. Noise	a) As necessary, install traffic calming measures, e.g., speed bumps in areas where there are sensitive receptors so as to further reduce noise levels from passing vehicles.	Part of Project cost	District Engineering Office (DEO)	DPWH

Environmental Impacts/Concerns	Proposed Mitigation Measures	Estimated Cost	Responsible for Implementation	Responsible for Monitoring
	b) Undertake regular maintenance of pavement and traffic management especially near receptors to contribute to lower ambient noise levels.	Part of Project cost	DEO	DPWH
2. Road safety hazards	a) Setting up warning and guide signs, arrow marks and providing delineation lines clearly along the road.	Part of Project cost	DPWH	
	b) Provision of traffic signals at key intersections.	Part of Project cost	DPWH	
	c) Improved road will have vertical curves that suit safe design criteria/requirement.	Part of Project cost	DPWH	
	d) Installation of chevron signs where required and speed limit signs.	Part of Project cost	DPWH	
	e) Road will have improved vertical alignment to suit sight distance requirement.	Part of Project cost	DPWH	
	f) Installation of guardrails between the road and ditches.	Part of Project cost	DPWH	
	g) prohibit the use of carriageway as parking to ensure safe, efficient and smooth vehicular flow	Part of Project cost	DPWH	
	h) Provision of pedestrian crossing.	Part of Project cost	DPWH	
	i) Provision of sidewalks and bicycle lanes where appropriate.	Part of Project cost	DPWH	
3. Solid waste build-up and shortage of health/sanitary facilities due to influx of migrants	Implementation of related mandates with regard to provision of solid waste management, health and sanitary facilities.		LGU	
4. Increase in resource use (e.g., tree cutting)	Implementation of related mandates to prevent or minimize illegal tree cutting and other resource extractive activities (e.g., through close monitoring).		DENR	

Table 26. Environmental Monitoring Activities during Construction

Aspect	Means of Monitoring	Frequency of Monitoring	Responsible for Monitoring
1. Close supervision of the contractor's implementation of mitigation measures to minimize or avoid impacts to air quality (particularly dust emission), noise, siltation of surface water and other impacts.	As part of day-to-day project supervision	On-going throughout the construction phase	DPWH/ESSD/CSC
2. Contractor's environmental performance and implementation of construction phase environmental mitigation measures specified in the IEE/ EMP	Site visit, ocular inspections, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
3. Dust	Visual observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
4. Noise	Site observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
5. Surface water quality	Visual observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
6. Air quality, noise, water quality	Field sampling	To be undertaken to validate complaints and/or during pollution events that are potentially caused by the project	Contractor under supervision of ESSD and CSC

118. The responsibilities for implementing the EMP are presented in **Table 27 .**

Table 27: Responsibilities for EMP Implementation

Agency	Responsibilities
Department of Public Works and Highways (DPWH) *Including Region IX Office and District Engineering Office (DEO)	• Executing agency with overall responsibility for project construction and operation; • Ensure that sufficient funds are available to properly implement the EMP; • Ensure that Project implementation complies with Government environmental policies and regulations; • Ensure that the Project, regardless of financing source, complies with the provisions of the EMP and ADB Safeguard Policy Statement 2009 (SPS); • Obtain necessary environmental approval(s) from the Environmental Management Bureau and/or other concerned government agencies prior to commencement of civil works; • Ensure that tender and contract documents for design, supervision and civil works include the relevant EMP requirements; • Establish information on an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns; and • Submit semi-annual monitoring reports on EMP implementation to ADB.
DPWH-Unified Project Management Office (UPMO), Roads Management Cluster II (RMC-II)	• Project management office with direct responsibility for the implementation of civil works, engineering designs and project coordination; • Ensure that EMP design measures are incorporated in the detailed design; • Ensure that EMP provisions are strictly implemented and monitored during various project phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels; • Ensure compliance with environmental permits; and • Include relevant provisions of the EMP in the bid and contract documents for design, civil works and supervision. • Coordinate with DENR-EMB, Local Government Units (LGU), and other concerned agencies related to environmental aspects for maintaining project`s compliance with environmental permits.
Environmental and Social Safeguards Department (ESSD) of DPWH	Assist the UPMO-RMC II and CSC in undertaking their environment-related tasks.
Detailed Engineering Design (DED) Consultant	• Incorporate into the project design the environmental protection and mitigation measures identified in the EMP for the design/pre-construction stage; and • Assist PMO to ensure that all relevant mitigation and monitoring measures from the EMP are incorporated in the bidding and contract documents for project supervision and civil works.
Construction Supervision	• Prior to establishment of contractor's facilities and commencement of civil works, undertake review of specific environmental management plans (e.g.,

Agency	Responsibilities
Consultant (CSC)	spoils disposal plan, facilities development plan, etc.) to be prepared by contractors to ensure that such plans are consistent with the provisions of the EMP. • Engage environment specialists who will undertake supervision and monitoring of EMP implementation and contractor's environmental performance; • As part of day-to-day project supervision, closely supervise the contractor's implementation of mitigation measures specified in the EMP; • Undertake monthly monitoring of contractor's environmental performance and over-all implementation of the EMP; • Prepare semi-annual environmental monitoring reports **(Appendix 3)** on status of EMP implementation for submission to ADB; • Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB
Contractors	• Recruit qualified environmental and safety officer to ensure compliance with environmental statutory requirements, contractual obligations and EMP provisions; • Provide sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP; and • Implement additional environmental mitigation measures, as necessary, to avoid, minimize and/or compensate for adverse impacts due to construction works and related activities performed by the contractor.
Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR)	• Review and approve environmental assessment reports required by the Government; and • Undertake monitoring of the project's environmental performance based on their mandate.
Asian Development Bank (ADB)	• Conduct periodic site visits to assess status of EMP implementation and over-all environmental performance of the Project; • Review environmental monitoring reports submitted by the executing agency to ensure that adverse impacts and risks are properly addressed; and • Publicly disclose through posting on ADB's website environmental monitoring reports, corrective action plans, prepared by the executing agency during project implementation.

I. CONCLUSION

119. Results of the initial environmental examination show that the project will not cause significant environmental impacts. Adverse impacts that will be experienced during site works are mainly due to dust and noise emissions as well as potential occupational and community health and safety risks. Road widening within the existing right-of-way will entail tree cutting and this will be compensated through replanting elsewhere of more than 500,000 tree seedlings to be contributed by the project to the country's National Greening Program. As the alignment does not pass through protected areas, critical habitats or high biodiversity sites; significant adverse ecological impacts are not anticipated. To mitigate negative impacts arising from the Project, an environmental management plan detailing mitigation measures, monitoring activities and responsibilities for implementation has been prepared as part of the IEE. Public consultations involving affected people and local officials have been conducted during the preparation of the IEE in compliance with ADB's information disclosure and consultation requirements. DPWH will include the EMP in the bid and tender documents for civil works to ensure that the Project will be carried out consistent with the EMP requirements. During construction, DPWH will be assisted by a construction supervision consultant who will also undertake monitoring of the environmental performance of contractors.

Appendix 1. Species, Conservation Status and Number of Trees to be Cut

No.	Scientific Name	Local/Common Name	Conservation Status		Barangay						
			IUCN Red List 2017	NLPTP 2007	Sto. Niño	New Dapitan	Poblacion	Farmington	Situbo	Sandayong	Total
1	*Acacia mangium*	mangium	NE	NL	101	97	5	16	105	0	324
2	*Albizia falcata*	falcata	NE	NL	7	0	0	0	40	3	50
3	*Albizia saponaria*	salangkogi	NE	NL	0	0	0	2	0	0	2
4	*Alstonia scholaris*	dita	LC	NL	0	0	0	1	0	0	1
5	*Anacardium occidentale*	cashew	NE	NL	0	0	0	1	0	0	1
6	*Annona muricata*	guyabano (soursop)	NE	NL	8	30	9	35	31	1	115
7	*Anona squamosa*	atis (custard apple)	NE	NL	0	2	0	3	7	0	12
8	*Anthocephalus chinensis*	Kaatoan-bangkal	NE	NL	0	1	0	0	0	27	28
9	*Antidesma ghaesembilla*	binayuyo/dum-on	NE	NL	6	2	1	4	9	0	22
10	*Artocarpus blancoi*	Antipolo	VU	NL	1	2	0	2	4	6	15
11	*Artocarpus camansi*	camansi (breadnut)	NE	NL	1	0	0	4	5	0	10
12	*Artocarpus heterophyllus*	jackfruit	NE	NL	14	54	9	101	139	8	325
13	*Artocarpus odoratissimus*	marang/(Johey oak)	NE	NL	2	2	2	35	74	11	126
14	*Averrhoa carambola*	star fruit	NE	NL	0	7	0	6	4	0	17
15	*Barringtonia racemosa*	putat	NE	NL	3	3	0	0	0	0	6
16	*Buchanania arborescens*	malamannga	NE	NL	62	1	0	1	2	0	66
17	*Canarium luzonicum*	salung/salong	VU	OTS	2	0	0	0	0	0	2
18	*Canthium dicoccum*	malakape	VU	NL	2	2	2	0	4	5	15
19	*Castanopsis philippinensis*	chestnut	NE	NL	0	3	1	8	0	0	12
20	*Ceiba pentandra*	doldol/kapok	NE	NL	0	1	2	4	0	0	7
21	*Chrysophyllum cainito*	star apple	NE	NL	0	3	0	23	6	0	32
22	*Cinnamomum mercadoi*	kalingag	VU	VU	0	0	0	0	3	0	3
23	*Citrofortunella microcarpa*	kalamansi (Philippine lime)	NE	NL	0	0	0	0	2	0	2

No.	Scientific Name	Local/Common Name	Conservation Status		Barangay						
			IUCN Red List 2017	NLPTP 2007	Sto. Niño	New Dapitan	Poblacion	Farmington	Situbo	Sandayong	Total
24	*Citrus limon*	lemon	NE	NL	0	2	5	3	0	0	10
25	*Citrus maxima*	pomelo	NE	NL	2	9	2	29	23	3	68
26	*Citrus* sp.	orange	NE	NL	0	1	0	2	0	0	3
27	*Cleistanthus pilosus*	banitlong	NE	NL	0	0	0	0	1	0	1
28	*Cocos nucifera*	coconut	NE	NL	4	147	19	241	322	2	735
29	*Cordia dichotoma*	anonang	NE	NL	0	0	0	0	5	1	6
30	*Corypha utan*	buli	LC	NL	0	0	0	0	6	3	9
31	*Cratoxylum sumatranum*	tagolingon/olingon/paguringon	NE	NL	123	26	0	0	2	0	151
32	*Crescentia cujeta*	wonder tree/calabash tree	NE	NL	0	1	0	5	1	2	9
33	*Dillenia philippinensis*	katmon	VU	OWS	0	0	0	0	7	0	7
34	*Dipterocarpus grandiflorus*	apitong	CR	NL	0	0	0	0	2	0	2
35	*Diospyrus blancoi*	mabolo/kamagong	NE	NL	0	1	0	0	0	0	1
36	*Dracaena sanderiana*	fortune plant	NE	NL	2	0	0	0	0	0	2
37	*Durio zibethinus*	durian	NE	NL	0	0	2	1	5	0	8
38	*Syzygium samarangense*	macopa/tambis	NE	NL	0	3	0	26	18	0	47
39	*Ficus balete*	balete	NE	NL	0	2	0	1	1	0	4
40	*Ficus minahassae*	haguimit/hagimit	NE	NL	0	0	0	8	12	2	22
41	*Ficus nota*	tubog/tibig	NE	NL	0	2	0	7	40	37	86
42	*Ficus septica*	lagnub/hauili	NE	NL	0	5	5	11	9	0	30
43	*Garcinia ituman*	ituman	NE	NL	0	0	0	1	0	0	1
44	*Garcinia mangostana*	mangosteen	NE	NL	0	0	0	3	4	0	7
45	*Gliricidia sepium*	kakawate/madre-cacao	NE	NL	0	2	1	2	10	0	15
46	*Glochidion camiguinense*	ituman	NE	NL	48	31	9	14	4	19	170
47	*Gmelina arborea*	gmelina	NE	NL	44	165	22	207	347	15	800
48	*Guettarda speciosa*	tabon-tabon	NE	NL	0	0	0	0	0	1	1

No.	Scientific Name	Local/Common Name	Conservation Status		Barangay						
			IUCN Red List 2017	NLPTP 2007	Sto. Niño	New Dapitan	Poblacion	Farmington	Situbo	Sandayong	Total
49	*Heritiera javanica*	lumbayao	NE	NL	0	0	0	0	2	0	2
50	*Hevea brasiliensis*	Para rubber tree	NE	NL	157	497	146	1382	2318	13	4513
51	*Hibiscus tiliaceus*	malabago	NE	NL	1	0	0	0	0	0	1
52	*Hopea mindanensis*	mangasusu	CR	CR	0	0	0	0	0	1	1
53	*Ixora coccinea*	giant santan	NE	NL	0	0	0	0	1	0	1
54	*Jatropha gossypifolia*	tuba-tuba	NE	NL	0	0	0	1	0	0	1
55	*Lagerstroemia speciosa*	banaba (queen's crape-myrtle)	NE	NL	1	1	0	0	0	0	2
56	*Lansium domesticum*	lanzones (langsat/duku)	NE	NL	1	10	0	29	19	1	59
57	*Leucaena leucocephala*	ipil-ipil	NE	NL	0	0	0	10	6	0	16
58	*Leucosyke capitellata*	alagasi (toothscrubber)	NE	NL	2	0	0	20	17	1	40
59	*Lithocarpus llanosi*	ulayan	NE	NL	0	0	0	0	4	0	4
60	*Litsea perottetii*	bakan	NE	NL	0	1	2	5	4	0	12
61	*Macaranga bicolor*	hamindang	VU	NL	0	0	1	0	0	0	1
62	*Macaranga tanarius*	binunga	NE	NL	0	8	27	24	19	9	87
63	*Mangifera caesia*	baluno	LC	NL	0	0	0	0	1	0	1
64	*Mangifera indica*	mango	DD	NL	110	58	18	80	116	6	388
65	*Manilkara zapota*	chico	NE	NL	0	0	0	0	0	1	1
66	*Melanolepis multiglandulosus*	alim	NE	NL	0	0	0	2	0	0	2
67	*Melastoma malabathricum*	hantotongaw/antotongaw	NE	NL	1	0	0	2	0	0	3
68	*Melia dubia*	bagalunga	NE	NL	0	0	0	0	1	1	2
69	*Micromelum minutum*	tulibastilos	NE	NL	0	0	0	0	1	1	2
70	*Moringa oleifera*	malunggay (horseradish tree)	NE	NL	0	0	0	1	0	0	1
71	*Muntingia calabura*	seriales/datiles (Jamaica cherry)	NE	NL	0	4	0	4	0	1	9

No.	Scientific Name	Local/Common Name	Conservation Status		Barangay						
			IUCN Red List 2017	NLPTP 2007	Sto. Niño	New Dapitan	Poblacion	Farmington	Situbo	Sandayong	Total
72	*Neonauclea formicaria*	hambabalod	NE	NL	0	0	0	0	0	3	3
73	*Nephelium lappaceum*	rambutan (hairy lychee)	LC	NL	1	2	2	11	8	0	24
74	*Pangium edule*	pangi	NE	NL	0	0	0	0	1	0	1
75	*Parashorea malaanonan*	bagtikan	CR	NL	0	0	0	0	2	0	2
76	*Persea americana*	avocado	NE	NL	45	10	1	15	14	8	93
77	*Pinus* sp.	pine tree	-	NL	0	0	0	2	0	0	2
78	*Pipers arborescens*	buyo-buyo/paoloberde	NE	NL	0	0	0	3	10	12	25
79	*Plumeria acuminata*	kalachuchi (frangipani)	NE	NL	0	2	0	0	0	0	2
80	*Polyalthia longifolia*	Indian tree	NE	NL	0	10	0	4	0	0	14
81	*Polyscias nodosa*	hagdang uwak/malapapaya	NE	NL	19	10	1	4	25	2	61
82	*Pouteria campechiana*	tiesa	NE	NL	0	0	0	2	0	0	2
83	*Premna odorata*	abgaw/alagaw	NE	NL	0	0	0	1	2	0	3
84	*Psidium guajava*	guava	NE	NL	2	22	7	34	38	0	103
85	*Pterocarpus indicus*	narra	VU	CR	0	2	0	9	6	1	18
86	*Sandoricum koetjape*	santol (lolly fruit)	NE	NL	1	21	6	43	137	5	213
87	*Saribus rotundifolius*	anahaw (footstool palm)	NE	NL	0	0	0	2	0	0	2
88	*Shorea contorta*	white lauan	CR	VU	0	0	0	0	3	1	4
89	*Spathodea campanulata*	African tulip	NE	NL	0	1	0	20	29	0	50
90	*Spondias* sp.	siniguelas (Spanish plum)	NE	NL	0	2	1	1	0	0	4
91	*Streblus asper*	paper tree	NE	NL	1	2	0	0	38	0	41
92	*Swietenia macrophylla*	mahogany	VU	NL	245	305	21	224	384	1	1180
93	*Syzygium cumini*	duhat/lomboy	NE	NL	4	0	0	2	2	4	12
94	*Syzygium hutchinsonii*	malatambis	NE	NL	0	6	0	15	4	1	26
95	*Tabebuia avellanedae*	tahibo/taheebo	NE	NL	0	0	0	1	0	0	1
96	*Tamarindus indica*	tamarind	NE	NL	0	0	0	2	0	0	2

No.	Scientific Name	Local/Common Name	Conservation Status		Barangay						
			IUCN Red List 2017	NLPTP 2007	Sto. Niño	New Dapitan	Poblacion	Farmington	Situbo	Sandayong	Total
97	*Tectona grandis*	teak	NE	NL	1	0	0	0	1	1	3
98	*Theobroma cacao*	cacao	NE	NL	6	14	0	12	14	0	46
99	*Trema orientales*	hanagdong	NE	NL	0	0	0	1	3	1	5
100	*Vatica mangchapoi*	ganon/narig	NE	NL	0	0	0	0	0	1	1
101	*Vitex negundo*	lagundi (five-leaved chaste tree)	NE	NL	0	3	0	1	0	1	4
102	*Vitex parviflora*	tugas/molave	VU	EN	0	0	0	0	0	4	4
103	*Ziziphus jujuba*	mansanitas (jujube plum)	LC	NL	0	1	0	5	0	0	6
					1,029	**1,599**	**329**	**2,781**	**4,530**	**226**	**10,494**

NOTE: All trees are in private land except for 1 mahogany and 29 Para rubber trees in Brgy. Sto. Niño.

IUCN Red List: International Union for the Conservation of Nature Red List of Threatened Species 2017

NLTPP: The National List of Threatened Philippine Plants (DENR Administrative Order No. 2007-01)

- : specific name not identified in the field

CR: Critically Endangered - facing extremely high risk of extinction in the wild in the immediate future (DENR Administrative Order No. 2007-01)

DD: Data Deficient - there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status

EN: Endangered species - not critically endangered but whose survival in the wild is unlikely if the causal factors continue operating.
LC: Least Concern - it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

NE: Not Evaluated - not yet evaluated against the criteria

NL: not listed
OTS: Other threatened species - not critically endangered, endangered nor vulnerable but is under threat from adverse factors, such as over collection, throughout its range and is likely to move to the vulnerable category in the near future.
OWS: Other wildlife species - non-threatened species of plants that have the tendency to become threatened due to destruction of habitat or other similar causes as may be listed by the Secretary upon the recommendation of the National Wildlife Management Committee.
VU: Vulnerable - the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of 2001 IUCN Red List Categories and Criteria version 3.1 - http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria), and it is therefore considered to be facing a high risk of extinction in the wild.

Appendix 2. Attendance Sheets during the Stakeholder Consultations in PR 07

TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015
Road Section : PR07 Tampilisan – Sandayong Road
Venue: : Silubo, Tampilisan, Zamboanga del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
NELFA E. MONETICIANO	DA	F	
Julia M. Cammade	DA	F	
Paterna O. Gumate	DA	F	
Leonita M. Garilla	DA	F	
TOMALES, ROSENDO	D2	M	
Telmarico a Hubotan	DA	M	
FREDDIE D. ACAS	DA	M	
BENJAMIN ALINGCOT	[illegible]	M	
DALAMON MARIBEL	Affected	F	
OMBAY LEAH	Affected	F	
CALIXTO SARIGUE	Senior Citizen	M	
BRIAN JAMES DIENDER	Affected	M	
[illegible] Tejada	Affected	M	
[illegible]	Affected	F	
Charlie Adanma	Affected	M	
Jolina Pedi	Affected	F	
Virginia M. Pedi	Women's Sector	F	
Ernesto Dagat	Affected	M	
Evelyn M. Balagonza	Affected	F	
Rufino A. Vallecera	Senior Citizen	M	

TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015
Road Section : PROJ tampilisan - Sandayong Road
Venue: : Brgy New Dapitan, Zambo. del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Benjamin C. Bisog	Senior citizen	M	
Imelda Cesar	Women's Sector	F	
Marilyn Aguana	Affected	F	
Sandra Z Alegado	Women's Sector	F	
JOSEPHINE B. MARTA	Affected	F	
Alejandra Jamula	Affected	F	
Mercidana U. Basacol	Affected	F	
Alma B. Mendayan	Affected	F.	
Felisa B. Inggo	Affected	F.	
Felipe R. Dondoyano	Affected	M.	
Benjamin Dumanjog	Affected	M	
Nesforio B Campos	Affected	M	
Jovino E Evalle	Affected	M	
Nestor C. Cuesta	Affected	M	
Corazon D. Maglongit	Affected	F	
Rhudson D. Maglongit	Affected	M	
CIELL C. DAGUINOTAS	Affected	F	
WILFREDO R. LOPEZ	Affected	M	
Julian I Tamino Jr.	Affected	M	
Leopoldo A. WAGAS	Senior Citizen Sector	M	

ADECO CTI

TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015

Road Section : PR 07 Tampilisan - Sandayong Road

Venue: : Brgy New Dapitan, Jambo-del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
MYRNA P. PAGLALUNAN	Affected	F	
TORRINO, RUDREN JAMES	Affected	M	
Joseph Benavao	Affected	M	
Eufrocia Baja	Affected	M	Baja
Jocelyn Pascol	Affected	M	
Sandy Panimicata	Affected	M	
ALREY D LIMPAHAN	Affected	M	
ROGELIO S. BARAY	Affected	M	
JOEL MAGLANGIT	Affected	M	
PATRICIO L. ALUNADY	Affected	M	
JERRIE FE F. TIME	Brgy. Treasurer	F	
Divine Fe M. Bongcawil	Brgy. Secretary	F	
MARY GRACE F. KPATAN	B.N.S / Business Sector	F	
Jenny S. Bucog	Affected	F	
Retchil A. Cruz	Affected	F	
Charlita B Carolasan	Business Sector	F	
Norma M. Tarino	Affected	F	
Maribel M Baracol	Affected	F	
Praxedes D. Paglinawan	Affected	F	
Mirasol Sencio	Affected	F	

PADECO CTI

TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015
Road Section : IR 07 Tangilisan - Sandayong Road
Venue: : Citubo, Tangilisan, Zamboanga del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Rosalina B. Lumayao	Affected	F	R. L.
Juanita B. Larato	Barangay Leader	F	Juan to
Victorina P. Tuse	Barangay Captain	F	
Modesto S. Puerto	Affected	F	
SYLVI J. VANDN -co	Parent leader Pantanan	F	
Mango E. Gumate	BHW	F	MGumate
Pacita A. Pfeider	Affected	F	
HELEN T. GORGOB	Business Sector	F	
Sheryl G. Larato	Affected	F	
Vivina U. Gubatan	Affected	F	
Jennifer E Gemitar	Affected	F	J.G.
Stanley T. Rada	Affected	M	
COSTAN GUBATAN	Affected	M	
Arturo Caamoy	Affected	M	
Jacinto Dante-	Affected	F	
ROGER A. ANTARAG	Affected	F	
Delia Dom	Affected	F	D. D
Gregorio A. Lumaypo	Affected	M	
Feliciano Andang	Affected	M	F. A.
Nilo Lardo	Affected	M	

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TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015
Road Section : PR 07 Tampilisan - Sandayong Road
Venue: : Situbo, Tampilisan, Zamboanga del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Arnold Hamoy	Affected	M	
CESAR OBAG	Affected	M	
Francisco Tabiga	Business Sector	M	Tabiga
Julaberg	Affected	M	
Puba Anggoi	Business Sector	F	P.O
Engely Otao	Business Sector	F	
REMELISHA G. TEJADA	Affected	F	Tejada
Merlyn A. Antawag	Women's Sector	F	
Encarnacion Binigay	Senior Citizen	F	
Alfredo Tabiga	Affected	M	A.T
Nida A. Pahayahay	Womens	F.	
Concepcion T. Dela Santa	Womens	F	
Reinboy B. Chavez	Affected	M	
Gina H Tejada	Affected	F	
Amelia Undaran	Womens	F	
Jurelyn O. Tomalen	Womens	F	
Emeteria O. Antawag	Womens/Sr.	F.	E. A.
Geolina Ganti	Womens/Sr.	F	
Pamela P. Cabag	Womens	F	Pamela P. Cabag
Peryate S. Tabogon	Womens	F	

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TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : PR 07 August 10, 2015
Road Section : PR 07 Tangili San - Sandayong Road
Venue: : brgy New Dagitan, Tambo - del Norte

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
ANITA B. PUSOD	Affected	F	
Arecita N. Dragon	Affected	F	
Delia Dagwinotas	Affected	F	D.D.
Rebecca Bulagao	Affected	F	
Ian D. Alegado	Affected	F	
Erlinda C. Bagacal	Affected	F	
Consolacion Faneulan	Affected	F	
Edvardo T. Mancao	DEPED	M	
Victorino P. Tuso	Brgy Capt.	F	
Ambrosia A. Bestes	Ex Barangay Capt	F	

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TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBIC CONSULTATION

Date : August 10, 2015

Road Section : PR07 Tampilisan - Sandayong Road

Venue: : Brgy New Capitan

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Norma G. Baroqua	Women's	F	
Lovenor C. Almacin	Affected	M	
Ernesto C. Almacin	Affected	M	
VIGILIO D. CREDO	MEO / LGU	M	
ROMEO L. CANTON	CE / DPWH	M	

Appendix 3. Grievance Intake Form

Name of Project

Project ____ welcomes complaints, suggestions, comments and queries regarding the project implementation and its stakeholders. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing "(CONFIDENTIAL)" above your name.

Thank you.

Contact Information

Name		Gender	□ Male □ Female
Home Address		Age	
		Phone No.	
City/Province		Email	

Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:

How do you want us to reach you for feedback or update on your comment/grievance?

Portion to be filled in by the staff:

Date received:	
Received through:	__ In person __ mail __ email __ fax __ phone __ sms
Name of staff who receive comment/ complaint	
Position of staff:	
Type of Grievance:	
Remarks	
Signature of staff	

Update on the case:

Date:	Update

Appendix 4. Project Semi-Annual Environmental Monitoring Report Outline

Environmental Monitoring Report

Semi-Annual Report
{Month Year}

{Short Country Name}: {Project Title }

Prepared by {complete and accurate name of implementing agency or external monitoring agency} for the {complete name of the borrower} and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of {Day Month Year})

{The date of the currency equivalents must be within 2 months from the date on the cover.}

Currency unit	–	{currency name in lowercase (Symbol)}
{Symbol}1.00	=	${ }
$1.00	=	{Symbol_____}

ABBREVIATIONS

{AAA}	–	{spell out (capitalize only proper names)}
{BBB}	–	{spell out}
{CCC}	–	{spell out}

{WEIGHTS AND MEASURES}

{symbol 1 (full name 1)}	–	{Definition 1}
{symbol 2 (full name 2)}	–	{Definition 2}
{symbol 3 (full name 3)}	–	{Definition 3}

{GLOSSARY}

{Term 1}	–	{Definition 1}
{Term 2}	–	{Definition 2}
{Term 3}	–	{Definition 3}

Table of Contents

The borrower/client is required to prepare periodic monitoring reports that describe progress with implementation of the project EMP and compliance issues and corrective actions. A sample outline which can be adapted or modified as necessary is provided below. Not all sections will be relevant in all cases.

Executive Summary

1. Introduction

1.1. Report Purpose

1.2. Project Implementation Progress *(Note: please present in matrix form)*

1.2.1. On-going Site Works (description of current site works, location and target completion)

1.2.2. Previous Activities (description of construction activities during the previous months: provide details of specific activities such as earthworks, vegetation clearing, spoils disposal, establishment of construction camp and other construction related facilities (e.g., concrete mixing plant, asphalt batching plant, crushing plant, etc.), establishment and operation of quarry/borrow areas, etc., including locations, schedules, dates, etc.

1.2.3. Schedule of construction activities for the subsequent months (provide details similar to above)

1.3. Specific dates (day/month/year) site visits/inspections conducted by the supervision consultant to monitor compliance of the contractors(and subcontractors) with the mitigation measures specified in the EMP.

2. Compliance with ADB environmental loan covenants and applicable government environmental laws, regulations and requirements *(Note: please present in matrix form)*

2.1. Status of compliance with ADB environmental loan covenants

2.2. Status of compliance with government environmental requirements: *provide a list of government environmental requirements (permits, etc.) for the project as well as construction-related facilities/ activities and specify level of compliance, indicate any required environmental permit/license/consent obtained to date and to be obtained (including schedule) for the project and construction related facilities/activities*

3. Changes in project scope

Such as change in alignment or footprint in case of horizontal infrastructure, implementation of additional Project component/s, etc. (with reference to the Project scope identified in the ADB-cleared environmental assessment report , i.e., IEE or EIA) and corresponding safeguard measures undertaken, if applicable.

4. Summary of Environmental Mitigations and Compensation Measures Implemented

Based on EMP; may include measures related to air quality, water quality, noise quality, pollution prevention, biodiversity and natural resources, health and safety, physical cultural resources, capacity building, and others. *Provide a table/matrix showing a summary of each environmental mitigation measure specified in the EMP/Construction EMP/Site Specific EMP*.

EMP Requirement (list all mitigation measures specified in the EMP/CEMP/SEMP) *NOTE: each row should only indicate one mitigation measure*	*Compliance Attained (NOTE: Answer should be either **Yes**, **No**, or **Partial** for each mitigation measure.)*	*Location (NOTE: Indicate specific location where observation was made)*	*Comment on Reasons for Partial or Non-Compliance (NOTE: State the reason why compliance is "No" or "Partial", indicate the specific dates – day/month/year, that partial or non-compliance was observed)*	*Required Action and Target Dates to Achieve Compliance (NOTE: Specify required action, responsible entity and target date to achieve compliance with each mitigation measure with compliance status of "No" or "Partial")*
1.				
2.				
3.				
etc.				

4.1. Emission/Wastewater Discharge (Source) Monitoring Program (*if relevant or required in the EMP*)

4.1.1. Summary of Monitoring

4.1.2. Results

4.1.3. Assessment[11]

4.2. Ambient Monitoring Program, i.e., air quality, noise, water quality, etc. (*if relevant or required in the EMP*)

4.2.1. Summary of Monitoring

4.2.2. Results

4.2.3. Assessment[12]

5. Key Environmental Issues

5.1. Key Issues Identified (e.g., non-compliance to loan covenants, EMP and/or government environmental requirements, insufficient mitigation measures to address Project impacts, incidents, accidents, etc.)

[11] Discharge levels should be compared to the relevant discharge standards and/or performance indicators noted in the EMP. Any exceedances should be highlighted for attention and follow-up. In addition, discharge levels could be compared to baseline conditions (if baseline data is available). Additional explanatory comments should be provided as necessary.

[12] Ambient environmental conditions should be compared to the relevant ambient standards and/or performance indicators noted in the EMP. Any exceedances should be highlighted for attention and follow-up. In addition, ambient environmental conditions could be compared to the baseline conditions (if baseline data is available). Additional explanatory comments should be provided as necessary.

5.2. Issues from previous report(s).

Issues from Previous Reports						
Issue	*Cause*	*Required Action*	*Responsibility*	*Timing (Target Dates)*	*Description of Resolution and Timing (Actual)*	*If not yet resolved, indicate the reason why and specify further required action and timeframe.*
1.						
2.						
etc.						

6. Complaints

6.1. Details of Complaint/s (In a matrix form, provide details of any complaints that have been raised by the local population and other stakeholders regarding environmental performance and environmental impacts (complainant, nature of complaint, date complaint was filed, which office received the complaint, etc. The attached grievance intake form to document complaints may be used)

6.2. Action Taken (Document how the complaints were addressed or will be addressed by indicating the following):

i. names and designation of specific staff or officials within the Grievance Redress Committee, executing agency, project management unit, local government, contractor and/or supervision consultant involved in receiving, documenting, and resolving the complaint (s).

ii. specific actions taken to be taken to resolve the complaint and corresponding timeframe

7. Conclusion and Recommendation

7.1. Overall Progress of Implementation of Environmental Management Measures

7.2. Problems Identified and Actions Recommended

7.3. Monitoring adjustment (recommended monitoring modifications based on monitoring experience/trends and stakeholders response, as necessary)

Appendices

1. Source and ambient monitoring Results (Laboratory Analysis), if applicable
2. Photographs
3. Location Map of Sampling Stations, if applicable,
4. Copies of Environmental Permits/Approvals
5. Filled-out Grievance Intake Forms
6. Minutes of meetings (as applicable)
7. Other relevant information/documents