Initial Environmental Examination

August 2015

Socialist Republic of Viet Nam: Second Greater Mekong Subregion Corridor Towns Development Project

Prepared by Bac Giang Provincial People's Committee for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 17 August 2015)

Currency unit	–	kip (K)
K1.00	=	$0.00012
$1.00	=	K8199.50

ABBREVIATIONS

ADB	-	Asian Development Bank
AfD	-	Agence Francaise de Development
AP	-	affected people
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
CPC	-	City Peoples Committee
CTDP	-	Corridor Towns Development Project
DARD	-	Department of Agriculture and Rural Development
DOLISA	-	Department of Labour, Invalids and Social Affairs
DONRE	-	Department of Natural Resources and Environment
DOC	-	Department of Construction
DOT	-	Department of Transport
DPI	-	Department of Planning and Investment
EA	-	Executing Agency
EIA	-	Environmental Impact Assessment
EMP	-	Environment Management Plan
GMS	-	Greater Mekong Subregion
IEE	-	Initial Environment Examination
HLNP	-	Hoang Linh National Park
MARD	-	Ministry of Agriculture and Rural Development
MONRE	-	Ministry of Natural Resources and Environment
NPA	-	National Protected Area
PMIS	-	Project Management Implementation Support
PMU	-	Project Management Unit
PIU	-	Project Implementation Unit
PPC	-	Provincial Peoples Committee
REA	-	Rapid Environment Assessment
SPS	-	ADB Safeguard Policy Statement 2009
SLEDP	-	Strategic Local Economic Development Plan
TSS	-	Total Suspended Solids
URENCO	-	Urban Environment Company
UXO	-	Unexploded Ordnance
WWTP	-	Wastewater Treatment Plant

WEIGHTS AND MEASURES

km	kilometre
kg	kilogram
ha	hectare
masl	meters above sea level
mm	millimeter

NOTES

(i) The fiscal year (FY) of the Government ends on 31 December

(ii) In this report, “$” refers to US dollars

Initial Environmental Examination

June 2015

Second Greater Mekong Subregion Corridor Towns Development Project (CTDP), PPTA 8425

Bac Giang, Mong Cai, and Sa Pa Towns, Viet Nam

EXECUTIVE SUMMARY

Bac Giang, Mong Cai, and Sa Pa are the towns in Viet Nam participating in the Second Greater Mekong Subregion Corridor Towns Development Project.[1] The three town-subprojects in Viet Nam consist of small infrastructure and environmental improvement investments that are being implemented with the immediate and ultimate goals of improving urban environments, and promoting socioeconomic development. Linked to the urban infrastructure investments is parallel development of Strategic Local Economic Development Plans (SLEDP) for each town and surrounding area. The selection of the urban infrastructure investments and the development of the SLEDPs are guided by the Viet Nam National Green Growth Strategy, and the ADB Green City Agenda.

The initial environmental examination (IEE) presented herein addresses the three subprojects in the towns of Bac Giang, Mong Cai and Sa Pa. The IEEs of the corresponding four corridor town-subprojects in Cambodia and the Lao PDR have been prepared separately.

A. Project Summary

The three subprojects in Viet Nam at the feasibility design stage are summarized by the components listed below. Similar subproject components are combined in the IEE to reduce redundancy in the assessment.

Bac Giang, Bac Giang Province
Urban Roads
Wastewater Improvements
Stormwater Improvements
Mong Cai, Quang Ninh Province
Wastewater and Stormwater Improvements
Riverbank Protection
Sa Pa, Lao Cai Province
Road 1 – Route 152
Wastewater and Drainage
Town Center Enhancement

B. Potential Impacts

The three subprojects in Viet Nam retain their Category B classification for environment. The examination of the subprojects indicates that potential environmental impacts are largely restricted to the construction phase of the subproject components. Construction-related disturbances such as noise, dust, erosion, surface water sedimentation, tree removal, solid and liquid waste pollution, worker camp disturbances, increased traffic and risk of worker and public

[1] Cambodia and the Lao PDR also participate in the Second Corridor Towns Development Project

injury can be managed with standard construction practices and guidelines (e.g., IFC/World Bank 2007).

The civil works required for the rehabilitation and protection of the Ka Long riverbanks in Mong Cai require careful soil erosion mitigation to ensure sedimentation of the river does not occur. The quality of the treated effluents of the new and upgraded wastewater treatment plants in all three subproject towns will need to be monitored after commissioning to ensure that effluent quality meets effluent design criteria, and government QCVN standards for wastewater quality. Effluent quality management is particularly important for the new WWTPs in Mong Cai given the sensitive of downstream marine coastal wetland and mangrove areas. Careful management of the aesthetics of the operational WWTPs is required which is particularly important in Sa Pa where rich natural and cultural assets support a well-developed tourist destination.

Careful control of construction traffic, and public safety measures must be in effect during the construction and operation of the new roads and road upgrades in Bac Giang and Sa Pa. Because Sa Pa is located in the buffer zone of the Hoang Linh National Park a tree replacement program should be developed to offset all trees that must be removed for the subproject components. Extra care with impact and disturbance mitigation during the construction phase of all subproject components in Sa Pa must occur.

Overall the subprojects will yield positive impacts on the environmental quality of three urban environments. The only potential induced or cumulative environmental impacts of the three subprojects concern increased natural resource consumption, and pollution that could arise from the target goal of increased socioeconomic development in and near the three corridor towns.

The subproject components in Mong Cai were screened with the REA and factors of AWARE to be the most sensitive to climate change which is defined by projected sea level rise, and inland flooding from an increased frequency and severity of rainfall events. The results of REA and AWARE provides the basis for the more in depth CVRA of potential socioeconomic and financial impacts of climate change in Mong Cai. The climate vulnerability and resilience assessment of the subproject indicated that climate change resilience and proofing measures such as elevated facility foundations, and adequate road grading and drainage must be addressed by the final designs of the subproject components.

The single subproject component of the three towns with the greatest potential for generating GHG is wastewater treatment due to the emissions of methane from anaerobic digestion of wastewater. However, because all three subprojects will apply the oxygen ditch-type wastewater treatment process to either expansions of existing or at new WWTPs the emissions of methane will be minimal to neutral. The oxygen-ditch process is aerobic, and thus production and emission of methane - by far the strongest greenhouse gas – from the WWTPs will be little to nil.

C. Conclusions

The description of the feasibility designs of the three subprojects combined with available information on the affected environment is sufficient to identify the scope of potential environmental impacts of the project. Providing that significant changes do not occur to the design of one or more subproject components, and that new sensitive environmental or social receptor data are not discovered, the subprojects will remain Category B for environment and will not require further detailed environmental impact assessment (EIA).

The three separate EMPs developed for the subprojects provide impact mitigation plans, environmental monitoring plans, and specify the institutional responsibilities and capacity needs for the environmental management of the subprojects. The EMPs will need to be reviewed and updated at the detailed design phase to ensure that they fully address the potential impacts of the final subproject designs.

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I. INTRODUCTION

A. Background to the IEE

1. The Second Greater Mekong Sub Region (GMS) Corridor Towns Development Project (PPTA 8425) is a multi-sector urban development project in Viet Nam, Cambodia, and the Lao PDR. The project is comprised of small urban infrastructure and environmental improvement investments in seven subproject towns the three participating countries (Figure 1) which consists of the two primary outputs as defined below:

1) Strategic Local Economic Development Plans (SLEDP) for the seven towns; and
2) Feasibility stage designs for urban infrastructure investments to improve the environmental quality of the towns and to ultimately strengthen socioeconomic development.

2. The selection of the urban infrastructure and environmental improvement investments, and the development of the SLEDPs are guided by the Viet Nam National Green Growth Strategy, and the ADB Green City Agenda[2]. The seven SLEDPs are presented elsewhere in the main body of the report.

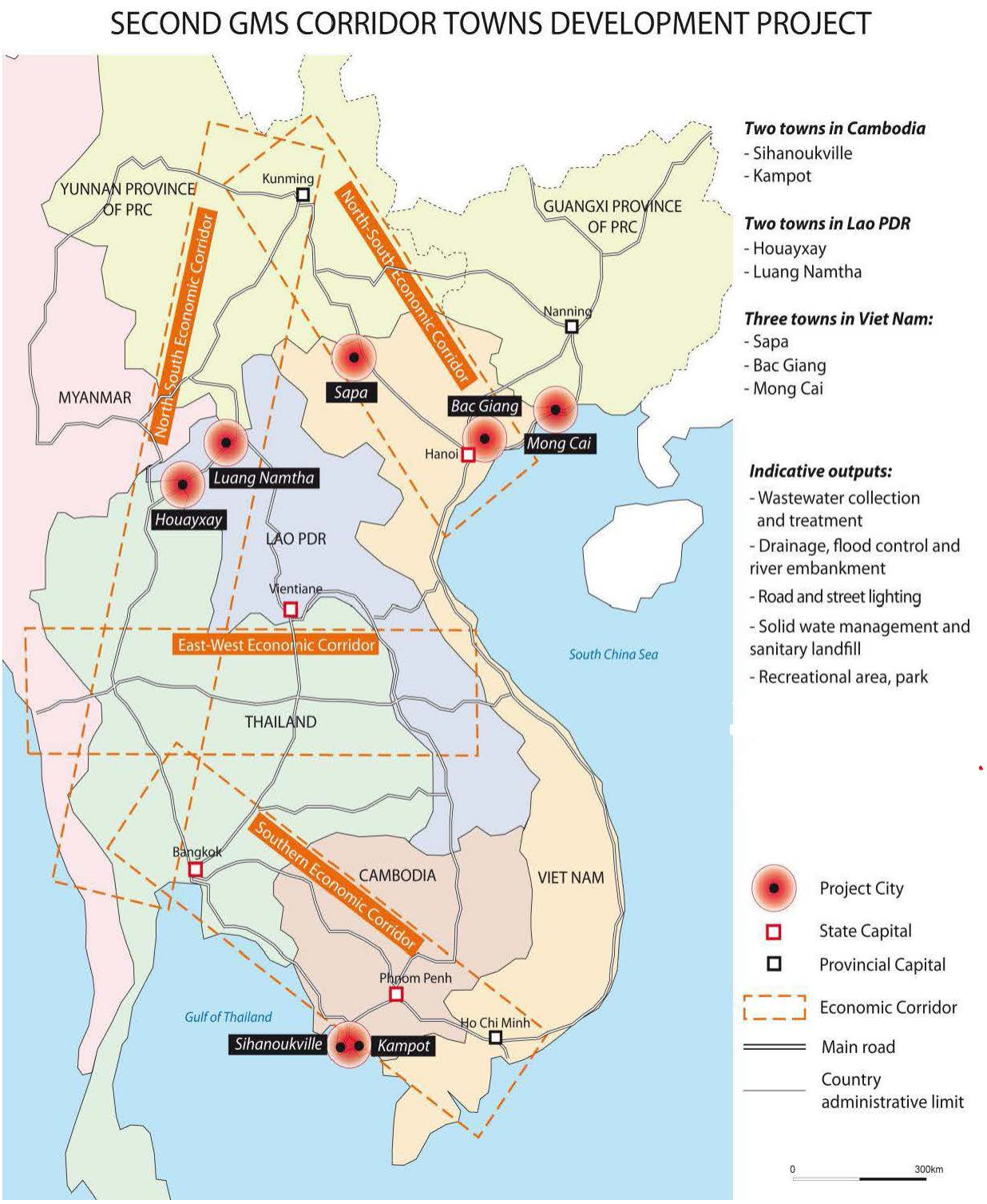
3. The subprojects in the towns of Bac Giang, Mong Cai and Sa Pa of Viet Nam are the focus of the IEE presented herein. The IEEs for the subproject towns in Lao PDR and Cambodia were prepared separately. The country-level IEE reporting structure for PPTA 8425 is the same safeguard reporting structure that was used for the first ADB Corridor Towns Development Project (CTDP) in the same countries in 2012. Table 1 summarizes the subproject components of each corridor town in PPTA 8425.

Table 1. Town subproject components of Viet Nam

Bac Giang, Bac Giang Province
Urban Roads
Wastewater Improvements
Stormwater Improvements
Mong Cai, Quang Ninh Province
Wastewater and Stormwater Improvements
Riverbank Protection
Sa Pa, Lao Cai Province
Road 1 – Route 152
Wastewater and Drainage
Town Center Enhancement

[2] :http://www.adb.org/publications/enabling-greeen-cities-operational-framework-integrated-urban-development-southeast-asia

Figure 1. Seven subproject towns of Second Corridor Towns Development Project



B. Assessment Context

4. The project is category B pursuant to ADB's 2009 *Safeguard Policy Statement*[3] and recent good practice sourcebook.[4] A category B project will have potential adverse impacts that are less adverse than those of a category A project, are site-specific, largely reversible, and can be mitigated with an environmental management plan (EMP).[5] The Category B assignment resulted from the initial rapid environmental assessment (REA) of the three subprojects found in Appendix A.

5. The subproject in Sa Pa posed an unusual screening situation because Sa Pa town and the entire subproject is located inside the buffer zone of the Hoang Linh National Park just a few kilometers from the core zone of the park. Normally, developments inside a protected area automatically create a Category A condition for environment requiring more extensive investigation, and a longer review period (pursuant to SPS 2009). As a result of further screening two of the originally proposed subproject components (new water supply and bypass highway) were dropped from the subproject because the water supply location was located 5 km inside the core zone of the park, and the bypass road would require too much forest clearing and damage to terraced gardens in the buffer zone.

6. The remaining subproject (upgrade to Road No 152, wastewater and drainage, and enhancements to the town centre) was given the Category B status because the remaining components are located inside Sa Pa town, and Road 152 already exists. These urban development components are normally Category B anywhere, and collectively will greatly improve standard of living of Sa Pa residents including enhancing the all-important tourism industry of this famous mountain town. That the buffer zone established for the HLNP includes Sa Pa town simply highlights the closeness of the town to the core zone of the Park, and that all urban development should proceed carefully to not disturb the spectacular natural environment which Sa Pa town is a part of. The rapid environmental assessment of the Sa Pa subproject reflects this in Appendix A.

7. The government of Viet Nam recognizes the importance of the numerous national protected areas (NPA) that they have established throughout the country. With respect to the Sa Pa subproject and the HLNP, the Director of the Management Board of the HLNP located in Sa Pa town was the architect of the location of the new water supply inside the core zone at the most restricted area[6], thus, the imperatives of development are also weighed by the GoV against environmental conservation.

8. The IEE was prepared for the Viet Nam subprojects in the feasibility design stage of the project using available data and information on sensitive ecological and cultural receptors that exist at the different subproject sites. Detailed designs of the subprojects will follow project approval. EMPs that have been prepared for the subprojects will be updated where necessary to meet the final detailed designs of the subprojects.

9. On January 1, 2015 Viet Nam government promulgated the revised Law on Environmental Protection (LEP 2014). With respect to environmental impact assessment (EIA)

[3] ADB. 2009. Safeguard Policy Statement. Manila.
[4] ADB. 2012. Environmental Safeguards, A Good Practice Sourcebook, Draft. Manila.
[5] Footnote 2, pg 19.
[6] Environment safeguard team meeting with Director of BM-HLNP November 2014

the LEP (2014) replaces the Environmental Protection Commitment (EPC) an Initial Environmental Examination (IEE), see section II.

Impact Footprints

10. The subprojects components of the three towns are located in established urban and peri-urban. Thus, urban impact footprints at the sites already exist, and potential environmental impacts of the subprojects will be mostly marginal to the existing urban impacts.

C. Approach and Structure of IEE

11. The IEE was prepared using available information on potentially affected environments obtained from provincial and district environment agencies, and from published grey literature. The collection essential but unavailable environmental information is specified for the detailed design phase in order to complete the environmental due diligence of a subproject. The IEE is organized by corridor town to minimize redundancy of background information. The IEE structure supports, and is consistent with the individual environmental management plans (EMPs) that have been prepared for each subproject town based on the results of the IEE.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

12. The subprojects in Viet Nam will be implemented according to the directives set down for use of Official Development Assistance (ODA) by Government Decree No. 131/2006/ND-CP which was promulgated on 9 November 2006, and in accordance with the administrative provisions for the project.

A. Viet Nam Regulatory Framework for Environmental Assessment

13. The recently revised Viet Nam Law on Environmental Protection (LEP 2014) prescribes the requirements for environmental assessment for international and domestic project interventions that affect natural and social environments. The primary change for EIA in the LEP (2014) is the Environmental Protection Commitment (EPC) was replaced by an Initial Environmental Examination (IEE) as described by new supporting Decree 18/2015/ND-CP issued February 2015 which replaces Decree 29/2011/ND-CP on strategic environmental assessment (SEA), and environmental impact assessment (EIA). Circular 26/2011/TT-BTNMT which supports Decree 18 remains unchanged.

14. The screening criteria of Decree 18 distinguish projects that require a full EIA from comparatively simpler IEE which reflects the required level of assessment, and final review and appraisal that is required. Decree 18 specifies a maximum period of 15 days for the government-equivalent of public consultation on a project, followed by a maximum of 45 days for the review of competed EIA by MONRE or DONRE.

15. To meet the requirements of the LEP (2014) the GoV will require a mix of EIAs and EMPs to be prepared for the different subproject components (Table 2).

Table 2. Environmental assessment requirements of Viet Nam

Subproject Component	IEE	EIA
Bac Giang		
Urban Roads		X
Wastewater Improvements		X
Stormwater Improvements		X
Mong Cai		
Wastewater and Stormwater Improvements		X
Riverbank Protection		X
Sa Pa		
Road 1 – Route 152		X
Wastewater and Drainage		X
Town Center Enhancement	X	

B. Applicable Laws, Policy, Environmental Standards, and Guidelines

16. The following are key directives for environmental assessment and protection in Viet Nam:

- Law on Environmental Protection No. 52/2005/QH11, in effect on June 12, 2005;
- Law on Water Resources No 08/1998/QH10.
- Biodiversity Law 20/2008/QH12 dated 13 November 2008.
- Cultural Heritage Law 28/2001/QH10 dated 29 June 2001.
- Land Law No.13/2003/QH11 dated 26 November 2003.
- Law on Forest Protection and Development No 29/2004/QH11.
- Decree No. 29/2011/ND-CP, dated April 18, 2011, on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment.
- Circular No. 26/2011/TT-BTNMT dated 08/12/2011 by the Ministry of Natural Resources and Environment on Guidance for Strategic Environmental Assessment, Environmental Impact Assessment, and Environmental Protection Commitment.
- Decree No.12/2009/ND-CP which replaces Decree No. 16/2005/ND-CP and Decree No. 112/2006/ND-CP on Investment Management on Construction Projects.
- Decree No.21/2008/NĐ-CP dated 28/02/2008 about Amendment and Addition of Some Articles in Decree No.80/2006/NĐ-CP dated on 09/8/2006.
- Decree No.59/2007/NĐ-CP dated 09/4/2007 by the Government about Solid Waste Management.
- Decree No.04/2007/NĐ-CP dated 29/01/2007 by the Government about Amendment and addition of some articles in Decree No.67/2003/NĐ-CP dated on 13/6/2003 by the Government.
- Decree 110/2002/ND-CP, supplementing some Articles of Decree 06/1995 on Labor Code of Occupational Safety and Health.
- Decree 06/1995, Elaborating Provisions of Labor Code on Occupational Safety and Health.
- Decree No.140/2006/NĐ-CP dated 22/11/2006 by the Government which regulates Environmental Protection, Designing, Approval and Implementation of Development Strategies, Plans, Programs and Projects.
- Decree No.12/2009/NĐ-CP on Investment Management of Construction Projects.
- Decree No.80/2006/NĐ-CP dated 09/8/2006 about Guiding for the Implementation of Some Articles in the Law on Environmental Protection (2005).

- Decree No.149/2004/NĐ-CP dated 27/7/2004 about Issuing Permits for Water Resource Exploration, Exploitation and Utilization and Permits for Discharge to Water Bodies.
- Decision No.16/2008/QĐ-BTNMT dated 31/12/2008 by the Ministry of Natural Resources and Environment about Promulgation of the National Technical Regulations for the Environment.
- Decision No.18/2007/QĐ-BTNMT dated 05/11/2007 about Promulgation of Statistic Indicator System for the Field of Natural Resources and Environment.
- Decision No.23/2006/QĐ-BTNMT dated 26/12/2006 about Promulgation of the List of Hazardous Waste
- Decision No.27/2004/QĐ - BXD dated 09-11-2004 by the Minister of Ministry of Construction on the Promulgation of TCXDVN 320:2004 "Landfill for hazardous waste – Design standards"
- Decision No.22/2006/QĐ-BTNMT dated 18/12/2006 about Obligations to Apply Vietnamese Standards for the Environment.
- Decision No.233/2006/QĐ-TTg dated 18/10/2006 about Approving the National Program on Labor Protection, Safety and Sanitation up to 2010.
- Decision No.1222/QĐ-BTNMT dated 20/09/2006 about Organization of Reception and Progressing Recommendations from Individuals, Organizations and Enterprises on Aspects which are managed by Ministry of Natural Resources and Environment.
- Decision No.35/2002/QD-BKHCNMT dated 25/6/2002 about Promulgation of Series of Vietnamese Standards for the Environment.
- Decision No.60/2002/QĐ-BKHCNMT dated 07/8/2002 about Promulgation of the Guidance for Disposal of Hazardous Wastes.
- Decision No.3733/2002/QĐ-BYT issued by Ministry of Healthcare dated 10/10/2002 about the Application of 21 Labor Health and Safety Standards
- Decision No.155/1999/QĐ-TTg dated /7/1999 by the Government on Promulgation of the Management Mechanism for Hazardous Waste.
- Decision No.505 BYT/QĐ, dated 13/4/1992 by the Ministry of Healthcare on the Regulation for Allowed Concentrations.
- Circular No. 16/2009/BTNMT and No. 25/2009/BTNMT on Promulgation of Vietnamese National Standards.
- Circular No.10/2007/TT-BTNMT dated 22/10/2007 about Guidance for Assurance and Control of the Quality of Environmental Monitoring.
- Circular No.12/2006/TT-BTNMT dated 26/12/2006 by the Ministry of Natural Resources and Environment on Guidance for Practice Conditions, Procedures for Application, Registration, Endorsement and Issuing the Code for Hazardous Waste Management.

International Environmental Management Conventions

17. Viet Nam is signatory to the following international conventions:
    - 1948 Agreement for the Establishment of the Indo-Pacific Fisheries Commission
    - 1971 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)
    - 1982 Protocol to Amend the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Paris
    - 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage October 1987]
    - 1973 Convention on International Trade in Endangered Species Wild Fauna and Flora
    - 1973/78 MARPOL Convention for the Prevention of Pollution from Ships
    - 1985 FAO International Code of Conduct on the Distribution and Use of Pesticides
    - 1985 Vienna Convention for the Protection of the Ozone Layer
    - 1987 Montreal Protocol on Substances that Deplete the Ozone Layer
    - 1992 Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen
    - 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

- 1992 United Nations Framework Convention on Climate Change
- 1992 Convention on Biological Diversity

Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigation purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: - National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: - National regulation heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: national technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

International Guidelines

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement & Analysis Environmental Quality

C. Forest Management in Viet Nam

18. The Ministry of Agriculture and Rural Development (MARD) identifies three primary types of forests with respect to forestry management. The forest types and indicative uses are summarized below.

A) Special Use Forests, e.g., national parks, conservation areas, or historical/cultural areas (1.9 million ha).

B) Protected Forests, e.g., water and soil resource conservation, coastal (6.2 million ha);

C) Productive Forests, e.g., wood and fibre production (4.5 million ha).

19. The three types of forests can occur together in certain situations where for example an area can have both protection and special use forests, or production forests and agriculture land use.

D. Climate Change Policy

20. The government has developed policy for combatting for climate change which is summarized below.

National Policy

- Directive 35/2005/CT-TTg in 2005 on Kyoto Protocol implementation
- Decision 47/2007/QĐ-TTg to approve implementation plan of Kyoto Protocol (KP)
- Decision 130/2007/QĐ-TTg dated 02/8/2007 of the PM on some financial mechanism and policy for CDM projects.
- National strategy reduction and prevention natural calamity until 2020 according to Decision 172/2007/QĐTTG
- Ministry of Natural Resources and Environment (MONRE) has approved Action Plan to response to climate change for the period 2011-2015
- Ministry of Agriculture and Rural Development (MARD) has promulgated Action Plan Framework on adaptation to climate change for the Agriculture and Rural Development Sector, period 2008 -2020

Sectoral Policy

Environment

- National Strategy for environmental protection until 2010 and vision toward 2020 (NSEP)
- Law on Environmental Protection, 2012

Energy

- National Strategy for development of electricity sector in period 2004-2010 and vision
- toward to 2020
- National Strategy for Energy Development until 2020 and vision toward 2050
- National Target Program on Efficient Use and Saving Energy (EUSE)
- Electricity Law
- Law on Energy Efficiency and Conservation 2010

Forestry

- Forest Protection and Development Law 2004
- National Forest Development Strategy (NFDS) 2006-2020

E. ADB Safeguard Policy

21. The ADB 2009 *Safeguard Policy Statement* (SPS 2009) along with the recent *Environmental Safeguards Good Practice Sourcebook* clarify the rationale, scope and content of an environmental assessment and are supported by technical guidelines (e.g., ADB's Environmental Assessment Guidelines 2003). Projects are initially screened to determine the level of assessment that is required according to the following three environmental categories (A, B, or C).

22. Category A is assigned to projects that normally cause significant or major environmental impacts that are irreversible, diverse or unprecedented, such as hydroelectric dams, whereby an Environmental Impact Assessment is required. Category B projects have potential adverse impacts that are less adverse than those of category A, are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects (an Initial Environmental Examination is required). Category C projects are likely to have minimal or no negative environmental impacts. An environmental assessment for Category C projects is not required but environmental implications need to be reviewed.

F. Parallel Environmental Due Diligence of Subprojects

23. The recently updated procedure and timing of environmental due diligence (DD) of infrastructure development projects required by the government[7] (MONRE or provincial DONRE) is generally similar to the environmental safeguard process of the ADB SPS (2009) including IEEs (or EIAs) of both jurisdictions being initiated for the feasibility design stage. However, the preparation of the ADB IEE normally leads due to the requirements of loan approval. A key document and milestone of the government safeguard process is the preparation and approval by the Prime Minister of the Project Detailed Outline (PDO) for the subprojects. The PDO must be prepared and approved by the Prime Minister before the ADB IEE can be approved by the GOV, and preparation of the required GoV IEE or EIA can be initiated.

24. Aside from the PDO the government does not require the ADB IEE/EMPs to comply with any specific environmental regulations or guidelines, however, after the PDO the draft IEE/EMPs must be reviewed by the government for complete IEE approval after initial review and approval by the ADB. The approval is by formal letter. Table 3 summarizes the major DD processes and timelines of both jurisdictions.

Table 3. Summary of environmental due diligence during project implementation

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS[8] / Contractor	
Feasibility design				
Initial stakeholder disclosure & consultation	PPTA	EA[9] assists		
Draft IEEs and EMPs	PPTA			Draft IEEs & EMPs completed
Preparation of Project Detailed Outline (PDO)		EA		Approval by Prime Minister
Finalize IEEs and EMPs	ADB review & approves IEE/EMPs			ADB approved IEE/ EMPs as per SPS (2009).
		EA reviews		EA approved IEE/ EMPs

[7] Revised Law of Environmental Protection (LEP 2014), and Decree 18/2015/ND-CP
[8] International Project Implementation Management Support Consultant (see Environmental Management Plan EMP)
[9] Government assigned Executing Agency of project (see EMP)

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS[8] / Contractor	
		and approves IEE/EMPs		with formal letter only. ***Compliance with specific GOV / EA regulations not required***
Loan documents (PAM/RRP)	Document preparation, approval by ADB	Review & approval of PAM		Loan approval
Initiation of Viet Nam environmental DD[10]		EA leads with oversight from DONRE		MONRE or DONRE approved IEE or EIA follows independently after VIE DD begins
Detailed engineering design				
Continued stakeholder disclosure & consultation		IA/PIU[11] lead	ES[12] support to PMIS	As per PCP (2012)[13] stakeholder disclosure and consultations continue throughout construction phase coincident with initiation of GRM[14]. ***Also satisfies consultation requirement of GOV[15].***
Update EMPs		Support to ES	Lead by ES	Approval of updated EMP by EA and ADB
Tendering / contract award				
EMPs included in tender documents		Lead by EA/IU	Support by ES	
Tenders let and bids prepared		Lead by EA	Contractor drafts CEMP[16]	CEMPs prepared and included in contractor bids
Construction packages	Input from ADB		CEMPs reviewed by ES/PMIS	Construction package awards
Construction & supervision				
Implementation of mitigation and monitoring plans		Support from IU/PIU	By contractor with support from ES	CEMP implemented by contractor, other aspects of EMP overseen by ES
Continued stakeholder disclosure and consultation		IA/PIU lead	Support from ES	As part of GRM

[10] Footnote 7
[11] Project Implementation Agency assigned by EA (see EMP) with supporting Implementation Unit
[12] International and national environment specialists of PMIS (see EMP)
[13] ADB Public Communication Policy (2012)
[14] Grievance Redress Mechanism (see EMP)
[15] Footnote 7
[16] Construction Environmental Management Plan based on EMP in tender documents (see EMP)

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS[8] / Contractor	
Monitoring reporting	To ADB	IA/PIU lead preparation of regular reports to ADB	Support from ES	Reports provide input for review missions

III. SUBPROJECT DESCRIPTIONS

25. As introduced in the main PPTA report, explicit with selection of the subproject components are the Strategic Local Economic Development Plans (SLEDP) for the three town subprojects and the inherent major theme of the greening of the affected urban environments, vis-à-vis, ADB's Green City Agenda. Coupled to the objective socioeconomic-based urban infrastructure developments is the opportunity to improve and rehabilitate the natural urban environments. The selection criteria for the subproject components included improvements to green spaces.

26. The components of a town-subproject from Table 1 that are similar, or are located in the same area are combined in the IEE to reduce redundancy in the assessment.

A. Bac Giang

27. The locations of the major subproject components of Bac Giang from Table 1 are shown in Figure 2.

1. Urban roads

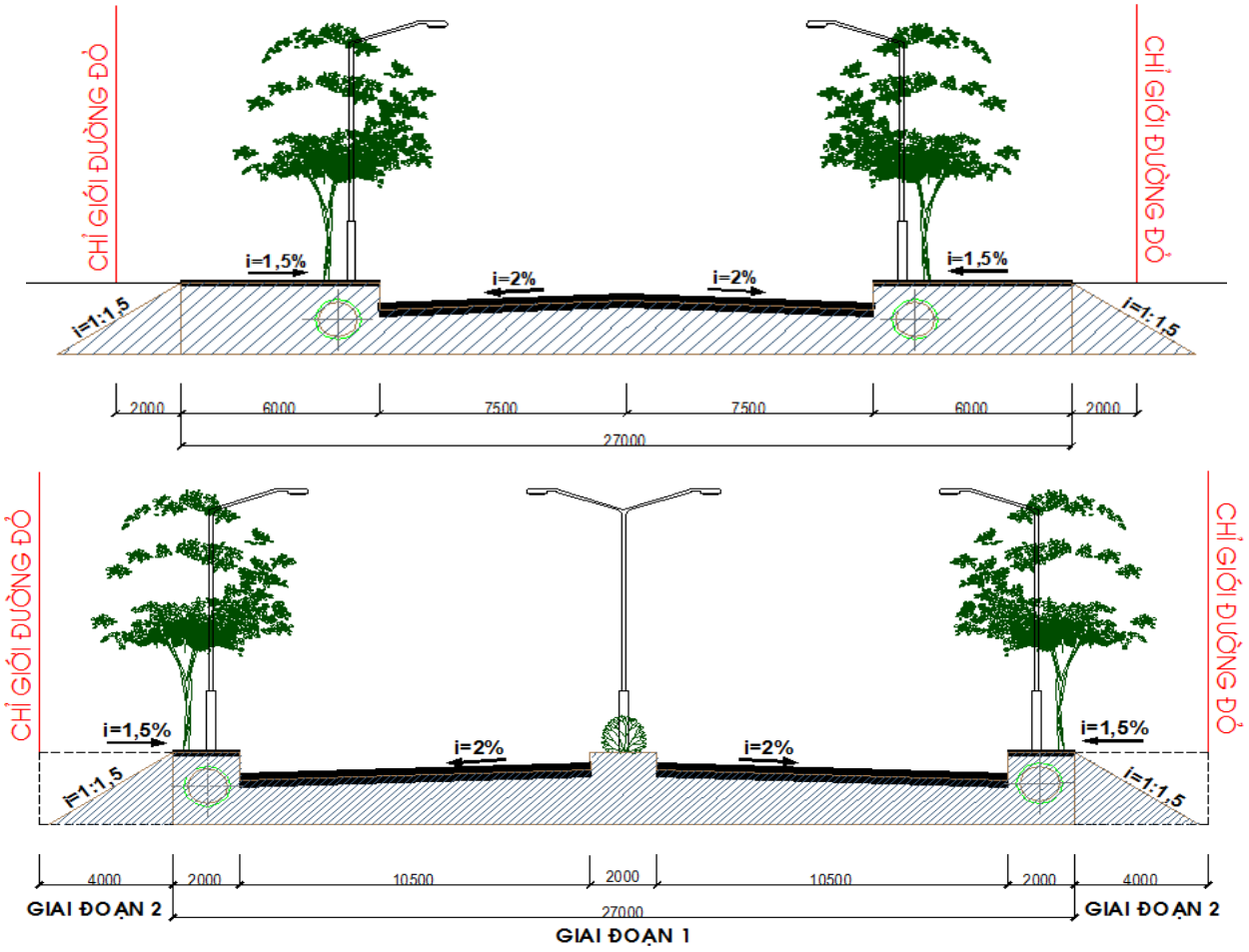
28. Two new roads on the east and west side of Bac Giang will be constructed[17]. The eastern road is 1.61 km southern extension of the road that currently services the fertilizer factory north of the city which will connect the fertilizer factory road to Hwy 1A (Figure 2). The new western road extends 710m west from an existing road across the Thuong river to a point where the new road will veer south another 880m to intersect Hwy 284. A bridge over the Thuong river for the western road is included. A separate double level railway crossing on the origin of the western road in the middle of town will be included in the urban roads component (Figure 2).

29. Road widths for the new western and eastern roads were determined using the standard categories contained in the National Building Code Decision 04.2008/QD-BXD. Figure 3 shows cross sections of western road.

[17] Updated from Fact Finding Mission, 5-15

Figure 2. Components of subproject in Bac Giang

Figure 3. Cross sections of new western road in Bac Giang



2. Wastewater improvements

30. The town has a combined wastewater facility with wastewater from the urban centre collected and pumped to an existing wastewater treatment plant (WWTP) south of the town (Figure 2). Prior to pumping the combined wastewater passes through a number of “separation” or overflow chambers which divert a proportion of the wastewater to a separate stormwater system during the wet season. During the dry season the flow is mostly full wastewater. This contaminated stormwater collects in stormwater ponds and is pumped to the river. Further contamination to these ponds comes from houses located around the edges of the ponds which discharge directly to the ponds. There are 10 stormwater ponds in Bac Giang, however, the subproject will rehabilitate ponds that require urgent attention (Figure 2).

31. There are four main catchments which need attention, Nha Dau, Dong Cua, Chau Xuyen #1, and Chau Xuyen #2. The ponds associated with these catchments are Soc Trang, Nha Dhau, Banh Keo and Dong Cua. The current problems with the stormwater ponds stem from raw domestic WW being discharged directly to the stormwater ponds which are then periodically

pumped to the Thuong river. Further, associated storm-wastewater canals and drains are clogged, and the pumping stations at the ponds are not working properly. All current issues with most of the pump stations will be addressed directly by the province. The proposed improvements to the ponds are summarized as follows:

***Nha Dau* pond**

32. The larger of the two Nha Dau ponds will be dredged to increase pond capacity. A concrete pipe will be installed along the periphery of the pond to collect WW which will be pumped to the existing WWTP. A recreational footpath will be placed around the pond. The smaller pond will have wastewater collected from households and diverted to the road at the front of the houses without a similar wastewater ring main installed.

***Dong Cua* pond**

33. Two overflow chambers on the two main inlets to the lake, and two lengths of pipe to deliver overflow WW to pump station #6 will be installed.

***Banh Keo* pond**:

34. Domestic WW will be collected in a concrete pipe along the periphery of the pond and pumped to the WWTP to prevent WW from entering pond. An overflow chamber on the main inlet will be installed, and the pond dredged to increase capacity.

***Soc Trang* pond**

35. Soc Trang pond will be dredged to increase pond capacity. Domestic WW will be collected in a concrete box culvert running around the pond prevent WW from entering pond lake with WW pumped to WWTP. A stone masonry embankment and a footpath will be installed around the pond.

***Chau Xuyen #2* catchment**

36. Two overflow chambers with pipe connections to existing system will be installed.

37. Figure 4 shows the work to be done on the Soc Trang and Banh Keo ponds. In addition to improving wastewater collection, the existing WWTP south of town (Figure 5) will be expanded to accommodate increased wastewater. The site of the oxidation ditch-type WWTP has land available to double the capacity of existing plant. The capacity of 10,000 m^3/day has been confirmed based on projected demands for a 20 year design life (estimated year 2038).

a. Associated facility

38. The existing WWTP in Bac Giang is an associated facility because the expansion of the WWTP to be financed by the ADB will be linked to an existing facility that was designed by an external entity. Thus, as per requirements of the SPS (2009) an environmental compliance audit (ECA) of the operations of the existing facility was required to determine how well the existing WWTP is meeting government regulations and policy for the operation of WWTPs, and to determine what measures need to be corrected or improved as part of the design of the WWTP expansion. The ECA report for the existing WWTP facility is presented in Appendix B.

Figure 4. Improvements to the collection and separation of WW and stormwater

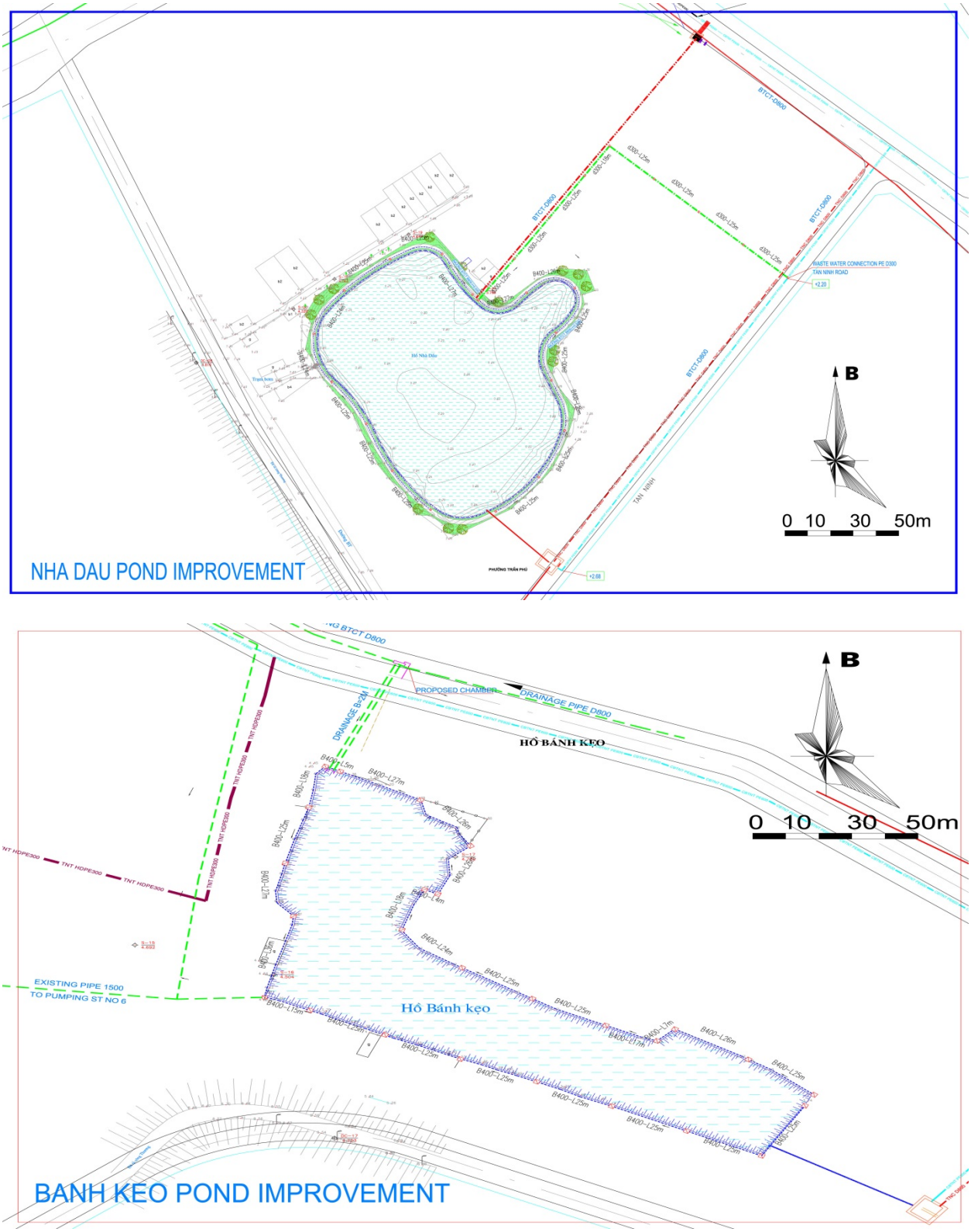


Figure 5. Expansion area of existing WWTP

i. Corrective action plan

39. The required corrective actions for the existing WWTP are addressed by the subproject design. The primary action is to completely commission functions of the existing WWTP operation that have been idle such as the chlorination plant at the end of the process. The subproject will expand the existing treatment process not improve upon it, and in doing so will inject additional equipment, capacity, and staff training to produce an overall increase in wastewater treatment for Bac Giang town.

3. Stormwater improvements

40. The southern Van Son pump station (Figure 2) which is over 40 years old is no longer working efficiently. Moreover, the maximum station capacity of 34,000 m^3/day is significantly under required capacity. The pump station needs to be replaced to better manage flooding of the eastern and southern areas of the city (Figure 2). Storm water from the catchment currently flows overland unconfined (Figure 2) in a natural channel from

the Ung Bo lake to the Van Son pump station. Similar to Van Son the nearby Chau Xuyen 2 drainage pump station is failing regularly and requires replacement.

41. Drainage in the eastern and southern city catchment area will be improved. A new earth-formed canal is proposed from Ung Bo lake to the Van Son pump station to improve flow, and to better define and preserve the flow path into the future. Sections of the canal already exist, however, a 3.5km section requires dredging to complete the route (Figure 2).

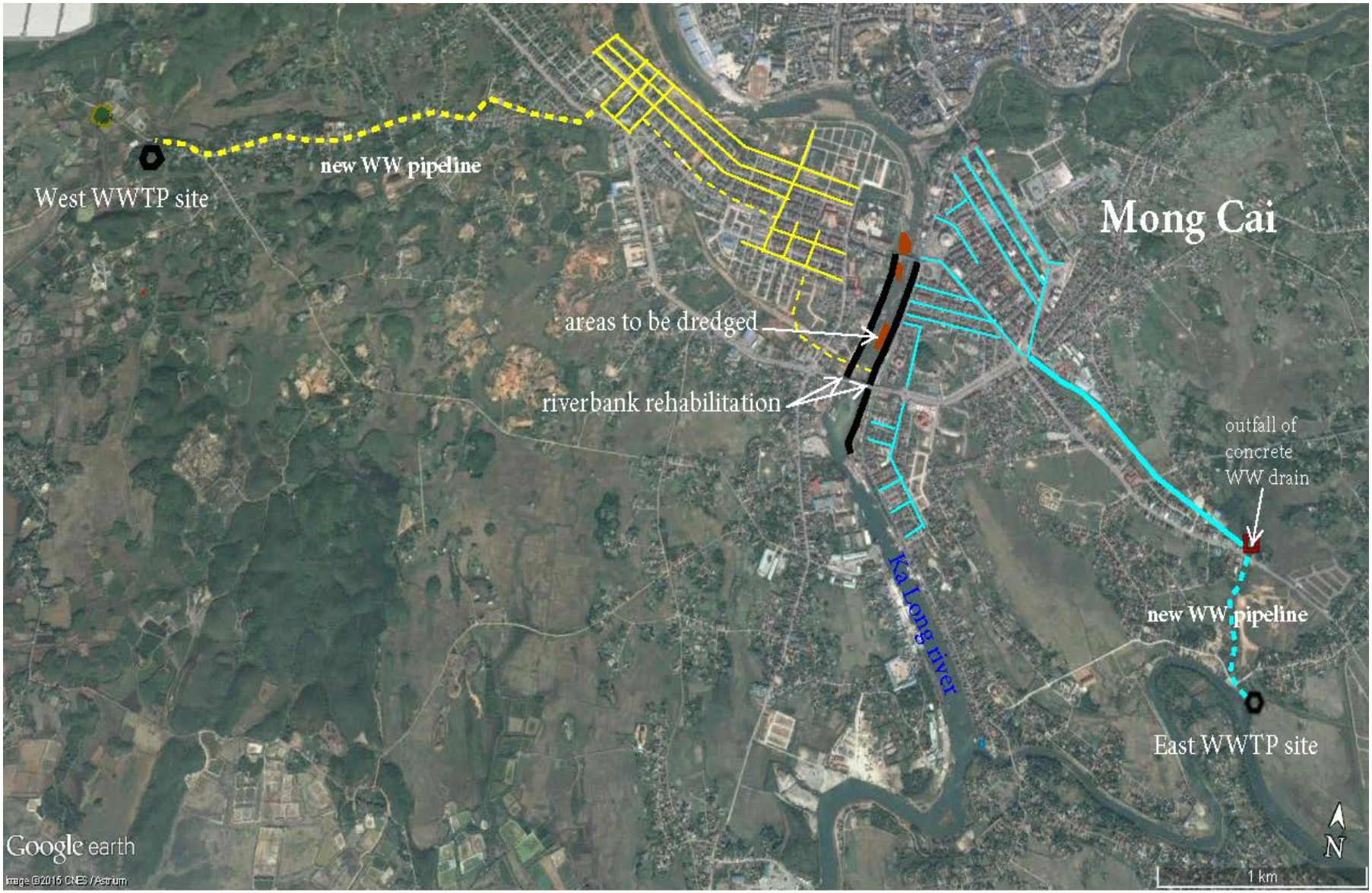
42. A replacement pump capacity of 86,000m^3/hr is proposed for the Van Son pump station site (Figures 2 and 6) to service the wider catchment of Van Son. A smaller number of larger submersible pumps are proposed – ten pumps of 10,000m^3/hour - to replace the current pumps. A new pump house will be required including an overhead crane to enable pumps to be installed and removed. The present pump station will need to continue operating during construction of the proposed new station. Similarly, the Chau Xuyen drainage pump station will be replaced with a new house and seven new pumps of capacity 5,000 m^3/day each.

Figure 6. Existing Van Son pump station

B. Mong Cai

43. The major subproject components of Mong Cai from Table 1 are shown in Figure 7.

Figure 7. Major subproject components of Mong Cai



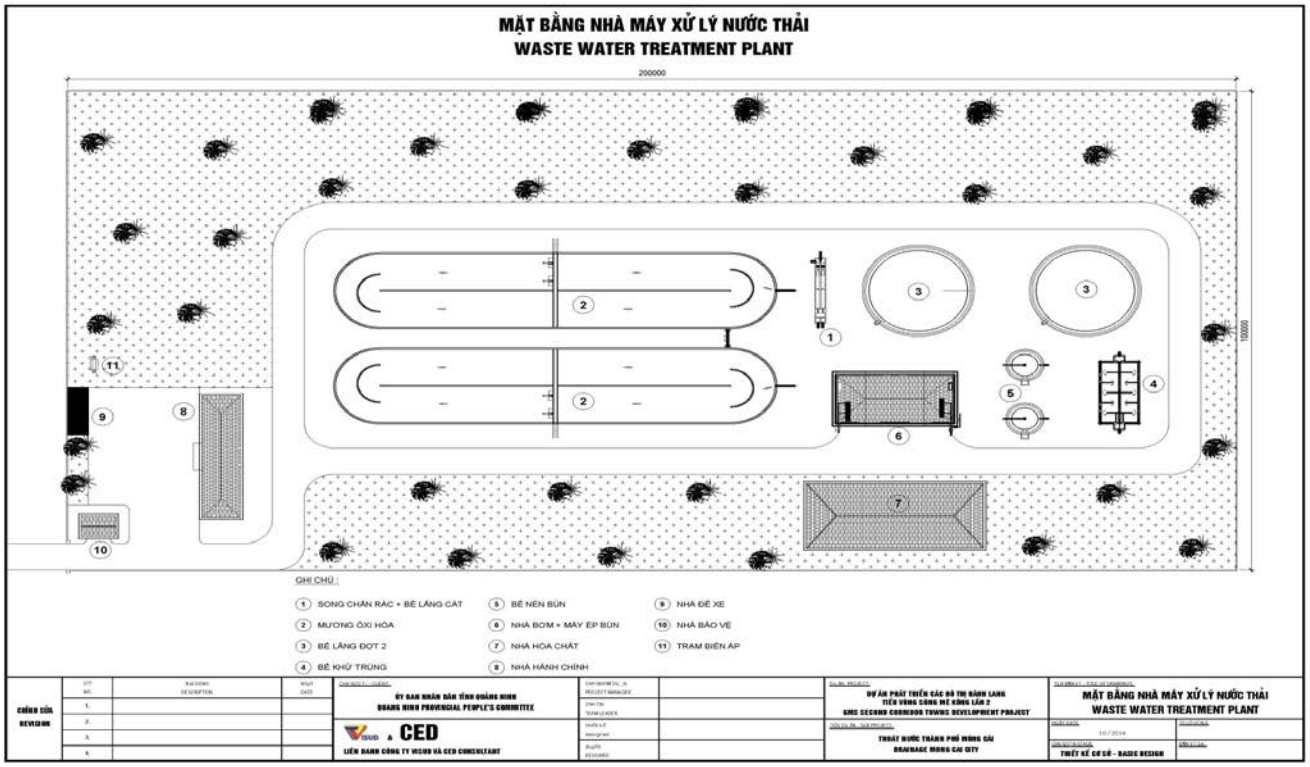
1. Wastewater and stormwater improvements

44. Untreated wastewater is currently discharged into Ka Long river and along the sides of town roads. Many households are not connected to the existing drainage system which causes local flooding. The subproject proposes to improve these degraded environmental conditions with wastewater collection and treatment, and improved drainage.

45. Many household septic tanks are not operating properly, and have lacked maintenance. Moreover, many households are not connected to the drainage system at all, particularly on the west side of the Ka Long river resulting in wastewater being discharged to open ditches along the sides of roads. The current combined drainage system is incomplete, and periods of high rainfall cause localized flooding.

46. Two separate reticulated sewerage systems and treatment plants will be constructed east and west of Mong Cai centre (Figure 7) which will include concrete pipelines, pump stations, and diversion wells. The two systems will be combined sewers. The more populated east side has an existing reticulation system and will need a number of extensions to serve new areas as well as two pump stations. The west area is less populated and has fewer existing drains so new drains will be required. Connections are proposed to be free to all households. The new east and west WWTPs will have capacities of 8,000m^3/day and 4,000 m^3/day, respectively. Oxidation ditch-type WWTPs similar to that in Bac Giang are preferred (Figure 8). Several larger drains for mainly stormwater will be installed, particularly for the western catchment.

Figure 8. Plan of WWTPs to be built in Mong Cai based on Bac Giang WWTP



1. Riverbank protection

47. Sedimentation in the Ka Long river has created islands and shallows which are a shipping hazard particularly during the dry season. A section of riverbank at the northern end of the city has been protected on both sides with a brick masonry embankment. The eastern side of this section has been landscaped with a riverside walkway and garden all the way from the Kalong bridge south past the Hoa Binh bridge to the bend in the river. Along this upstream eastern section the riverside footpath, seating, and lighting is too low for peak flood levels and becomes submerged for a few days during every rainy season. The lower levels of the current embankment are deteriorating and collapsing into the river. There presently are no riverside walkways or gardens on the western side of the river.

48. During the rainy season the high Ka long river flow erodes the river embankments, damaging the integrity of the riverbank, and putting residential areas along both sides of the river at risk. During the dry season the river bed sediments create islands that affect the waterway traffic routes of the city.

49. Dredging of riverbed and removal of dunes is proposed for 3-5 islands with approximately 20,000m^3 of material to be removed from the river. Construction of an embankment protection structure is proposed along both sides of the river through the city (Figures 7 and 9).

East bank:

50. The work will extend from Ka Long bridge downstream past the Hoa Binh bridge to a point adjacent to Nguyen Du street. The river embankment will be sloped on the water side and finished with either decorative stonework or planter tiles. On top of the riverbank there will be a walkway, lighting, seating, and a landscaped area back from the river with a road behind the landscaped area (Figure 9).

West bank:

51. The work will extend from Ka Long bridge downstream to the Hoa Binh bridge. The work will be similar to the east bank except that there will be no road. A shared-surface of sufficient width for the walkway may be used to allow a service vehicle access. The proposed embankment on both sides will be raised above the flood zone.

Figure 9. Riverbank protection and development along Ka Long river

Fig 9a. longitudinal view

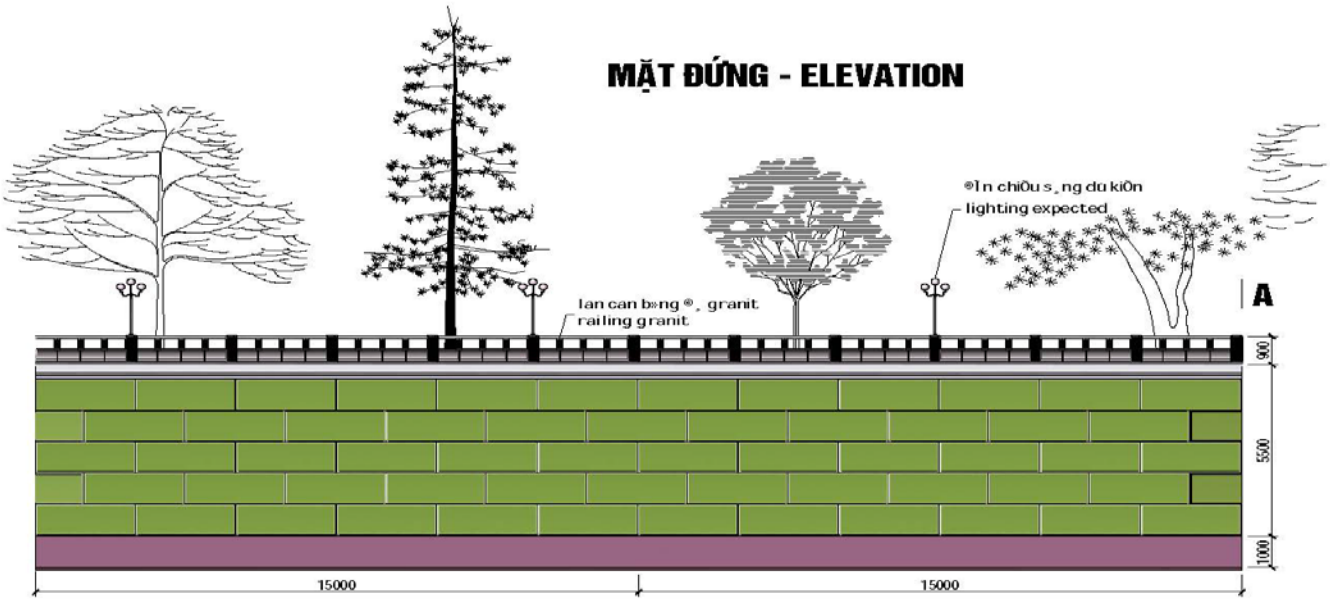
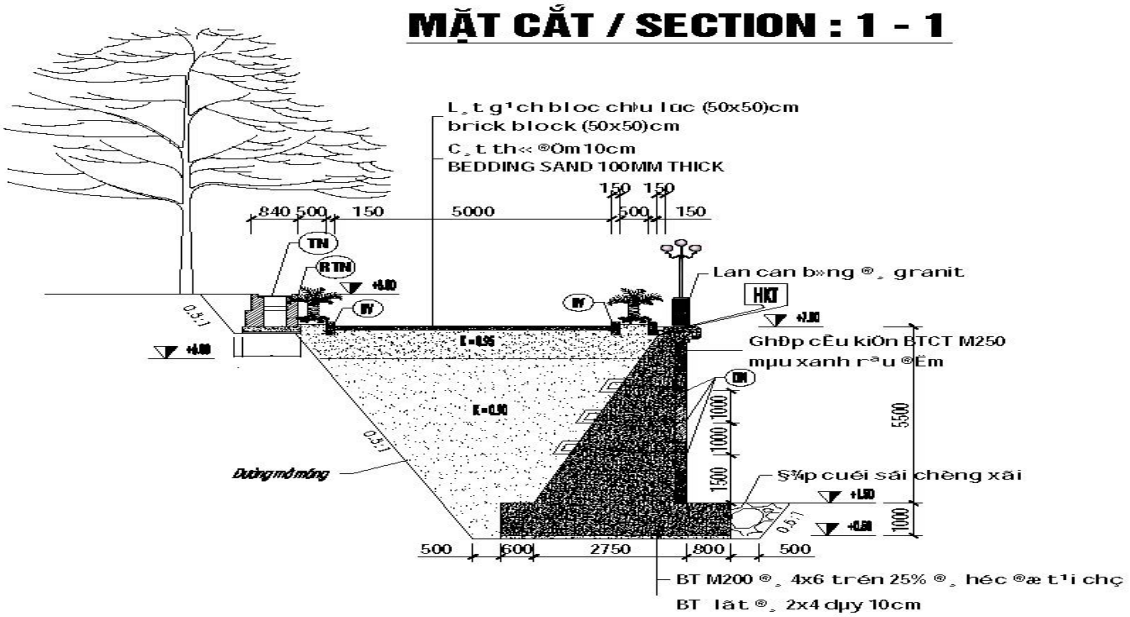


Fig 9b. cross sectional view



C. Sa Pa

52. A green city action plan[18] for based on ADB's Green City Agenda would be very appropriate for Sa Pa due to the dominance of the natural environment in the cultural and tourism industry. The subproject components chosen for Sa Pa should support such an action plan. Figures 10 and 11 show the major subproject components of Sa Pa listed in Table 1.

1. Road 1 – Route 152

53. Road #152 is a well-used the 13.7 km scenic tourist route along a picturesque valley between Sapa and Ban Den that is in poor condition with rough surfaces, several slip areas, and no drainage along. The proposal is to upgrade Road 152 from Sa Pa town to Ban Den commune to where it meets the recently upgraded stretch of the road onward to the Lao Cai expressway to the east.

54. The length of the proposed upgrade is 14.4 km including a 700 m extension into the town centre. Also proposed is to include two or three traditional style houses at road junctions with tracks that provide tourists access to the valley walkways. The buildings can be used by ethnic minorities for selling handicrafts thus incorporating a social benefit element to the subproject component. A limit to heavy traffic use of the upgraded road including buses is proposed to reduce town centre congestion. The road north to Lao Cai will continue to be used. Figure 12 provides example cross sections of upgraded road.

[18] ADB, 2012.Technical Assistance for Green Cities – a Sustainable Urban Future in Southeast Asia, TA 8314.

Figure 10. Road 152, and WWTP sites of Sa Pa subproject

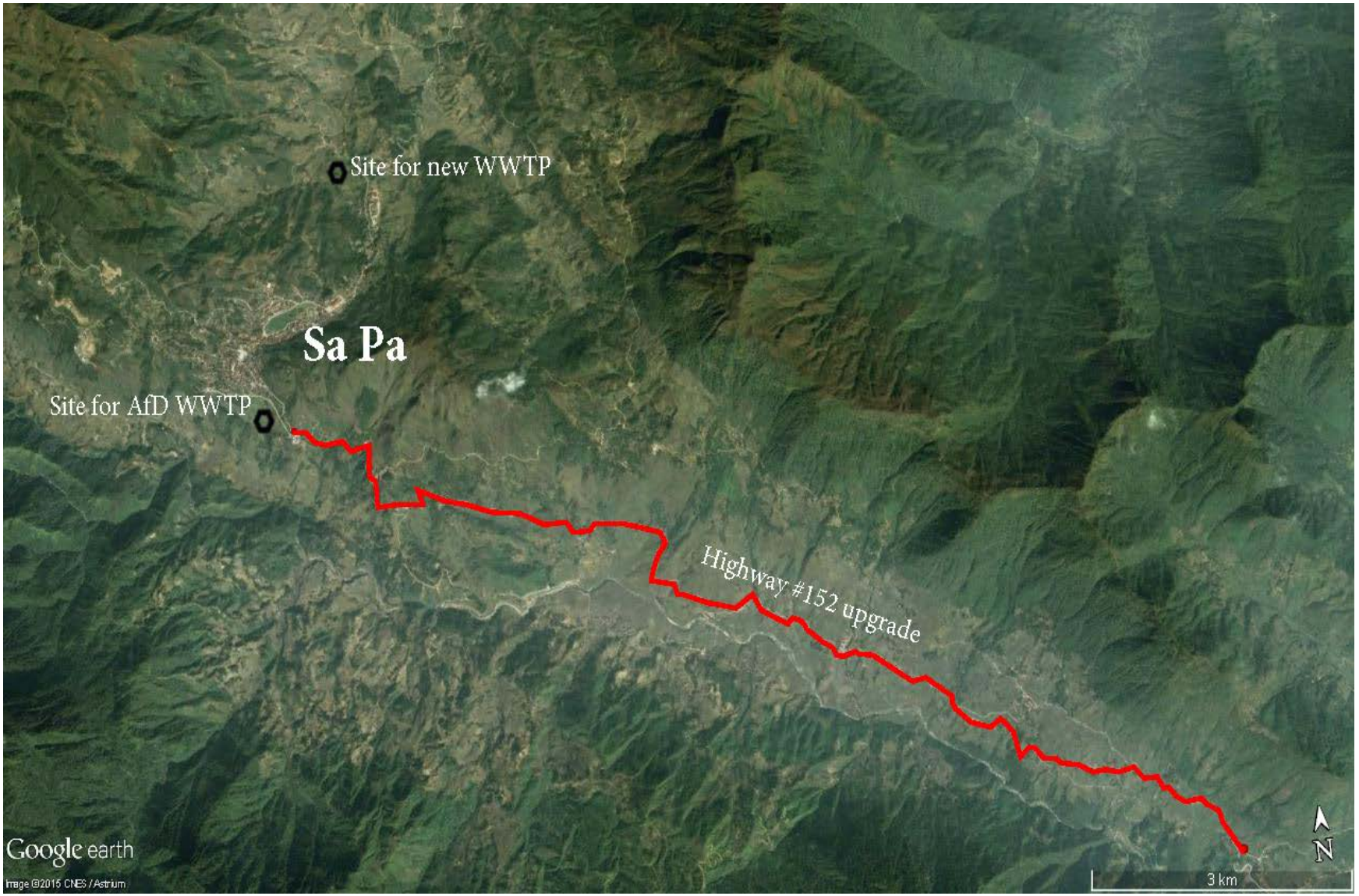


Figure 11. Wastewater collection and area of town enhancement of Sa Pa

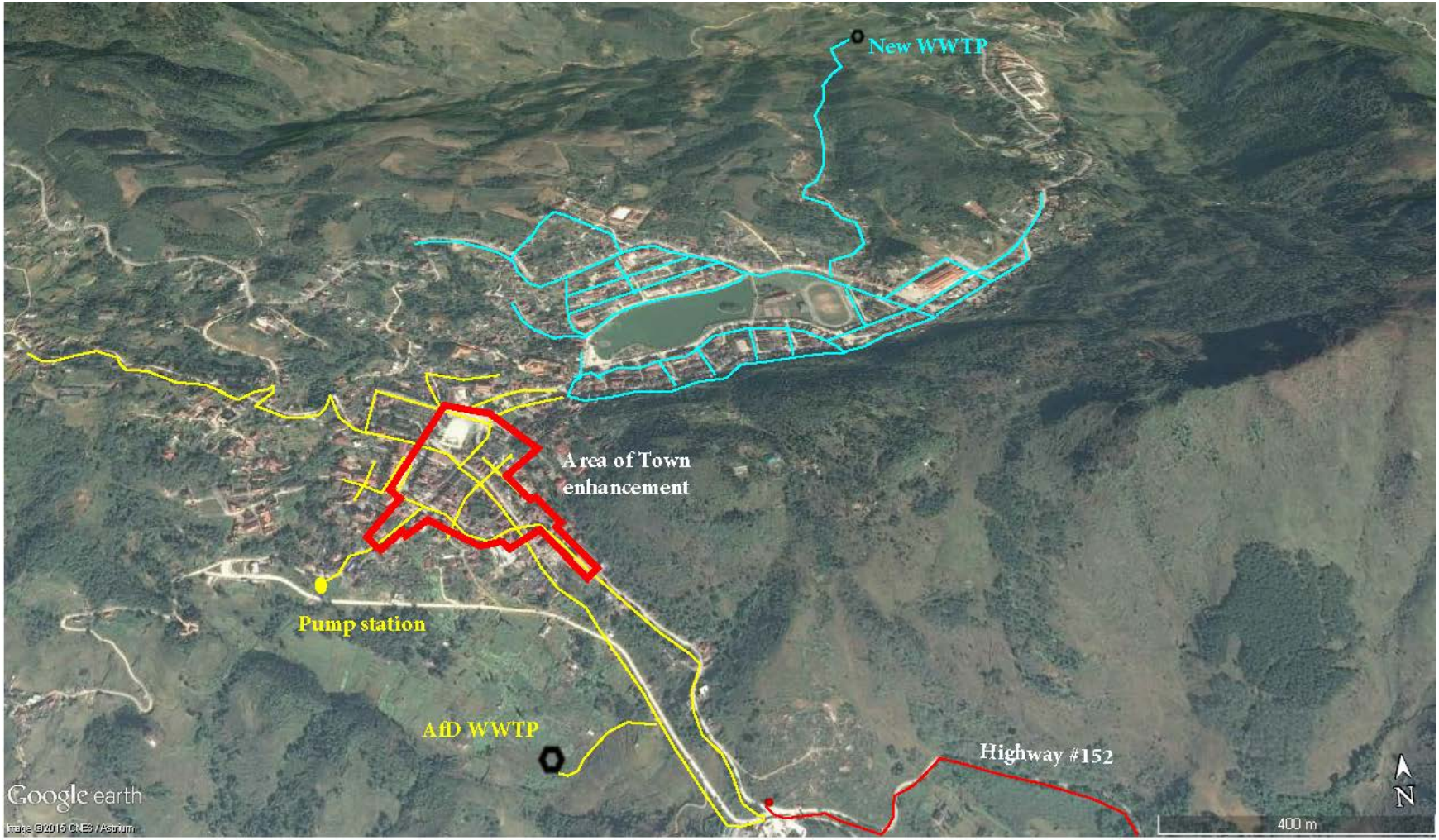
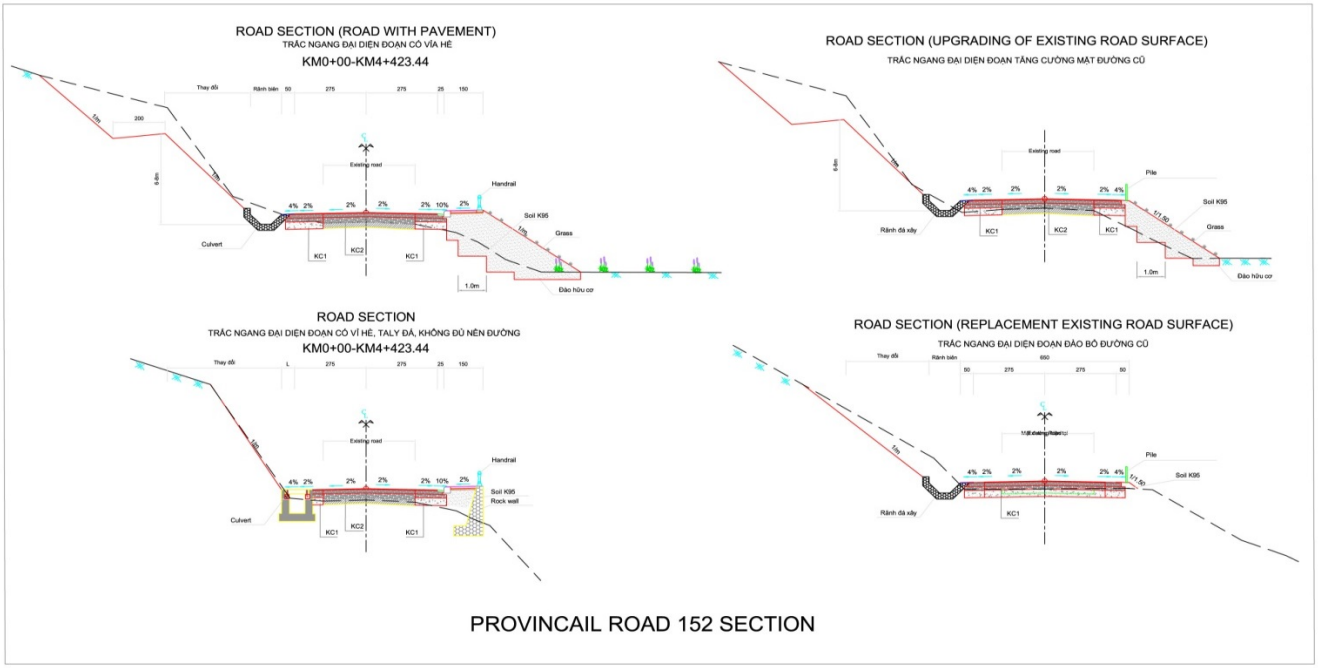


Figure 12. Cross sections of upgraded Road 152



1. Wastewater and Drainage

55. There are two catchments in Sa Pa. The northeast catchment includes the town lake and the new market area, and the southwest catchment contains the old town area. Currently there is no wastewater treatment, and the existing combined wastewater-stormwater collection system is in poor condition.

56. A separate wastewater collection system is proposed for the northeast catchment of 74 ha with a total pipe length of approximately 10km. Houses will be connected to a rider main via grease trap chambers with the rider mains connected to a main wastewater collection pipe that will transport wastewater to the treatment plant. Two pump stations will be required, and temporarily affected the roads and footpaths will need restoration.

57. The northeast WWTP with capacity 2,500 m3/day will be built on a hill due north of the town lake (Figure 11). The stream that currently receives wastewater will be pumped to a collection chamber near road 4D and gravity fed through a DI pipe to the WWTP. The WWTP will use an oxidation-type treatment system.

58. A separate wastewater collection system for the southwest catchment is proposed (Figure 11). A recent Agence Francaise de Developpment (AfD) project completed a final design for a wastewater system for this catchment but there were insufficient funds for construction. Moreover, the capacity of the new WWTP was underestimated at 2,500 m^3/day. For a 20 year design life a 5,000 m^3/day capacity will be required, so while the AfD design can be utilized, the WWTP will need to be upsized and new construction drawings completed. The system which will be accessible from Road 152 will mostly work by gravity, but will require one

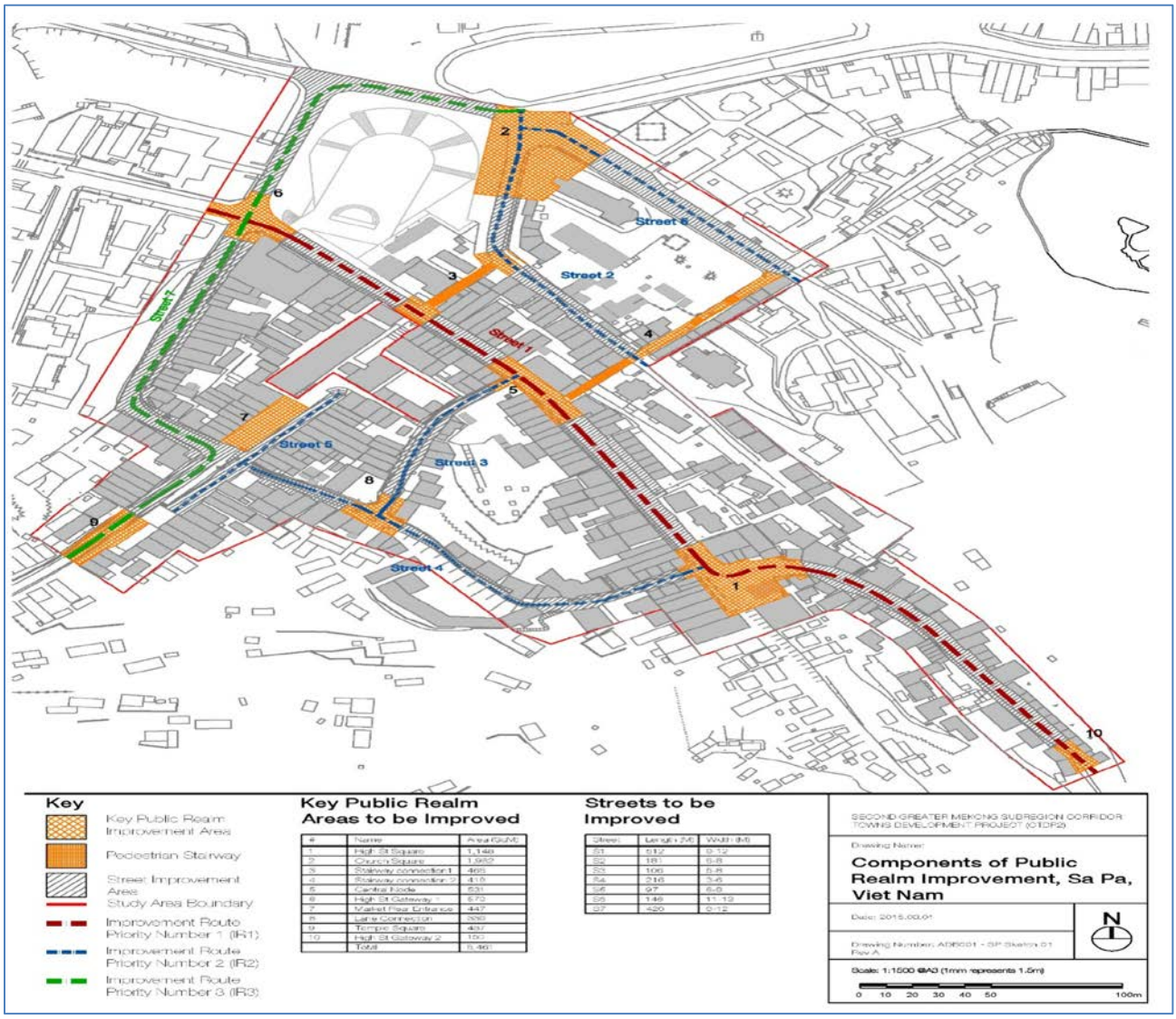
pump station to collect from the lower areas to the south west of the town. The WWTP will use an oxidation-type treatment system.

2. Town centre enhancement

59. In the town centre footpaths are broken, drains are poor, power and telecom cables are untidy, and the market area is very basic and in a state of disrepair. The pedestrian environment is poor in terms of visual aesthetics, safety, and air quality all of which detract from the stunning natural landscapes of the surrounding area.

60. The subproject will upgrade the public realm in a designated area in the town centre including the main shopping street and the old market (Figure 11). Actual works will include replacing footpaths and road surface, undergrounding overhead cables, installing drains and permanent ramps from the road to businesses, and limiting or stopping traffic through the main street in the evenings (Figure 13).

Figure 13. Planned improvements to heritage area in Sa Pa



IV. DESCRIPTION OF AFFECTED ENVIRONMENTS

61. Given the multiple infrastructure and environmental improvement investments in each of the three subproject towns of Bac Giang, Mong Cai, and Sa Pa the descriptions of the affected environments focus on the immediate environments that could possibly be affected by the subprojects, or the environmental features that could possibly influence the successful implementation and operation of the completed subprojects. Regional or provincial environmental information is provided only for needed context.

62. The environmental baseline information was obtained primarily from provincial State of the Environment Reports prepared by the provincial DONREs and supplemented with information from other reports where available. Collectively, the data and information obtained

for the affected environments of the three subproject areas is sufficient to obtain a sufficient understanding of the potential environmental impacts of the different subprojects. Some baseline information is provided on social, economic, and demographic features of the subproject areas for context. However, the complete description of the socioeconomic and demographic profiles of the subproject areas is provided in the separate Social Assessment and Resettlement Plan chapters of the draft final report.

A. Bac Giang

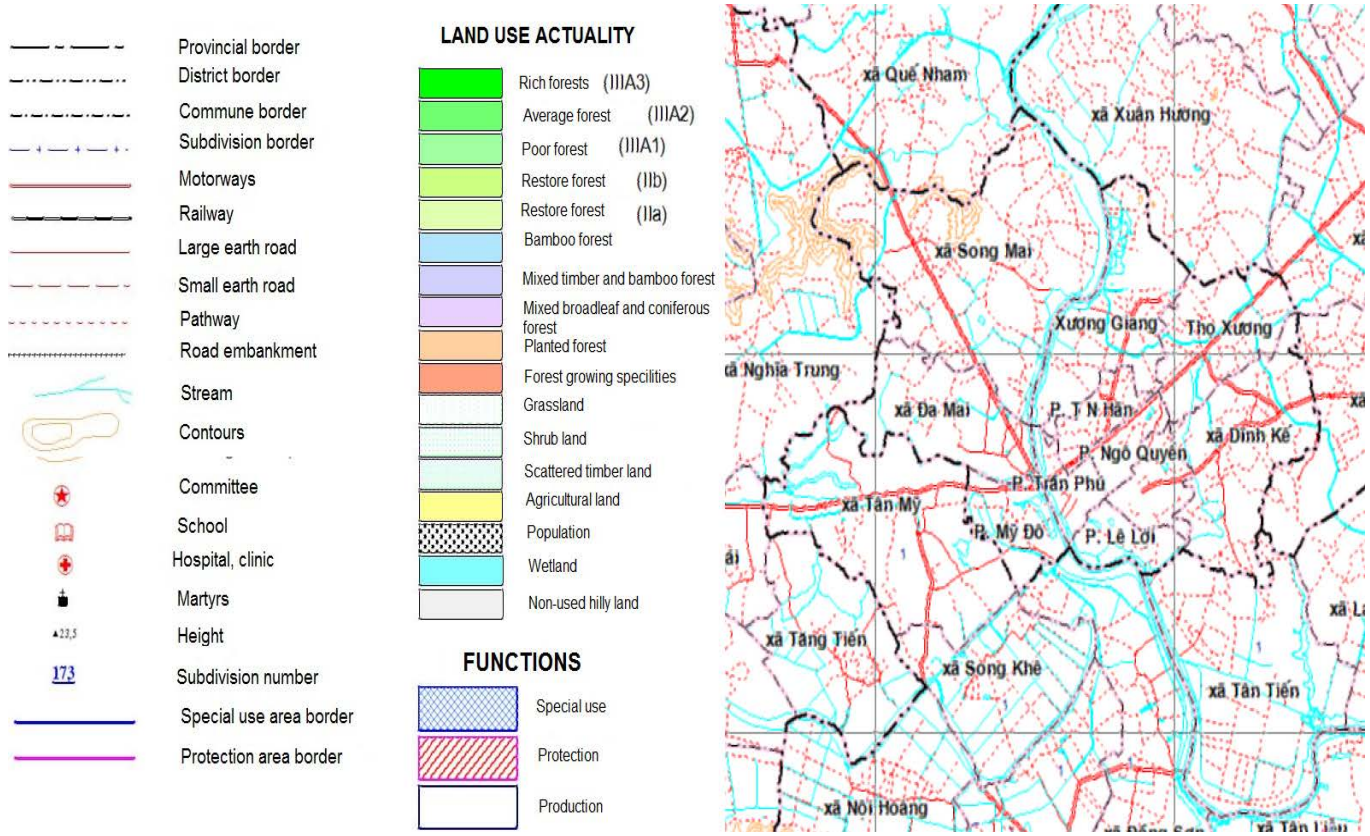
63. Bac Giang town, Bac Giang province is located at 21009'N - 21015'N and 106007'E - 106020'E in northeast Viet Nam. The town is bordered by Tan Yen district to the north, Lang Giang district to the east, Yen Dung district in the south, and Viet Yen district to the west. Bac Greater Bac Giang town is 66.6 km^2 and consists of 16 administrative units defined by 7 wards and 9 communes.

1. Physical Resources

Topography

64. Bac Giang town is situated on the flood plain of the Thuong river in a largely lowland area that extends to the Red river delta to the south. Hilly terrain arises to the southwest of the town and in the mountainous north. The vicinity of the town is not forested with forested areas located at the northern areas of the province. Figure 14 indicates the immediate area of the town is dominated by grasslands, wetlands, scrubland and some scattered forest.

Figure 14. Terrain of Bac Giang town



Geology and soils

65. Bac Giang town is underlain by recent holocene fluvial sediments comprised primarily of coarse and silty sands extending approximately from 5 to 40m deep. Clay strata exist with the sands. The hilly terrain located about 10km to the southwest is underlain by triassic sedimentary conglomerates, shales and sandstones.

Climate

66. Bac Giang experiences a tropical monsoon climate of the northern plain that is defined by distinct rainy (April – October) and dry (November – March) seasons. Average annual air temperature is 23^{o}C with maximum and minimum recorded temperatures of 41^{o}C and 13^{o}C . Average humidity is 83 - 84%, and total annual precipitation reaches 1,400 – 1,730mm.

67. Annual sunshine reaches 1,500 to 1,700 hours which is good for agriculture. The average wind velocity is 2.1 m/s. Because the town is located inland from the Gulf of Tonkin and the South China Sea (East Sea) the incidence of hurricanes and storms is low, though periodic whirlwinds and hail storms occur as a result of the influence of the distant mountain ranges.

Air quality

68. Air quality monitoring conducted in 2013 by the provincial Department of Natural Resources and Environment (DONRE) indicates that air quality in the vicinity of the town is generally good with only episodic localized dust pollution occurring. The single largest source of dust apparently is the Habac Fertilizer and Chemical Company located in the north side of town. Dust levels in the vicinity of the fertilizer plant have exceeded the QCVN Standard for ambient total suspended particulates (TSP)[19].

Water Resources

69. The primary surface water resource of Bac Giang town is the Thuong river which flows through the western side of the town (Figure 2). The headwaters of the Thuong river are located in the hilly area of Chi Lang district, Lang Son province. The river which is approximately 87 km flows through the provincial districts of Yen The and Lang Giang, Tan Yen, Yen Dung, and Bac Giang town.

70. The secondary surface water resource of Bac Giang town is the network of multi-purpose drainage ponds that are scattered throughout the town and in outlying peri-urban areas. The ponds which reflect the extensive low lying area of Bac Giang are used for flood control, domestic wastewater collection, and some local aquaculture. As indicated in Section 3 the ponds are a major focus of the Bac Giang subproject.

Water quality

71. Water quality in the Thuong river, and in select drainage ponds in Bac Giang town was determined in 2013 by the DONRE. Similar to most rivers in northern Viet Nam the Thuong river is characteristically turbid due to basin land erosion from unregulated agriculture and shoreline development activity.

72. Dissolved oxygen (mg/l DO) levels at all sampling sites in the river lay within permitted limits (QCVN 08:2008/BTNMT column B1) whereas total suspended sediment (TSS) [related to turbidity] exceeded the national standard for ambient surface waters at 9 of the 10 sampling stations. TSS in the pond in Tran Phu Ward was 46.7 mg/l and lower than the standard.

73. Expectedly DO was the lowest in the drainage ponds and associated canals with DO levels at all 10 sampling points below the QCVN standard. Notable was the very low DO level in the canal through Song Khe commune.

74. The 5 day biological oxygen demand (BOD_5 mg/l) at all stations was 1.1 - 4.7 times higher than QCVN standard (QCVN 08:2008/BTNMT). The highest BOD_5 levels were found in Thuong river just downstream of the discharge outfall of Habac Nitrogenous Fertilizer & Chemicals Plant.

75. The ambient concentrations (mg/l) of the heavy metals Fe, Mn, Cu, Zn, Pb, Cd, As, Hg are within permissible ambient levels. The other water quality indicators of total N, total P,

[19] BG DONRE, 2014. Report on Bac Giang Environmental Monitoring results

coliform, chloride, and mineral oil vary around permissible ambient concentrations. Coliform and nutrients (N & P) are generally highest in the drainage ponds and connecting canals.

76. The concentrations of heavy metals (Fe, Mn, Cu, Zn, Pb, Cd, As, Hg) at the sampling stations have not have not changed significantly since 2012. Similarly, total N, total P, coliform, and mineral oil have been stable. However, DO and BOD_5 have been variable at sites and across time since 2012. DO ranged from 3.8 to 6.8 mg/l whereas BOD_5 (mg/l) decreased since 2012 ranging widely from 16.4 to 71.5 mg/l. [20]

Groundwater

77. Groundwater quality monitoring at 10 sites in Bac Giang town show the concentrations of heavy metals of Fe, Mn, Cu, Zn meet QCVN standards for ambient water quality. Water hardness as $CaCO_3$, Cl, NO_3, SO_4 10 sites also meet QCVN standards. No data for the heavy metals Pb, Cd, As, Hg are available. However, all 10 sites showed concentrations of ammonia (NH_3) exceeding the QCVN standard by up to 30 times. The well water of households in Song Khe commune, near centralised drain of Song Khe – Noi Hoang industrial zone registered the highest levels of ammonia.

78. Coliform levels at 5 of 10 sites exceeded permissible levels with the highest coliform levels at 133 times the QCVN standard occurring in Thanh Mai hamlet, Da Mai commune near the solid waste landfill of Da Mai commune. Compared to surface water quality groundwater quality has not fluctuated since 2012.

Soil quality

79. Soil sampling at 5 locations in Bac Giang town indicate that pesticide and fertilizer residues exist in Tieu hamlet, Dinh Ke commune; and Lim Xuyen hamlet, Song Khe commune). However, the residue concentrations meets the regulated standard (QCVN 03:2008/BTNMT). Soil quality appears to be stable both in space and time since 2012[21].

2. Biological Resources

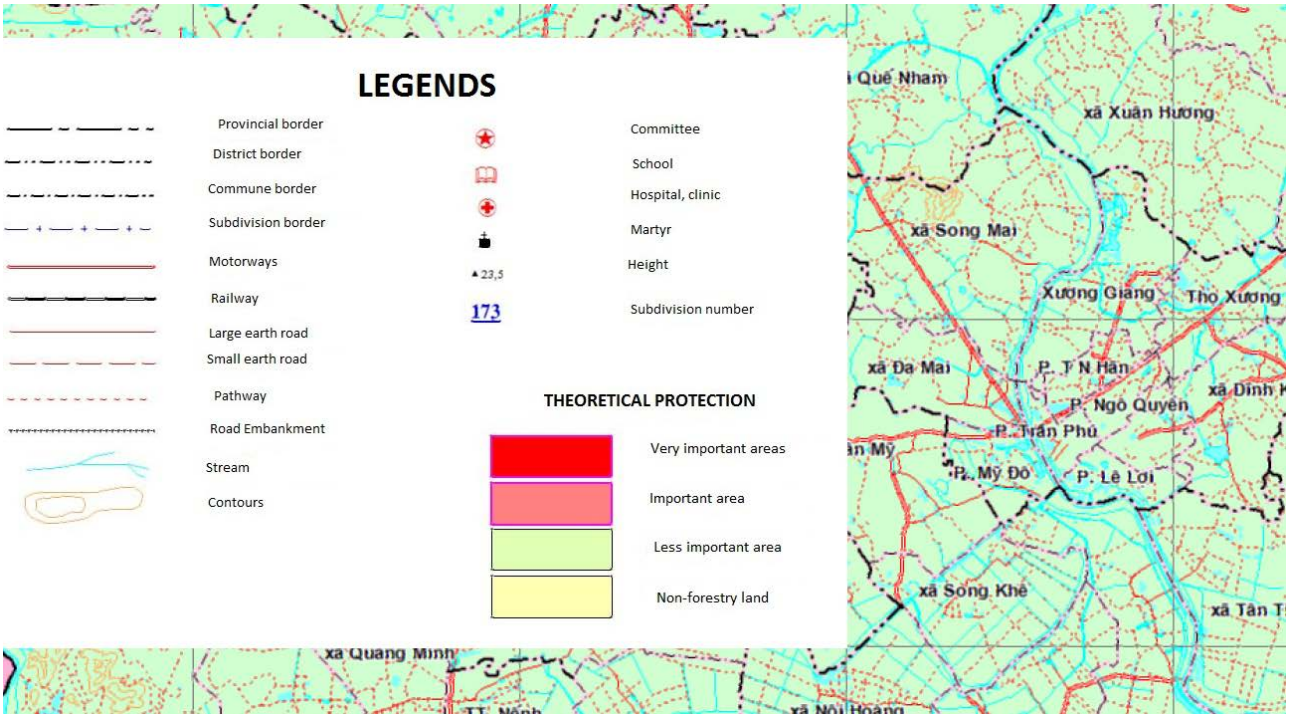
80. The vicinity of Bac Giang town and the province as a whole does not support any known rare or endangered wildlife, or critical habitat for existing wildlife[22]. The town is not near an environmental protected area with the nearest protected area being Yên Tử Nature Reserve located southeast of the province.

81. Biodiversity in the vicinity of Bac Giang town is relatively low, and not well documented. Figure 15 indicates that the immediate area of Bac Giang town is not valued for ecological protection. Conversely, at the northeastern part of the province along the border with Quảng Ninh the Khe Rỗ forest (72 km^2) supports a rich biodiversity of wildlife. A survey of the multi-taxa inventory of Bac Giang province by the Centre for Biodiversity and Conservation at the American Museum of Natural History, New York (CBC-AMNH), and the Institute for Ecology and

[20] BG DONRE, 2014. Report on Bac Giang Environmental Monitoring results
[21] BG DONRE, 2014. Report on Bac Giang Environmental Monitoring results
[22] BG DONRE pers. Com. 2014

Biological Resources, Hanoi (IEBR) recorded 146 species of birds throughout the province including 61 species from Khau Ria and Mt. Pu Tha Ca and 105 species from Mt. Tay Con Linh.

Figure 15. Relative ecological value of Bac Giang area



82. The province is used primarily for agriculture, tree production, and lowland aquaculture and thus consists of developed land. No information was available on any organized fishery that may exist in the Thuong river, or the nature and production of local aquaculture. Tree development in Bac Giang is comprised of 31.4 ha of perennial trees, and 324 ha of production forests. Within Bac Giang town the dominant biological resource is home gardens and agriculture.

Land Use

83. The agricultural land of Bac Giang town is expected to decrease quickly from transformed into non-agricultural land uses (e.g., housing, and specialized uses. It is estimated that the area for urban construction will increase to 2,463 ha in 2020 (Table 4).

Table 4. Anticipated land use change in Bac Giang town

Land Allocation (ha) and Use	2010	2020
Total natural land area	3209.1	7,436.0
1. Urban land	1100.9	2,933.0

Land Allocation (ha) and Use	2010	2020
a. Land for urban construction	983.9	2,462.7
- civil land	693.5	1,854.4
- non-civil land	290.4	608.3
b. Other lands	117.0	470.3
- agricultural land	60.0	328.1
- forestry land	7.0	9.1
- non-use land	-	83.5
- other specialized land	50.0	49.6
2. Suburban land	2108.2	4,503.1
- land for urban construction	120.0	376.9
- land for industry, small industry and handicraft, warehouses	82.0	252.4
- green and sport area	12.5	43.0

3. Human Resources

84. Bac Giang town has population of 148,172 which consists of 70,019 urban and 78,153 rural citizens[23] with a density of 3,353 inhabitants /km^2. The focus of town development is to develop the socio-economy through capacity development of management in the town. The town is attempting to create favourable conditions to promote technical staff and facilities development.

85. Attention is being given to production and business activities of households to create jobs and development of new types of household and co-operative business, as well as developing and expanding social insurance for people in the province. Planning to provide unemployment insurance for employees in state enterprises, expansion of cooperative, joint-stock companies, limited companies and foreign investment companies is underway, as well as ensuring vocational training in the town region with schools and vocational centres.

Education and quality of life

86. The quality of living in Bac Giang has increased. The poverty rate has decreased to 1.55%. Education and training is developing along three lines: socialisation, standardisation and modernisation. All Wards and Communes have public learning centers with quality in education the top priority of the province. Currently, Bac Giang town provides training in eight different vocations in 15 professional secondary schools. Continuing vocational colleges, career centres, education centres, colleges enrol over 16,000 students each year.

[23] 2011 Central Population and Housing Census

4. Features of Bac Giang Subproject Sites

87. Figures 16 and 17 show the type of agricultural and home garden lands that the eastern and western roads will traverse. Note in Figure 17 the cemetery at the eastern end of the western road that will have to be moved. Just beyond (west) of the cemetery is the Thoung river which will require a new bridge (Figure 2).

Figure 16. Agricultural land through which new eastern road will cross

Figure 17. Cemetery at start of western road, and agricultural land of alignment

88. Figure 18 exemplifies two stormwater ponds that will be rehabilitated with the installation of domestic wastewater collection pipelines around periphery of ponds that will collect and shunt

wastewater to the WWTP. Note that careful civil works, and careful complete or partial pond drainage will be required to minimize disturbance of adjacent households.

Figure 18. Example stormwater ponds to be rehabilitated

89. The wastewater lagoon of existing WWTP is shown in Figure 19 along with the unused property east of the WWTP that will be used for the expansion to the facility. If additional area is required agricultural land adjacent the facility will be used.

Figure 19. Existing WWTP, and planned expansion area behind facility

B. Mong Cai

90. Mong Cai town is located in the northeast corner of Quang Ninh province which is the northeastern-most province of Viet Nam. Quang Ninh province is bordered in the west by Bac Giang and Lang Son provinces, by Hai Phong and Hai Duong provinces to the south, by the PRC China to the north, and by the Gulf of Tonkin to the west. Mong Cai town is 265 km northeast of Bac Giang town. The major physiographical difference between Mong Cai and inland Bac Giang is the influence of the vast intertidal area of the Gulf of Tonkin to the east and south of town.

1. Physical Resources

Climate

91. The climate in Mong Cai is coastal tropical and relatively moderate with two distinct rainy-hot and dry-cooler seasons. Summers are humid with heavy rains from April to October, while winters are dry from northeasterly winds from November to March. Average total annual rainfall is 3,120 mm with recorded maximum and minimums of 3,830mm and 2,015mm. The period from April to October accounts for 93% of total annual rainfall. Winters are dry with November to April contributing 7% of annual rainfall. The least rainy month is October (1.9mm).

92. Average annual temperature is 22.5ºC with average maximum and minimum temperatures of 30-34^{o}C, and 5-15ºC. Winters in Mong Cai are cooler than in Bac Giang. Average humidity is 81% with peaks of 92% in March and April, and lows of 75% in October and November.

93. Mong Cai experiences wind from the northeast and southeast with an average wind speed of 2-4 m/s. The stormiest months are July and August. The town experiences an average of 5 to 6 storms per year which are mostly small and moderate. Storm wind over 20m/s in some places is not uncommon with 40m/s winds been registered. Table 5 summarizes the weather in Mong Cai.

Table 5. Summary of climate parameters in Mong Cai town

Item	Month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Temperature ^{0}C	13.5	20.1	25.5	25.2	26.4	30.1	33.5	1.4	28.5	25.3	20.4	16.5
Humidity %	80	85	91	92	83	86	86	83	84	76	75	79
Precipitation (mm)	7.2	8,4	43,9	98	416	810	557	164	80,3	1,9	15,6	9,8
Sunny hours	132	204	304	176	20	111	131	214	118	193	175	122

Item	Year					
	2005	**2006**	**2007**	**2008**	**2009**	**2010**
Temperature ^{0}C	22.4	23.3	21.6	22.7	24.1	22.5
Humidity %	82	80	81	79	82	81
Precipitation (mm)	3540	2015	1980	2364	3034	2456
Sunny hours	1600	1645	1578	1478	1592	1437

Source: Quang Ninh 2011 Statistical Year Book

Air quality

94. Air quality data exist for national road 18A to the Ka Long bridge in Mong Cai (Table 6). In general air quality along the road to the city is polluted only with dust and noise. At Hai Yen industrial park and the Ka Long car park SO_2 and NO_X levels are high.

Table 6. Air quality along national road 18A into Mong Cai town

Sampling Sites	Dust (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	CO (mg/m^3)	Noise (dBA)
Road18 (Quang Nghia commune)	0.34	0.23	0.15	21.8	72
Road 18 (village 7, Hai Tien commune)	0.38	0.25	0.18	20.5	71
Road18 (Hai Dong commune)	0.40	0.25	0.18	26.1	74
Road 18 (Hai Yen Industrial park)	0.44	0.36	0.21	26.6	74
Road 18 (Ka Long car park)	0.57	0.37	0.29	37.5	79
QCVN 05-2009, QCVN 26-2010 (noise)	**0.3**	**0.35**	**0.2**	**30**	**70**

Source: DONRE, 2014

95. Air quality at select areas in town is generally good with some parameters exceeding the relevant QVCN standard (Table 7). Areas of air pollution include the central market, international border gate, and the chicken processing plant.

Table 7. Air quality at select areas in Mong Cai town

Sampling Sites	Dust (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	CO (mg/m^3)	Noise (dBA)
Chicken feet processing plant	0.36	0.52	0.29	21	61.5
International border gate.	0.34	0.21	0.15	19.8	68.5
Central market	0.44	0.41	0.12	23	58
Wharf (canoe) to Vinh Thuc	0.36	0.39	0.19	46	66
Van Gia port	0.22	0.14	0.09	17	49
Mui Ngoc tourist attraction	0.19	0.16	0.11	21	57
QCVN 05-2009,QCVN26-2010 (noise)	**0.3**	**0.35**	**0.2**	**30**	**70**

Source: DONRE, 2014

Mineral resources

96. The mineral resources of Mong Cai town are best represented by the Vin Phuc area which consist of sands for glass production with forecasted reserves of 0.1 million m^3, llmeite placer deposits of 2.5 km^2 found with forecast reserves of 50,000 tonne. There is an estimated 6 km^2 of placer in Binh Ngoc with a forecasted reserve of 68,0000 tonne.

97. Brick and tile clay are found in Hai Yen ward with an estimated holding area of 4 km^2, and a forecast reserve of 2.73 million m^3. Granite exists in an area of 2 km^2 in Luc Phu with a forecasted reserve of 35 million m^3. Stone and gravel/sand reserves for construction are estimated at 20 million m^3 and 15 million m^3, respectively, with the latter located primarily along rivers, streams, and coastal area.

Surface Water Resources

98. There are 3 rivers in the vicinity of Mong Cai town, however, the Ka Long river is the subproject river because it flows through the centre of town. The 109 km Ka Long river originates in the Dabie mountains in the PRC China to form the Vietnam – PRC China border before reaching Mong Cai. After leaving Mong Cai the Ka Long river flows southeast to empty into the Gulf of Tonkin. Flow during the flood season rises to approximately 7000 m^3/s, whereas from December to January flow decreases to 12.1 m^3/s.

99. The other two rivers in the area are the Trang Vinh river and the Pat Cap river. The Trang Vinh river originates in the north-western mountains to pass through Trang Vinh lake before discharging to the Gulf of Tonkin. Average flood and dry season flows are 33.0 m^3/s and 0.1 m^3/s. The flooding frequency is unpredictable and influenced by the tide. Pat Cap river flow during the flood and dry seasons reaches 686 m^3/s and 1.17 m^3/s.

100. Mong Cai town has built storage reservoirs for irrigation and water supply to offset the short steep headwaters of the rivers, and seawater intrusion from the Gulf of Tonkin. Example reservoirs to the west of town are 125 million m^3 Trang Vinh reservoir that fills from a basin of 70.8 km^2, and the 10.5 million m^3 Quat Dong reservoir that draws from a basin of 13 km^2. A third reservoir is Kim Tinh lake with a storage capacity of over 2 million m^3. Trang Vinh and Quat Dong are the two biggest reservoirs providing abundant water for the town.

Surface water quality

101. The water quality report (2006-2010) prepared by the Quang Ninh DONRE indicates that surface water quality in Mong Cai is generally good, and is strongly influenced by the rainy and dry seasons. Water quality in Ka Long river in 2013 is summarized in Table 8.

Table 8. Water quality of the Ka Long river in 2013

River section	Parameter (mg/l)	Quarter I	Quarter II	Quarter III	Quarter IV	QCVN 08:2008/BTNMT
Ka Long river in Ninh Duong ward	BOD_5	10.25	13.7	20.1	18.7	**15**
	COD	15.3	15.9	29.7	30.0	**30**
	TSS	31	26	29	27	**50**
	Pb	0.0351	0.0432	0.0536	0.0355	**0.05**
	Grease	0.146	0.139	0.164	0.143	**0.1**
Ka Long river bridge	BOD_5	11.58	12.5	19.74	13.7	

River section	Parameter (mg/l)	Quarter I	Quarter II	Quarter III	Quarter IV	QCVN 08:2008/BTNMT
						15
	COD	18.3	19.3	25.1	24.3	**30**
	TSS	37	34	42	41	**50**
	Pb	0.0257	0.0312	0.0315	0.0329	**0.05**
	Grease	0.187	0.124	0.176	0.165	**0.1**
Confluence of Ka Long river and Bac Luan river	BOD_5	18.37	11.1	15.47	14.2	**15**
	COD	34.8	28.9	23.7	25.9	**30**
	TSS	60	55	65	62	**50**
	Pb	0.0378	0.0388	0.0354	0.0292	**0.05**
	Grease	0.289	0.133	0.163	0.147	**0.1**

Source: DONRE, 2014

102. The BOD_5 in the river fluctuates from 10.25 – 20.1 mg/l sometimes exceeding the QCVN standard by 1.4 times. Similarly, chemical oxygen demand (COD) in the river fluctuates from 15.3 – 34.8 mg/l which on occasion exceeds the QCVN standard by 1.2. Total suspended solids (TSS) in the river range from 26 to 65 mg/l. Lead (Pb) and grease have exceeded the QCVN standards by 3.7 and 5.8 times, respectively.

Groundwater resources

103. The Quang Ninh environment report (2006-2010) indicates Mong Cai is underlain by a large aquifer, or numerous integrated small aquifers. Groundwater quality in Mong Cai in July, 2012 is summarized in Table 9. The sampling station locations are summarized in Table 10 Stations Nn 7 – 9 are coastal.

Table 9. Groundwater quality in Mong Cai in 2012

Parameters (mg/l)	Sampling Station									QCVN 09-2008
	Nn 01	Nn 02	Nn 03	Nn 04	Nn 05	Nn 06	Nn 07	Nn 08	Nn 09	
pH	7.2	6.8	7.3	7.2	7.2	6.9	7.5	7.1	6.8	5.5-8.5
COD	2.3	1.6	1.3	0.9	2.1	1.6	3.2	1.8	3.1	4
Cl^-	15.2	21.3	51.8	16.9	27.1	30.6	155.7	214.1	146.3	250
hardness	136.1	257.3	186.5	227.4	186.4	325.8	216.3	186.2	226.7	500
TSS	353.1	170.9	427.4	661.1	380.3	577.1	133.4	160.6	251.3	1500
NH_4^+	0.12	0.08	0.11	0.15	0.08	0.07	0.13	0.12	0.08	0.1
NO_3^-	2.65	1.77	1.28	1.82	1.62	2.30	2.13	3.15	4.81	15
As	0.06	0.04	0.06	0.07	0.03	0.05	0.06	0.04	0.06	0.05
Cd	0.002	0.002	-	-	-	-	0.003	-	-	0.005

Parameters (mg/l)	Sampling Station									QCVN 09-2008
	Nn 01	Nn 02	Nn 03	Nn 04	Nn 05	Nn 06	Nn 07	Nn 08	Nn 09	
Cu	0.12	0.10	0.09	0.08	0.13	0.11	0.08	0.11	0.09	1.0
Cr (VI)	0.04	nd	-	-	-	-	0.05	-	-	0.05
Hg	-	-	-	-	-	-	-	-	-	0.001
Pb	-	0.011	0.008	0.012	0.009	0.007	0.012	0.008	0.012	0.01
Zn	0.24	0.17	0.19	0.16	0.21	0.20	0.17	0.17	0.21	3.0
Coliform (MPN/100ml)	12	kph	kph	9	kph	kph	kph	25	17	3

Source: DONRE, 2014
nd is not detectable

Table 10. Groundwater sampling stations

Station (Nn)	Description
1	Well (5m deep) in Mr. Tran Van Dong house in group 3, Ha Long area, Ninh Duong ward.
2	Well of Ms. Dinh Thi Xuyen house's well (25 m deep), village 4, Hai Tien commune.
3	Well (20m deep) of Mr. Dao Thanh Hoi Nước, in group 4, Hai Yen commune.
4	Well in Binh Ngoc ward People's committee area.
5	Well in Ving Trung commune people's committee area.
6	Well in Dong village, Van Ninh commune.
7	Well in Hai village, Hai Dong commune (near sea)
8	Well in Border post 3, in Van Ninh commune (near sea)
9	Well in border post in Village 1, Vinh Thuc commune (near sea)

104. The quality of groundwater is generally good in the area of Mong Cai. There is much variation in recorded concentrations of some parameters but all largely meet QCVN 09 standards. However, notable is the influence of the Gulf of Tonkin as shown by the abrupt increase in chloride (Cl^{-}) levels at stations Nn 7-9. Groundwater in coastal communes is affected by acidity and has relatively high salinity. Some samples are microbiologically contaminated. Due to absence of treated drinking water local people must use simple filters to avoid ill health.

Coastal water quality

105. Coastal water quality near Mong Cai is summarized in Table 11. Nearshore seawater in shows signs of microbiological and grease contamination. Biochemical indicators such as COD, BOD_5 are relatively high. Although no indicators exceed QCVN 10-2008 the levels are approximately equal to maximum levels of permissible standards.

Table 11. Coastal water quality near Mong Cai.

Parameters (mg/l)	Sampling Stations					QCVN 10-2008	
	Nb 01	Nb 02	Nb 03	Nb 04	Nb 05	Column 1	Column 3
pH	7.4	7.3	7.4	7.5	7.3	6-8.5	6-8.5
COD	5.1	4.3	4.8	6.0	5.1	3	-
BOD_5	3.4	2.6	3.8	4.7	3.1	-	-
DO	6.9	7.2	6.8	6.5	6.7	>5	-
TSS	1.82	1.72	1.34	0.93	1.32	50	-
NH_4^+	0.21	0.16	0.18	0.25	0.19	0.1	0.5
NO_3^-	1.55	1.02	1.22	1.66	1.73	2	5
As	0.005	0.004	0.002	0.004	-	0.01	0.05
Cd	0.003	-	-	-	0.003	0.005	0.005
Cu	0.10	0.13	0.04	0.05	0.07	0.03	1
Cr (VI)	0.03	-	-	0.02	0.05	0.02	0.05
Hg	-	-	-	-	-	0.001	0.001
Pb	0.011	0.012	0.008	0.008	0.008	0.05	0.1
Zn	0.09	0.11	0.07	0.04	0.10	0.05	2.0
Greases	0.12	0.14	0.18	0.09	0.15	KPH	0.2
Coliform MPN/ 100ml	1.250	1.650	1.260	1.250	1300	1.000	1.000

Source: DONRE, 2014
Column 1: seawater for aqua cultural production and aquatic conservation
Column 3: seawater for other purposes
(-): below detection limit

106. Sampling stations in Table 11 correspond to Nb 01: shore in village 3, Binh Ngoc ward; Nb 02: Hai Yen river mouth; Nb 03: Mui Ngoc port; Nb 04: Thia Cong river mouth; and Nb 05: shore in Hai Hoa ward.

2. Biological resources

Biodiversity

107. The greater Mong Cai area contains a rich diversity of wildlife[24]. There are 1,027 species of plants from 6 phyla and 171 families. The major families, e.g., Magnolidae, are comprised of

[24] Report on Bio-diversity of Quang Ninh province in 2012 by Quang Ninh's DONRE, 2012)

951 species, Pteridophyta 58 species and the Pinaceae 11 species. There are about 120 species of animals, including 11 amphibian species, 15 reptilian species, 67 avian species, and 34 mammalian species.

108. Mong Cai area supports 52 species of animals defined into 4 classes and 28 families of vertebrates. There are 11 families and 22 species of mammals, 14 families and 18 species of birds, 4 families and 7 species of reptiles, and 3 families and 4 species of amphibians. The flora and fauna of the coastal-intertidal of the Gulf of Tonkin to the east and south of Mong Cai consists of 128 species of the following groups of phytoplankton and algae: Cyanophyta, Bacillariophyta, and Pyrrophyta. Bacillariophyta is represented by 109 species, Pyrrophyta 15 species and, Cyanophyta with 3 species. There are 210 species of marine fish including 133 brackish species.

Forests

109. The total forest area of Mong Cai is 29,548 ha which accounts for 57.0% of the natural land area. Of this 17,352 ha is protection forest, and 12,222 ha is production forest. The natural forest occupies 12,067 ha accounting for 41% of forest area which is concentrated in upland regions in the three communes of Hai Son, Bac Son, and Quang Nghia. Included are the rich and ecologically important mangrove forests along the east and southern coastal zone (Zone C:11, Figure 20).

110. The natural forest area has plant capacity ranging from “Poor” to “Average”. The natural forest reserve has about 90,000 m^3 of “poor” to “average” grade species including bamboo and neohouzeaua. In the Mong Cai Economic Zone (MCEZ), the total area of natural forest is 15,148 ha, of which total area of “poor” and “restored” forest is 12,643 ha.

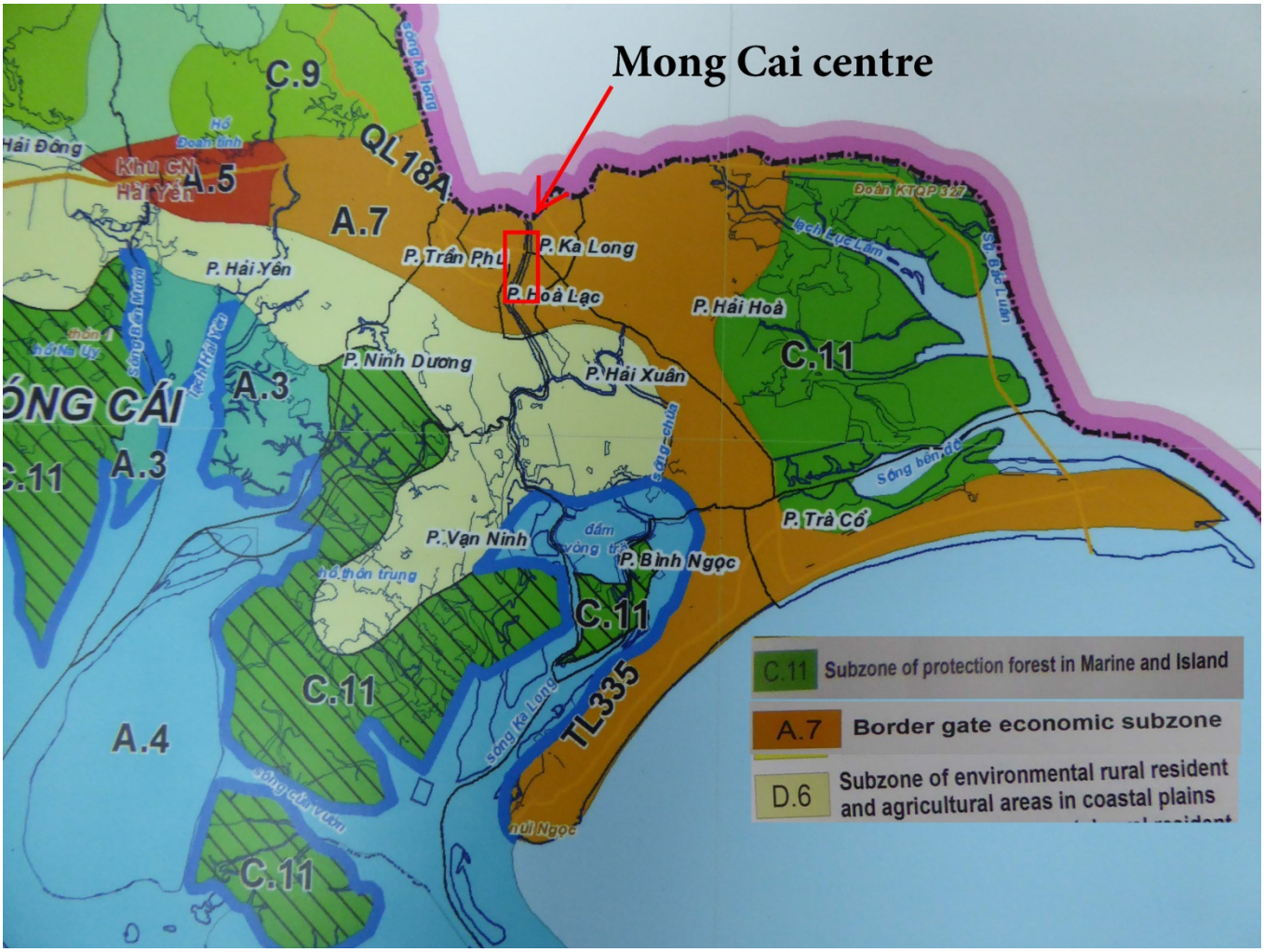
111. The planted forest of the Mong Cai area covers an area of 17,480 ha accounting for 59% of the total forest area which is distributed in the Wards and communes of Bac Son, Hai Son, Quang Nghia, Hai Tien, Hai Dong, Hai Yen, and two island communes. The planted forest is mainly for growing pinaceae and acacia with a reserve of approximately 76,000 m^3 of wood.
In recent years the forest reserves have increased as a result of successful implementation of a forest plantation plan. However, natural forests are suffering due to the increasing pressure of wood exploitation.

Mangroves and aquaculture

112. The large brackish coastal area created by the discharges of Ka Long and Bac Luan rivers at the Gulf of Tonkin coupled with the extensive mangrove forests (Figure 20) on the coast south of Mong Cai results in a diverse assemblage of coastal plants and animals, and provides a rich area for aquaculture. South of Mong Cai at the Gulf of Tonkin is the location of pristine mangrove forests for which the QN DoNRE plans to apply for Ramsar wetland status. The mangroves have contributed to natural coastline storm surge and mitigation of inland wetland erosion, as well as enhancing the tourist experience of the area.

113. Subsistence and commercial aquaculture in the area south of Mong Cai consists of shrimp, crab, and garupa production. The total area of aquaculture in Mong Cai in 2013 was

Figure 20. Three eco-urban development zones of Mong Cai



Modified from QN-PPC (2014). Environmental Improvement Project for Quang Ninh Province

estimated at 1,655 ha for which shrimp cultivation in 1,104 ha was dominant product. Total output of local fisheries of the same year was estimated to be 9,540 tons of which 5,655 tons were caught and 3,885 tons cultivated.

3. Socioeconomic Resources

Human Resources

114. Mong Cai has 14 ethnic groups of which the Kinh group comprises 95% of total population. Other ethnic minority groups represent 5.3%, including Yao, Tay, Chinese, San Chay, San Diu, ung, Thai. Each group has their own language, customs, and distinct culture which are highly valued by local authorities.

Population, labour, employment and income

115. The 2010 socio-economic development plan for Mong Cai to 2020 with vision to 2030 projects the population of Mong Cai to exceed 91,500 people, of which 50.2 % are female. The urban and rural populations correspond to 59.16% with 40.84% in rural areas. Average population density is 172 people/ km^2 which is unevenly distributed amongst the wards and communes. The wards of highest density are Hoa Lac ward (6,833 people/ km^2), Tran Phu (5,358 people/ km^2), Ka Long (4,509 people/ km^2), while lowest densities occur are in Hai Son (15 people/ km^2) and Bac Son (29 people/ km^2)

116. Labour in agriculture, forestry, and aquaculture consist of 23,257 people accounting for 45.2% of labour in the town. Labour in industry comprise 2,650 people (5.1% of labourers), and in trade and tourism 25,600 people (49.7% of labours). Labourers working in state sectors include 3,446 people (6.7% of labours).

117. The GDP/ person in Mong Cai increased 1.5% from 2005 to USD $1,500 in 2010 compared to the provincial GDP of USD $1,310. However, income is not equal and between urban areas and rural areas, and among economic, state and private sectors. Mong Cai is considered the dynamic economic center of the Gulf of Tonkin area, and the gate and economic ring in the country. Annual growth rate of the town was 14.35% in 2006-2010, which was higher than the average rate of Quang Ninh (12.7%). Growth rate of trade and tourism is 18.35%, industry-construction is 12.6% and agriculture-forestry-aquaculture is 6%.

Agricultural production

118. Total area of crop lands in 2013 was 5,548 ha. The cultivated area tends to not meet income expectations given the increasing price of material, fertilizers, and agricultural services as well as decreases in productivity. Farmers that cannot cultivate all of their land area change to the fishery and border-gate services. It can be concluded that some local authorities have not paid proper attention on directing sufficient attention to seasonal crop production. Standing stock of livestock in 2013 is summarized as follows: 34,630 pigs, 5,842 buffaloes, 1,679 cows, and 156,339 head of poultry and water-bird.

Tourism

119. Mong Cai supports eco-tourism, and seaside and international border tourism. The most attractive destination tourist areas are Mui Ngoc, Tra Co beach, and the international border. The diverse international coastal geography of the area provides ideal conditions for the development of a stable base of eoc-tourism, shopping tourism, coastal activities such as bathing and fishing. Vinh Thuc island includes Vinh Trung and Vinh Thuc island communes, which has an enormous potential in tourism for the clean, stunning, isolated, and calm beaches.

4. Features of Subproject Sites

120. The site for the eastern WWTP of Mong Cai (Figure 7) is shown in Figure 21. Also shown in Figure 21 is the major tributary of Ka Long river adjacent to the WWTP site into which the treated effluent from the WWTP will be discharged. The third panel of Figure 21 shows the end of the main town WW drain (Figure 7) which will be connected to the new WWTP with a pipeline (approx. 0.5 km) thereby ending the discharge of raw WW to the side tributary of the

Ka Long river. The WWTP will be built on agricultural land less than 75 m from (east) of the Ka Long river.

Figure 21. Site of east WWTP, Ka Long river effluent discharge area, and WW drain

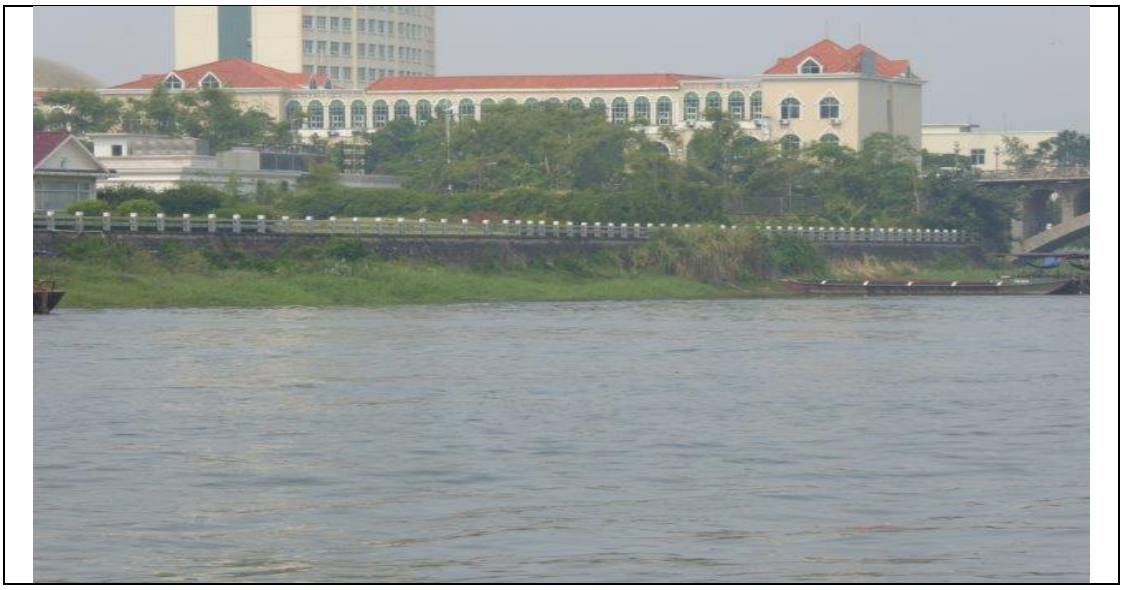
121. Figure 22 shows the site of the west WWTP which is an elevated area on the fringe of wetland-aquaculture area. Also shown in Figure 22 is the adjacent river into which the treated effluent of the WWTP will be discharged.

Figure 22. Site of west WWTP on hill (left background), and effluent discharge river

122. The sections of the Ka Long river bank that will be rehabilitated (Figure 7) are shown in Figure 23. The east bank is dominated by a two-tiered riverbank promenade that will be re-designed and elevated above seasonal flood levels. The west riverbank directly across from the east riverbank which only has sections of retaining wall and rail will be re-developed with a similar elevated parkland promenade.

123. Not shown in Figure 23 are the 3-4 sandbars at the base of the west riverbank that will be dredged to improve flow and navigation. The MC DONRE has sampled and analysed the bottom sediments to be dredged which indicated that the sediments meet the QCVN standards for sediment/surface water quality.

Figure 23. East bank with promenade and opposing west bank of Ka Long river



C. Sa Pa

124. Sa Pa town, Lao Cai province is 345 km northwest of Bac Giang town in northwest Vietnam 22°07'04'' to 22°28'46'' North, and 103°43'28 to 104°04’15’’ East. Sa Pa district with an area of 67,864 ha borders Bat Xat district to the north, Phong Tho, and Than Uyen (Lai Chau) districts in the west, Van Ban district in the south, and Bao Thang district and Lao Cai city to the east. Sa Pa administration includes the communes of Hau Thao, Ban Phung, Ta Phin, Nam Sai, Thanh Phu, Sa Pa, Lao Chai, Trung Chai, San Sa Ho, Thanh Kim, Ban Ho, Su Pan, Suoi Thau, Ta Van, Ban Khoang, Ta Giang Phinh, and Nam Cang

1. Physical Resources

Topography

125. Sa Pa town is in mountainous Hoang Lien National Park (HLNP) with Mount Fanzipan (3,143m) located 12km to the south. The mountainous terrain of Sa Pa which ranges from 1,200m to 1,800m strongly contrasts the lowland terrain of Mong Cai and Bac Giang towns. Sa Pa gradually rises from the west and southwest to the northeast. Sa Pa terrain typifies northwest Vietnam which is characterized by the subalpine zone of the region comprising the communes of Ta Giang Phinh, Ban Khoang, Ta Phin and San Sa Ho. The total area of subalpine zone is 16,574 ha accounting for 24.42% of the natural area of Sa Pa district. The rugged terrain is strongly dissected having steeply cut slopes and valleys.

Climate

126. The strong seasonal climate of Sa Pa and the HLNP is unique in Vietnam which is characterized by a warm subtropical summer and a temperate winter. Under the Köppen climate classification Sa Pa has a subtropical highland climate. Mean annual temperature for Sa Pa town is 15.8 °C with recorded maximum and minimum temperatures of 30°C and -2.2°C (Table

12). The warmest and coldest periods are July-August, and December–January, respectively. Snow is common at the higher altitudes. The centre of HLNP 12 km to the south experiences a marked wet season from May-September with the heaviest rainfall occurring in July-August. Mean annual rainfall is 2,763 mm with maximum and minimum rainfalls of 4,023 mm 2,064 mm.

127. Humidity ranges from 82 to 93% with a yearly mean of 88%. The high elevations surrounding Mt. Fansipan influences cloud cover and fog in the area including the nearby steep valleys. Average sunshine hours fluctuate from 1400 to 1460 hours per year with uneven distribution among months. Sunshine is greatest hours in summer with a low of 30-40 hours in October.

Table 12. Temperature, precipitation, and humidity of Sa Pa

Weather Parameters for Sa Pa													
Metric	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Highest °C	23.9	25.6	27.2	30.0	30.0	28.9	28.9	28.3	32.8	27.2	26.7	22.8	32.8
Daily mean °C	8.1	9.5	14.7	17.2	19.5	20.0	20.6	20.0	19.2	16.1	13.9	10.8	15.8
Lowest °C	−2.2	0.0	1.7	2.8	8.9	11.1	7.2	10.6	10.0	6.1	1.1	−2.2	−2.2
Precipitation mm	40.6	71.1	119.4	177.8	370.9	355.6	480.1	480.1	320.1	190.5	119.4	40.6	2,766.2
Humidity %	86	92	86	82	85	88	88	89	87	93	90	88	88

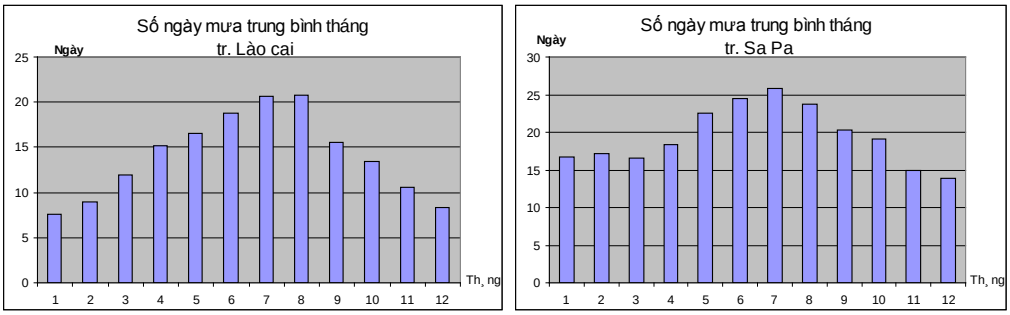
128. Annual average rainfall in Sa Pa is 2,766mm with the highest recorded annual rainfall reaching 3,484mm. Rainfall is also unevenly distributed among months. The rainy seasons start from May to October accounted for 80% the total rainfall in one year. In contrast, the dry months have only 50 to 100 mm per month. Average monthly rain is summarized in Figure 24.

129. Sa Pa experiences two prevailing winds from the northwest, and from the northeast in winter. The complex mountainous terrain inland location buffers Sa Pa from from monsoon winds. Average wind speed is 2.2 m/s with a recorded maximum of 19.7 m/s. The summer brings the stormiest weather accompanied with heavy rains, flashy floods.

Land, Soil, and Mineral Resources

130. The complex topography of the province produces a diverse array of land and soil types. Land groups are divided into many soil types, including alluvial soils along the Red river, different complexes of clay, marsh soils, black soils, barren soils, and humus, found mainly in Sa Pa district. Land is a critical component of the economy given the dominance of sloping terrain. The total land area of 638,389 ha is classified as follows: (i) agricultural land, 397,270

Figure 24. Average monthly rainy days in Sa Pa



ha; (ii) non-agricultural land, 32,826 ha; and (iii) unused land, 208,292 ha.The mineral resources of Sa Pa consist of black shale, rare earth, kaolin, dolomite, and marble.

Water resources

131. A rich network of rivers and streams exist in the immediate Sa Pa area. The major systems are the Muong Hoa, Ta Trung Ho, and Dum stream systems which are all tributaries of the dominant Red river. The 50 km Dum stream which has the headwaters in the northern part of Hoang Lien Son mountain range is divided into two main branches that extend to the north and northeast communes of Sa Pa, Trung Chai, and Ta Phin with the total basin area of 156 km^2.

132. The 80 km Muong Hoa stream system originates from the south mountains of Hoang Lien Son with the total basin area of 578 km^2. Due to the mountainous and steeply cut valleys Sa Pa streams are narrow and steep showing erratic flow and high seasonal variation. In the rainy season large floods with strong flows are common which may cause flash flooding in low lying areas. Conversely, stream flow drops significantly during the dry season. Seasonal flow for other smaller rivers and canals are summarized in Table 13.

Table 13. Seasonal flow of some water courses near Sa Pa (m^3/s)

Stream/ canals	Dry season					Raining season				Dry season		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Bo canal	4.5	4.0	3.0	4.4	15.6	21.6	40.9	57.8	42.2	21.9	11.4	6.0
Thau stream	0.8	0.4	0.7	0.8	2.5	3.6	5.1	6.0	4.1	2.3	1.2	0.6
Dum canal	1.5	1.2	1.1	2.5	7.8	11.3	1	19.1	13.2	7.3	3.7	1.9
Mong Xen stream	0.4	0.3	0.3	0.6	1.9	2.8	4.0	4.7	3.3	1.8	0.9	0.5

Water Quality

133. Water quality data for the Dum river at Thanh Phu commune, Sa Pa are shown in Table 14 The data indicate water quality meets the Vietnamese standards for the protection of aquatic species (QCVN 08/2008, B class).

Table 14. Water quality of Dum river at Thanh Phu commune, Sa Pa

Parameters (mg/l)	Value	QCVN 08/2008 B
TDS	56	-
TSS	9	80
DO	4.61	≥ 2
COD	5	< 35
BOD_5	2.22	< 25
NH_4^+	not detected	1
NO_3^-	not detected	15
PO_4^{3-}	not detected	-
Cl^-	not detected	-
Fe	0.831	1
Pb	0.005	0.1
Cd	not detected	0.02
Zn	not detected	2
Mn	not detected	0.8
Hg	not detected	0.002
SO_4^{2-}	2.002	-
As	0.005	0.1
Oil and grease	0.2	0.3
Coliform total (MPN/100ml)	95	10.000
Turbidity (NTU)	12	-

Ground Water

134. Sa Pa is believed to have a rich supply of good quality groundwater. Some areas of groundwater reputedly generate hot springs approaching 40^0C.

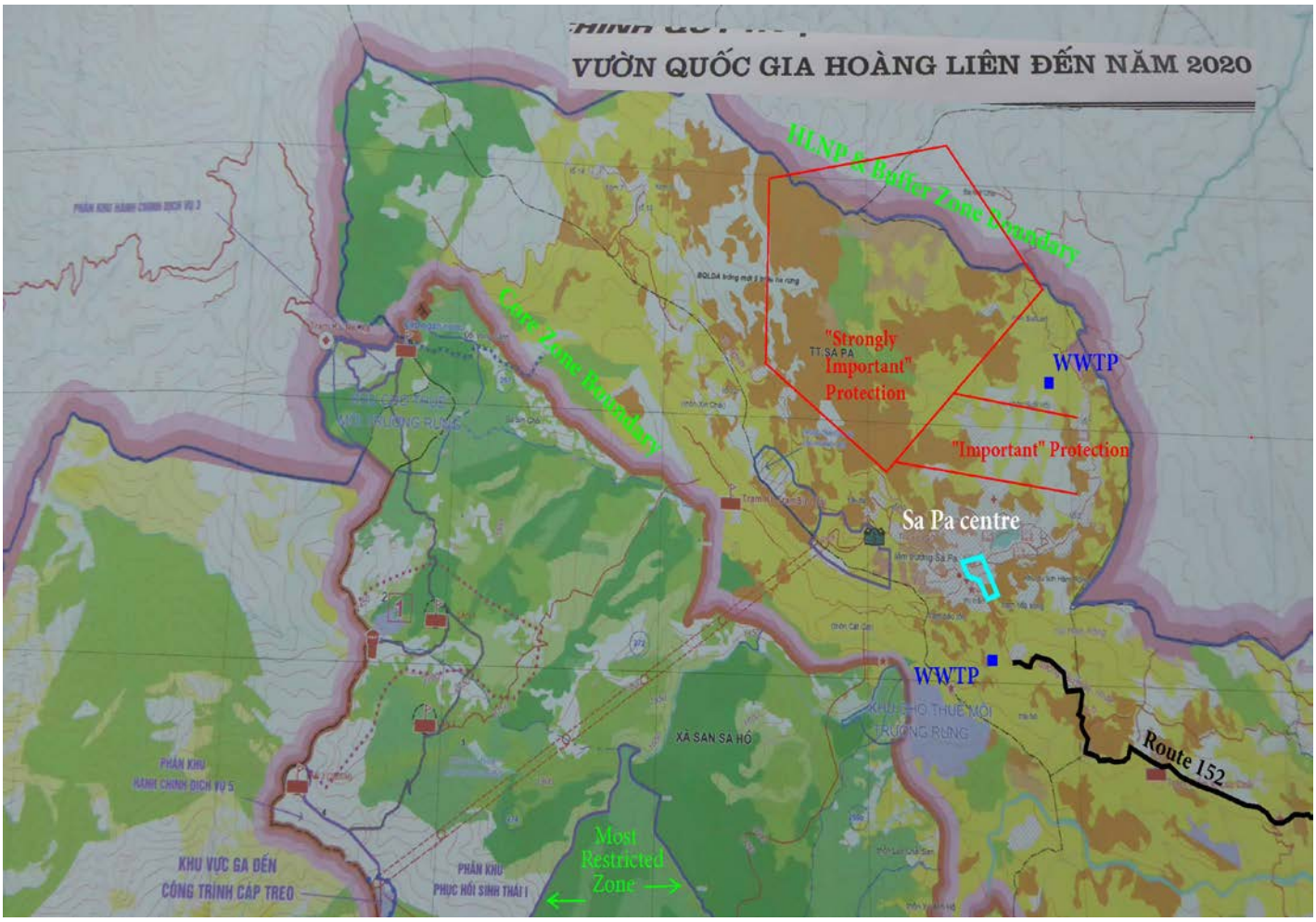
2. Biological resources

Biodiversity

135. The relative geographical isolation of the area makes it a truly unique place for many interesting plants and animals allowing continued support of many rare species. This rich biodiversity is centred in the core zone of HLNP to the southwest of Sa Pa town. It is estimated that HLNP and other non-urban areas support more than 2,000 species of plants, 442 species of birds, mammals, reptiles, and amphibians The core area of the park supports rare species such as black gibbons, civet, tiger snake, gold mink, clouded leopard, leopard, and flying squirrel.

136. The urban and peri-urban environments of Sa Pa, and the subproject components are located in the buffer zone of the HLNP (Figure 25). The two WWTPs of the subproject are located outside the protected forested zones within the buffer zone. Figure 25 was modified from the REA for Sa Pa (Appendix A).

Figure 25. Sa Pa and subproject components in core and buffer zones of HLNP.



3. Socioeconomic Resources

Human Resources and Cultural Diversity

137. Sa Pa is famous for the cultural diversity of the array ethnic minority groups that inhabit the area. The seven largest ethnic groups in the area account for over 90% of the whole town population. The ethnic groups are defined by the Kinh (true Vietnamese) 35%, Hmong 22%, Tay 14%, Dao (Mien) 13%, Thai 9%, Nung 4.5% and the Giay at 4.3% of the population. The minor ethnic groups of Phula, Hani, Latis, Tu Di, Pin Tao, Tu Lao, Pa Di, Sapho, Lolo and Xa Mang are represented by a few hundred individuals across a few villages. The ethnic minorities and their diverse cultures underpin the tourist industry in Sa Pa along with the spectacular natural landscape of the area. However, the peoples of Sa Pa area are very poor by Vietnam's rural standards. Efforts to improve the situation for the local people include both governmental and nongovernmental initiatives.

Tourism

138. As introduced above the Sa Pa area is highlighted by its natural beauty and its ethnic history. Nestled in the mountains Sa Pa is known for rice production, and sunrise and sunset trips to layered rice fields will make any photographer's mouth water. Vietnam's famed karst formations of ancient limestone cliffs, and mountains (i.e., Ham Rong mountain, and Mt. Fansipan) are major attractions along with the natural mountain ecosystems of Hoang Lien National Park in which Sa Pa is found in the buffer zone. The notable nearby villages of Ta Phin, Lao Chai and Cat-Cat provide excellent experiences with red Dao and black Hmong minorities. Most ethnic minority peoples work crop on sloping terraces which is the local and famous adaption to the mountainous terrain. The terraces are a major attraction due to enhanced vistas they create.

4. Features of Subproject Sites

139. Figure 26 shows example sections of Road 152 (Figure 10) which will be upgraded with a wider alignment and guard rails, new surface, and improved lateral drainage. Figure 27 shows the site of the southern WWTP (Figure 11) which also will be constructed on cleared agricultural land.

Figure 26. Sections of Road 152 southeast of Sa Pa.

Figure 27. Site of southern WWTP (background)

140. The elevated site for the northern WWTP (Figure 11) on agriculture land is shown in Figure 28. Also included in Figure 28 is the path to the WWTP site area which will guide the alignment of the raw WW pipeline from town along the high shoulder of the path. The natural stream and tributary of the Red river that is currently used for raw wastewater from the town is located at the base of the WWTP and below the access road. The treated effluent from new WWTP will be discharged to the same stream.

Figure 28. Site of northern WWTP, and alignment for raw WW pipeline beside path

141. Views of town centre areas to be enhanced are shown in Figure 29.

Figure 29. Town centre of Sa Pa

5. Natural Hazards and UXO

142. The three subproject areas are sensitive to different natural hazards as a result of the respective locations. Bac Giang because of the extensive lowland area is exposed to perennial urban flooding from the annual rainy season. The need for the series of stormwater collection ponds which the subproject will rehabilitate is the primary mechanism for managing the flooding of the town east of the Thuong river dyke.

143. Mong Cai is situated in part on the intertidal flood plain of the Gulf of Tonkin to the south and south east. It should be sensitive to typhoon surge as well as local lowland flooding during the rainy season.

144. The unique mountainous terrain of Sa Pa exposes the area to flash flooding due to the steeply cut river valleys and insufficient catchment absorption. Whereas, lowland flooding and typhoon sensitivity is low.

145. The years of war in Viet Nam has resulted in the continued risk of UXO harm especially in areas of new excavation. Bac Giang and Mong Cai would be more sensitive than Sa Pa, however, all three subproject sites need careful screening for UXO during the pre-construction phase.

V. PUBLIC CONSULTATION

146. Stakeholder consultations on environmental concerns and issues with the subprojects were conducted as part of the IEE as pursuant to the SPS (2009). The principles of meaningful engagement, transparency, participation, and inclusiveness were applied to ensure that affected and marginalized groups such as women and the poor were given equal opportunities to voice concerns and participate in the design of the project. Where possible the stakeholder consultations for environment were coordinated with the social impact consultations of the subprojects.

147. Public Consultation will continue during the detailed design and construction phases as per the PCP (2012), and as summarized Table 3 which shows the insertion points for public consultation in the final design and implementation of the subprojects.

A. Identification of Stakeholders

148. Stakeholders were identified and engaged in a participatory manner. Stakeholder communication focused on provincial stakeholders, and households affected by the proposed subproject components. The stakeholders involved in the design of the project include:

- Institutional/provincial stakeholders including the (i) project EAs and IAs, and provincial and urban environmental management agencies, and NGOs.
- Mass organizations such as the Women's Union and Youth Union were consulted and provided information on the design of the various subproject interventions. All were invited to consultation meetings.
- Households living near the subproject component areas who will be affected directly and indirectly by the project, and who have an interest in identifying measures to enhance or

maximize the benefits while minimizing any perceived negative impacts through mitigation measures; and

- Vulnerable and/or marginalized groups who have an interest in the identification and implementation of measures that support and promote their involvement and participation in the project

B. Discussion Guide and Objectives

149. The stakeholder discussions began with an introduction to the major the subproject components, followed by discussion of the current environmental situation and perceived impacts of the subprojects, and then stakeholder views of ways to minimize impacts and maximize the effectiveness and overall success of the subproject components. The response of the project owner was also solicited and recorded.

150. Five open-ended questions were used to the guide consultation discussions (Table 15.). To help orient the discussions on environmental issues and concerns a list common environmental components (Table 16) was introduced to the stakeholders ahead of the question and answer sessions.

Table 15. Guiding questions and discussion points of stakeholder consultations

1. Do you have any environmental concerns with the subproject?
   Please list environmental concerns of project.

2. Do you any have environmental concerns with the **construction activities** of the subproject?
   Please list environmental concerns of construction phase activities.

3. Do you have environmental concerns with the **completed operation phase** of the completed subproject?
   Please list environmental concerns of the operation of completed subproject.

4. Do you think the subproject design or operation should be changed to prevent negative environmental, or community impacts?

5. Please list changes to subproject that you think will prevent or reduce negative environmental, or community impacts?

Table 16: Example environmental components to guide stakeholder discussions

• drinking water quality & availability • surface water quality and quantity • groundwater quality & quantity • air quality • climate • land and soil quality • coastal zone, ocean, rivers, reservoirs,	• terrestrial & aquatic animals, e.g., fish, birds, small mammals • ecological protected areas (e.g., national parks, wildlife sanctuaries), • land & coastal zone uses (e.g., agriculture, fisheries, forestry, navigation, aquaculture, commercial,

• mangroves, trees, other vegetation, • coastal and terrestrial resources e.g., sea grass beds, mangroves, forests, salt beds	other), • public safety, • public movement & access • physical cultural values (e.g., pagodas, cemeteries, monuments)

C. Summary of Public Consultation

151. The stakeholder consultations revealed overall positive support for the three subprojects in Bac Giang Mong Cai, and Sa Pa. Tables 17-19 summarize the original translated record of the discussions and comments of the stakeholders. The tables also summarize how the environmental management plans (EMPs) for the three town-subprojects will respond to the environmental issues and concerns that were raised by stakeholders. Follow-up stakeholder consultations that may be required during the detailed design phase will begin with a review of the issues and mitigations initially identified by the stakeholders. Appendix C details the participants and venue of the consultations in three subproject towns.

1. Bac Giang

152. A consultation meeting of 47 individuals was held on October 22/14, followed by a meeting of 20 individuals on March 12/15. Each consultation included household heads, representatives from the provincial DARD, District environment and water resources staff of DONRE, District and Communes Peoples Committees, Women's Union, and Farmers Association.

Table 17: Summary of stakeholder views of Bac Giang subproject

Bac Giang Meetings held October 22, 2014, and March 12, 2015		
Stakeholder Views Current Situation	**Community response & Proposal**	**Response of Project Owner**
Urban Roads		
- The new roads will interfere with existing road intersections, damage irrigation network causing impacts on traffic on the other roads and change water supply for local agriculture. - The new roads will separate administrative areas from residential areas.	- The community fully supports the project after hearing its objectives as they recognize its significance for improving their livelihood. - People mentioned the potential traffic accidents since the materials are transported and gathered near the road under construction and the transportation flow of vehicles passing some parts nearby the residential areas. (Song Mai commune). Or, accidents from construction activities practice such	- People will be informed of the construction schedule 2 weeks prior to the construction date (making announcement at the Commune People's Committee) - Signs will be put up to warn people of the construction sites. The residual building materials will be collected after the work is completed. The manholes shall be covered with lids or surrounded by a round fence that is easy to recognize. The material gathering place will not be located near

Bac Giang Meetings held October 22, 2014, and March 12, 2015		
Stakeholder Views **Current Situation**	**Community response & Proposal**	**Response of Project Owner**
	as dangerous uncovered manholes. - People expressed their worry on the potential that the project might cause some delay to their cultivation/ agricultural production regarding the irrigation or water supply for rice plantation. Also, a difficulty accessing the field might occur when road under construction, and blocking access paths (Song Mai commune - The project should consider designing flood sewage options for rainy season in addition to the drain system across and beneath the road. The project is expected to consider options of water drainage and determine the size of drains crossing roads (including expansion room) - Intersection between the proposed road and existing local roads should not disturb normal travel of people. That the slope, structure/road roughness are suitable for simple small vehicle transport. - The project should offer a chance for community to join the construction supervision.	the road. - Extensions of ditches that are near the construction site will be created for a temporary period of time to ensure that the crop watering shall not be disturbed. The project will do land leveling needed to provide people with temporary pathways. - The project will utilize circular sewers and box culverts in intersection with canal networks and flood drainage positions. Project will build horizontal and vertical drains in intersection with the canal networks and flyovers to avoid flooding. However, this proposal will be considered during process of detailed designing. <u>The plan needs further consultation and publication to people.</u> - This proposal has been listed in Requirements of Environment when designing.
Response of project		
- In addition to the engineering solutions provided above for the issues identified by the stakeholders, the EMP for the subproject will prescribe specific mitigation sub-plans to address public safety, traffic congestion and potential accidents, and safe transport of construction materials. Explicit in EMP are measures to ensure normal public access to agricultural areas along road is not disrupted, and that normal drainage and irrigation functions of existing ditches is not impaired during road construction		
Wastewater Treatment and Drainage		
- Lakes and drainage canals receive wastewater from surrounding residential areas.	- People have no objection toward the project.	- The project shall collect wastewater and sludge from the wastewater

Bac Giang Meetings held October 22, 2014, and March 12, 2015		
Stakeholder Views **Current Situation**	**Community response & Proposal**	**Response of Project Owner**
- Deposits are likely to be contaminated. - Lakes and drainage canals regulate stormwater but are severely filled, and lakebeds are utilized for crop cultivation. - Current open ditches cause incapacity of water drainage. Additionally, the large number of water hyacinth obstructs the water flow. - In dry season the ditches mainly contains polluting wastewater. - The canal is encroached and narrowed by housing & buildings. The width of many canal sections is less than 50cm. - In rainy season, the slow water drainage leads to inundation. - Adding separate wastewater collection system around lakes is needed - Study of roads specialized for improvements to lakes and drainage canals is needed - The sludge of lakes and drainage canals is likely to be contaminated; therefore it needs monitoring.	- People are concerned that wastewater and sludge might be flushed out to the nearby areas (Tran Phu commune) - Promenade around lake and drainage canals is proposed, especially for people living in Dong Son and Song Mai Commune. - They propose that wastewater from residential areas, surrounding lake, and canal system should be collected. - Necessary measures are needed to prevent localized floods, minimize dusts, noise, waste disposal that potentially disturbs local people's lives.	treatment system complying with the provincial regulations. - In the preparatory phase of the project, the issues are clarified and managed by DONRE.
Project response		
- The basic design of the rehabilitation of the ponds and canals will address all issues identified of the current situation. Walkways will be constructed where possible around ponds that provide sufficient room between the ponds and houses. - Explicit with the design of the subproject component, and as re-iterated in EMP is sludge management. All sludge		

Bac Giang Meetings held October 22, 2014, and March 12, 2015		
Stakeholder Views Current Situation	**Community response & Proposal**	**Response of Project Owner**
from upgraded WWTP and when necessary from ponds will be disposed of in DONRE-approved locations which DONRE identified during first mission as being local landfill sites. - The EMP of subproject specifies construction phase mitigation sub-plans to manage temporary local drainage and flooding problems, dust, noise, and the management and disposal of construction waste		

2. Mong Cai

153. A consultation meeting of 61 individuals was held on October 15/14, followed by a meeting of 14 individuals on January 30/15. Each consultation also included household heads, representatives from the provincial DARD, District environment and water resources staff of DONRE, District and Communes Peoples Committees, Women's Union, and Farmers Association of commune level.

Table 18. Summary of stakeholder views of Mong Cai subproject

Mong Cai Meetings held October 15, 2014, and January 30, 2015		
Stakeholder Views Current Situation	**Proposed Design Consideration**	**Response of Project Owner**
Wastewater and Stormwater Improvements		
- Open WW canal on west of town gets clogged with high pollution during dry season - In rainy season the slow water drainage of canal leads to inundation in, e.g., Hoa Lac, Tran Phu areas. - CPC must investigate and definitely manage these issues as part of new WWTP design. -	- The risks that wastewater and sludge from centralized wastewater treatment system might be flushed out to the surrounding area by the storm water (in Hai Xuan and Hai Yen communes) - The design should also aim at improved water drainage for rainy season. - Existing urban roads in project area are small and have low capacity, therefore, contractors should adopt special use roads and means of transportation during the construction phase of WWTPs.	- The wastewater and sludge from the new wastewater treatment systems should be collected complying with the regulations. - The resolution for these issues must be taken into consideration during the project implementation by DONRE. - Special-use road for the project is determined by contractors, then agreed by local authorities. The requirement should be specified in EMP.

Mong Cai Meetings held October 15, 2014, and January 30, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
	- Prevention of impact of noise, dust, rubbish, and food and traffic accident should be implemented strictly. In general, the community supports project implementation.	
Response of project		
- The design of the eastern WTTP includes a pipeline which will connect the existing concrete WW drain to the new WWTP thereby isolating the creek into which raw WW currently flows from concrete drain. The pipeline will correct the existing pollution issue in the creek. - Similarly, the project design incorporates sludge management for both WWTPs. Sludge from the lagoons of the WWTPs will be disposed in the existing landfill identified by DONRE during the sites visits and meetings during interim mission. DONRE will oversee all environmental compliance requirements of the implementation of the new WWTPs. - In addition to the design issues identified the EMP for the subproject incorporates mitigation sub-plans to manage the construction disturbances of noise, dust, traffic congestion along the urban roads and possible special roads for construction vehicles, and for the management of solid and liquid construction waste		
Ka Long Riverbank Protection		
- CPC must investigate and definitely handle all issues associated with riverbank protection work. - It is necessary to identify the volume of sludge during dredging process to transport to appropriate landfill sites. - Appropriate implementation methods should be used to avoid affecting aquaculture activities and waterway transport	- Staff and workers in the river port and Loi Lai Hotel might encounter some problems of travelling. The operation of the river port and Loi Lai hotel might face some difficulties as building materials and sludge would be scattered and not be collected, the construction shall make noise. - It causes some difficulties for people to travel by the waterway during the time of dredging and construction in Ka Long ward - Dredged sediments are likely to be contaminated. Volume of sediment during dredging process is quite huge, therefore appropriate landfill sites should be figured out as soon as possible. - During construction area, there should be measures to control environment al sanitation and rubbish as well as to reduce impact on noise, dust, rubbish, food.	- The ground would be leveled and Loi Lai hotel and people working in the river port will be notified about the construction within 2 weeks prior to the commencing date. (Announcement would be made via the Commune People's Committee) - The project would cooperate with competent agencies and local people to help direct the flow of boat transportation. - Sludge should be stored, transported and treated under regulations. - Machines are maintained periodically; do not work at night such that the lives of people living and working in Loi Lai Hotel and river port shall not be disturbed by the noise from the construction site.

Mong Cai Meetings held October 15, 2014, and January 30, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
	- Additionally, it is essential to boost speed of project implementation to solve flooding issue. - The community agrees to implement the project.	
Response of Project		
- As part of the public disclosure of all subproject components to the affected stakeholders along the riverbank such as the Loi Lai Hotel and workers in the affected port areas, all stakeholders will be notified well in advance of the onset of construction to allow businesses and the public to optimize their schedules and activities to accommodate the riverbank works. The EMP prescribes where possible that noisy riverbank works are not conducted at night. - The EMP prescribes the need to post signage above and below the riverbank work area to warn boat traffic of riverbank works. And if possible dedicated shoreline lanes will be given to construction barge and dredges to minimize normal navigation disruption along the river. The EMP also prescribes mitigation sub-plans to manage the construction disturbances of noise, construction waste and sanitation, and dust. EMP also prescribes the need for the contractors to keep all motorized equipment in good working order. - The DONRE has sampled the sediments of the river and determined that they meet appropriate QCVN standards. DONRE will direct the disposal of the dredged sediments to the local landfill.		

1. Sa Pa

154. A consultation meeting of 33 individuals was held on October 30/14, followed by a meeting of 7 individuals on January 23/15. Each consultation also included household heads, representatives from the provincial DARD, District environment and water resources staff of DONRE, District and Communes Peoples Committees, Women's Union, and Farmers Association of commune levels.

Table 19. Summary of stakeholder views of Sa Pa project

Sa Pa Meetings held October 30, 2014, and January 23, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
Road 1 – Route 152		

Sa Pa Meetings held October 30, 2014, and January 23, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
- The local people support the project and agree with mitigation methods proposed by the project owner and engineer, and also commit to create favorable conditions for contractors during construction phases. - The local people hope that the project will be implemented soon.	- People expressed concerns of the impacts from noise and dust during the construction of the road as there will be a number of vehicles traveling through the sits (to carry and transport the building materials, or to remove the excavated materials/ waste out of the construction site) in the communes of Lao Chai, Ta Van, Hau Thao. - They worry about the potential danger of loose stone and rock. (Communes: Lao Chai, Ta Van, Hau Thao) - People might find inconvenient travelling within the commune of Lao Chai, Ta Van, Hau Thao)	- The Investor will hold a community meeting to inform people the time of construction that causes noise. The project will strictly follow the schedule/ plan as committed. - There will be a serious grievance redress mechanism for complaints about noise sent by the community. The representative of the Investor shall take noise-mitigating measures. - They will not allow vehicles to honk when travelling within the construction site. The procedures of materials loading and dumping must be done carefully to avoid making noise. - Road watering will occur on sunny days. - Scattered soil and rock will be collected in order not to be traffic hazards.
Response of Project		
- The required information disclosure and grievance redress mechanism identified by the project owner and engineer during the meetings are complemented by an extensive set of mitigation measures prescribed in EMP to manage all construction-related disturbances and impacts similar to the other subproject components. In particular is management of construction vehicles, and the transport of construction materials along Route 152 to not disrupt normal use of the key roadway in/out of Sa Pa. - As part of construction site management in EMP all civil works areas in which loose gravel and rock will be common will be cordoned off to prevent risk of public vehicle accidents. Completed upgraded road sections will be cleaned of all loose rock and gravel. - The EMP prescribes wetting agents along the entire section of Route 152 that will be upgraded to control dust.		
Wastewater and Drainage		
- Drains are openly built, and incapable for water drainage - In the rainy season, flooding is common especially in surrounding	- Similar to two new WWTPs in Mong Cai concern raised of safe operation of the plants. Odour and sludge management must not be released into Sa Pa town areas.	- The activities of regularly collecting sludge from the wastewater treatment plant would be taken in compliance with the rules and regulations set forth by DONRE.

Sa Pa Meetings held October 30, 2014, and January 23, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
area of Muong Hoa stream, etc. - It is requested that City People's Committee should examine and solve problems thoroughly. - The new WWTPs are very welcomed to the town. Cleaner Sa Pa will be better for tourism interests.	- The community agrees to implement the project	
Response of Project		
- The comparatively limited concerns and issues identified of the new WWTPs and drainage upgrades with respect to sludge management and the aesthetics of the WWTPs facilities will be addressed by the subproject design. The prescription and underscoring of the regulatory role of the DONRE for all environmental compliance issues of construction and operation of the new WWTPs is addressed by the EMP.		
Town Centre Enhancement		
- Negative and positive impacts of current town area should be reviewed. - Improvements to the business areas and where tourists go will be beneficial to Sa Pa. - Walking areas will benefit	The traffic might be interrupted due to the construction of social infrastructure (Sa Pa town center) - People mention the risks that cause accidents for pedestrians as the residual building materials are not collected and the manholes are not covered. - Local authorities and residents agree to implement the project, however the project should be implemented quickly, and avoid delaying or lasting long. The project shall ensure the cleanliness of environment and work quality control should be requested. - Besides, when the investor starts to implement the project, they should publicize information and announce in advance to districts and communes. - People request planned actions to mitigate the impacts by the noise, trash, and dust during the construction.	- The project will provide temporary walkways for people during construction - The project will put on signal signs and collecting residual building materials scattering on the construction site. - Materials gathering yard shall not be located near the residential areas. - Owners commit to seriously reduce effects of negative impacts that are brought in by the project as well as manage environment and monitor environment quality. - Also, people will be informed by notice ahead of construction by Commune People's Committees

Sa Pa Meetings held October 30, 2014, and January 23, 2015		
Stakeholder Views **Current Situation**	**Proposed Design** **Consideration**	**Response of Project Owner**
	- People make a request to local authority that they must ensure affected households to have equal or better life than before. - They don't object the project implementation.	
Response of Project		
- The town enhancements will require the greatest focus of construction disturbance management because they will occur in the middle of the highest density of inhabitants and tourists. The EMP for subproject prescribes clear mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access. - While the speed of implementation is very important as noted by the meeting participants, implementation speed is traded-off with time required to mitigate and manage construction disturbances. Follow-up discussion of this trade-off should occur in future public consultations so that the stakeholders and public can agree on the acceptable speed of implementation and level of construction disturbances are acceptable.		

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

155. The assessment of potential impacts of the subprojects is structured by subproject town (Table 20) which follows the previous chapter on Description of Subprojects.

Table 20: Components of town subprojects

Subproject Component	Town
Urban Roads	**Bac Ninh**
Wastewater Improvements	"
Stormwater Improvements	"
Wastewater and Stormwater Improvements	**Mong Cai**
Riverbank Protection	"
Road 1 – Route 152	**Sa Pa**
Wastewater and Drainage	"
Town Center Enhancement	"

156. The area of influence of the subprojects combines direct and indirect effects of the subprojects. The area of influence is delimited by the area immediately affected by the infrastructure developments, and the “downstream” effects defined by for example receiving water quality, the socioeconomic and cultural effects of the increase in vehicle traffic in/out of the towns, expanded access to riverbank promenades and previously seasonally flooded areas, and reduced incidence of waterborne disease.

A. Subproject Benefits

157. The benefits common to all three subproject towns in Viet Nam are improved urban environmental quality, more useful and attractive urban infrastructure and landscapes, and strengthened transportation networks. These benefits will lead to urban and regional socioeconomic development. Subproject-specific benefits are summarized below.

1. Bac Giang

158. The much needed re-designed stormwater ponds in the town will greatly enhance stormwater management, and reduce flooding in the town east of the dyke road that separates the town from the Thuong river. Also, separation, collection, and transferring domestic wastewater away from the ponds to the southern wastewater treatment plant will improve the quality of the ponds and surrounding urban area enabling safe and healthy uses of the ponds. The expanded wastewater collection network and treatment plant will facilitate improved environmental conditions of the town, downstream quality of the Thuong river, and human health. The improvements to stormwater pumping at the Van Son will reduce significant local flooding along the west side of town. The construction of the eastern and western roads will link major arteries resulting more efficient transportation within, and to/from Bac Giang which will stimulate local socioeconomic development.

2. Mong Cai

159. The addition of the first two new WWTPs in eastern and western Mong Cai will greatly improve the quality of the urban environment of Mong Cai, reduce human disease, and improve the quality of the downstream rivers and the intertidal area of the Gulf of Tonkin. The rehabilitated riverbank and dredging of the Ka Long river in town will enhance transportation and economic trade use of the river, and will provide a beautiful riverside promenade for local residents.

3. Sa Pa

160. The upgrades to Road 152 will improve movement of vehicles in and out of Sa Pa with particular benefit to tourist travel. The increased tourism and overall transportation will increase socioeconomic development in Sa Pa. Similarly, the upgrades to the town centre will directly benefit merchants and residents, and will greatly enhance the tourist experience of Sa Pa. The addition of the first active WWTPs in Sa Pa will greatly improve the urban environment, support socioeconomic development, and improve human health of residents and visitors.

B. Subproject Impacts and Mitigations

161. The assessment of potential negative impacts of the subprojects is structured by the three development phases of (i) pre-construction preparation; (ii) construction; and (iii) post-construction operation in order to distinguish important impact periods of subproject implementation, and to prevent redundancy in the assessment and reporting. This structure is carried forward and applied to the three environmental management plans (EMP) prepared for the subprojects.

162. To minimize redundant descriptions of potential impacts all subproject components, the potential impacts common to all subproject components are presented first and discussed together. This structure allows for clearer discussion of subproject-specific potential impacts which are subsequently presented and reported.

1. Pre-construction Phase

163. Negative impacts associated with the pre-construction phase concern potential land acquisition and resettlement. At the feasibility design stage the requirements for any resettlement and compensation are expected to vary amongst the subprojects in the three corridor towns. The details of the impacts and required management actions are addressed in the Resettlement Plans (RP) and Resettlement and Ethnic Minority Development Plan (REMDP) and inventory of Losses (IoL) that have been prepared for each subproject under separate cover. Compensation for land loss or resettlement identified at the feasibility design stage is summarized below:

- In Bac Giang town about 499 households (HH) will have to be compensated for loss of agriculture land or assets which will be caused by the construction of the new east and west roads. The subproject is Category B.

- In Mong Cai town about 13 households (HH) and one hotel will have to be compensated for loss of agriculture/business operation land or assets which will be caused by the construction of two WWTPs and river embankment. The subproject is Category B.

- In Sa Pa town 147 HH will lose some agricultural land, and land for forest plantations. Three houses will need to be moved. Ninety percent of the affected HHs are ethnic minorities. Some resettlement will occur for the upgrades to Road 152 and one of the new WWTPs. The subproject is Category B.

a. Updating Environmental Management Plans

164. The subproject EMPs will need to be updated during the pre-construction detailed design stage to ensure they fully address the potential impacts of the final detailed designs of the subprojects. This will involve finalization of mitigation sub-plans to manage potential impact areas such erosion, sedimentation of surface waters, noise, dust and air quality, selected sites for disposal of dredging sediment and future sludge from WWTPs, and traffic, and worker and public safety at the subproject component sites. The impact mitigations for the pre-construction phase of the subprojects are detailed in the individual EMPs.

165. Key impact mitigation measures of the pre-construction phase are:

1) Initiation of compensation or resettlement plans for the affected households and businesses;
2) Completion of detailed designs of the subprojects of each town; and
3) Updating and initiation the subproject EMPs.

2. Construction Phase

a. Potential impacts of all subproject components

166. The potential environmental impacts of the subprojects are associated primarily with the construction phase of the individual subproject components. Common disturbances and impacts from civil works construction are, for example; reduced and/or blocked public access; disrupted business and recreation; noise, and dust caused by construction truck traffic and heavy equipment use; soil and surface water pollution caused by equipment operation and maintenance; potential public and worker accidents at the sites, increased traffic accidents; land erosion and surface water sedimentation; drainage and flooding problems; solid waste and domestic pollution from worker camps; and communicable diseases and community problems caused by migrant workers. The magnitude and duration of the short-term construction-related impacts will vary amongst subprojects and components depending on the relative magnitude of the intervention and exposure of the environment.

i. Mitigation measures

167. Management measures to mitigate potential common construction-related impacts or disturbances are shown below. The mitigation measures are detailed further in the individual subproject EMPs.

1) Care must be taken to ensure that sites for all earthworks (e.g., excavations, trenches) that are suspected to have unexploded ordnance (UXO) are surveyed by the military prior to construction. If such ordnance is detected clearing work will need to be commissioned prior to undertaking civil works. UXO review is particularly important in Mong Cai and Bac Giang.
2) Open excavations should be fenced, and trenches covered where public walkways or vehicles must cross.
3) A chance find management plan must be in place for cultural artifacts and property.
4) Regular use of wetting agents should be employed at construction sites, and along construction roads to minimize dust.
5) All construction vehicles and equipment should be maintained in proper working order, noise minimized, and not operated at night if possible.
6) Speed limits should be posted and adhered to by construction vehicles.
7) As much as possible construction vehicles should use different roads, or dedicated lanes of roads shared by the public.
8) Trees and other vegetation at all construction sites and along road corridors should be protected with minimal removal. Each tree removed must be replaced with 3 new trees at

site or nearby. No tree removal in special use forests. This is particularly important in Sa Pa.

9) Present and past land use should be reviewed to assess whether excavated soils are contaminated spoil. Contaminated spoil should be disposed at a nearby landfill or a location approved by DONRE.

10) Berms and/or silt curtains should be constructed around all excavation/trench sites and along all surface waters to prevent soil erosion and surface water sedimentation. This is especially pertinent to the Ka Long river in Mong Cai, and Thuong river in Bac Giang .

11) Local workers should be used as much as possible to prevent or minimize influx of migrant workers, and incidence of communicable disease and community unrest.

12) Worker camps must have adequate domestic waste collection facilities and sufficient pit latrines that are located away from public areas and surface waters.

13) Dedicated fuel storage areas must be established away from public areas and marked clearly.

14) To minimize the impact of construction on the public and workers, the specific guidelines for safety of the worker and public set down by the Ministry of Labor, Invalids and Social Assistance (MOLISA) must be followed. The IFC/World Bank Environment, Health, and Safety Guidelines (2007) that govern the safe and orderly operation of civil works should be added as supplementary guidance if needed.

15) Aggregates (e.g., sand, gravel, rock) that are transported by truck should be covered.

16) Prolonged use of temporary storage piles of sand, gravel and rock should be avoided, or covered and wetted regularly to prevent dust and erosion.

17) Sand extraction in rivers for road embankment fill should be done at licensed areas only.

18) Storage of bulk fuel should be on covered concrete pads away from the public and worker camp. Fuel storage areas and tanks must be clearly marked, protected, and lighted. Contractors should be required to have an emergency plan to handle fuel and oil spillage.

168. The subproject components will create varying levels of the construction disturbances summarized above. Provided below are subproject-specific, or notable individual potential impacts that should be managed with mitigation.

b. Bac Giang subproject

169. Significant construction disturbances will occur during the re-design of the town stormwater ponds, and when the new eastern and western roads are constructed. The stormwater ponds are surrounded by houses and gardens with house walls and garden borders forming the immediate boundary of the ponds. Thus, the civil works required to either drain the ponds, or use of coffer dams to isolate and install separate domestic waste collection systems along the pond perimeters will occur adjacent to the houses. Great care must be taken to minimize physical damage and disturbance to houses and property.

170. The construction of the new eastern and western roads will occur through rice paddy and garden plots. Care must be exercised to minimize the construction impact footprint. The fewest possible temporary construction access roads to the new road alignments must be used with all construction traffic being restricted along the new alignments as the roads are constructed.

171. The small bridge that will span the Thuong river for the western road should be designed with the vertical support piles located on the banks of the river, not in the river. Temporary earth berms and/or and plastic sheet fencing should be installed along both riverbanks to isolate the river from all earthworks to prevent erosion and sedimentation of the river.

172. The expansion of the existing WWTP on plant property with additional treatment lagoons and equipment buildings will create short-term erosion, sedimentation, and construction waste issues that will be contained within the perimeter fence. However, the additional land that may be required for the WWTP expansion (Figure 4) will mean those construction disturbances will occur in open paddy and garden land. These potential impacts need to be managed in like manner to the same disturbances created by construction of the new roads.

Critical habitat, conservation, and physical cultural resources

173. Bac Giang is a well-developed urban-agricultural area. There are no known rare or endangered terrestrial or aquatic wildlife, or critical habitat in the area that will be damaged or disturbed during construction. The nearest protected area is along the border of the province to the northeast. No cultural property or values such as cemeteries will be affected by the subproject.

c. Mong Cai subproject

174. The primary disturbances and potential impacts will be caused by the construction of the new eastern and western WWTPs and pipelines, and the rehabilitation and protection of the east and west banks of the Ka Long river in town (Figure 5). Construction disturbances caused by the upgrades and expansion to urban drainage can be managed as summarized above.

175. For the western WWTP the relatively long raw WW pipeline from town must be laid along the alignment of the existing road to the WWTP site to avoid the complex of aquaculture, scattered mangroves, and lowland agriculture of the area. In particular, the scattered mangroves on the western side of town must be avoided. The site of the WWTP must be located on the planned high ground site in order to keep the treatment lagoons above the water table, and seasonal flood levels. Similarly, the treated effluent pipe to the outfall at the adjacent river to the west must not be laid through mangrove or aquaculture areas.

176. The important construction management requirement of the new eastern WWTP just south of town is to ensure that erosion and sedimentation of the Ka Long river and nearby agriculture lands does not occur when the relatively short raw WW pipeline is installed and connected to the existing box-concrete WW canal just north of the new WWTP site. Similarly, earth berms and/or plastic fencing should be placed around the WTTP site to contain soil erosion. The elevation of the WWTP site needs to be graded high to keep the treatment lagoons above the water table and seasonal flood levels.

177. The rehabilitation and protection of the western and eastern banks of the Ka Long river in Mong Cai town will expose the river to major erosion and sedimentation from the required earth and civil works activities. If possible a silt curtain should be installed parallel to the river that separates the riverbank works from the main river as a measure to contain the eroded soil along the banks. Careful use of temporary berms and plastic fencing should be used to keep soil erosion from entering the river during bank reconstruction. The riverbank work should be conducted during the dry season.

178. The other cause of environmental impact during riverbank rehabilitation and protection will be from dredging will in front of the riverbanks. Dredging will cause short periods of extreme sedimentation and turbidity in the river which will be very difficult to mitigate unless special dredging barges equipped with peripheral silt curtains are used. It is not known whether that type of dredger will be used.

179. The potential major impact of river dredging is re-suspension of contaminated bottom sediment and chemicals in the water column for downstream dispersal, and creating a problem for safe on-land dredge disposal. River sediments in urban areas can be contaminated with heavy metals, and other chemicals depending on human activities the basin. However, in consideration of this potential problem the QN DONRE tested the quality of the river bottom sediments to be dredged and found that the chemical constituents of the sediments meet current QCVN standards.

180. To minimize boat traffic congestion and possible collisions the barges or boats that are required during the rehabilitation of the riverbanks including dredging activities should be confined to well-marked dedicated lanes near the banks to minimize disturbance to other river traffic. The construction vessels should be well marked for easy recognition by local boat traffic.

Critical habitat, conservation, and physical cultural resources

181. Rich mangrove forests are located south of Mong Cai along the coast of the Gulf of Tonkin which form the northern part of the Ha Long bay conservation area of coastal Quang Ninh which extends south to UNESCO heritage area of Ha Long Bay and Cat Ba island. These protected mangrove areas are far enough south to not be affected the construction phase of the subproject activities. Moreover, the addition of domestic wastewater treatment to Mong Cai will act to improve the quality of the downstream habitat.

182. There are no known rare or endangered wildlife in Mong Cai or in the area of the western WWTP. All documented sensitive aquatic and terrestrial wildlife are located in the Ha Long Bay conservation area to the south. The Ka Long river has been disturbed from years of local and international boat traffic from PRC China to the north. There is no recorded critical habitat, or rare and endangered species in the river in town. No cultural property or values such as cemeteries will be affected by the subproject.

d. Sa Pa subproject

183. Sa Pa and all subproject components are located in the buffer zone of the Hoang Linh National Park (HLNP). This means that extra care is needed to minimize the impact footprint of the construction phase of the subproject by avoiding forested areas, not negatively affecting the natural beautiful landscapes of the area, and adversely affecting the rich ethnic minority

presence of Sa Pa. The universal rule that must apply to all subproject components that all trees and shrubbery that must be removed must be replaced at site or elsewhere. Three trees must be replanted for every tree that is cut down.

184. The same potential impacts and mitigations of construction of the new WWTPs in Mong Cai also apply to the two new WWTPS in Sa Pa. The raw WW pipeline from the town to the new northeastern WWTP should be placed alongside the existing dirt road that goes close to the WWTP site to prevent cutting a swath through the forest. The shorter treated effluent pipeline should be aligned along the existing agriculture land not forest. Similarly, the pipelines for the new southwestern WWTP can, and should avoid tree removal.

185. Construction vehicles should use existing roads to the WWTPs with minimal construction of new access roads. The elevations of both WWTP sites must be graded high which will avoid tapping into the local groundwater water local tables.

186. The key potential construction impacts and disturbances that will be caused by upgrading Road #152 is loss of trees and shrubbery along the existing alignment. There are no new river crossings, or existing bridges to upgrade.

187. The short-term construction issues with the planned town centre upgrades are captured by the common impacts and issues of construction listed above along with the standard mitigation measures.

Critical habitat, conservation, and physical cultural resources

188. The core zone of the HLNP located just south of Sa Pa, and the population of ethnic minorities of Sa Pa are form the rich ecological-cultural resource of the subproject areas. The subproject components while in the buffer zone of the HLNP are located in either urban or peri-urban areas away from the core zone of HNLP. The documentation of critical habitat and rare and endangered wildlife is focused on the core zone of the Park. However, no sensitive wildlife are known to inhabit the subproject areas. The subprojects will not affect physical cultural resources such as monuments or cemeteries.

e. All Subprojects

189. Because the final location of facilities and components of the subprojects will only be determined at the detailed design phase, the potential exists for valued ecological and cultural resources to be negatively affected should subproject locations be altered significantly. Thus, as part of the detailed design stage when subproject siting and designs are finalized, and as part of updating the EMPs to meet the detailed designs, a review of the proximity and sensitivity of all valued eco-cultural resources of the subproject areas in relation to finalized infrastructure developments should be undertaken. Moreover, final siting and designs of all subprojects need to be reviewed to ensure that the targeted original subproject selection criteria are met.

3. Operation Phase

190. The operation phase starts when construction of the subprojects is complete, and when the improved infrastructures and environmental facilities have been commissioned. Potential impacts of the subprojects in the operation phase are presented below.

a. Bac Giang subproject

191. The important potential operational impacts of the Bac Giang subproject concern the treated effluent quality of the expanded WWTP, management of WTTP sludge, and the risk of increased traffic accidents in the local road network caused by the addition of the new eastern and western roads. There are no appreciable operational impacts associated with the rehabilitated stormwater ponds and pump stations.

192. The expanded treatment plant will be designed to produce an effluent quality that is better than the current effluence quality, and to meet the QCVN 14 (2008) standard for industrial waste. The risk is that the effluent design quality is not met during operation, thereby, the WWTP discharges an effluent that negatively affects downstream users of the Thuong river. Thus, to mitigate that potential impact, the WWTP should be required to regularly test the treated effluent, and report the results to DONRE.

193. During feasibility design stage the future quality of the WWTP sludge is not clear. However, the sludge will have to be removed from the treatment lagoons and disposed. When interviewed in 2015 the DONRE indicated that they will have an approved site for the disposal of the sludge. The DONRE indicated the sludge would be disposed in the existing municipal landfill or another site to be determined during detailed design phase.

194. The potential increase in road accidents caused by the addition of the new east and west roads to the Bac Giang road network needs to be addressed. Enforcement of clearly posted speed limits, and appropriate vehicle use designations for the different roads should occur for the new roads as well all other roads of the road network.

b. Mong Cai

195. The operational issues and required mitigations of the expanded WWTP in Bac Giang also apply to the two new WTTPs in Mong Cai. The quality of treated effluent must be monitored to ensure it meets design criteria, and sludge from the WWTPs must be disposed in a location acceptable by DONRE which will be finalized during detailed design phase of the subproject.

196. Other issues with creating new WWTPs are aesthetics and public safety. The new WWTP must not become negative externalities in the urban and rural landscape. Potential impacts are as follows:

1. Production of odor, noise, and altered visual aesthetics of the WWTP facilities;
2. Contamination of land or surface water from spills, or uncontrolled discharge of untreated and treated wastewater, arising from pipeline or equipment failure;
3. Increased incidence of vector carried disease arising from the treatment ponds; and
4. Risk of public injury from exposure to the treatment pond operations.

The detailed design phase of the WWTPs will address these issues including siting and O&M. The composite impact mitigation for the new WWTPs and pipelines consists of:

a) Sustained, safe collection and transport wastewater to the WWTPs;
b) Consistent treatment of wastewater to effluent quality design specifications;

c) Ability of river receiving environments to assimilate the treated effluent year-round;
d) Safe sludge disposal; and
e) Ability of wastewater system not to impinge on the aesthetics of the area.

197. Additional mitigations for the potential impacts of the operation of WWTPs and pipelines are provided below. All mitigation measures are detailed in the EMP.

a) A fenced, treed perimeter berm built around entire WWTP property to isolate facility from the area, reduce noise and odor, and prevent negative aesthetics;
b) Enforced well marked speed limits will be posted on roads used by staff working at the WWTPs, and vehicles kept in good working order;
c) Designs ensure treatment lagoons do not contaminate groundwater and land, monitored by regular groundwater testing;
d) A regular effluent and sludge quality testing protocol;
e) All equipment and processes are kept maintained in good working order with back-up equipment and processes in place in critical areas;
f) Engineering and management systems are in place to prevent and address emergency spill and discharge situations; and
g) All staff are properly trained with regular refresher courses;

198. The operation of the upgraded riverbanks and promenade, and the upgraded drainage network in Bac Giang will not create appreciable environmental impacts.

c. Sa Pa subproject

199. The potential issues, impacts, and required mitigation measures for the operation of the new WWTPs in Mong Cai apply directly to the new WWTPs in Sa Pa. Of particular importance are that the potential aesthetic issues of the WWTPs are managed well to preserve the highly valued tourist appeal of the natural and cultural assets of Sa Pa.

200. The operational issues of the upgraded Road #152 concern increased vehicle accidents, and increased GHG production. The former can be addressed with enforced, clearly marked speed limits. Increased GHG production from increased vehicle traffic can be managed with reduced speed limits, and legislated requirements for vehicles which use the road to be good working condition.

C. Induced and Cumulative Impacts

201. A potential induced spatial and temporal cumulative impact of the targeted increase in socioeconomic development of the three corridor towns of Bac Giang, Mong Cai and Sa Pa is an increase in consumption of natural resources, and production of pollution. Sa Pa would be the most sensitive to increased consumption and production of pollution. Mong Cai is the most sensitive to the impact of international socioeconomic development being the border town with PRC China.

D. Climate Change

1. Projections

202. There have been numerous recent reports and summaries, e.g.,[25],[26],[27], of climate change scenarios for Viet Nam based on the most recent climate change projections of the different Global Circulation Models (GCM). The fact sheet for Viet Nam[28] compiled by the MONRE of Viet Nam summarizes projected climate change for Viet Nam as follows.

203. By 2100 average annual air temperature in the country is expected to increase by 2.3 C^o with the frequency of heat waves increasing by 100-180%, and cold surges decreasing by 20-40%. Total rainfall, and extreme rainfall events is expected to increase everywhere in the country with particular increases occurring in the mountainous northern areas. However, rainfall is expected to decrease during dry season. By 2100 mean sea level is expected to increase 1.0 m.

2. Climate Risk and Vulnerability

204. The vulnerability of the subprojects to climate change was assessed using a climate risk flowchart of increasing sensitivity analysis that was prepared for ADB infrastructure investments[29]. The initial rapid environmental assessment checklist (REA) of the subprojects (Appendix A) indicated that the sensitivity to climate change is variable among the subprojects. With the climate risk initially screened at *Medium* (Appendix A) the Mong Cai subproject is considered most sensitive to climate change due to the coastal town being next to the intertidal zone of the Gulf of Tonkin with the elevation of the southern areas of town close to sea level.

205. While all three subproject areas will experience increased rainy season rainfall and flooding, Mong Cai also will be exposed to the projected rise in sea level, and likely most significantly increased typhoon storm surge up the tidal Ka Long and Tra Co rivers, and across the wetland areas south, east, and west of the town. Flood prone areas in the southern part of town include Ka Long station, Hoa Lac, and Tran Phu, whereas in the eastern and western Ka Long basin flood prone areas are Tran Phu, Dao Phuc Loc, Hoang Quoc Viet, Dong Tri, and along the roads of Hung Vuong, Pham Ngu Lao.

206. Following initial REA screening checklist the next more detailed screening of the climate risk flowchart was application of the factors of the AWARE climate sensitivity software. Once again the single climate-related factor on which the southern WWTP in Mong cai was judged to be sea level rise and potential typhoon storm surge up the Ka Long river and Tra Co rivers.

207. The next step in the risk flowchart[30] is application of the much more in depth CVRA to obtain an understanding of the potential socioeconomic, stakeholder, and financial implications

[25] ADB (2013). Viet Nam and Climate Change Assessment and Impacts, 31 pgs + Appendices
[26] MONRE, 2009. Climate Change and Sea Level Rise Scenarios, 15 pgs + Apppendices
[27] UNEP, 2010. Assessment of Capacity Gaps and Needs of Southeast Asian Countries Addressing Impacts, Vulnerabilities, and Adaption to Climate Variability and Climate Change, 215 pgs + references
[28] MONRE 2010, Climate Change Fact Sheet for Viet Nam
[29] ADB (2014) Figure 1 *of* Climate Proofing ADB Investment in the Transport Sector: Initial Experience, 88 pgs + Appendices
[30] Footnote 18

the risk of the new WWT in Mong Cai. The CVRA represents a stand-alone detailed study that requires biophysical, financial, and stakeholder assessments in addition to the IEE.

Mitigation and Adaptation

208. The measures to protect the new WWTPs in Mong Cai from increased flood events caused by sea level rise and storm surge and/or overland flooding from projected increases in rainy season rainfall are the design of the facilities. As indicated in the REA (Appendix A), the facility grading, use of berms and bunds, and placement of emergency pumping equipment at each site will result in the WWTPs being resilient to climate change-induced increases in overland and ocean flooding. The alignments and foundations of the raw WW and treated effluent pipelines and outfalls of both WWTPs must be secure and erosion proof.

209. The costs of the designs of the WWTPs must reflect the technical requirements to make both facilities resilient to climate change. As part of the capacity development and training program for the new WWTPs, training and skill development must include managing wastewater collection and treatment during extreme flood events.

210. To a lesser extent the low lying town centre areas of Bac Giang east of the Thuong river are expected to be vulnerable to projected increases in rainfall-induced flooding (DONRE pers comm., 2014). However, explicit in the design of the rehabilitation of stormwater ponds and select pump station upgrades is accommodation of projected increases in local flooding from climate change. The new eastern and western roads will traverse agriculture lowland areas and therefore could be sensitive to climate change-induced increases in seasonal flooding and erosion lateral. However, the grading, surfacing, shoulder structure, and later drainage of both roads will be designed to withstand increased flood levels.

211. Lao Cai province and Sa Pa town are considered vulnerable to climate change[31] due to the sensitivity of flash flooding in the area to increases in extreme rainfall events and the poor soil absorption and steep slopes that exist. The upgrades to the Road 152 will include design measures to withstand and be resilient to overland and steep flash runoffs. Similarly, while the two new WWTPs will be constructed on high ground both facilities and associated pipelines will be designed to be resilient to flash runoff, erosion, and flooding events.

212. Major capacity development and training, and adequate O&M budgets are included in the design of the subprojects in order to sustain the operation of the urban infrastructures as designed. This is especially important for managing and responding to system stresses caused by climate change-induced increases in flooding, erosion, and sea level rise and storm surge.

3. Contribution to Global Climate Change

a. Greenhouse gas emissions

213. The single potential major source of GHGs of the three subprojects is the wastewater treatment (WWT) component. The production and emission of GHGs - the most important of which is methane (CH_4) – by wastewater treatment processes depends on the extent of

[31] Mekong-Building Climate Resilient Asian Cities 2012.

anaerobic digestion of the wastewater[32],[33]. Methane is the key GHG because it is approximately 40-50 times stronger a greenhouse gas that carbon dioxide (CO_2). A bi-product of anaerobic digestion of wastewater is methane which is emitted to the atmosphere unless captured and flared or otherwise neutralized. Aerobic waste water treatment processes produce little no methane and thus are more GHG friendly. The WWT planned for the three subprojects uses the oxygen ditch type WWT process which is an aerobic process and thus produces little to no methane. Ambient oxygen is either actively or passively to digest the raw wastewater.

214. Qualitatively, wastewater treatment of the subprojects is estimated as either GHG neutral or slightly pro-GHG emissions. The oxidation ditch type WWTP that exists in Bac Giang will be expanded which means the GHG emissions in Bac Giang can be considered neutral. The new WWTPs to be built in Mong Cai and Sa Pa will create sources of GHGs such as CO_2 and nitrous oxide (NO_2), however, overall GHG footprint will be low given the low production of methane.

215. The potential indirect GHG emissions from the aerobic WWTPs in the three towns stem from the electrical power produced offsite that is needed to actively aerate the wastewater in the WWTPs. The indirect GHG electrical power footprint would vary among the subproject WWTPs. Electrical power for Mong Cai and Bac Giang likely comes from the Mong Duong thermal (coal) power plant in Cam Pha just south of Mong Cai which would have the greatest indirect GHG footprint. Whereas the WWTPs in Sa Pa would be powered from the Son La hydroelectric power plant, and thus the smallest GHG footprint.

216. Consideration of climate change includes measures to reduce the contribution of the subprojects to greenhouse gas production. Effort through design will be taken to reduce the GHG footprint of the project by ensuring for example that speed limits along upgraded roads are established and subsequently enforced, vehicles that use the upgraded roads are maintained in good working order, and all lighting installed at the subproject component sites use light bulbs that are energy efficient.

VII. ANALYSIS OF ALTERNATIVES

217. The analysis of subproject alternatives considered; a) subproject scope to meet allocated subproject budgets; b) appropriateness of a subproject component to the outputs and guiding principles PPTA 8425; c) subproject components that could create a Category A condition for environment (SPS 2009); and the realization practical engineering solutions for subproject needs.

1. WWTPs in Mong Cai

218. The initial site for the western WWTP was on a cluster of shrimp aquaculture ponds with the raw WW pipeline from the town aligned through scattered mangroves and aquaculture. The site was changed to the current higher elevation location on a cleared area away from

[32] Bogner et al. 2007. Waste Management, In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[33] Doorn and Irving 2006. IPCC Guidelines for Greenhouse Gas Inventories, Wastewater Treatment & Discharge

aquaculture ponds. The alignment for the raw WW pipeline to the WWTP was moved to the alignment of the road from town to the new WWTP site.

219. The third site for the western WWTP that was considered before the final location was selected was the western bank of Ka Long river just south of town. However, that site was abandoned because of anticipated land acquisition issues, and because extensive modifications to the current wastewater drainage network would be required which are not required for the selected western site. No alternate sites were examined for the eastern WWTP on the east bank of the Ka Long river south of town.

2. Roads in Bac Giang

220. Two of the four original road sections comprising the western road in Bac Giang were dropped because of budget issues, and the risk that the separate planned connecting trunk road on which the two road sections depended for completion would not be constructed by the government. The two contiguous sections of the western road that now form the subproject component are connected to existing roads at each end which removes the risk that the completed roads would not go anywhere.

VIII. INFORMATION DISCLOSURE AND PUBLIC GRIEVANCE MECHANISM

221. The subproject components were introduced to affected stakeholders and public during the public consultations with verbal and visual presentations of the subproject components. The formal disclosure of subproject information in local language to affected persons and stakeholders that occurred during the development of the IEE is meant to form the beginning of continued information disclosure and stakeholder involvement as the project is implemented. At a minimum the executive summary of the IEE should be translated into the Vietnamese language and distributed to all affected persons. As part of the stakeholder communication strategy developed for the IEE, regular information exchange meetings with stakeholders is required throughout implementation of the subprojects.

222. Pursuant to the ADB Public Communication Policy (2012) the IEE should be available on the provincial peoples committee (PPC) website, at PPC offices, district DONRE offices, and at subproject sites. Similarly, all project reporting with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/IA/PSC should be available at the same offices and web sites. Moreover, the IEE will also be available on the ADB web site. After implementation of subprojects begins, all environmental and EMP reporting submitted by the EA/IA will also be available on the ADB web site.

223. A well-defined grievance redress and resolution mechanism will be established to address grievances and complaints of affected persons (AP) regarding environmental issues, land acquisition, resettlement and compensation, to be carried out in a timely and satisfactory manner. All APs will be made fully aware of their rights, and the detailed procedures for filing grievances, and the appeal process. This shall be published and disseminated through an effective public information campaign. The grievance redress mechanism and appeal procedures will also be explained in a project information booklet (PIB) that will be distributed to all APs.

224. APs are entitled to lodge complaints regarding any aspect of affected environments, land acquisition and resettlement requirements such as, noise, pollution, entitlements, rates, and payment and procedures for resettlement and income restoration programs. APs complaints can be made verbally or in written form. In the case of verbal complaints, the grievance committee will be responsible to make a written record during all meetings with the APs.

225. A Grievance Committee with members that have experience in addressing environmental and social issues will be organized in communes, led by local leaders designated for such tasks. The designated commune officials shall exercise all efforts to settle complaints and issues at the commune level through appropriate community consultation. All meetings shall be recorded by the grievance committee and copies shall be provided to APs. A copy of the minutes of meetings and actions undertaken shall be provided to the PPC, IA, PSC, and ADB upon request.

226. The procedures for grievance redress are set out below. The procedure described below should apply to both social and environmental issues and are consistent with the legal process for resolution of disputes in Viet Nam.

i) Stage 1: Complaints from APs for the first time shall be lodged verbally or in written form with the village head or commune leader. The complaints shall be discussed with the APs and the designated Head of Grievance Committee or members of the committee. Because initial environmental issues will most likely be construction-related, the contractor and PIU/PMU need to be notified immediately. It will be the responsibility of the Head of Grievance Committee to resolve the issue within 15 days from the date the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to APs.

ii) Stage 2: If no understanding or amicable solution can be reached or if no response is received from the grievance committee within 15 days from filing the complaint, the APs can elevate the case to the District Grievance Committee (DGC). The District Grievance Committee is expected to respond within 15 days upon receiving the APs appeal.

iii) Stage 3: If the AP is not satisfied with the decision of the District Grievance Committee, or in the absence of any response, the APs can appeal to the Provincial Grievance Committee (PGC). The PGC will review and issue a decision on the appeal within 30 days from the day the complaint is received.

iv) Stage 4: If the AP is still not satisfied with the decision of the PGC or in the absence of any response within the stipulated time, the APs, as a last resort may submit his/her case to the provincial court. The court will address the appeal by written decision and submit copies to the respective entities which include the PPC, DGC/PGC and the APs. If however, the AP is still not satisfied the court's decision, the case may be elevated to the provincial court. If however, the decision of the provincial court is still unsatisfactory to the APs, the APs may bring the complaints to the Higher Court.

227. The PPC will be responsible for checking the procedures and resolutions of grievances and complaints. The monitoring unit of the PPC must have expertise and experience in social

and environmental issues associated with infrastructure developments. The PPC may recommend further measures to be taken to redress unresolved grievances. The consultant environmental specialists will provide the necessary training to improve grievance procedures and develop capacity building programs for the grievance committee members when required.

228. In cases where APs do not have the writing skills or are unable to express their grievances verbally, they are encouraged to seek assistance from the recognized local groups, nongovernment organizations, family members, village heads or community chiefs to have their grievances recorded in writing, and to have access to documentation and survey or valuation of assets, to ensure that where disputes do occur, all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible committee will ensure that the concerned APs are provided with copies of complaints and decisions or resolutions reached.

229. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, APs have the right to directly discuss their concerns or problems with the ADB Southeast Asia Department through the ADB Viet Nam Resident Mission (VRM). If APs are still not satisfied with the responses of VRM, they can directly contact the ADB Office of the Special Projects Facilitator.

230. ADB's accountability mechanism provides a forum where people adversely affected by ADB-assisted projects can voice and seek solutions to their problems and report alleged noncompliance of ADB's operational policies and procedures. It consists of two separate but complementary functions: problem solving and compliance review function. Complaints must be in writing and addressed to the Complaints Receiving Officer. More information can be found at: (http://www.adb.org/site/accountability-mechanism/main).

IX. ENVIRONMENTAL MANAGEMENT PLANS

231. The three environmental management plans for the subprojects in Bac Giang, Mong Cai, and Sa Pa have been prepared, and are reported under separate covers.

X. CONCLUSIONS AND RECOMMENDATION

232. The examination of the subprojects in Bac Giang, Mong Cai, and Sa Pa indicates that the potential environmental impacts are largely restricted to the construction phase of the subproject components. The civil construction disturbances such dust, noise, traffic disruptions, erosion and sedimentation, and public and worker safety can be managed effectively with standard construction practices (e.g., IFC/World Bank 2007). A comprehensive tree replacement program for all trees removed for the subproject components in Sa Pa must be implemented given the entire town is located inside the buffer zone of the Hoang Linh National Park.

233. The description of the feasibility designs of the three subprojects combined with available information on the affected environment is sufficient to identify the scope of potential environmental impacts of the project. Providing that significant changes do not occur to the

design of one or more of the subproject components, and that new sensitive environmental or social receptor data is not discovered, a further detailed environmental impact assessment (EIA) of the project is not required.

234. The three separate EMPs developed for the subprojects provide impact mitigation plans, environmental monitoring plans, and specify the institutional responsibilities and capacity needs for the environmental management of the subprojects. The EMPs will need to be reviewed and updated at the detailed design phase to ensure that they fully address the potential impacts of the final subproject designs.

XI. REFERENCES CITED

ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.

ADB, 2003, Environmental Assessment Guidelines of the Asian Development Bank.

World Bank Group, 2007. Environmental, Health, and Safety Guidelines. Washington DC., 96 pgs.

APPENDIX A: RAPID ENVIRONMENTAL ASSESSMENTS OF THE SUBPROJECTS

Bac Giang

Rapid Environmental Assessment (REA) Checklist **Roads and Highways**

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE – **Bac Giang**

Sector Division: Urban Roads / Urban Development / SERD

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		x	
▪ Protected Area		x	
▪ Wetland		x	
▪ Mangrove		x	
▪ Estuarine		x	
▪ Buffer zone of protected area		x	
▪ Special area for protecting biodiversity		x	
B. Potential Environmental Impacts Will the Project cause…			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?	x		A large cemetery will have to be moved to accommodate western road
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		x	
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	x		The EMP for subproject will prescribe mitigation measures to contain erosion and prevent sedimentation of the river that will be bridged as part of western road
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	x		The EMP will prescribe worker camp waste management plans
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		x	

Screening Questions	Yes	No	Remarks
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ noise and vibration due to blasting and other civil works?	X		The EMP for subproject prescribes mitigation sub-plans for noise. Blasting is not required.
▪ dislocation or involuntary resettlement of people?		X	
▪ dislocation and compulsory resettlement of people living in right-of-way?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ hazardous driving conditions where construction interferes with pre-existing roads?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for subproject prescribes mitigation sub-plan for managing waste at construction sites and work camps
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		X	
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?	X		The EMP for subproject prescribes mitigation measures to manage the increased construction traffic. Transport of toxic materials during, and after construction is not planned
▪ increased noise and air pollution resulting from traffic volume?	X		The EMP for subproject prescribes mitigation measures for increased noise and local air pollution from increased traffic during construction, and after roads are completed
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?	X		The EMP for subproject prescribes mitigation measures to manage waste hydrocarbons at construction sites
▪ social conflicts if workers from other regions or countries are hired?		X	

Screening Questions	Yes	No	Remarks
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Urban Roads

Division/Department: Urban Development / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	The alignments for the roads cross lowland rice paddy which will experience increased flooding events due to climate change. Grading, surfacing, and drainage of both roads will be resilient to increased severity and duration of seasonal flood events along the alignments.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	As part of the above the required bridge crossing at Thuong river will be designed to be above greater flood levels of the Thuong river,and be resilient to increased erosion from river scour.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate	0	Provision of sufficient O&M for road

	conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		and bridge maintenance from extreme flood events will be required in the financing of the new roads. Required capacity development and training for road maintenance will also be provided to address extreme weather events.
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Low **Other Comments**: n/a

Rapid Environmental Assessment (REA) Checklist **SEWAGE TREATMENT**

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE – **Bac Giang**

Sector Division: Wastewater and Stormwater Improvements / Urban Development / SERD

Screening Questions	Yes	No	Remarks
B. PROJECT SITING IS THE PROJECT AREA			
▪ DENSELY POPULATED?		X	
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		X	
▪ ADJACENT TO, OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
• CULTURAL HERITAGE SITE		X	
• PROTECTED AREA		X	
• WETLAND		X	
• MANGROVE		X	
• ESTUARINE		X	
• BUFFER ZONE OF PROTECTED AREA		X	

Screening Questions	Yes	No	Remarks
• SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
• BAY		X	
A. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		X	
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		X	
▪ dislocation or involuntary resettlement of people?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	X		Treated effluent quality of expanded WWTP will meet level QVCN 14 (2008)
▪ overflows and flooding of neighboring properties with raw sewage?		X	
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	X		DONRE has identified location fro disposal of all sludge and septage
▪ noise and vibration due to blasting and other civil works?	X		The EMP for subproject prescribes mitigation sub-plans for noise. Blasting is not required.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical,and biological hazards during project construction and operation?		X	
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		X	
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		X	
▪ road blocking and temporary flooding due to land excavation during the rainy season?		X	

Screening Questions	Yes	No	Remarks
▪ noise and dust from construction activities?	X		As above the EMP for subproject prescribes mitigation sub-plans short-term noise, and dust disturbances
▪ traffic disturbances due to construction material transport and wastes?	X		The EMP for subroject prescribes mitigation measures for short-term construction-caused traffic problems
▪ temporary silt runoff due to construction?	X		The EMP for subproject prescribes mitigation measures to prevent or contain land erosion and sedimentation of Ka Dong river during construction phase
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		X	
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		X	
▪ contamination of surface and ground waters due to sludge disposal on land?		X	
▪ health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and un-stabilized sludge?		X	
▪ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		X	
▪ social conflicts between construction workers from other areas and community workers?	X		Migrant worker population is expected to be small, however, the EMP for subproject prescribes mitigation sub-plans for these social local issues.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Wastewater and Stormwater Improvements

Division/Department: Urban development / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	Site of existing WWTP that will be expanded, and existing WW pipeline are on high ground, and not susceptible to flooding.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	Included in the designs of upgraded stormwater pumping stations is increased capacity to accommodate more severe storm and rainfall events
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Low **Other Comments**: n/a

Mong Cai

Rapid Environmental Assessment (REA) Checklist: **SEWAGE TREATMENT**

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE – **Mong Cai**

Sector Division: Wastewater and Stormwater Improvements / Urban Development / SERD

Screening Questions	Yes	No	Remarks
B. PROJECT SITING IS THE PROJECT AREA.			
▪ DENSELY POPULATED?		X	
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		X	
▪ ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
• CULTURAL HERITAGE SITE		X	
• PROTECTED AREA		X	
• WETLAND	X		New eastern and western WWTPs are located far north, and will not affect mangrove forested wetland area south of Mong Cai at the Gulf of Tonkin that QN DONRE plans to apply in 2020 for Ramsar Wetland Status. If required mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
• MANGROVE	X		As above
• ESTUARINE		X	
• BUFFER ZONE OF PROTECTED AREA		X	
• SPECIAL AREA FOR PROTECTING BIODIVERSITY	X		As above
• BAY		X	
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			

Screening Questions	Yes	No	Remarks
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		X	
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		X	
▪ dislocation or involuntary resettlement of people?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	X		The quality of treated effluent will meet the QCVN 14: (2008) for industrial effluent
▪ overflows and flooding of neighboring properties with raw sewage?		X	
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		X	
▪ noise and vibration due to blasting and other civil works?	X		The EMP for subproject prescribes mitigation measures for construction noise. Blasting is not required.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical,and biological hazards during project construction and operation?		X	
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		X	
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		X	
▪ road blocking and temporary flooding due to land excavation during the rainy season?		X	
▪ noise and dust from construction activities?	X		As above the EMP for subproject prescribes mitigation sub-plans short-term noise, and dust disturbances
▪ traffic disturbances due to construction material transport and wastes?	X		The EMP for subproject prescribes mitigation measures for short-term construction-caused traffic problems
▪ temporary silt runoff due to construction?	X		The EMP for subproject prescribes mitigation measures to prevent or contain land erosion and sedimentation of Ka Dong river during construction phase

Screening Questions	Yes	No	Remarks
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		X	
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	X		WWTP pond sludge will be disposed in a DONRE-approved site such as a landfill, or other approved location
▪ contamination of surface and ground waters due to sludge disposal on land?		X	WWTP pond sludge will be disposed in a DONRE-approved site such as a landfill, or other approved location
▪ health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and un-stabilized sludge?		X	
▪ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		X	
▪ social conflicts between construction workers from other areas and community workers?	X		Migrant worker population is expected to be small, however, the EMP for subproject prescribes mitigation sub-plans for these social local issues.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	

Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Wastewater and Stormwater Improvements

Division/Department: Urban development / SERD

Screening Questions		Score	Remarks
Location and Design of	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions	1	The site elevation of eastern WWTP including lagoons will need to be raised to be resilient to current rainy season flooding from adjacent Ka Long river, and from

Screening Questions		Score	Remarks
project	including extreme weather related events such as floods, droughts, storms, landslides?		increased rainfall/flooding scenarios of climate change. The western WWTP is located adjacent to an inland wetland area of the coastal flood zone of the Gulf of Tonkin which presently is inundated during rainy season. The overland WW pipeline, and foundations of the WWTP including lagoons would need to be notably elevated to be resilient to present flooding, and future climate change induced flooding and sea level rise.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	As indicated above the supporting structures of above ground WW pipeline would need to be tall and stable enough to accommodate flooding from increased rainfall, ad sea level rise.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Medium **Other Comments**: n/a

Rapid Environmental Assessment (REA) Checklist **Ports and Harbours**

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE – **Mong Cai**

Sector Division: Riverbank Protection / Urban Development / SERD

Screening Questions	Yes	No	Remarks

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		X	
▪ PROTECTED AREA		X	
▪ WETLAND		X	
▪ MANGROVE		X	
▪ ESTUARINE		X	
▪ BUFFER ZONE OF PROTECTED AREA		X	
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds?		X	
▪ short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows at dredging site?	X		The EMP for subproject prescribes mitigation measures to minimize turbidity in Ka Long river from shore works and dredging.
▪ removal and disturbance of aquatic flora and fauna at dredging site?	X		The dredging works will not cause significant damage to aquatic fauna or flora because the ecosystem of the Ka Long river in central Mong Cai is depauperate of wildlife due to past dredging and ongoing shipping activities
▪ deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	X		The EMP for subproject prescribes mitigation measures to minimize turbidity in Ka Long river from shore works and dredging. Waste from work camps will be managed away from river
▪ alteration of bottom surface and modifications to bathymetry, causing changes in tidal bore, river circulation, species diversity, and salinity?	X		By design dredging of Ka Long river will improve flow during low flow periods.
▪ changes in sediment pattern and littoral drift that may cause beach erosion of neighboring areas?		X	

Screening Questions	Yes	No	Remarks
▪ modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil?		X	
▪ short-term air quality degradation due to dredging-related operations?		X	
▪ noise and vibration due to blasting and other civil works?		X	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		X	
▪ dislocation or involuntary resettlement of people?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ other social concerns relating to inconveniences in living conditions in the project areas?		X	
▪ social conflicts if construction depletes local fishery resources on which communities depend for subsistence?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations (such as STI's and HIV/AIDS)?	X		The EMP for subproject prescribes mitigation sub-plan to manage worker camp waste. Social diseases will be prevented with education, and a small migrant worker population
▪ social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)?		X	
▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges?		X	

Screening Questions	Yes	No	Remarks
▪ increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from maneuvering and berthing ships and the waterfront industry?	X		Minor short-term decreases in air quality from dredging operations, and from earthwork machines along shoreline will be managed with prescribed equipment maintenance program
▪ large population increase during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ social conflicts especially when workers from other areas are hired?	X		Minor potential impact due to anticipated small migrant worker population
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Riverbank Protection

Division/Department: Urban Development / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	By design the height of the rehabilitated riverbank and walkway will be resilient to seasonal high water levels of Ka Dong river now, and in climate change rainfall scenarios
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	As above.
Materials and	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature	0	

Maintenance	contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Low **Other Comments:** n/a

Sa Pa

235. The initial rapid environment assessment (REA) of the subproject in Sa Pa town identified an unusual situation for the environmental due diligence of the subproject because Sa Pa town and the entire subproject are located inside of the buffer zone of Hoang Linh National Park (HLNP) with the original new water supply component of the subproject located inside the core zone of the park (Figure 30). The REA is based on documents, site visits, close liaison with PPTA engineers, and interviews/meetings with Lao Cai environmental management agencies including provincial and district DONRE and DARD staff, and the Director of the Hoang Lien National Park Management Board (HLNP) in Sa Pa.

1. Analysis of subproject components

236. The Sa Pa subproject now consists of the following major components: 1) two domestic wastewater treatment plants (WWTP) and pipelines; 2) town centre infrastructure upgrades; and 3) upgrades to eastern Road #152. The originally proposed new northern bypass road, and water supply for the existing treatment plant (WTP) were dropped from the subproject because the location of the new water supply source is inside the most restricted area of the core zone of the HLNP, and too much forest had to cut for the bypass road located inside the buffer zone.

237. Normally developments located inside a buffer or core zone of a protected area create a Category A condition for environment (SPS 2009) requiring more in-depth study and a longer project review period.

a. Upgrades to Road #152

238. The environmental impact footprint of the road already exists. The impacts of the upgrades to the road will be restricted to short-term construction disturbances and potential impacts that can be mitigated and managed with standard construction management practices. Potential operational impacts of increased GHG emissions and vehicle accidents from increased traffic and driving speeds can be mitigated with enforced, posted speed limits, vehicle type specification, and ensuring vehicles that use the road are in good working condition. There is no critical wildlife habitat, or known rare or endangered species living along the alignment of Road #152.

b. Town-centre Upgrades

239. The planned small-scale infrastructure improvements to public areas and the market in SA Pa centre will not negatively affect the surrounding natural environment or wildlife. Construction disturbances and public safety can be managed with standard construction practices.

c. Wastewater Treatment

<u>Southeast WWTP</u>

240. The site of the WWTP is on long-cleared, agri-garden land in the per-urban area just south of town on which the existing concrete raw WW holding tank is situated. The existing raw WW pipeline from the town will be upgraded to serve more catchment areas. The treated effluent will be piped to an outfall on the tributary of Red river that flows below the site. The potential impacts of the new WWTP and pipelines will be construction-related disturbances that can be mitigated. The treated effluent will improve environmental conditions in the area

including river quality over the current practice of discharging raw WW from the holding tank down the slope. There is no critical wildlife habitat, or rare or endangered species on the southwest side of town.

Northwest WWTP

241. The site of the WWTP is located on a small hill in semi agriculture, peri-urban area. No tourist-oriented terraced agriculture was observed in the area. A new raw WW pipeline will be installed along a dirt road that parallels the stream to the west. Treated effluent from the WWTP will be discharged to the stream presently used for raw WW which also is a tributary to the Red river. There are no critical wildlife habitat, or known rare or endangered species on the southwest side of town.

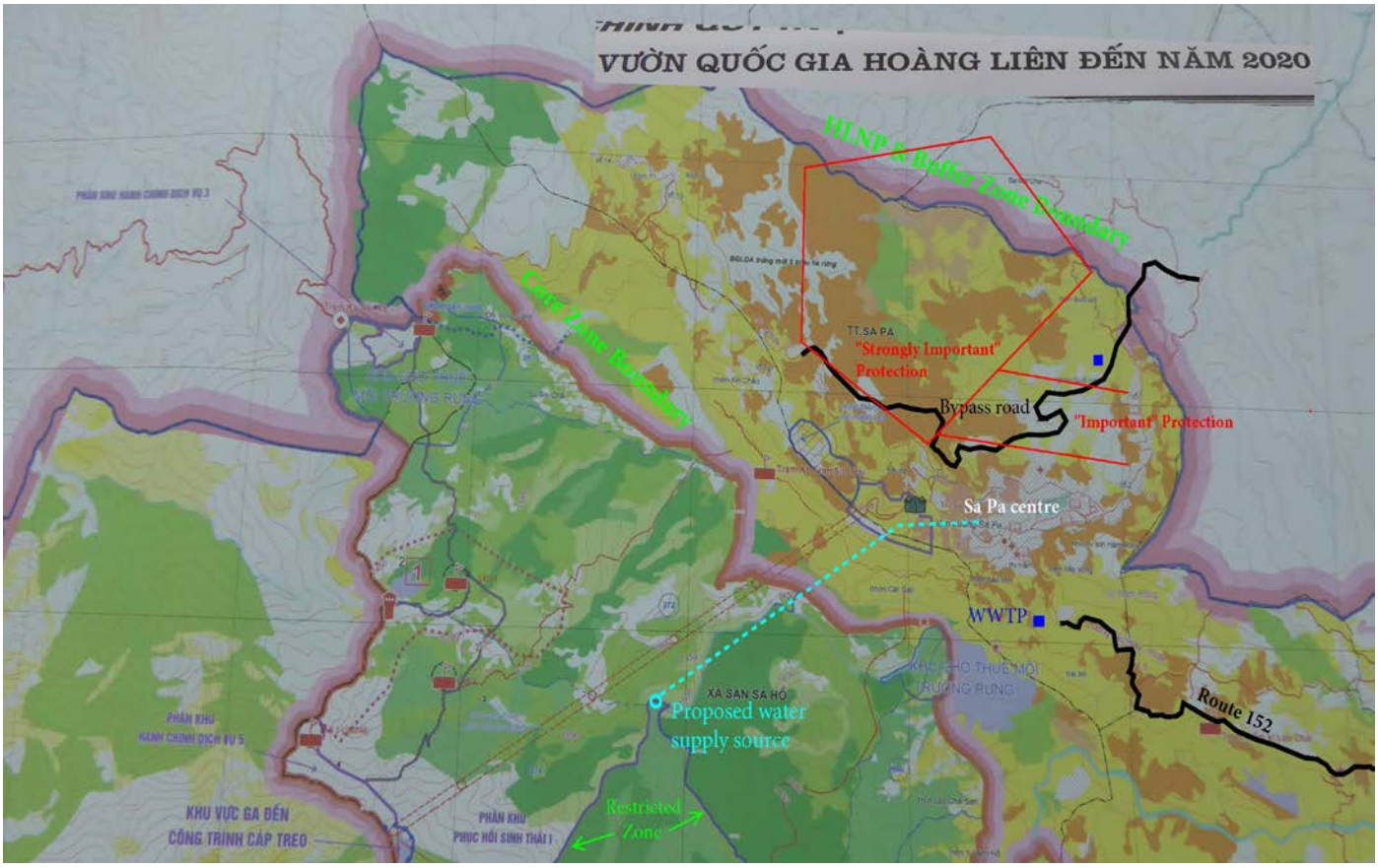
d. New Bypass Road

242. The alignment of proposed new bypass road branched off Route 4D outside of the HLNP north of Sa Pa town and extended southwesterly across the top of the town before veering northwest to re-join route 4D (Figure 30). The northeastern reach of the alignment would traverse agricultural land which reputedly includes some tourist oriented terraced agriculture. The south and east sections of the alignment would traverse a mixed forest type which includes large swaths of “Strongly Important” protection forest and “Important” protection” forest as defined by the provincial DARD (Figure 30). The bypass road was dropped because of the expected forest and terraced garden losses.

e. New Water Supply

243. The proposed new water supply (Figure 30) is located at the most restricted zone 5 km into the core zone of the HLNP. The water supply component was dropped from subproject as a result.

Figure 30. Sections of core and buffer zones of Hoang Linh National Park



Rapid Environmental Assessment (REA) Checklist **Roads and Highways**

Country/Project Title:	Second Corridor Towns Development Project, PPTA 8425 VIE **Sa Pa**
Sector Division:	Road 1 – Route 152 / Urban Development / SERD

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		X	

Screening Questions	Yes	No	Remarks
▪ PROTECTED AREA	x		Sa Pa town and area is locate in the buffer zone of Hoang Lien National Park thus minimal to modest development interventions should occur to avoid a Category A condition. The upgrading of Hwy 152 will occur outside the town center. Mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
▪ WETLAND		x	
▪ MANGROVE		x	
▪ ESTUARINE		x	
▪ BUFFER ZONE OF PROTECTED AREA	x		As above subproject is located inside buffer zone of HLNP. The upgrading of Hwy 152 will occur outside the town center. Mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY		x	
C. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?	x		The upgrading of Hwy 152 will occur outside the town center. Mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.

Screening Questions	Yes	No	Remarks
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?	x		Encroachment on buffer zone. The upgrading of Hwy 152 will occur outside the town center. Mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	x		The EMP for subproject prescribes mitigation measures to contain erosion from the steep slopes and prevent sedimentation of affected streams leading to river through town. The upgrading of Hwy 152 will occur outside the town center. Mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	x		As above
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		x	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		x	
▪ noise and vibration due to blasting and other civil works?	X		The EMP for subproject prescribes mitigation sub-plans for noise. Blasting is not anticipated
▪ dislocation or involuntary resettlement of people?	X		Along Road 152
▪ dislocation and compulsory resettlement of people living in right-of-way?	X		Along Road 152
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	X		Yes, as above, because indigenous peoples dominate population of Sa Pa

Screening Questions	Yes	No	Remarks
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ hazardous driving conditions where construction interferes with pre-existing roads?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for subproject prescribes mitigation sub-plan for managing waste at construction sites and work camps
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		X	
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?	X		The EMP for subproject prescribes mitigation measures to manage the increased construction traffic. Transport of toxic materials during, and after construction is not anticipated
▪ increased noise and air pollution resulting from traffic volume?	X		The EMP for subproject prescribes mitigation measures for increased noise and local air pollution from increased traffic during construction, and after roads are completed
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?	X		The EMP for subproject prescribes mitigation measures to manage waste hydrocarbons at construction sites
▪ social conflicts if workers from other regions or countries are hired?		X	
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	

Screening Questions	Yes	No	Remarks
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Road 1 – Route 152

Division/Department: Urban Development / SE

Screening Questions		Score	Remarks[34]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	No significant sensitivity to climate change given the elevation of the roads
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	As above
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0

Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low **Other Comments**: n/a

Sa Pa Rapid Environmental Assessment (REA) Checklist

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE **Sa Pa**

Sector Division: Wastewater and Drainage / Urban Development / SERD

Screening Questions	Yes	No	Remarks
B. PROJECT SITING IS THE PROJECT AREA			
▪ DENSELY POPULATED?		X	
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		X	
▪ ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
• CULTURAL HERITAGE SITE		X	
• PROTECTED AREA	X		Sa Pa town and area is located in the buffer zone of Hoang Lien National Park, thus minimal to modest WWTPs development interventions should occur to avoid a Category A condition. While the WWTPs are located in and near the town center (hence, in developed area), appropriate mitigating measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
• WETLAND		X	
• MANGROVE		X	
• ESTUARINE		X	

Screening Questions	Yes	No	Remarks
• BUFFER ZONE OF PROTECTED AREA	X		As above subproject is located in buffer zone of Hoang Lien National Park. While the WWTPs are located in and near the town center (hence, in developed area), appropriate mitigating measures including compensatory (or offset) measures will be included in the EMP and C/EMP to achieve no net loss of biodiversity.
• SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
• BAY		X	
C. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		X	
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		X	
▪ dislocation or involuntary resettlement of people?	X		For WWTPs
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	X		Due to dominance of EM groups in Sa Pa
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	X		The quality of treated effluent needs to meet the standards of QCVN 14: (2008) for industrial effluent
▪ overflows and flooding of neighboring properties with raw sewage?		X	
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	X		By design sludge from WWTPs will be disposed in DONRE-approved locations
▪ noise and vibration due to blasting and other civil works?	X		The EMP for subproject prescribes mitigation sub-plans for noise. Blasting is not anticipated

Screening Questions	Yes	No	Remarks
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?		X	
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		X	
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		X	
▪ road blocking and temporary flooding due to land excavation during the rainy season?		X	
▪ noise and dust from construction activities?	X		As above the EMP for subproject prescribes mitigation sub-plans short-term noise, and dust disturbances
▪ traffic disturbances due to construction material transport and wastes?	X		The EMP for subproject prescribes mitigation measures for short-term construction-caused traffic problems
▪ temporary silt runoff due to construction?	X		The EMP for subproject prescribes mitigation measures to prevent or contain land erosion and sedimentation of local streams and main river during construction phase
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		X	
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	X		By design sludge from WWTPs will be disposed in DONRE-approved locations
▪ contamination of surface and ground waters due to sludge disposal on land?	X		By design sludge from WWTPs will be disposed in DONRE-approved locations
▪ health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		X	
▪ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		X	

Screening Questions	Yes	No	Remarks
▪ social conflicts between construction workers from other areas and community workers?	X		Migrant worker population is expected to be small, however, the EMP for subproject prescribes mitigation sub-plans for these social local issues.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Wastewater and Drainage

Division/Department: Urban Development / SERD

Screening Questions		Score	Remarks[35]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	Sites for WWTPs, PS, and pipelines are at a high elevation and thus not vulnerable to climate change-induced flooding or rainfall events.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of	0	

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Screening Questions		Score	Remarks[35]
	project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Low **Other Comments**: n/a

Sa Pa Rapid Environmental Assessment (REA) Checklist

Country/Project Title: Second Corridor Towns Development Project, PPTA 8425 VIE **Sa Pa**

Sector Division: Town Center Enhancement / Urban Development / SERD

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA…			
▪ DENSELY POPULATED?		x	
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		x	
▪ ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?		x	
• CULTURAL HERITAGE SITE		x	

Screening Questions	Yes	No	Remarks
• PROTECTED AREA	X		Sa Pa town is located inside the buffer zone of Hoang Linh National Park. Thus, the town center enhancements should be carefully designed and implemented to minimize environmental impact. While the component is located within the town center (hence, in developed area), if necessary mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to offset any risk of loss of biodiversity.
• WETLAND		X	
• MANGROVE		X	
• ESTUARINE		X	
• BUFFER ZONE OF PROTECTED AREA	X		Sa Pa town is located inside the buffer zone of Hoang Linh National Park. Thus, market developments and improvements should be carefully designed and implemented to minimize environmental impact. While the component is located within the town center (hence, in developed area), if necessary mitigation measures including compensatory (or offset) measures will be included in the EMP and C/EMP to offset any risk of loss of biodiversity.
• SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
• BAY		X	
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		X	

Screening Questions	Yes	No	Remarks
▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?		X	
▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		X	
▪ dislocation or involuntary resettlement of people?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable group?		X	
▪ degradation of cultural property, and loss of cultural heritage and tourism revenues?		X	
▪ occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?		X	
▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters?		X	
▪ air pollution due to urban emissions?		X	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation?		X	
▪ road blocking and temporary flooding due to land excavation during rainy season?		X	
▪ noise and dust from construction activities?	X		The EMP for subproject prescribes mitigation measures for noise and dust during construction.
▪ traffic disturbances due to construction material transport and wastes?	X		The EMP for subproject prescribes mitigation measures for increased traffic and risk of traffic accidents during construction.

Screening Questions	Yes	No	Remarks
▪ temporary silt runoff due to construction?		X	
▪ hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		X	
▪ water depletion and/or degradation?		X	
▪ overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		X	
▪ contamination of surface and ground waters due to improper waste disposal?		X	
▪ pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		X	
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ social conflicts if workers from other regions or countries are hired?		X	
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		X	
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: GMS Second Corridor Towns Development Project PPTA 8474 REG

Sector: Urban Development

Subsector: Town Centre Enhancement

Division/Department: Urban Development / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	The town enhancements are sited at high elevation and surrounded by town buildings, thus not vulnerable from flooding, and is buffered from high winds
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Result of Initial Screening (Low, Medium, High): Low **Other Comments**: n/a

APPENDIX B: RESULTS OF ENVIRONMENTAL AUDIT OF BAC GIANG WWTP

Terms of Reference of ECA

PPTA - 8425 (REG): Greater Mekong Sub-region Second Corridor Towns Development Project

Environment Compliance Audit for Existing Wastewater Water Treatment Plant of Bac Giang Subproject, Viet Nam

April 2015

Background:

244. Bac Giang, Mong Cai, and Sa Pa are the towns in Viet Nam that are participating in the GMS Second Corridor Towns Development Project[36] (2nd CTDP). The three town-subprojects consist of small infrastructure and environmental improvement investments that are being implemented with the immediate and ultimate goals of improving urban environments, and promoting socioeconomic development, respectively. Linked to the urban infrastructure investments of the subprojects is the parallel development of Strategic Local Economic Development Plans (SLEDP) for each town and surrounding area. The selection of the urban infrastructure investments and the development of the SLEDPs are guided by the ADB Green City Agenda[37]. The 2nd CTDP follows the first CTDP which was conducted in the Vietnamese towns of Dong Ha, Lao Bao, and Moc Bai in 2012.

Project Description:

245. The components of the subprojects in Cambodia at the feasibility design stage are summarized below. The Wastewater Improvements component in Bac Giang consists of the

Bac Giang
Urban Roads
Wastewater Improvements
Stormwater Improvements
Mong Cai
Wastewater and Stormwater Improvements
Riverbank Protection
Sa Pa
Road 1 – Route 152
Wastewater and Drainage
Town Center Enhancement

[36] Lao PDR and Cambodia also participate in the Second Corridor Towns Development Project

[37] :http://www.adb.org/publications/enabling-greeen-cities-operational-framework-integrated-urban-development-southeast-asia

expansion of an existing WWTP in the town centre.

Introduction to Assignment:

246. ADB is committed to ensuring the social and environmental sustainability of the projects it supports through the application of its Safeguard Policy Statement (SPS 2009), which aims to promote the sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts. Per the SPS SR1 (Appendix 1) para 10, when the project involves existing activities or facilities, relevant external experts will perform environmental compliance audit (ECA) to determine the existence of any areas where the project may cause or is causing environmental risks or impacts. If the project does not foresee any new major expansion, the audit constitutes the environmental assessment for the project.

247. The existing WWTP subproject component of Bac Giang falls under the requirement of the SPS (2009) for an ECA. Specifically, the existing WWTP located in the town centre that will be upgraded by the 2nd CTDP meets the criteria of para 10 of Appendix 1 of the SPS (2009).

Objective of assignment:

248. The objective of the assignment i.e., Environment Compliance Audit (ECA) is to identify past or present concerns related to impacts on the environment [of the existing WTP]. The objective of the ECA is to determine whether actions were in accordance with ADB's safeguard principles and requirements for borrowers, or are in compliance with government regulations, and to identify and plan appropriate measures to address outstanding compliance issues Where non-compliance is identified, a corrective action plan agreed on by ADB and the borrower will be prepared as part of the ECA. Since the subproject involves upgrading an existing WWTP, the SPS calls for the preparation of an environmental assessment and a compliance audit of the existing WTTP. This responds to the SPS requirement for projects involving existing facilities described in para 10 of Appendix 1 and para 12 of Appendix 4.

Scope of work:

249. The consultant will conduct an ECA as required by the ADB SPS (2009) Appendix 1, para 10 as applicable for ADB financing for "existing facilities", (SPS Appendix 4, para 12[38]). In this regard, the Consultant will:

(i) conduct a review of the waste water treatment plant (WTTP) and check whether actions were in accordance with ADB's safeguard principles and requirements for borrowers, or in compliance with government regulations. In case ADB's requirements are stricter than those of the government, and less stringent levels or measures are appropriate in view of specific circumstances, provide full and detailed

[38] Existing Facilities 12. For projects involving facilities and/or business activities that already exist or are under construction, the borrower/client will undertake an environment and/or social compliance audit,
including on-site assessment, to identify past or present concerns related to impacts on the environment, involuntary resettlement, and Indigenous Peoples. The objective of the
compliance audit is to determine whether actions were in accordance with ADB's safeguard Appendix 4 principles and requirements for borrowers/clients and to identify and plan appropriate measures to address outstanding compliance issues. Where noncompliance is identified, a corrective action plan agreed on by ADB and the borrower/client will be prepared. The plan will define
necessary remedial actions, the budget for such actions, and the time frame for resolution of noncompliance. The audit report (including corrective action plan, if any) will be made available to the public in accordance with the information disclosure requirements of the Safeguard Requirements 1–3. For environment category A projects involving facilities and/or business
activities that already exist or are under construction, the borrower/client will submit the audit report to ADB to disclose on ADB's website at least 120 days prior to ADB Board approval. If a project involves an upgrade or expansion of existing facilities that has potential impacts on the environment, involuntary resettlement, and/or Indigenous Peoples, the requirements for
environmental and social impact assessments and planning specified in Safeguard Requirements 1-3 will apply in addition to compliance audit.

justification for any proposed alternatives that are consistent with the requirements presented in the SPS. In the latter context, verify the existing project's compliance with the applicable government (i.e., DONRE) environment laws, regulations, and standards including Law of Environmental Protection (2015), and QCVN water quality and wastewater discharge standards.

(ii) check on the availability of GOV issued permits/licenses pertaining to the WWTP operation and review enforcement conditions if any, and review the existing project's compliance;

(iii) conduct random sampling of the treated effluent, waste sludge, receiving water quality during different periods of operations including at least once during peak operation in the day and check compliance with government waste water effluent standards, applicable regulations, receiving water quality, respectively. Check if disposal procedures for waste sludge meet GOV requirements. Supplement the findings with review of past wastewater effluent, and sludge quality monitoring reports.

(iv) Ascertain staff observance of occupational health and safety practices to comply with government laws/regulations.

(iii) Consult the surrounding community and ascertain if there are complaints due to noise, /odour or other environmental aspects;

(iv) identify noncompliance, if any, and formulate a corrective action plan, to be agreed with the proponent including the budget and timeline for implementation of the agreed-upon measures.

(v) Prepare an environmental audit report following the major elements (covering outputs of tasks above), listed below, to be attached to the IEE as an addendum
a. facilities description, including both past and current activities;
b. summary of national, local, and any other applicable environmental laws, regulations, and standards;
c. audit and site investigation procedure;
d. findings and areas of concern; and
e. corrective action plan that provides the appropriate corrective actions for each area of concern, including costs and schedule.

(vi) Review adequacy of capacity of staff responsible in operating and maintaining the WWTP, and of laboratory facilities required to monitor the WWTP's environmental performance.

Results of

Environmental Compliance Audit

Existing WWTP in Bac Giang Town, Bac Giang Province

Checklist for ECA for present day operations

Name and Type of facility: ***Bac Giang Town Wastewater Treatment Plant***

Name of Water Company: Center of Urban Drainage and Pumping in Bac Giang city

Location: Tan Tien commune - Bac Giang town - Bac Giang province

Age of WTP: October 2010

Capacity of WTP: Qt = 752.4 m^3/h.

Population serviced: 84,414 people (according to 2014 data)

250. Bac Giang WWTP was put into operation in October 2010 and applies the sequencing batch reactor (SBR) technology (SBR tank is wastewater treatment tank by biological method with sequential batch reactors for the treatment of wastewater. Available analytical results of raw WW and treated effluent quality of the WWTP show that the existing wastewater treatment system of WWTP is operating smoothly. However, due to increasing flow of domestic wastewater generated in Bac Giang town and required environmental sanitation, it is required to enhance capacity of Bac Giang WWTP.

Item	Yes	No	Remarks
Water Supply Source/s - …River		x	(*) This is WWTP, therefore, use of river, or other surface waters as input feed-water source for the WWTP does not apply
On-site Water Treatment (Yes/No)		x	
Estimated Average Volume treated (Gal/day)		n/a	
Water quality of river water for raw water intake monitored.		n/a	
Decree No. 149/2004/ND-CP dated 27/07/2004 on regulation of licensing to invest, exploit, use water resource, discharge wastewater in water source.	x		This Decree is applied to the project in accordance with regulations on discharge of wastewater into water sources.
Decree No. 59/2007/ND-CP dated 09/04/2007 on solid waste management.	x		This Decree is applied to the Project in accordance with regulations on collection and treatment of waste sludge from wastewater treatment

			system of the plant.
QCVN 08:2008/BTNMT: national regulation on surface water quality	x		
QCVN 10:2008/BTNMT: national technical regulation on coastal water quality		x	This regulation does not apply because Bac Giang town WWTP not on coast.
QCVN 05:2013/BTNMT: national regulation on ambient air quality	x		This regulation replaces with QCVN 05:2009/ BTNMT – National regulation on ambient air quality
QCVN 09:2008/BTNMT: national regulation on groundwater quality	x		
QCVN 14:2008/BTNMT – National regulation on domestic wastewater	x		see below
QCVN 26:2010/BTNMT: national technical standard for noise	x		
Decree 110/2002/ND-CP, supplementing some articles of Decree 06/1995 on labour code of occupational safety and health	x		Government's Decree No. 06/1995/ND-CP detailing some articles of Labor Law on labor safety and hygiene
Decree 06/1995, elaborating provisions of labour code on occupational safety and health.	x		
Availability of GOV issued permits and / or licenses pertaining to the WTP operation and Compliance with enforcement conditions if any.	x x		- Decision on approving EIA report of the Project - After completing work items, it is required to prepare application for completion confirmation of environmental treatment system as stipulated. - Periodically submit Monitoring Report to Department of Natural Resources and Environment of Bac Giang province and Natural Resources and Environment Division of Bac Giang town

Sampling of raw water carried out regularly	x		see below
Treated water quality sampling carried out regularly (during different periods of operations including during peak operation in the day).	x		see below
Records maintained of past water quality monitoring reports	x		see below
Sludge disposal adequately carried in compliance GOV regulations Sludge mass balance maintained (Volume generated, volume disposed and volume reused (if known)	x		Procedures for collection and treatment of waste sludge from wastewater treatment system comply with Decree No. 59/2007/ND-CP dated 09 April 2007 on solid waste management
Registration of complaints due to noise, /odour or other environmental aspects from surrounding community	x		All complaint from local authorities and residents regarding WTP will be received and timely solved by agency in charge of management and operation
Record maintained of response to community complaints and grievances	x		

Raw wastewater quality of Bac Giang WWTP

- Sampling location: At un-treated wastewater collector of Bac Giang WWTP
- Date of sampling: 17 December 2014
- Laboratory: Center for Environmental Monitoring of Bac Giang province

Table 1: Untreated raw wastewater of Bac Giang WWTP

No.	Indicators	Unit	Result	QCVN 14: 2008/ BTNMT, (column B) C_{max}
1	pH	-	7,01	5,0 - 9,0
2	BOD_5	mg/l	**76**	50
3	Total N	mg/l	34,5	-
4	Total P	mg/l	0,32	-
5	Total suspended solids	mg/l	45 (*)	100
6	Lead (Pb)	mg/l	0,032	-

7	Animal oil and grease	mg/l	4,2	20
8	Total Coliforms	MPN/100ml	**36,000**	5,000

(Source: Center for Environmental Monitoring of Bac Giang province)

Note:

(-) *not prescribed by standard;*

QCVN 14:2008/BTNMT - National technical regulation on domestic wastewater quality, C_{max} = C x K (K is coefficient, K = 1.0)

C_{max}: Permitted maximum value of parameters of domestic wastewater pollution (not applicable: pH, Total Coliforms).

C: is density of pollution parameter. K: is coefficient depending on the type, size of service facilities, public facilities and apartment buildings

Comments:

- Content of BOD_5 exceeding QCVN 1.52 time. Content of total Coliforms exceeding QCVN 7.2 times. Content of other analytical criteria within permitted limits of QCVN 14:2008/BNMT.
- (*) Total suspended solids are low due to wastewater was sampled at the surface of the un-treated wastewater tank. Wastewater was sampled at the surface, so many solids can settle down to the bottom of the wastewater tank.
- Before taking test sample, it was advised that the sample should be taken at the intake canal but since this canal is underground and cover so this was impossible therefore the sample was taken at the tank before treatment process.

Treated wastewater effluent of Bac Giang WWTP

- Sampling position: at treated wastewater discharge point of Bac Giang WWTP
- Date of sampling: 17/12/2014
- Laboratory: *Center for Environmental Monitoring of Bac Giang province*

Table 2: Treated wastewater effluent of Bac Giang WWTP

No.	Indicators	Unit	Analytical results	QCVN 14: 2008/ BTNMT, (column B) C_{max}
1	pH	-	6,96	5,0 - 9,0
2	BOD_5	mg/l	28	50
3	Total N	mg/l	19,6	-
4	Total P	mg/l	0,52	-
5	Total suspended solid	mg/l	19	100
6	Lead (Pb)	mg/l	< 0,01	-

7	Animal oil and grease	mg/l	3,32	20
8	Total Coliforms	MPN/100ml		5.000

(Source: Center for Environmental Monitoring of Bac Giang province)

Notes:

(-) Not prescribed by standard;

QCVN 14:2008/BTNMT - National technical regulation on domestic wastewater quality, C_{max} = C x K (K is coefficient, K = 1.0)

C_{max}: Permitted maximum value of parameters of domestic wastewater pollution (not applicable: pH, Total Coliforms).

C: is density of pollution parameter. K: is coefficient depending on the type, size of service facilities, public facilities and apartment buildings

Comments:

Measured treated parameters within permitted limits of QCVN 14:2008/BTNMT with noted absence of coliform date. Coliform levels would likely have exceeded the QCVN standard

Figure 31. Wastewater treatment lagoon of Bac Giang WWTP

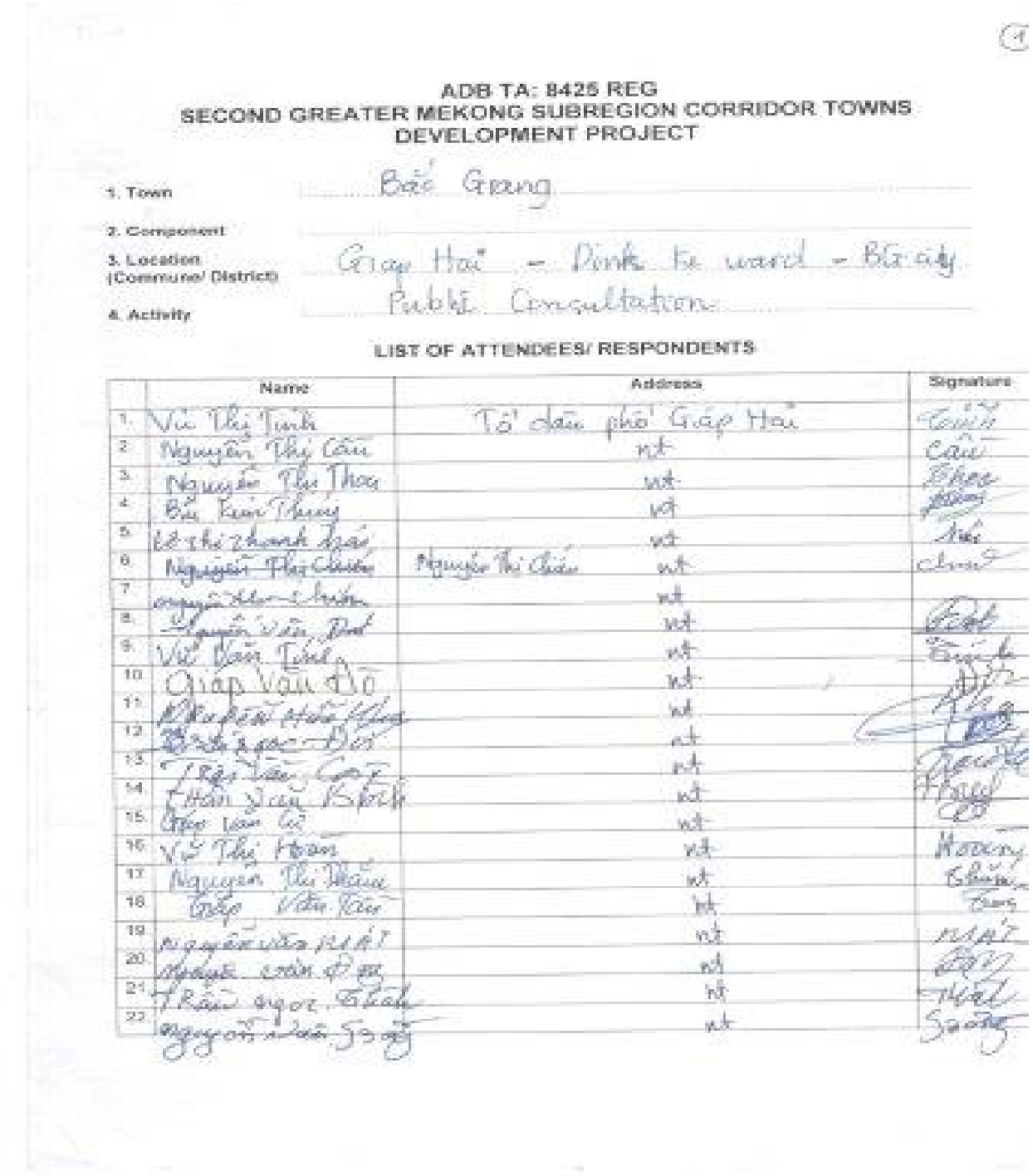
Corrective Action Plan:

The only required corrective actions to the existing WTP are addressed by the subproject. Specifically, to completely commission aspects of the existing WWTP operation that have been idle such as the chlorination plant at the end of the process. The subproject will expand the

existing treatment process not improve upon it, and in doing so will inject additional equipment, capacity, and staff training to produce an overall increase in wastewater treatment for Bac Giang town.

APPENDIX C: PARTICIPANTS OF PUBLIC CONSULTATIONS

Bac Giang



ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT

1. Town: Bắc Giang
2. Component:
3. Location (Commune/ District): Giáp Hải – Dĩnh Kế ward – BG city
4. Activity: Public Consultation

LIST OF ATTENDEES/ RESPONDENTS

	Name	Address	Signature
1.	Vũ Thị Tình	Tổ dân phố Giáp Hải	
2	Nguyễn Thị Cẩm	nt	
3.	Nguyễn Thị Thoa	nt	
4.	Bùi Thị Thung	nt	
5.	[illegible]	nt	
6	Nguyễn Thị Châu	Nguyễn Thị Châu nt	
7	[illegible]	nt	
8.	[illegible]	nt	
9.	Vũ Văn Tình	nt	
10.	Giáp Văn Đô	nt	
11.	[illegible]	nt	
12	[illegible]	nt	
13.	[illegible]	nt	
14.	[illegible]	nt	
15.	[illegible]	nt	
16	[illegible]	nt	
17	Nguyễn Thị [illegible]	nt	
18	[illegible]	nt	
19	[illegible]	nt	
20	[illegible]	nt	
21	[illegible]	nt	
22	[illegible]	nt	

	Name	Address	Signature
23.	Nguyễn Văn Hải	nt	
24.	Nguyễn Thị Mười	nt	
25.	Nguyễn Hữu Trọng	nt	
26.	Trần Đình Lai	nt	
27.	Bùi Kim Quyến	nt	
28.	Nguyễn Hữu Tiến	nt	
29.	Nguyễn Thị Lựu	nt	
30.	Trần Ngọc Phương	nt	
31.	Trần Ngọc Thái	nt	
32.	Nguyễn Văn Cơ	nt	
33.	Nguyễn Văn Lương	nt	
34.	Trần Văn Dương	nt	
35.	Nguyễn Thị Xá (Hoà)	nt	
36.	Nguyễn Văn Chí	nt	
37.	Trần Thị Tiến	nt	
38.	Nguyễn Hữu Lai	nt	
39.	Vũ Thị Bản	nt	
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT

1. Town: Bắc Giang

2. Component:

3. Location (Commune/ District): Tổ dân phố Giáp Hải - Phường Dĩnh Kế

4. Activity: Public Consultation

LIST OF ATTENDEES/ RESPONDENTS

	Name	Address	Signature
1	Lê Quang Toàn	Tổ trưởng tổ dân phố	
2	Nguyễn Văn Tế	Bí thư chi bộ	
3	Hoàng Đình Thắng	Tổ phó	
4	Nguyễn Văn Hoàn	Tổ phó	
5	Vũ Văn Bế	Tổ phó	
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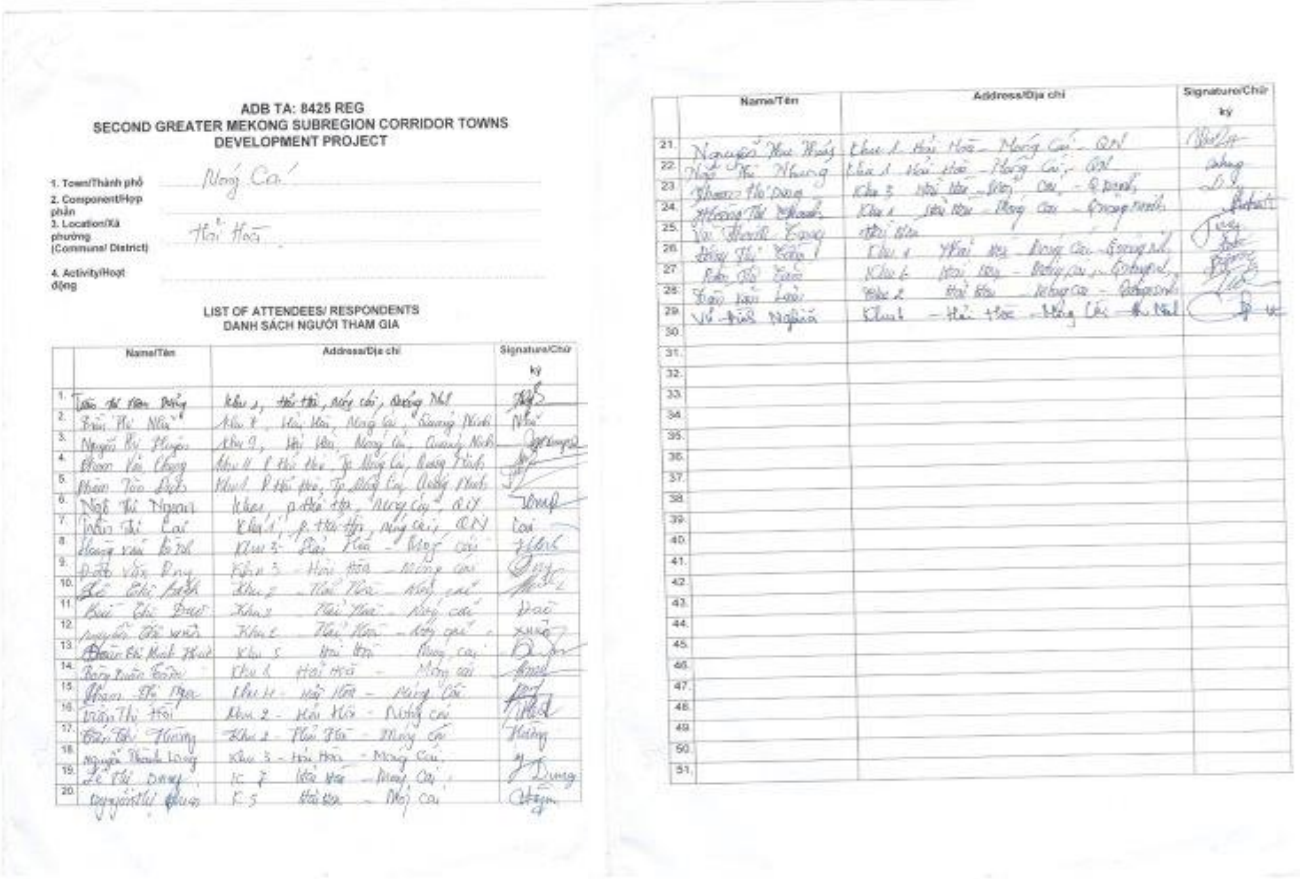
Mong Cai



ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT

1. Town/Thành phố: Mong Cai
2. Component/Hợp phần:
3. Location/Khu phường (Commune/ District): Hai Hoa
4. Activity/Hoạt động:

LIST OF ATTENDEES/ RESPONDENTS
DANH SÁCH NGƯỜI THAM GIA

	Name/Tên	Address/Dịa chỉ	Signature/Chữ ký
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS
DEVELOPMENT PROJECT

1. Town/Thành phố: Móng Cái
2. Component/Hợp phần: Hội phụ nữ
3. Location/Xã phường (Commune/ District): Xã Hải Xuân
4. Activity/Hoạt động:

LIST OF ATTENDEES/ RESPONDENTS
DANH SÁCH NGƯỜI THAM GIA

	Name/Tên	Address/Địa chỉ	Signature/Chữ ký
1.	Lê Thị Thu Lan	Thôn 10A	[signature]
2.	Nguyễn Thị Hồng Minh	" 10A	[signature]
3.	Trần Thị Duyên	Thôn 8	[signature]
4.	Đỗ Thị Hà	Thôn 8	[signature]
5.	Nguyễn Thị Mận	Thôn 8	Mận
6.	Nguyễn Thị Hợp	Thôn 8	Hợp
7.	Đỗ Thị Xuyến	Thôn 10A	[signature]
8.	Đỗ Thị Đài	Thôn 10B	[signature]
9.	Lê Thị Kim Xuân	Thôn 8	[signature]
10.	Nguyễn Thị Đông	Thôn 10A	[signature]
11.	Trần Thị Ngọc	Thôn 10A	[signature]
12.	Vũ Thị Vân	Thôn 10A	[signature]
13.	Hoàng Thị Hường	Thôn 10	[signature]
14.	Nguyễn Thị Thùy	Thôn 10A	[signature]
15.	Hoàng Thị Tiến	Thôn 10A	[signature]
16.	Nguyễn Thị Hà	Thôn 10	[signature]
17.	Đỗ Thị Tra	Thôn 10A	[signature]
18.	Nguyễn Thị Mận	Thôn 10A	[signature]
19.	Phạm Thị Hằng	Thôn 7	[signature]
20.	Nguyễn Thị Nhàn	Thôn 10A	[signature]

	Name/Tên	Address/Địa chỉ	Signature/Chữ ký
21.	Lê Thị Lý	Thôn 1	[signature]
22.	Lê Thị Luân	Thôn 1	[signature]
23.	Hà Thị Huyền	Thôn 10A	[signature]
24.	Lê Kim Thanh	Thôn 10A	[signature]
25.	Nguyễn Thị Chiến	Thôn 10A	[signature]
26.	Nguyễn Thị Mơ	Thôn 10B	[signature]
27.	Lưu Thị Chang	Thôn 10A	[signature]
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS
DEVELOPMENT PROJECT

1. Town: Móng Cái – Quảng Ninh
2. Component:
3. Location (Commune/ District):
4. Activity: Tham vấn cộng đồng (Public Consultation)

LIST OF ATTENDEES/ RESPONDENTS

	Name Họ và tên	Address Đơn vị / Cơ quan	Signature Chữ ký
1	Ông Đỗ Minh Tuấn	Sở Kế hoạch và Đầu tư	
2	Ông Lưu Hoàng Linh	UBND thành phố Móng Cái	
3	Ông Vũ Xuân Huyền	Sở KHĐT	[signature]
4	Ông Bùi Sỹ Thuận	Sở KHĐT	[signature]
5	Bà Đào Thị Thanh Tâm	Sở KHĐT	[signature]
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS
DEVELOPMENT PROJECT

1. Town: Móng Cái – Quảng Ninh
2. Component:
3. Location (Commune/ District):
4. Activity: Tham vấn cộng đồng (Public Consultation)

LIST OF ATTENDEES/ RESPONDENTS

	Name Tên	Address Đơn vị / Cơ quan	Signature Chữ ký
1.	Đỗ Minh Tuấn		
2.	Trần Thị Thanh Bình		
3.	Vũ Xuân Huyền	Phó trưởng phòng KTĐN - Sở KHĐT	[signature]
4.	Bùi Sỹ Thuận	Phó trưởng phòng KTĐN - Sở KHĐT	[signature]
5.	Nguyễn Hoàng Hải	GĐ Ban QLDA công trình TP Móng Cái	
6.	Đào Văn Hùng	" " "	[signature]
7.	Đặng Thị Hương	" " "	[signature]
8.	Phạm Kế Đô	Ban QLDA công trình TP Móng Cái	[signature]
9.	Lưu Hoàng Linh		
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT

1. Town: Móng Cái – Quảng Ninh
2. Component: Nạo vét và kè bờ sông Ka Long
3. Location (Commune/ District):
4. Activity: Tham vấn cộng đồng (Public Consultation)

LIST OF ATTENDEES/ RESPONDENTS

	Name	Address	Signature
1	Nguyễn Đức Việt	phó phòng quản lý đô thị - TPMC	[signature]
2	Nguyễn Mạnh [illegible]	[illegible] phường Ka Long. TP Móng Cái	[signature]
3	Vi Văn Quảng	CB địa chính P Ka Long. TPMC	[signature]
4	Nguyễn Văn [illegible]	[illegible] Lào Cai (0903259131)	[signature]
5	Đặng Huy Hoàng	[illegible] Lào Cai	[signature]
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ADB TA 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT
DỰ ÁN PHÁT TRIỂN CÁC ĐÔ THỊ HÀNH LANG TIỂU VÙNG SÔNG MÊ-KÔNG LẦN THỨ HAI

1. Town (Tỉnh/ thành phố): TP Móng Cái
2. Component (Hợp phần): Wastewater
3. Location (Vị trí) (Commune- Xã/ District – Huyện):
4. Activity (Hoạt động):

LIST OF ATTENDEES/ RESPONDENTS
DANH SÁCH NGƯỜI THAM DỰ/ TRẢ LỜI CÂU HỎI

	Name Họ và tên	Address Địa chỉ	Signature Chữ ký
1.	Trần Văn Y	Thôn Đông, xã Hải Xuân	[signature]
2.	Trần Văn Đường	nt	[signature]
3.	Nguyễn Văn Sinh	nt	[signature]
4.	Nguyễn Thị Thu	nt	
5.	Trần Đức Thịnh	nt	[signature]
6.	Đặng Văn Hải	nt	[signature]
7.	Ngô Vĩnh Thành	nt	[signature]
8.	Ngô Ngọc Lan		[signature]
9.	Phạm Văn An		[signature]
10.	Chu Bá Tùng		[signature]
11.	Nguyễn Văn Lập		[signature]
12.	Hoàng Anh	Tổ 1 khu 4, P Hải Yên	[signature]
13.	Hoàng Thị Tuất	nt	[signature]
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Sa Pa

ADB TA 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT
DỰ ÁN PHÁT TRIỂN CÁC ĐÔ THỊ HÀNH LANG TIỂU VÙNG SÔNG MÊ-KÔNG LẦN THỨ HAI

1. Town (Tỉnh thành phố) : Lào Cai - Sa Pa
2. Component (Hợp phần) : [illegible]
3. Location (Vị trí) (Commune- Xã/ District – Huyện) : Sa Pa [illegible]
4. Activity (Hoạt động) :

LIST OF ATTENDEES/ RESPONDENTS
DANH SÁCH NGƯỜI THAM DỰ/ TRẢ LỜI CÂU HỎI

	Name Họ và tên	Address Địa chỉ	Signature Chữ ký
1.	Hàng A Cang	[illegible] Suối Hồ	[illegible]
2.	[illegible]	"	[illegible]
3.	Giàng A [illegible]	Nậm Tra	
4.	[illegible]	Nậm Tra	[illegible]
5.	Hàng A [illegible]	Suối Hồ	[illegible]
6.	Hàng A [illegible]	Suối Hồ	[illegible]
7.	Hàng A [illegible]	"	
8.	Hàng A [illegible]	"	
9.	Giàng A [illegible]	Nậm Tra	
10.	Hàng A [illegible]	Suối Hồ	[illegible]
11.	Hàng A [illegible]	"	[illegible]
12.	Hàng A Sang	"	[illegible]
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT
DỰ ÁN PHÁT TRIỂN CÁC ĐÔ THỊ HÀNH LANG TIỂU VÙNG SÔNG MEKONG LẦN THỨ HAI

1. Town (Tỉnh/Thành Phố) : Sa Pa
2. Component (Hợp phần) : [illegible] / 152 [illegible]
3. Location (Commune-Xã/ District-Huyện) :
4. Activity (Hoạt động) :

LIST OF ATTENDEES/ RESPONDENTS
DANH SÁCH NGƯỜI THAM DỰ/TRẢ LỜI CÂU HỎI

	Name (Họ tên)	Address (Địa chỉ)	Signature (Chữ Ký)
1.	[illegible]	Tả Van	[illegible]
2.	[illegible]	"	[illegible]
3.	[illegible]	"	
4.	[illegible]	Lao Chải	
5.	[illegible]	"	[illegible]
6.	[illegible]	"	
7.	Giàng A [illegible]	Hầu Thào	[illegible]
8.	[illegible]	"	
9.	[illegible]	"	
10.	[illegible]	"	
11.	[illegible]	Sử Pán	[illegible]
12.	[illegible]	"	
13.	[illegible]	"	[illegible]
14.	[illegible]	Tả Van	[illegible]
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ADB TA: 8425 REG
SECOND GREATER MEKONG SUBREGION CORRIDOR TOWNS DEVELOPMENT PROJECT

1. Town: Sa Pa - Lao Cai
2. Component: Nâng cấp cơ sở hạ tầng đô thị - Xử lý nước thải
Town Enhancement - WWTP
3. Location (Commune/ District): Sa Pa
4. Activity:

LIST OF ATTENDEES/ RESPONDENTS

	Name	Address	Signature
1	Hầu Thu Quy	Sa Pa	
2	Giàng Thị Lan	Sa Pa	
3	Mã A Ba	Sa Pa	
4	Đào Văn Phú	Sa Pa	
5	Mã A Say	Sa Pa	
6	Mã A Lử	Sa Pa	
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Environmental Management Plan

June 2015

Socialist Republic of Viet Nam: Second Greater Mekong Subregion Corridor Towns Development Project

Bac Giang Subproject

ABBREVIATIONS

ADB	-	Asian Development Bank
PAH	-	Project Affected Household
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
CPC	-	City Peoples Committee
DCST	-	Department of Culture Sport and Tourism
DOC	-	Department of Construction
DOH	-	Department of Health
DONRE	-	Department of Environment and Natural Resources
DOT	-	Department of Transport
DPI	-	Department of Planning and Investment
EA	-	Executing Agency
ECC	-	Environmental Compliance Certificate
EIA	-	Environment Impact Assessment
EMP	-	Environment Management Plan
EERT	-	External Emergency Response Team
EO	-	Environmental Officer
ERT	-	Emergency Response Team
ERTL	-	Emergency Response Team Leader
ESU	-	Environmental and Social Unit
IEE	-	Initial Environmental Examination
IA	-	Project Implementation Agency
GMS	-	Greater Mekong Sub-Region
GOV	-	Government of Viet Nam
NGO	-	Non-Government Organization
O&M	-	Operation and Maintenance
PIU	-	Project Implementation Unit
PMIS	-	Project Management Implementation Support
PMU	-	Project Management Unit
PPC	-	Provincial Peoples Committee
PSC	-	Project Steering Committee
SO	-	Safeguards Officer
UXO	-	Unexploded Ordnance

WEIGHTS AND MEASURES

km	Kilometre
kg	Kilogram
ha	Hectare
mm	Millimeter

Table of Contents

I. INTRODUCTION

1. The environmental management plan (EMP) for the Bac Giang subproject is one of three EMPs that have been prepared for the subprojects of the Second Corridor Towns Development Project (CTDP) in Viet Nam. The other two EMPs of the CTDP in Viet Nam address subprojects in the towns of Mong Cai and Sa Pa. The three separate EMPs are comprehensive and are developed as stand-alone management tools.

2. A single Initial Environmental Evaluation (IEE) of all three subprojects in Viet Nam was prepared under separate cover. Details of the CTDP and the subprojects in Viet Nam can be found in the parent IEE.

A. Overview of Bac Giang subproject

3. The Bac Giang subproject consists two new urban roads, upgrades to the existing WWTP, and improved urban drainage (Table 1).

Table 1. Bac Giang Subproject components

Component	General Specifications[1]
Urban Roads	• DBST standard • Western road, 1.59 km X 27 m carriageway • Eastern road, 1.61 km X 35 m carriageway • roadside drainage & culverts • new bridge, 0.31 km X 13 m
Wastewater Improvements	• additional anaerobic lagoons • expanded WWTP capacity to 10,000 m^3/day
Stormwater Improvements	• improved storage ponds and upgraded pump stations

II. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

4. At the feasibility stage the primary management framework[2] responsible for the implementation of the environmental management plan (EMP) for the subprojects in Bac Giang province is summarized as follows. The Bac Giang Provincial Peoples Committee (PPC) which is the executing agency (EA) for the project will take overall responsibility for the successful implementation of the EMP, and will liaise with the ADB on the submission of consolidated environmental safeguards reports. The EA will establish a Project Steering Committee (PSC) which, *inter alia*, will provide support for implementation of the EMP

5. The Bac Giang City Peoples Committee (CPC) will be the subproject implementation agency (IA) to oversee day to day implementation of the project including EMP implementation and reporting to the EA. A project management unit (PMU) will be created to assist the IA. The PMU will appoint a project implementation unit (PIU) for each town will consist of staff with expertise in infrastructure. The PIU Director will appoint a S*afeguards Officer* (SO) who will supervise implementation of the EMP. The PIU/SO will oversee implementation of the Contractor Environmental Management Plans (CEMP)[3] for the future construction packages of the Bac Giang subproject. Expertise from the Department of Transportation (DOT)/Department of Construction (DOC) will be cross appointed to the PMU/PIU when necessary.

[1] Updated from Interim Report 3/15
[2] Adapted from Interim Report 3/15
[3] Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

6. The civil works contractor's Chief of Construction (CCW) will be responsible for all construction activities at the construction sites, including compliance with the EMP. The CCW will assign an *Environmental Officer (EO)* to ensure the contractor's responsibilities for the EMP are met.

7. External support to the PMU/PIU for EMP updating, capacity building, and monitoring will be provided by the *International and National Environment Specialists (ES)* of the Project Management Implementation Support[4] firm (PMIS). The PMIS will have a provisional budget to engage an *Environmental Monitoring Consultant (EMC)* to conduct field sampling and laboratory analyses of field samples (e.g., water quality, air quality) as required. Provided below is a summary of key responsibilities for implementation of the EMP.

8. The responsibilities of the EA as supported by PSC include:

1. Coordinate environmental and social safeguards implementation and monitoring undertaken by the IA/PMU;
2. Liaise with ADB on the implementation of the EMP; and
3. Coordinate resolution with IA/PMU, and ADB if necessary with issues arising from the implementation of EMP.

9. The responsibilities of PMU/PIU Safeguards Officer include:

1. Assist PMIS with updating the EMP to meet final detailed subproject designs;
2. Notify IA/EA to verify GoV approvals of project are met, and that EMP is compliant with requirements of LEP (2014) as implemented by Decree 18/2015/ND-CP, and Circular 26/2011/TT-BTNMT.
3. Assist PMIS with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
4. Undertake day to day management of EMP implementation activities;
5. Work with EMC on implementation of monitoring plan of EMP;
6. Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as IPPs, GAPs, resettlement plans);
7. Lead follow-up meetings with all affected stakeholders;
8. Prepare and submit quarterly reports on EMP implementation to PSC;
9. Oversee implementation of CEMP by contractor;
10. Coordinate with ES of PMIS for EMP implementation;
11. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
12. Ensure EO/CCW of contractor submits monthly reports on construction mitigations and monitoring.

10. The responsibilities of the environment specialists (international and national) of the PMIS are detailed in the Terms of Reference for the two positions, as set out in Appendix A. The consultant's key responsibilities for the EMP are:

1. Update the EMP to meet final detailed designs of subprojects;
2. Provide technical direction and support to PIU/SO for implementation of EMP;

[4] PMIS to be defined.

3. Oversee design and delivery of capacity development and training of PIU-SO and EO of contractor(s);
4. Provide advice and support to EMC with their monitoring activities;
5. Review all environmental reports prepared by PIU/PMU/IA and EMC for ADB; and
6. Review location of any possible contaminated sites near subprojects.

11. The responsibilities of Environmental Monitoring Consultant (EMC) include:

1. Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and PIU.
2. Perform required laboratory analyses for monitoring program detailed in EMP; and
3. Prepare and submit quarterly reports to IA/EA on monitoring activities.

12. The responsibility of Chief of Construction Work (CCW) of contractor with assistance from Environmental Officer (EO) includes:

1. Ensure implementation of the CEMP during the construction phase; and
2. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.

13. The implementation of the EMP as part of the overall environmental due diligence (DD) of the subproject is conducted alongside the separate parallel DD of the government. Table 2 reproduces the summary of environmental due diligence from the IEE which shows that the government must approve the ADB IEE and EMP by formal letter, and that approval of the ADB IEE/EMP is not contingent on compliance with any specific government regulation other than the Project Detailed Outline (PDO) which is required by the Prime Minister.

Table 2. Summary of environmental due diligence during project implementation

Design and Implementation	**Environmental DD and Approvals**			**Milestones & Notes**
	ADB / PPTA	**Viet Nam**	**PMIS / Contractor**	
Feasibility design				
Initial stakeholder disclosure & consultation	PPTA	EA assists		
Draft IEEs and EMPs	PPTA			Draft IEEs & EMPs completed
Preparation of Project Detailed Outline (PDO)		EA		Approval by Prime Minister
Finalize IEEs and EMPs	ADB review & approves IEE/EMPs			ADB approved IEE/ EMPs as per SPS (2009).
		EA reviews and approves IEE/EMPs		EA approved IEE/ EMPs with formal letter only. ***Compliance with specific GOV / EA regulations not required***

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
Loan documents (PAM/RRP)	Document preparation, approval by ADB	Review & approval of PAM		Loan approval
Initiation of Viet Nam environmental DD		EA leads with oversight from DONRE		MONRE or DONRE approved IEE or EIA follows independently after VIE DD begins
Detailed engineering design				
Continued stakeholder disclosure & consultation		IA/PIU lead	ES support to PMIS	As per PCP (2012)[5] stakeholder disclosure and consultations continue throughout construction phase coincident with initiation of GRM[6]. ***Also satisfies consultation requirement of GOV*.**
Update EMPs		Support to ES	Lead by ES	Approval of updated EMP by EA and ADB
Tendering / contract award				
EMPs included in tender documents		Lead by EA/IU	Support by ES	
Tenders let and bids prepared		Lead by EA	Contractor drafts CEMP[7]	CEMPs prepared and included in contractor bids
Construction packages	Input from ADB		CEMPs reviewed by ES/PMIS	Construction package awards
Construction & supervision				
Implementation of mitigation and monitoring plans		Support from IU/PIU	By contractor with support from ES	CEMP implemented by contractor, other aspects of EMP overseen by ES
Continued stakeholder disclosure and consultation		IA/PIU lead	Support from ES	As part of GRM
Monitoring reporting	To ADB	IA/PIU lead preparation of regular	Support from ES	Reports provide input for review missions

[5] ADB Public Communication Policy (2012)
[6] Grievance Redress Mechanism (see below)
[7] Construction Environmental Management Plan based on EMP in tender documents (see EMP)

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
		reports to ADB		

14. The Department of Natural Resources and Environment (DONRE) oversees environmental management of Bac Giang. The DONRE with district staff provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2014) as implemented by Decree 29/2011/ND-CP, and Circular 26/2011/TT-BTNMT, and national environmental standards and criteria. The environmental standards and criteria for Viet Nam are listed in Appendix B. See IEE for complete legal and regulatory framework for environmental management in Viet Nam.

15. The ADB provides guidance to EA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by EA which are disclosed on ADB website pursuant to ADB Policy on Public Communication (2011).

A. Worker and Community Health and Safety

16. The Ministry, and counterpart provincial Department of Labour, Invalids and Social Assistance (DoLISA) prescribes regulations and guidelines governing worker and public safety in the workplace[8]. The directives of M/DoLISA must be followed throughout the construction and operational phases of the subprojects. To supplement the M/DoLISA the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should be consulted when necessary.

III. SUMMARY OF POTENTIAL IMPACTS

17. The potential impacts of the construction and operation of the Bac Giang subproject components (Table 1) from the IEE which are summarized in Table 3 arise primarily from the civil works during the construction phase of the different subproject components. The short-term construction disturbances concern noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and local soil erosion & surface water sedimentation, and solid and liquid waste. These short-term impacts can be managed and mitigated with Mitigation Plan provided below.

Table 3. Summary of potential impacts of Bac Giang subproject components

Pre-construction Phase
• Major loss of agriculture land, no relocation
Construction Phase

[8] Example, Decree 110/2002/ND-CP, supplementing some Articles of Decree 06/1995 on Labour Code of Occupational Safety and Health, Decree 06/1995, Elaborating Provisions of Labour Code on Occupational Safety and Health.

Upgraded WWTP and improved drainage • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution from by increased truck traffic and heavy equipment use, soil and canal and agriculture land pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion & canal and agriculture land sedimentation, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
Urban roads • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution caused by increased truck traffic and heavy equipment use, soil and Thuong river pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion & Thuong river sedimentation, drainage and flooding problems, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
Operation Phase
Urban roads • increased risk of traffic accidents from increased traffic along new roads and throughout road network • Increased GHG emissions from traffic, and riving speeds Upgraded WWTP • Land and surface water pollution from improperly maintained WWTP systems, and design effluent quality

A. Public Consultation

18. The stakeholder consultation program that was developed for the IEE will be continued with the start of the pre-construction phase of both subprojects. The first step will be to disclose the draft IEE to the affected stakeholders that were consulted to obtain their review and comment.

Follow-up Consultation

19. As indicated by the IEE a concern of the public and stakeholders of the subproject were disturbances during construction of the upgrades to roads, and the effect of the upgraded road on increased traffic, and traffic accidents. These issues plus any others will be reviewed during follow-up consultations throughout the pre-construction, construction, and operation of the completed subproject components.

IV. MITIGATION PLAN

20. The impact mitigation measures of the EMP are presented in a comprehensive mitigation plan for the subproject in Table 4. Similar to IEE the mitigation plan is structured by the three development phases of the subproject defined by the pre-construction; construction; and post construction operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

21. The mitigation plan combines construction phase impacts common to all three subproject components for which single mitigation measures are prescribed. In this way common mitigation measures are not re-stated numerous times. However, impacts and required mitigations that are specific to a subproject component are also identified. Or, common mitigations that are particularly important to a subproject component are further developed.

22. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan by design is comprehensive in order for the plan to be updated easily to meet the final detailed designs of the subproject.

Table 4. Environmental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase of Bac Giang Subproject (Urban Roads, Wastewater & Drainage Improvements)								
Confirmation of required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	EA/IA/PMU	Resettlement/ compensation committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE	For all construction sites.	Beginning of project	Quarterly	No marginal cost[10]	PMU/SO	PIU
GoV approvals	No negative impact	3. Notify DoNRE of subproject initiation to complete EA requirements, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoNRE	DoNRE

[9] Costs will need to be updated during detailed design phase.
[10] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Detailed designs of subproject,	Minimize negative environmental impacts	4. Work with PMIS[11] to complete detailed designs of the individual subproject components. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) no cutting of trees if possible; d) locate any required aggregate borrow pits away from human settlements with fencing and access barriers; e) no, or minimal disruption to town water supply, utilities, and electricity with contingency plans for unavoidable disruptions; f) no, or minimal disruption to normal pedestrian and vehicle traffic along all construction roads with contingency alternate routes; g) for public areas include specific plan to notify & provide residents and merchants of construction activities & schedule to minimize disruption to normal commercial and residential activities. h) review measures to prevent or minimize disturbances to households surrounding stormwater ponds i) review measures to prevent or minimize disturbances to homeowners living beside eastern road alignment	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	PMIS	PMUP/IU

[11] PMIS is project implementation consultant to be determined

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Update EMP	Positive environmental impacts	5. Large cemetery at eastern end of western road must be entirely moved to a suitable location 6. Review finalized RoWs of eastern and western roads to minimize impact on agriculture lands 7. Review measures that will ensure minimal to no erosion and sedimentation of Thuong river at western road bridge site 8. Review effluent quality design of upgraded WWTP to ensure discharged effluent meets appropriated QCVN standard (#14, 2008) 9. Re-clarify with DoNRE that no known rare or endangered species inhabit the subproject areas 10. Identify any new potential impacts of subproject and include in EMP 11. Confirm solid waste disposal site(s) with DoNRE 12. Confirm WWTP sludge disposal site(s) with DoNRE 13. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments. 14. Submit updated EMP with new potential impacts to ADB to review. 15. Develop individual management sub-plans for CEMP: a) Construction drainage; b) Soil erosion; c) Noise and dust; d) Contaminated spoil disposal; e) Solid and liquid waste disposal; f) Construction & urban traffic congestion; g) Utility and power disruption; h) Worker and public safety; i) Tree and vegetation removal and site restoration; j) Construction materials acquisition, transport, & storage, and k) Cultural chance finds.	All sites including Thuong river downstream of subproject areas	Before construction initiated	Once with detailed designs documents		PMIS	PMU/PIU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Update EMP	Positive environmental impacts	16. Update baseline water quality & presence of aquatic biota in Thuong river downstream of WWTP, and at bridge site of western road	Thuong river	Before construction initiated	Once with updated EMP	See Monitoring Plan below	PMIS/PMU	PMIS/PIU
		17. Update baseline effluent quality for existing WWTP operation	Outfall of WWTP					
		18. Update baseline of discharge quality of example stormwater ponds	Outfall of example stormwater ponds					
Confirm GoV approved construction waste disposal sites	No negative impact	19. Notify DoNRE to confirm locations of sites for borrow pits and disposal areas for construction for subprojects, and obtain required permits.	Entire subproject	Before construction	As required	No marginal cost	PMU/DoNRE	PIU
UXO survey, & removal	Injured worker or public	20. Ensure GoV military is consulted and clears subproject areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	PMU/PIU	GoV military
Develop bid documents	No negative environmental impact	21. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of EMP must be budgeted. 22. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMIS	PIU
Create awareness of physical cultural resources in area	No negative environmental impact	23. EA/IU to review potential locations of physical cultural resources, and explain possible PCR to contractors and PMIS	All subproject areas	Before construction begins	Once	No marginal cost	DCST	DCST
Obtain & activate permits and licenses	Prevent or minimize impacts	24. Contractors to comply with all statutory requirements set out by GoV for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Capacity development	No negative environmental impact	25. Develop and schedule training plan for IU/SO/EO to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 26. Create awareness and training plan for contractors (EO) whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PMIS	PMIS
Recruitment of workers	Spread of sexually transmitted disease	27. Use local workers as much as possible thereby reducing #s of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	PMU/PIU	Contractor's bid documents
Construction Phase of Urban Roads, Upgrades to WWTP, and Drainage Improvements								
Initiate EMP & sub-plans,	Prevent or minimize impacts	28. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Worker camps	Pollution and social problems	29. Locate worker camps away from human settlements. 30. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 31. A solid waste collection program must be established and implemented that maintains a clean worker camps 32. Locate separate pit latrines for male and female workers away from worker living and eating areas. 33. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 34. Worker camps must have adequate drainage. 35. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 36. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers. 37. Camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor
Training & capacity	Prevent of impacts through education	38. Implement training and awareness plan for PIU/SO/EO and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMIS	PMIS/PIU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Construction materials acquisition, transport, and storage sub-plan	Pollution, injury, increased construction traffic congestion	39. All borrow pits should be reviewed by DoNRE. 40. Select pits in areas with low gradient and as close as possible to construction sites. 41. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 42. Pits and quarries should not be located near surface waters, houses, or cultural property or values. 43. All topsoil and overburden removed should be stockpiled for later restoration. 44. All borrow pits and quarries should have a fence perimeter with signage to keep public away. 45. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil. 46. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting. 47. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites. 48. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled. 49. All aggregate loads on trucks should be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
DBST (pavement) production, and application	Air pollution, land and water contamination, and traffic & access problems,	50. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non- traffic areas 51. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 52. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 53. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations. 54. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities. 55. Bitumen should not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Spoil management sub-plan	Contamination of land and surface waters from excavated spoil, and construction waste	56. Uncontaminated spoil to be disposed of in GoV-designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified. 57. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature. 58. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits. 59. A record of type, estimated volume, and source of disposed spoil must be recorded. 60. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal. 61. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoV regulations. 62. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMIS & PIU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	63. Management of general solid and liquid waste of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 64. Areas of disposal of solid and liquid waste to be determined by GoV. 65. Disposed of waste should be catalogued for type, estimated weigh, and source. 66. Construction sites should have large garbage bins. 67. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 68. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 69. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations. 70. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 71. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 72. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Noise and dust sub-plan	Dust Noise	73. Regularly apply wetting agents to exposed soil and construction roads. 74. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 75. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed. 76. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving. 77. Maintain equipment in proper working order 78. Replace unnecessarily noisy vehicles and machinery. 79. Vehicles and machinery to be turned off when not in use. 80. Construct temporary noise barriers around excessively noisy activity areas where possible.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	81. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 82. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 83. Contact affected community to inform them of planned outages. 84. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU & Utility company	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	85. Contact DARD for advice on how to minimize damage to trees and vegetation. 86. Restrict tree and vegetation removal to strict road alignments . 87. Prevent tree removals, and install protective physical barriers around trees that do not need to be removed. 88. All areas to be re-vegetated and landscaped after construction completed. Consult DARD to determine the most successful restoration strategy and techniques. Aim to replant three trees for each tree removed.	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Erosion control sub-plan	Land erosion	89. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 90. Earthworks should be conducted during dry periods. 91. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 92. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 93. Re-vegetate all soil exposure areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement worker and public safety sub-plan	Public and worker injury, and health	94. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 95. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 96. Worker and public safety guidelines GoV should be followed (DoLISA regulations & guidelines). 97. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles. 98. Standing water suitable for disease vector breeding should be filled in. 99. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers. 100. Appropriate safety clothing and footwear should be mandatory for all construction workers. 101. Adequate medical services must be on site or nearby all construction sites. 102. Drinking water must be provided at all construction sites. 103. Sufficient lighting be used during necessary night work. 104. All construction sites should be examined daily to ensure unsafe conditions are removed.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Civil works	Degradation of water quality & aquatic resources	105. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and Thuong river and other surface waters. 106. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 107. Earthworks should be conducted during dry periods. 108. All construction fluids such as oils, and fuels should be stored and handled well away from Thuong river and other surface waters 109. No waste of any kind is to be thrown Thuong river and other surface waters 110. No washing or repair of machinery near surface waters. 111. Pit latrines to be located well away from Thuong river and other surface waters 112. No unnecessary earthworks in or adjacent to water courses. 113. All irrigation canals and channels to be protected the same way as Thuong river	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works	Degradation of terrestrial resources	114. All construction fluids such as oils, and fuels should be stored and handled well away from Thuong river and other surface waters	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	115. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights. 116. Post speed limits, and create dedicated construction vehicle roads or lanes. 117. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 118. Demarcate additional locations where pedestrians can develop road crossings away from construction areas. 119. Provide construction road and walkway lighting.	All construction sites	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Construction Drainage sub-plan	Loss of drainage & flood storage	120. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 121. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses. 122. Install temporary storm drains or ditches for construction sites 123. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing stormwater storage capacity.	All areas near stream	Design & construction phases	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works & Chance finds sub-plan	Damage to cultural property or values, and chance finds	124. As per detailed designs all civil works should be located away from all cultural property and values. EA identified potential sites and types of PCR in pre-con phase. 125. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 126. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DCST notified by	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		telephone if valuable. 127. Work at find site will remain stopped until DCST allows work to continue.						
Construction of Eastern Road								
Construction alignment for road	Destruction or damage to extensive home gardens along alignment	128. Extra care to locate road alignment to avoid or minimize destruction or damage of dense home garden plots in road area.	Along entire 1.59 km road	Through construction phase	Monthly	No marginal cost	PIU/PMIS	contractor
	Damage to irrigation network along alignment	129. Any damage to existing irrigation canal network must be avoided, or repaired or replaced if damage unavoidable						
Construction of Western Road								
Construction of new bridge for western road	Sedimentation of Thuong river near new bridge site	130. Temporary earthen berms, or plastic fencing need to be installed along both riverbanks to isolate river from erosion caused by earthworks for bridge construction	0.31 km X 13 m bridge site	During all earthworks activities	Monthly	No marginal cost	PIU/PMIS	contractor
	Damage aquatic habitat in Thuong river	131. Bridge support piles should be place on the riverbanks not in the river		When foundation of bridge constructed				
Construction of Upgraded Stormwater Ponds Road								
Isolation of pond perimeters from adjacent houses	Acute disturbance of property including flooding	132. The work area along the houses around the ponds must be isolated from the exterior walls of the houses to prevent encroachment into household activities. Rubber dams should be installed along external house walls to prevent pond water from entering houses	At external walls of all houses facing stormwater ponds	Throughout construction period	Monthly	No marginal cost	PIU/PMIS	contractor
Post-construction Operation of Western and Eastern Roads								

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Operation of new roads	Risk of vehicle accidents Air & land pollution	a) Ensure well marked safe speed limits inside and between villages are enforced. b) All vehicles that use the roads should be required to be in good working condition c) Only emergency vehicle maintenance should occur on road shoulders.	Along both new roads	Fulltime	Biannual	O&M	DoT	
Operation of Upgraded WWTP								
Operation of WWTP	Reduced effluent quality leading to pollution of Thuong river	d) The quality of treated effluent should be monitoring regularly to ensure that it always meets effluent quality design criteria	At WWTP	Quarterly	Biannual	O&M	WWTP operators / DONRE	
	Equipment failure causing chemical spills, and raw WW discharge	e) Sufficient annual O&M budget must be provided to ensure all equipment stays in good working condition. f) All staff must be properly trained on upgraded WWTP operations		Fulltime			WWTP operators	

V. MONITORING PLAN

23. The environmental monitoring plan for the EMP is provided in Table 5. The monitoring plan focuses on three phases (pre-construction, construction, post-construction operation) of the subproject and consists of environmental indicators, sampling locations & frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document unexpected positive or negative environmental impacts of the subprojects.

A. Environmental Quality Standards for Subproject Components

24. Environmental quality standards and criteria for Viet Nam are listed in Appendix B. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) should be consulted to supplement GOV standards if required.

25. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program under the supervision and coordination of the PMIS/PIU. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SO and EO will coordinate monitoring work with the EMC. The PMIS/PIU will also provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

26. After construction is completed and the new roads are in operation the frequency of vehicles accidents on the new roads and throughout the urban road network should be monitored by PPC and DoT. Similarly, the treated effluent quality of the upgraded WWTP should be monitored either by the WWTP or by DONRE. Monitoring of the success of any minor resettlement/compensation will be undertaken as part of the separate RP prepared for the subproject. Table 2 summarizes the responsibilities for monitoring during the construction-implementation of the subproject.

1. Performance Monitoring

27. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the entire subproject. Select indicators of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 6.

2. Reporting

28. Regular reporting on the implementation of mitigation measures, and monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 4 and 5) summarize proposed timing of reporting. Appendix C provides a monitoring report template for the PIU that the PIU with assistance from the PMU and PMIS must complete and attach as part of regular PIU reporting to the PMU/IA.

29. A report on environmental monitoring and implementation of EMP for the subproject component sites will be prepared quarterly for the EA/PSC by the PIU. The PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PMIS. The PIU report will also be sent to the DoNRE and ADB.

The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 6), and will reference relevant GoV environmental quality standards.

Table 5. Environmental Monitoring Plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
					Supervision	Implementation	
Pre-construction Phase – Update Environmental Baseline Conditions							
Review baseline of existing sensitive receptors (e.g., cultural property & values, rare/ endangered species, critical habitat)	At all subproject sites including Thuong river,	Consultation with community, and DONRE	Once	Once	PMU/PIU	Environmental Monitoring Consultant	$1,000.
A) Update baseline qualitative air quality: dust, noise, and vibration levels B1) update baseline river water quality: TSS B2): update baseline river water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform	A): Along new road alignments, at ponds areas, and at WWTP B1): Thuong river at crossing of western road B2: Thuong river at WWTP, and below example stormwater ponds	Using field and analytical methods approved by DoNRE.	A & B: One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PIU	Environmental Monitoring Consultant	A) $1,000. B) $4,000.
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once	Once	PIU	Environmental Monitoring Consultant	$500.
Construction Phase of all Subproject Components							

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
					Supervision	Implementation	
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease, hydrocarbons).	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once if needed	Once	PIU	Environmental Monitoring Consultant	$2,500.
A) Qualitative air quality: dust, , noise, and vibration levels B1): TSS of Thuong river B2: Thuong river water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform C) Analysis of soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons. D) Domestic (worker) and construction solid waste inside & outside construction sites including worker camps. E) Public comments and complaints F) Incidence of worker or public accident or injury	A), B1), B2): Baseline sites of pre-construction phase. C) At sites where contaminated soil is suspected. D) All construction sites and worker camps E) Using hotline number placed at construction areas F) At all construction areas	A – C : Using field and analytical methods approved by DoNRE. Include visual observations of dust and noise from contractor & public reports . D) Visual observation E) Information transferred by telephone hotline number posted at all construction sites. F) regular reporting by contractors/PIU	(A – B): Quarterly during construction periods Daily visual records C) Once at start of excavations D) Monthly E) Continuous public input F) Continuous	Monthly	(A - D):		
					PIU	EMC	A & B: $20,000./yr C: $2,000./yr D: no marginal cost
					(E & F) & daily observations:		
					PMU/PIU	contractor	E: $1,000./yr F: no marginal cost
Operation of Eastern and Western Roads							
Incidence of road accidents	Along both new roads , and in urban road network connected to new roads	Regular reporting by police	Biannually	Biannually	PPC/DOT		$1000./yr

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
					Supervision	Implementation	
Operation of Upgraded Stormwater Ponds and WWTP							
TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P	Thuong river near stormwater ponds and below discharge of WWTP	Using field and analytical methods approved by DoNRE	Quarterly	Biannually	WWTP/DONRE		$10,000. /yr
	Effluent of WWTP before discharge to Thuong river						

Table 6. Performance Monitoring Indicators for Subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation & Disclosure	Affected public & stakeholders	Meetings with stakeholders contacted during IEE & new stakeholders convened for follow-up consultation & to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Updated EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP[12])	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of PIU/PMU	Training course(s) & schedule	By end of P-C phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Thuong river quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Document baseline conditions as per Monitoring Plan	Survey
WWTP effluent quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Document baseline conditions as per Monitoring Plan	Survey
Construction Phase			
All subproject areas	Critical habitat, rare or endangered species ***if present***	All *present* critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC[13]
Thuong river quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S [14]	Levels never exceed pre-construction baseline levels	Monitoring by EMC
Qualitative air quality	Dust, noise, vibration[15]	Levels never exceed pre-construction baseline levels	EMC & contractor monitoring reports,
Soil & surface quality	Solid & liquid waste	Rigorous program of procedures & rules to collect and store all waste from construction camps and sites	Contractor and EMC monitoring reports

[12] Contractor Environmental Management Plan developed from EMP in contractor bidding document
[13] Environmental Monitoring Consultant hired by PMIS to assist implementation of Environmental Monitoring Plan
[14] See Appendix B for list of available environmental quality standards
[15] Footnote 10

Major Environmental Component	Key Indicator	Performance Objective	Data Source
		practiced.	
Hazardous materials & waste	Oil, gasoline, grease, alum, chlorine, soda	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public & worker safety	Frequency of injuries	Adherence to GoV OHS regulations/policy to prevent accidents[16]	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports
Traffic	Frequency of disruptions & blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Operation of Upgraded WWTP and Stormwater Ponds			
Aesthetics, solid waste	Odour, uncontained garbage	Clean pond and WWTP areas, no aesthetic issues	Public/PPC
Air quality	dust, noise on property roads	Levels never exceed pre-construction baseline levels	Public/DoNRE,
Thuong river quality below WWTP	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S) [17]	Levels never exceed pre-construction baseline levels	DONRE
Treated effluent of WTTP	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S) [18]	Effluent quality meets design criteria, and QCVN standards	WWTP/DONRE
Operation of New Urban Roads			
Risk of accidents, noise, dust	Incidence of accidents, and dust & noise levels	Levels never exceed pre-construction baseline levels	DOT/PPC

VI. ESTIMATED COST OF EMP

30. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. From Table 5 the preliminary costs for the implementation of the EMP for the subproject are summarized in Table 7. These costs include per diem technician fees.

[16] MoLISA GoV Regulations and Policy
[17] See Appendix B for list of available environmental quality standards
[18] See Appendix B for list of available environmental quality standards

31. An estimated budget of USD $10,000.00 is required for capacity building and training for environmental management in conjunction with other capacity development activities of the project such as occurring as part of overall the capacity development component of the PPTA. The costs to implement the EMP will need to be updated by the PMIS in conjunction with the PIU during the pre-construction phase.

Table 7. Estimated Costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	$1,000.00
environmental quality	$5,500.00
Construction Phase	
environmental quality	$48,500.00
public consultation	$2,000.00
Post-construction Operation Phase	
environmental quality	$22,000.00
public input	none
Capacity Development and training	$10,000.00
Total	**$89,000.00**

VII. EMERGENCY RESPONSE PLAN

32. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;
ii) the District fire and police departments, emergency medical service, the Department of Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

33. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 8. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary & requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools & funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of Subproject progress.

34. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

35. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

36. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PMU/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) Subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used; any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
iv) the Contractor's Emergency Management Plan
v) names and contact details of the ERT members

37. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

38. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and vi) conducted drills for different possible situations.

39. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

A. Alert Procedures

40. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:

- Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
- EERT institutions/organizations
- Concerned village authority/ies
- PIU Office, SO

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.
(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

B. Emergency Response Situations

The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 9. Evacuation Procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.
▪ If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 10. Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: ▪ Safety first of both the rescuer and the victim.

Procedure	Remarks
	▪ Do not move an injured person unless: ▪ victim is exposed to more danger when left where they are, e.g., during fire, chemical spill ▪ it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure ▪ instructed or directed by the EERT. ▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.
▪ Call the EERT emergency medical services &/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: ▪ an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. ▪ Other ERT members to clear access road for smooth passage of the EERT.
▪ If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 11. Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: ▪ call the attention of other people in the site, ▪ sound the nearest alarm, and/or ▪ Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) ▪ report/communicate the emergency situation to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control	▪ Guided by the training they undertook,

Procedure	Remarks
fire from spreading.	ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
▪ Call the nearest fire & police stations &, if applicable, emergency medical services.	▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: ▪ an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. ▪ some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

VIII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

41. Currently there is insufficient experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP. i.e., PMU/PIU in Bac Giang province. No dedicated environmental staff exist in the PIU and thus the PMU. The PMIS with assistance from the designated SO/PIU will develop and deliver training courses to the PIU/PMU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/PMU/SO to oversee implementation of the EMP by construction contractors, and EMC

42. The SO who is a full-time environmental member of the PIU as well as the EO of the contractor should attend training courses as required. Costs for training are included with costs for implementation of the EMP.

43. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

APPENDIX A: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF PMIS

International Environmental Specialist. With assistance from the national environmental specialist the international consultant will be responsible for updating the subproject EMPs at detailed design, and assisting the PIU with overall environmental management of the implementation of the three subprojects (Bac Giang, Mong Cai, Sa Pa) in Viet Nam. The consultant will: (i) update the three environmental management plans (EMP) for the three three subproject towns to ensure that EMPs address the detailed designs and engineering of subprojects. Updates to EMPs include mitiation and monitoring plans, budget, and capacity development needs of executing agencies (PPC) and PIUs (CPCs and DPI); (ii) with national consultant design comprehenisve training plan for safeguards officer/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) coordinate and work with the SO/PIUs to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMPs and the actual site conditions; (v) oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) coordinate with the three provincial Departments of Environment and Natural Resources (DONRE) on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PIUs consult GoV authorities to assist with ToR development and implementation; (ix) with SO/PIUs prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction; (x) prepare ToR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the three subproject EMPs; (xi) coordinate with PIU/DoTs when necessary to address vehicle traffic issues during road upgrades; (xii) advise SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (xiii) with SO/PIUs ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and SO/PIUs prepare a table of contents for regular reports PIU must submit to the EA on implementation of EMPs, environmental, issues, and corrective actions; (xv) assist SO/PIUs prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of all EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the PPCs and ADB. The consultant should have at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Viet Nam) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, project implementing units.

National Environmental Specialist. Provide assistance to the international environmental specialist including acquisition of information new information to update the three EMPs at detailed design, and work with the PIU with overall environmental management of the implementation of the three subprojects in the three corridor towns of Viet Nam. The national consultant will assist with: (i) updating all environmental management plans (EMP) for the three subprojects to ensure that EMPs address the detailed designs and engineering of subprojects.; (ii) deliver initial training to EA/PIU/PMU on the purpose, content, and roles and responsibilities for implementation of updated EMPs; (iii) ensure relevant safeguards of the EMPs are addressed in the bidding documents in accurate local language and in evaluation criteria for awarding contracts; (iv) help SO/PIUs to ensure that contractors prepare their respective site-specific plans based on the updated EMPs and the actual site conditions; (v) help Int'l ES consultant oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with the three provincial DoNREs on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with SO/PIUs, prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. (viii) assist PIU/DoT when necessary to address vehicle traffic issues during road upgrades; (ix) with Iint'l ES consultant advise the SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (x) with SO/PIU ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have at least 5 years with environmental assessment of infrastructure projects in Viet Nam including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to provincial project implementing units.

APPENDIX B: ENVIRONMENTAL STANDARDS AND CRITERIA FOR VIET NAM

Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of about coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigational purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: - National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: - National regulation heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: national technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

International Guidelines

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement & Analysis Environmental Quality

APPENDIX C: MONITORING REPORT TEMPLATE FOR PROJECT IMPLENTATION UNIT

Safeguards Monitoring Report

This report is to be completed by the PIU with assistance from the PMIS and PMU. The report forms part of the regular reporting of PIU to PMU and ultimately to the EA and ADB.

1. Introduction and Project Overview

Project Number and Title:		
Safeguards Category	Environment	B
	Indigenous Peoples	C
	Involuntary Resettlement	B
Reporting period:		
Last report date:		
Key sub-project activities since last report:	*This section can include, among others, the following:* • *Activities of PIU/PMU* • *Progress of work (% physical completion)* • *Changes of surrounding environment* • *Status of permits / consents*	
Report prepared by:		

2. Environmental Performance Monitoring

a. Summary of Compliance with EMAP Requirements (Environmental Performance)

Monitoring Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use tabled performance monitoring indicators of EMP			

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of monitoring or mitigation measures or activities not completed			

(last column of previous table)			
New Issues from This Report			

c. Other activities

- Other issues not covered by mitigation or monitoring plans of EMP
- Any additional environmental monitoring required (e.g., air quality, water sampling)

3. Occupational, Health and Safety (OHS) Performance Monitoring

a. OHS for worker

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

b. Public Safety

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			

New Issues from This Report			

4. Information Disclosure and Socialization including Capability Building

Prepare brief summary of the information below where applicable

- Field visits conducted (sites visited, dates, persons met)
- Public consultations and meetings conducted (date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training conducted (nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media releases
- Material development/production (e.g., brochure, leaflet, posters)

5. Grievance Redress Mechanism

Summary:

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

6. Conclusion

- Important results from the implementation of mitigation and monitoring of EMP

- Recommendations to improve EMP implementation

7. Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Photographs
- Maps

Environmental Management Plan

June 2015

Socialist Republic of Viet Nam: Second Greater Mekong Subregion Corridor Towns Development Project

Mong Cai Subproject

ABBREVIATIONS

ADB	-	Asian Development Bank
PAH	-	Project Affected Household
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
CPC	-	City Peoples Committee
DCST	-	Department of Culture Sport and Tourism
DOC	-	Department of Construction
DOH	-	Department of Health
DONRE	-	Department of Environment and Natural Resources
DOT	-	Department of Transport
DPI	-	Department of Planning and Investment
EA	-	Executing Agency
ECC	-	Environmental Compliance Certificate
EIA	-	Environment Impact Assessment
EMP	-	Environment Management Plan
EERT	-	External Emergency Response Team
EO	-	Environmental Officer
ERT	-	Emergency Response Team
ERTL	-	Emergency Response Team Leader
ESU	-	Environmental and Social Unit
IEE	-	Initial Environmental Examination
IA	-	Project Implementation Agency
GMS	-	Greater Mekong Sub-Region
GOV	-	Government of Viet Nam
NGO	-	Non-Government Organization
O&M	-	Operation and Maintenance
PIU	-	Project Implementation Unit
PMIS	-	Project Management Implementation Support
PPC	-	Provincial Peoples Committee
PSC	-	Project Steering Committee
SO	-	Safeguards Officer
UXO	-	Unexploded Ordnance

WEIGHTS AND MEASURES

km	Kilometre
kg	Kilogram
ha	Hectare
mm	Millimeter

Table of Contents

I. INTRODUCTION

1. The environmental management plan (EMP) for the Mong Cai subproject is one of three EMPs that have been prepared for the subprojects of the Second Greater Mekong Subregion Corridor Towns Development Project (CTDP) in Viet Nam. The other two EMPs of the CTDP in Viet Nam address subprojects in the towns of Bac Giang and Sa Pa. The three separate EMPs are comprehensive and are developed as stand-alone management tools.

2. A single Initial Environmental Evaluation (IEE) of all three subprojects in Viet Nam was prepared under separate cover. Details of the CTDP and the subprojects in Viet Nam can be found in the parent IEE.

A. Overview of Mong Cai subproject

3. The Mong Cai subproject consists two (2) new wastewater treatment plants (WWTP), riverbank protection along the Ka Long river, and improved drainage (Table 1).

Table 1. Mong Cai subproject components

Component	General Specifications[1]
Wastewater and Stormwater Improvements	• 8,000 m^3/d eastern WWTP • 4,000 m^3/d western WWTP • Anaerobic lagoons like WWTP in Bac Giang • Both WWTPs are combined systems • New and upgraded stormwater drains
Riverbank Protection	• Raise and upgrade existing riverbank protection structure and promenade on eastern bank • Construct equivalent protection structures and promenade directly across on western riverbank • Dredging of some dunes adjacent to riverbank works

II. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

4. At the feasibility stage the primary management framework[2] responsible for the implementation of the environmental management plan (EMP) for the subprojects in Mong Cai town is summarized as follows. The Quang Ninh Provincial Peoples Committee (PPC) which is the executing agency (EA) for the project will take overall responsibility for the successful implementation of the EMP, and will liaise with the ADB on the submission of consolidated environmental safeguards reports. The EA will establish a Project Steering Committee (PSC) which, *inter alia*, will provide support for implementation of the EMP

5. The Mong Cai City Peoples Committee (CPC) will be the subproject implementation agency (IA) to oversee day to day implementation of the project including EMP implementation and reporting to the EA. A project management unit (PMU) will be created to assist the IA. The PMU will appoint a project implementation unit (PIU) for each town will consist of staff with expertise in infrastructure. The PIU Director will appoint a S*afeguards Officer* (SO) who will supervise implementation of the EMP. The PIU/SO will oversee implementation of the Contractor Environmental Management Plans (CEMP)[3] for the future construction packages of

[1] Updated from Interim Report 3/15
[2] Adapted from Interim Report 3/15
[3] Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

the Mong Cai subproject. Expertise from the Department of Transportation (DOT)/Department of Construction (DOC) will be cross appointed to the PMU/PIU when necessary.

6. The civil works contractor's Chief of Construction (CCW) will be responsible for all construction activities at the construction sites, including compliance with the EMP. The CCW will assign an *Environmental Officer (EO)* to ensure the contractor's responsibilities for the EMP are met.

7. External support to the PMU/PIU for EMP updating, capacity building, and monitoring will be provided by the *International and National Environment Specialists (ES)* of the Project Management Implementation Support[4] firm (PMIS). The PMIS will have a provisional budget to engage an *Environmental Monitoring Consultant (EMC)* to conduct field sampling and laboratory analyses of field samples (e.g., water quality, air quality) as required. Provided below is a summary of key responsibilities for implementation of the EMP.

8. The responsibilities of the EA as supported by PSC include:

1. Coordinate environmental and social safeguards implementation and monitoring undertaken by the IA/PMU;
2. Liaise with ADB on the implementation of the EMP; and
3. Coordinate resolution with IA/PMU, and ADB if necessary with issues arising from the implementation of EMP.

9. The responsibilities of PMU/PIU Safeguards Officer include:

1. Assist PMIS with updating the EMP to meet final detailed subproject designs;
2. Notify IA/EA to verify GoV approvals of project are met, and that EMP is compliant with requirements of LEP (2014) as implemented by Decree 18/2015/ND-CP, and Circular 26/2011/TT-BTNMT.
3. Assist PMIS with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
4. Undertake day to day management of EMP implementation activities;
5. Work with EMC on implementation of monitoring plan of EMP;
6. Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as IPPs, GAPs, resettlement plans);
7. Lead follow-up meetings with all affected stakeholders;
8. Prepare and submit quarterly reports on EMP implementation to PSC;
9. Oversee implementation of CEMP by contractor;
10. Coordinate with ES of PMIS for EMP implementation;
11. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
12. Ensure EO/CCW of contractor submits monthly reports on construction mitigations and monitoring.

10. The responsibilities of the environment specialists (international and national) of the PMIS are detailed in the Terms of Reference for the two positions, as set out in Appendix A. The consultant's key responsibilities for the EMP are:

1. Update the EMP to meet final detailed designs of subprojects;

[4] PMIS to be defined.

2. Provide technical direction and support to PIU/SO for implementation of EMP;
3. Oversee design and delivery of capacity development and training of PIU-SO and EO of contractor(s);
4. Provide advice and support to EMC with their monitoring activities;
5. Review all environmental reports prepared by PIU/PMU/IA and EMC for ADB; and
6. Review location of any possible contaminated sites near subprojects.

11. The responsibilities of Environmental Monitoring Consultant (EMC) include:

1. Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and PIU.
2. Perform required laboratory analyses for monitoring program detailed in EMP; and
3. Prepare and submit quarterly reports to IA/EA on monitoring activities.

12. The responsibility of Chief of Construction Work (CCW) of contractor with assistance from Environmental Officer (EO) includes:

1. Ensure implementation of the CEMP during the construction phase; and
2. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.

13. The implementation of the EMP as part of the overall environmental due diligence (DD) of the subproject is conducted alongside the separate parallel DD of the government. Table 2 reproduces the summary of environmental due diligence from the IEE which shows that the government must approve the ADB IEE and EMP by formal letter, and that approval of the ADB IEE/EMP is not contingent on compliance with any specific government regulation other than the Project Detailed Outline (PDO) which is required by the Prime Minister.

Table 2. Summary of environmental due diligence during project implementation

Design and Implementation	**Environmental DD and Approvals**			**Milestones & Notes**
	ADB / PPTA	**Viet Nam**	**PMIS / Contractor**	
Feasibility design				
Initial stakeholder disclosure & consultation	PPTA	EA assists		
Draft IEEs and EMPs	PPTA			Draft IEEs & EMPs completed
Preparation of Project Detailed Outline (PDO)		EA		Approval by Prime Minister
Finalize IEEs and EMPs	ADB review & approves IEE/EMPs			ADB approved IEE/ EMPs as per SPS (2009).
		EA reviews and approves IEE/EMPs		EA approved IEE/ EMPs with formal letter only. ***Compliance with specific GOV / EA regulations not***

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
				required
Loan documents (PAM/RRP)	Document preparation, approval by ADB	Review & approval of PAM		Loan approval
Initiation of Viet Nam environmental DD		EA leads with oversight from DONRE		MONRE or DONRE approved IEE or EIA follows independently after VIE DD begins
Detailed engineering design				
Continued stakeholder disclosure & consultation		IA/PIU lead	ES support to PMIS	As per PCP (2012)[5] stakeholder disclosure and consultations continue throughout construction phase coincident with initiation of GRM[6]. ***Also satisfies consultation requirement of GOV*.**
Update EMPs		Support to ES	Lead by ES	Approval of updated EMP by EA and ADB
Tendering / contract award				
EMPs included in tender documents		Lead by EA/IU	Support by ES	
Tenders let and bids prepared		Lead by EA	Contractor drafts CEMP[7]	CEMPs prepared and included in contractor bids
Construction packages	Input from ADB		CEMPs reviewed by ES/PMIS	Construction package awards
Construction & supervision				
Implementation of mitigation and monitoring plans		Support from IU/PIU	By contractor with support from ES	CEMP implemented by contractor, other aspects of EMP overseen by ES
Continued stakeholder disclosure and consultation		IA/PIU lead	Support from ES	As part of GRM
Monitoring reporting	To ADB	IA/PIU lead preparation	Support from ES	Reports provide input for review missions

[5] ADB Public Communication Policy (2012)
[6] Grievance Redress Mechanism (see below)
[7] Construction Environmental Management Plan based on EMP in tender documents (see EMP)

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
		of regular reports to ADB		

14. The Department of Natural Resources and Environment (DONRE) oversees environmental management of Quang Ninh province The DONRE with district staff in Mong Cai town provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2014) as implemented by Decree 29/2011/ND-CP, and Circular 26/2011/TT-BTNMT, and national environmental standards and criteria. The environmental standards and criteria for Viet Nam are listed in Appendix B. See IEE for complete legal and regulatory framework for environmental management in Viet Nam.

15. The ADB provides guidance to EA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by EA which are disclosed on ADB website pursuant to ADB Policy on Public Communication (2011).

A. Worker and Community Health and Safety

16. The Ministry, and counterpart provincial Department of Labour, Invalids and Social Assistance (DoLISA) prescribes regulations and guidelines governing worker and public safety in the workplace[8]. The directives of M/DoLISA must be followed throughout the construction and operational phases of the subprojects. To supplement the M/DoLISA the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should be consulted when necessary.

III. SUMMARY OF POTENTIAL IMPACTS

17. The potential impacts of the construction and operation of the Mong Cai subproject components (Table 1) from the IEE which are summarized in Table 3 are caused primarily from the civil works during the construction phase of the different subproject components. The short-term construction disturbances concern noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and local soil erosion & surface water sedimentation, and solid and liquid waste. These short-term impacts can be managed and mitigated with Mitigation Plan provided below.

Table 3. Summary of potential impacts of Mong Cai subproject components

Pre-construction Phase
• Loss agriculture land and business operation land, and no relocation

[8] Example, Decree 110/2002/ND-CP, supplementing some Articles of Decree 06/1995 on Labour Code of Occupational Safety and Health, Decree 06/1995, Elaborating Provisions of Labour Code on Occupational Safety and Health.

Construction Phase
Two new WWTPs and improved drainage • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution caused by increased truck traffic and heavy equipment use, soil and Ka Long river pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion & Ka Long and western rivers sedimentation, potential loss of scattered mangroves at western WWTP site, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
Riverbank protection • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution from increased truck traffic and heavy equipment use, soil and surface water pollution caused by equipment operation and maintenance, public and worker accidents, disruption of roads traffic and boat traffic on Ka Long river, increased traffic accidents, land erosion & Ka Long river sedimentation, drainage and flooding problems, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
Operation Phase
New WTTPs and stormwater improvements • Land, and Ka Long & western rivers pollution caused from improperly maintained WWTP systems, and design effluent quality • Raw wastewater or chemical spills on WTTP property from unmaintained equipment Riverbank protection • n/a

A. Public Consultation

18. The stakeholder consultation program that was developed for the IEE will be continued with the start of the pre-construction phase of both subprojects. The first step will be to disclose the draft IEE to the affected stakeholders that were consulted to obtain their review and comment.

Follow-up Consultation

19. As indicated by the IEE a concern of the public and stakeholders of the subproject were management of the sludge of the new WWTPs, and boast navigation disruption in the Ka Long river. These issues plus any others will be reviewed during follow-up consultations throughout the pre-construction, construction, and operation of the completed subproject components.

IV. MITIGATION PLAN

20. The impact mitigation measures of the EMP are presented in a comprehensive mitigation plan for the subproject in Table 4. Similar to IEE the mitigation plan is structured by the three development phases of the subproject defined by the pre-construction; construction; and post construction operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

21. The mitigation plan combines construction phase impacts common to all three subproject components for which single mitigation measures are prescribed. In this way common mitigation measures are not re-stated numerous times. However, impacts and required mitigations that are specific to a subproject component are also identified. Or, common mitigations that are particularly important to a subproject component are underscored.

22. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan by design is comprehensive in order for the plan to be updated easily to meet the final detailed designs of the subproject.

Table 4. Environmental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase of Mong Cai Subproject (Wastewater & Stormwater Improvements, & Riverbank Protection)								
Confirmation of required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	EA/IA/SO	Resettlement/ compensation committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE	For all construction sites.	Beginning of project	Quarterly	No marginal cost[10]	PMU	PIU
GoV approvals	No negative impact	3. Notify DoNRE of subproject initiation to complete EA requirements, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PMU/DoNRE	DoNRE

[9] Costs will need to be updated during detailed design phase.
[10] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

Detailed designs of subproject,	Minimize negative environmental impacts	4. Work with PMIS[11] to complete detailed designs of the individual subproject components. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) no cutting of trees including mangroves if possible; d) locate any required aggregate borrow pits away from human settlements with fencing and access barriers; e) no, or minimal disruption to town water supplies, utilities, and electricity with contingency plans for unavoidable disruptions; f) no, or minimal disruption to normal pedestrian and vehicle traffic along all construction roads with contingency alternate routes; g) for public areas include specific plan to notify & provide residents and merchants of construction activities & schedule to minimize disruption to normal commercial and residential activities. h) review measures to prevent or minimize disturbances to households business along Ka Long riverbanks	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	PIC	EA/IA/PMU

[11] PIC is project implementation consultant to be determined

Update EMP	Positive environmental impacts	5. Review finalized sites for new WWTPs and pipelines to minimize impact on agriculture lands, with no mangrove loss from western site and pipeline 6. Review measures that will ensure minimal to no erosion and sedimentation of Ka Long river at riverbank protection sites 7. Finalize plan for managing safe boat traffic in Ka Long river during riverbank and dredging works 8. Review effluent quality design of new WWTPs to ensure discharged effluent meets appropriated QCVN standard (#14, 2008) 9. Re-clarify with DoNRE that no known rare or endangered species inhabit the subproject areas 10. Identify any new potential impacts of subproject and include in EMP 11. Confirm solid waste disposal site(s) with DoNRE 12. Confirm WWTP sludge disposal site(s) with DoNRE 13. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments. 14. Submit updated EMP with new potential impacts to ADB to review. 15. Develop individual management sub-plans for CEMP: a) Construction drainage; b) Soil erosion; c) Noise and dust; d) Contaminated spoil disposal; e) Solid and liquid waste disposal; f) Construction & urban traffic congestion; g) Utility and power disruption; h) Worker and public safety; i) Tree (including mangrove) and vegetation removal and site restoration; j) Construction materials acquisition, transport, & storage, and k) Cultural chance finds.	All sites including Ka Long river at riverbank and eastern WWTP sites	Before construction initiated	Once with detailed designs documents		PMIS	PMU/PIU
Update EMP	Positive environmental impacts	16. Update baseline water quality & presence of aquatic biota in Ka Long river at eastern WWTP and at riverbank protection sites, and of river receiving effluent from western WWTP	Ka Long river	Before construction initiated	Once with updated EMP	See Monitoring Plan below	PMIS/PIU	PMIS/SO

Confirm GoV approved construction waste disposal sites	No negative impact	17. Notify DoNRE to confirm locations of sites for borrow pits and disposal areas for construction for subprojects, and obtain required permits.	Entire subproject	Before construction	As required	No marginal cost	PMU/DoNRE	PIU
UXO survey, & removal	Injured worker or public	18. Ensure GoV military is consulted and clears subproject areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	IA/PMU	GoV military
Develop bid documents	No negative environmental impact	19. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of EMP must be budgeted. 20. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMIS	PIU
Create awareness of physical cultural resources in area	No negative environmental impact	21. PMU/PIU to review potential locations of physical cultural resources, and explain possible PCR to contractors and PMIS	All subproject areas	Before construction begins	Once	No marginal cost	DCST	DCST
Obtain & activate permits and licenses	Prevent or minimize impacts	22. Contractors to comply with all statutory requirements set out by GoV for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Capacity development	No negative environmental impact	23. Develop and schedule training plan for PIU/SO/EO to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 24. Create awareness and training plan for contractors (EO) whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PMIS	PMIS
Recruitment of workers	Spread of sexually transmitted disease	25. Use local workers as much as possible thereby reducing #s of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	PMU/PIU	Contractor's bid documents
Construction Phase of Wastewater and Drainage Improvements and Riverbank Protection								

Initiate EMP & sub-plans,	Prevent or minimize impacts	26. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Worker camps	Pollution and social problems	27. Locate worker camps away from human settlements. 28. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 29. A solid waste collection program must be established and implemented that maintains a clean worker camps 30. Locate separate pit latrines for male and female workers away from worker living and eating areas. 31. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 32. Worker camps must have adequate drainage. 33. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 34. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers. 35. Camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor
Training & capacity	Prevent of impacts through education	36. Implement training and awareness plan for PIU/SO/EO and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMIS	PMIS/PIU

Implement Construction materials acquisition, transport, and storage sub-plan	Pollution, injury, increased construction traffic congestion	37. All borrow pits should be reviewed by DoNRE. 38. Select pits in areas with low gradient and as close as possible to construction sites. 39. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 40. Pits and quarries should not be located near surface waters, houses, or cultural property or values. 41. All topsoil and overburden removed should be stockpiled for later restoration. 42. All borrow pits and quarries should have a fence perimeter with signage to keep public away. 43. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil. 44. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting. 45. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites. 46. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled. 47. All aggregate loads on trucks should be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor

DBST (pavement) production, and application	Air pollution, land and water contamination, and traffic & access problems,	48. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non- traffic areas 49. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 50. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 51. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations. 52. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities. 53. Bitumen should not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Implement Spoil management sub-plan	Contamination of land and surface waters from excavated spoil, and construction waste	54. Uncontaminated spoil to be disposed of in GoV-designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified. 55. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature. 56. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits. 57. A record of type, estimated volume, and source of disposed spoil must be recorded. 58. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal. 59. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoV regulations. 60. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMIS & PIU & DoNRE	contractor

Implement Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	61. Management of general solid and liquid waste of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 62. Areas of disposal of solid and liquid waste to be determined by GoV. 63. Disposed of waste should be catalogued for type, estimated weigh, and source. 64. Construction sites should have large garbage bins. 65. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 66. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 67. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations. 68. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 69. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 70. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU & DoNRE	contractor

Implement Noise and dust sub-plan	Dust Noise	71. Regularly apply wetting agents to exposed soil and construction roads. 72. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 73. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed. 74. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving. 75. Maintain equipment in proper working order 76. Replace unnecessarily noisy vehicles and machinery. 77. Vehicles and machinery to be turned off when not in use. 78. Construct temporary noise barriers around excessively noisy activity areas where possible.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	79. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 80. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 81. Contact affected community to inform them of planned outages. 82. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU & Utility company	contractor

Implement Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	83. Contact DARD for advice on how to minimize damage to trees including mangroves, and vegetation. 84. Restrict tree and vegetation removal to strict WWTP site and pipeline alignments RoW area. 85. Prevent tree removals, and install protective physical barriers around trees that do not need to be removed. 86. All areas to be re-vegetated and landscaped after construction completed. Consult DARD to determine the most successful restoration strategy and techniques. Aim to replant three trees for each tree removed.	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Erosion control sub-plan	Land erosion	87. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 88. Earthworks should be conducted during dry periods. 89. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 90. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 91. Re-vegetate all soil exposure areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Implement worker and public safety sub-plan	Public and worker injury, and health	92. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 93. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 94. Worker and public safety guidelines GoV should be followed (DoLISA regulations & guidelines). 95. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles. 96. Standing water suitable for disease vector breeding should be filled in. 97. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers. 98. Appropriate safety clothing and footwear should be mandatory for all construction workers. 99. Adequate medical services must be on site or nearby all construction sites. 100. Drinking water must be provided at all construction sites. 101. Sufficient lighting be used during necessary night work. 102. All construction sites should be examined daily to ensure unsafe conditions are removed.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Civil works	Degradation of water quality & aquatic resources	103. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and Ka Long river and all other surface waters. 104. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 105. Earthworks should be conducted during dry periods. 106. All construction fluids such as oils, and fuels should be stored and handled well away from Ka Long and western rivers and other surface waters 107. No waste of any kind is to be thrown Ka Long and western rivers 108. No washing or repair of machinery near surface waters. 109. Pit latrines to be located well away from Ka Long and western rivers 110. All irrigation canals and channels to be protected the same way as Ka Long and western rivers	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works	Degradation of terrestrial resources	111. All construction fluids such as oils, and fuels should be stored and handled well away from Ka Long and western rivers	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	112. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights. 113. Post speed limits, and create dedicated construction vehicle roads or lanes. 114. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 115. Demarcate additional locations where pedestrians can develop road crossings away from construction areas. 116. Provide construction road and walkway lighting.	All construction sites	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Construction	Loss of drainage & flood storage	117. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding.	All areas near stream	Design & construction phases	Monthly	No marginal cost	PMIS & PIU	contractor

Drainage sub-plan		118. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses. 119. Install temporary storm drains or ditches for construction sites 120. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing stormwater storage capacity..						
Civil works & Chance finds sub-plan	Damage to cultural property or values, and chance finds	121. As per detailed designs all civil works should be located away from all cultural property and values. EA identified potential sites and types of PCR in pre-con phase. 122. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 123. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DCST notified by telephone if valuable. 124. Work at find site will remain stopped until DCST allows work to continue.	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Construction of Western WWTP								
Construction of WWTP	Destruction or damage to scattered mangroves in area	125. Extra care to locate WWTP site and alignment of raw WW pipeline away from scattered mangroves west of Mong Cai. Pipeline must be placed along access road to WWTP site	At western WWTP site & pipeline	Through construction phase	Monthly	No marginal cost	PIU/PMIS	contractor
Construction of Riverbank Protection								
Construction of riverbank protection and dredging	Heavy sedimentation of Ka Long river	126. Temporary earthen berms, or plastic fencing need to be installed along riverbanks to isolate shoreline earthworks from river. Silt curtains placed in river parallel to shoreline to isolate riverbank works from main river	Eastern and western riverbanks of Ka Long river	During all river earthworks activities	Monthly	No marginal cost	PIU/PMIS	contractor
	Damage aquatic	127. Dredging operations should be minimized as much as						

	habitat in Ka Long river	possible with peripheral silt curtains installed at sites to contain the spread of suspended sediment down river.						
Operation of New WWTPs								
Operation of WWTPs	Reduced effluent quality leading to pollution of Ka Long and western rivers	a) The quality of treated effluent of both WWTPs should be monitoring regularly to ensure that it always meets effluent quality design criteria	At WWTP	Quarterly	Biannual	O&M	WWTP operators / DONRE	
	Equipment failure at WWTPs causing chemical spills, and raw WW discharge	b) Sufficient annual O&M budget must be provided to ensure all equipment stays in good working condition. c) All staff must be properly trained on upgraded WWTP operations		Fulltime			WWTP operators	

V. MONITORING PLAN

23. The environmental monitoring plan for the EMP is provided in Table 5. The monitoring plan focuses on three phases (pre-construction, construction, post-construction operation) of the subproject and consists of environmental indicators, sampling locations & frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document unexpected positive or negative environmental impacts of the subprojects.

A. Environmental Quality Standards for Subproject Components

24. Environmental quality standards and criteria for Viet Nam are listed in Appendix B. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) should be consulted to supplement GOV standards if required.

25. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program under the supervision and coordination of the PMIS/PIU. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SO and EO will coordinate monitoring work with the EMC. The PMIS/PIU will also provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

26. After construction is completed and the new WWTPs are in operation the treated effluent quality of the WWTPs should be monitored regularly either by the WWTP operators or by DONRE. Table 2 summarizes the responsibilities for monitoring during the construction-implementation of the subproject.

1. Performance Monitoring

27. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the entire subproject. Select indicators of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 6.

2. Reporting

28. Regular reporting on the implementation of mitigation measures, and monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 4 and 5) summarize proposed timing of reporting. Appendix C provides a monitoring report template for the PIU that the PIU with assistance from the PMU and PMIS must complete and attach as part of regular PIU reporting to the PMU/IA.

29. A report on environmental monitoring and implementation of EMP for the subproject component sites will be prepared quarterly for the EA/PSC by the PIU. The PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PMIS. The PIU report will also be sent to the DONRE and ADB. The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 6), and will reference relevant GoV environmental quality standards.

Table 5. Environmental Monitoring Plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
					Supervision	Implementation	
Pre-construction Phase – Update Environmental Baseline Conditions							
Review baseline of existing sensitive receptors (e.g., cultural property & values, rare/ endangered species, critical habitat)	At all subproject sites including Ka Long and western rivers,	Consultation with community, and DONRE	Once	Once	PMU/PIU	Environmental Monitoring Consultant	$1,000.
A) Update baseline qualitative air quality: dust, noise, and vibration levels B): update baseline river water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform	A): Along riverbanks of Ka Long river and at WWTP sites B): Ka Long river at riverbank sites & eastern WWTP site, and at western river at western WWTP site.	Using field and analytical methods approved by DoNRE.	A & B: One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PIU	Environmental Monitoring Consultant	A) $1,000. B) $5,000..
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once	Once	PIU	Environmental Monitoring Consultant	$500.
Construction Phase of all Subproject Components							
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease,	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once if needed	Once	PIU	Environmental Monitoring	$2,500.

hydrocarbons).						Consultant	
A) Qualitative air quality: dust, , noise, and vibration levels B: Ka Long river & western river quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform C) Analysis of soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons. D) Domestic (worker) and construction solid waste inside & outside construction sites including worker camps. E) Public comments and complaints F) Incidence of worker or public accident or injury	A), B): Baseline sites of pre-construction phase. C) At sites where contaminated soil is suspected. D) All construction sites and worker camps E) Using hotline number placed at construction areas F) At all construction areas	A – C : Using field and analytical methods approved by DoNRE. Include visual observations of dust and noise from contractor & public reports . D) Visual observation E) Information transferred by telephone hotline number posted at all construction sites. F) regular reporting by contractors/PIU	(A – B): Quarterly during construction periods Daily visual records C) Once at start of excavations D) Monthly E) Continuous public input F) Continuous	Monthly	(A - D):		
					PIU	EMC	A & B: $24,000./yr C: $2,000./yr D: no marginal cost
					(E & F) & daily observations:		
					EA/PIU	contractor	E: $1,000./yr F: no marginal cost
Operation of New WWTPs							
TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform	Ka Long and western rivers below discharges of eastern and western WWTPs Effluents of both WWTPs before discharged to rivers	Using field and analytical methods approved by DoNRE	Quarterly	Biannually	WWTP/DONRE		$12,000. /yr

Table 6. Performance Monitoring Indicators for Subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation & Disclosure	Affected public & stakeholders	Meetings with stakeholders contacted during IEE & new stakeholders convened for follow-up consultation & to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Updated EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP[12])	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of PIU/PMU	Training course(s) & schedule	By end of P-C phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Ka Long and western rivers quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Document baseline conditions as per Monitoring Plan	Survey
Planned WWTPs effluent quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Compare with original design criteria	desktop
Construction Phase			
All subproject areas	Critical habitat, rare or endangered species ***if present***	All *present* critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC[13]
Ka Long and western rivers quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S [14]	Levels never exceed pre-construction baseline levels	Monitoring by EMC
Qualitative air quality	Dust, noise, vibration[15]	Levels never exceed pre-construction baseline levels	EMC & contractor monitoring reports,
Soil & surface quality	Solid & liquid waste	Rigorous program of procedures & rules to collect and store all waste from construction camps and sites	Contractor and EMC monitoring reports

[12] Contractor Environmental Management Plan developed from EMP in contractor bidding document
[13] Environmental Monitoring Consultant hired by PIC to assist implementation of Environmental Monitoring Plan
[14] See Appendix B for list of available environmental quality standards
[15] Footnote 10

Major Environmental Component	Key Indicator	Performance Objective	Data Source
		practiced.	
Hazardous materials & waste	Oil, gasoline, grease, alum, chlorine, soda	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public & worker safety	Frequency of injuries	Adherence to GoV OHS regulations/policy to prevent accidents[16]	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports
Traffic	Frequency of disruptions & blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Operation of Upgraded WWTPs			
Aesthetics, solid waste	Odour, uncontained garbage	Clean pond and WWTP areas, no aesthetic issues	Public/PPC
Air quality	dust, noise on property roads	Levels never exceed pre-construction baseline levels	Public/DoNRE,
Ka Long and western rivers river quality below WWTPs	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S) [17]	Levels never exceed pre-construction baseline levels	DONRE
Treated effluent of WTTPs	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S) [18]	Effluent quality meets design criteria, and QCVN standards	WWTPs/DONRE

VI. ESTIMATED COST OF EMP

30. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. From Table 5 the preliminary costs for the implementation of the EMP for the subproject are summarized in Table 7. These costs include per diem technician fees.

31. An estimated budget of USD $10,000.00 is required for capacity building and training for environmental management in conjunction with other capacity development activities of the project such as occurring as part of overall the capacity development component of the PPTA.

[16] MoLISA GoV Regulations and Policy
[17] See Appendix B for list of available environmental quality standards
[18] See Appendix B for list of available environmental quality standards

The costs to implement the EMP will need to be updated by the PMIS in conjunction with the PIU during the pre-construction phase.

Table 7. Estimated Costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	$1,000.00
environmental quality	$6,500.00
Construction Phase	
environmental quality	$54,500.00
public consultation	$2,000.00
Post-construction Operation Phase	
environmental quality	$24,000.00
public input	none
Capacity Development and training	$10,000.00
Total	**$98,000.00**

VII. EMERGENCY RESPONSE PLAN

32. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;
ii) the District fire and police departments, emergency medical service, the Department of Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

33. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 8. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the

Entity	Responsibilities
	response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary & requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools & funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of Subproject progress.

34. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

35. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

36. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PCU/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) Subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used; i
iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
v) the Contractor's Emergency Management Plan
vi) names and contact details of the ERT members

37. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

38. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;

iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and vi) conducted drills for different possible situations.

39. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

A. Alert Procedures

40. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
- Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
- EERT institutions/organizations
- Concerned village authority/ies
- PIU Office, SO

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.

(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

B. Emergency Response Situations

The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 9. Evacuation Procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.
▪ If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 10. Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: ▪ Safety first of both the rescuer and the victim. ▪ Do not move an injured person unless: ▪ victim is exposed to more danger when left where they are, e.g., during fire, chemical spill ▪ it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure

Procedure	Remarks
	▪ instructed or directed by the EERT. ▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.
▪ Call the EERT emergency medical services &/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: ▪ an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. ▪ Other ERT members to clear access road for smooth passage of the EERT.
▪ If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 11. Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: ▪ call the attention of other people in the site, ▪ sound the nearest alarm, and/or ▪ Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) ▪ report/communicate the emergency situation to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control fire from spreading.	▪ Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
▪ Call the nearest fire & police stations &, if applicable, emergency medical services.	▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the	▪ ERTL/Deputy ERTL to instruct:

Procedure	Remarks
emergency site.	▪ an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. ▪ some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

VIII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

41. Currently there is insufficient experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP. i.e., PPC/PIU/PMU in Mong Cai province. No dedicated environmental staff exists in the PIU and thus the PMU. The PMIS with assistance from the designated SO/PIU will develop and deliver training courses to the PIU/PMU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/PMU/SO to oversee implementation of the EMP by construction contractors, and EMC

42. The SO who is a full-time environmental member of the PIU as well as the EO of the contractor should attend training courses as required. Costs for training are included with costs for implementation of the EMP.

43. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

APPENDIX A: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF PMIS

International Environmental Specialist. With assistance from the national environmental specialist the international consultant will be responsible for updating the subproject EMPs at detailed design, and assisting the PIUs with overall environmental management of the implementation of the three subprojects (Bac Giang, Mong Cai, Sa Pa) in Viet Nam. The consultant will: (i) update the three environmental management plans (EMP) for the three three subproject towns to ensure that EMPs address the detailed designs and engineering of subprojects. Updates to EMPs include mitiation and monitoring plans, budget, and capacity development needs of executing agencies (PPC) and PIUs (CPCs and DPI); (ii) with national consultant design comprehenisve training plan for safeguards officer/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) coordinate and work with the SO/PIUs to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMPs and the actual site conditions; (v) oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) coordinate with the three provincial Departments of Environment and Natural Resources (DONRE) on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PIUs consult GoV authorities to assist with ToR development and implementation; (ix) with SO/PIUs prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction; (x) prepare ToR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the three subproject EMPs; (xi) coordinate with PIU/DoTs when necessary to address vehicle traffic issues during road upgrades; (xii) advise SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (xiii) with SO/PIUs ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and SO/PIUs prepare a table of contents for regular reports PIU must submit to the EA on implementation of EMPs, environmental, issues, and corrective actions; (xv) assist SO/PIUs prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of all EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the PPCs and ADB. The consultant should have at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Viet Nam) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, project implementing units.

National Environmental Specialist. Provide assistance to the international environmental specialist including acquisition of information new information to update the three EMPs at detailed design, and work with the PIU with overall environmental management of the implementation of the three subprojects in the three corridor towns of Viet Nam. The national consultant will assist with: (i) updating all environmental management plans (EMP) for the three subprojects to ensure that EMPs address the detailed designs and engineering of subprojects.; (ii) deliver initial training to EA/PIU/PMU on the purpose, content, and roles and responsibilities for implementation of updated EMPs; (iii) ensure relevant safeguards of the EMPs are addressed in the bidding documents in accurate local language and in evaluation criteria for awarding contracts; (iv) help SO/PIUs to ensure that contractors prepare their respective site-specific plans based on the updated EMPs and the actual site conditions; (v) help Int'l ES consultant oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with the three provincial DoNREs on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with SO/PIUs, prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. (viii) assist PIU/DoT when necessary to address vehicle traffic issues during road upgrades; (ix) with Iint'l ES consultant advise the SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (x) with SO/PIU ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have at least 5 years with environmental assessment of infrastructure projects in Viet Nam including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to provincial project implementing units.

APPENDIX B: ENVIRONMENTAL STANDARDS AND CRITERIA FOR VIET NAM

Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of about coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigational purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: - National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: - National regulation heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: national technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

International Guidelines

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement & Analysis Environmental Quality

APPENDIX C: MONITORING REPORT TEMPLATE FOR PROJECT IMPLENTATION UNIT

Safeguards Monitoring Report

This report is to be completed by the PIU with assistance from the PMIS and PMU. The report forms part of the regular reporting of PIU to PMU and ultimately to the EA and ADB.

1. Introduction and Project Overview

Project Number and Title:		
Safeguards Category	Environment	B
	Indigenous Peoples	C
	Involuntary Resettlement	B
Reporting period:		
Last report date:		
Key sub-project activities since last report:	*This section can include, among others, the following:* • *Activities of PIU/PMU* • *Progress of work (% physical completion)* • *Changes of surrounding environment* • *Status of permits / consents*	
Report prepared by:		

2. Environmental Performance Monitoring

a. Summary of Compliance with EMAP Requirements (Environmental Performance)

Monitoring Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use tabled performance monitoring indicators of EMP			

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of monitoring or mitigation measures or activities not completed			

(last column of previous table)			
New Issues from This Report			

c. Other activities

- Other issues not covered by mitigation or monitoring plans of EMP
- Any additional environmental monitoring required (e.g., air quality, water sampling)

3. Occupational, Health and Safety (OHS) Performance Monitoring

a. OHS for worker

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

b. Public Safety

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			

New Issues from This Report			

4. Information Disclosure and Socialization including Capability Building

Prepare brief summary of the information below where applicable

- Field visits conducted (sites visited, dates, persons met)
- Public consultations and meetings conducted (date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training conducted (nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media releases
- Material development/production (e.g., brochure, leaflet, posters)

5. Grievance Redress Mechanism

Summary:

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

6. Conclusion

- Important results from the implementation of mitigation and monitoring of EMP

- Recommendations to improve EMP implementation

7. Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Photographs
- Maps

Environmental Management Plan

June 2015

Socialist Republic of Viet Nam: Second Greater Mekong Subregion Corridor Towns Development Project

Sa Pa Subproject

ABBREVIATIONS

ADB	-	Asian Development Bank
PAH	-	Project Affected Household
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
DCST	-	Department of Culture Sport and Tourism
DOC	-	Department of Construction
DOH	-	Department of Health
DONRE	-	Department of Environment and Natural Resources
DOT	-	Department of Transport
DPI	-	Department of Planning and Investment
EA	-	Executing Agency
ECC	-	Environmental Compliance Certificate
EIA	-	Environment Impact Assessment
EMP	-	Environment Management Plan
EERT	-	External Emergency Response Team
EO	-	Environmental Officer
ERT	-	Emergency Response Team
ERTL	-	Emergency Response Team Leader
ESU	-	Environmental and Social Unit
IA	-	Implementation Agency
IEE	-	Initial Environmental Examination
PIU	-	Project Implementation Unit
GMS	-	Greater Mekong Sub-Region
GOV	-	Government of Viet Nam
NGO	-	Non-Government Organization
O&M	-	Operation and Maintenance
PIU	-	Project Implementation Unit
PMIS	-	Project Management Implementation Support
PPC	-	Provincial Peoples Committee
PSC	-	Project Steering Committee
SO	-	Safeguards Officer
UXO	-	Unexploded Ordnance

WEIGHTS AND MEASURES

km	Kilometre
kg	Kilogram
ha	Hectare
mm	Millimeter

Table of Contents

I. INTRODUCTION

1. The environmental management plan (EMP) for the Sa Pa subproject is one of three EMPs that have been prepared for the subprojects of the Second Greater Mekong Subregion Corridor Towns Development Project (CTDP) in Viet Nam. The other two EMPs of the CTDP in Viet Nam address subprojects in the towns of Bac Giang and Mong Cai. The three separate EMPs are comprehensive and are developed as stand-alone management tools.

2. A single Initial Environmental Evaluation (IEE) of all three subprojects in Viet Nam was prepared under separate cover. Details of the CTDP and the subprojects in Viet Nam can be found in the parent IEE.

A. Overview of Sa Pa subproject

3. The Sa Pa subproject consists two new wastewater treatment plants (WWTP), upgrades to Road 152, and enhancements to the town centre (Table 1).

Table 1. Sa Pa Subproject components

Component	General Specifications[1]
Road 1- Route 152	• 13.7 km road • 700 m extension into town • DBST surface with shoulders and lateral drains • Addition of tourist tracks down into valley
Wastewater and Drainage	• A 2,500m^3/day WWTP northeast of town • Two pump stations • Anaerobic lagoons • A 5,000m^3/day WWTP southwest of town • Anaerobic lagoons • One pump station
Town Centre Enhancement	• Improving public spaces • Replacing footpaths and road surfaces • Burying overhead cables, • Installing drains and permanent ramps from the road to businesses, and • Limiting traffic on main street in the evenings

II. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

4. At the feasibility stage the primary management framework[2] responsible for the implementation of the environmental management plan (EMP) for the subproject in Sa Pa town is summarized as follows. The Lao Cai Provincial Peoples Committee (PPC) which is the executing agency (EA) for the project will take overall responsibility for the successful implementation of the EMP, and will liaise with the ADB on the submission of consolidated environmental safeguards reports. The EA will establish a Project Steering Committee (PSC) which, *inter alia*, will provide support for implementation of the EMP

5. The Department of Planning and Investment (DPI) will be the subproject implementation agency (IA) to oversee day to day implementation of the project including EMP implementation and reporting to the EA. A project management unit (PMU) will be created to assist the IA. The

[1] Updated from Interim Report 3/15
[2] Adapted from Interim Report 3/15

PMU will appoint a project implementation unit (PIU) for each town will consist of staff with expertise in infrastructure. The PIU Director will appoint a S*afeguards Officer* (SO) who will supervise implementation of the EMP. The PIU/SO will oversee implementation of the Contractor Environmental Management Plans (CEMP)[3] for the future construction packages of the Sa Pa subproject. Expertise from the Department of Transportation (DOT)/Department of Construction (DOC) will be cross appointed to the PMU/PIU when necessary.

6. The civil works contractor's Chief of Construction (CCW) will be responsible for all construction activities at the construction sites, including compliance with the EMP. The CCW will assign an *Environmental Officer (EO)* to ensure the contractor's responsibilities for the EMP are met.

7. External support to the PMU/PIU for EMP updating, capacity building, and monitoring will be provided by the *International and National Environment Specialists (ES)* of the Project Management Implementation Support[4] firm (PMIS). The PMIS will have a provisional budget to engage an *Environmental Monitoring Consultant (EMC)* to conduct field sampling and laboratory analyses of field samples (e.g., water quality, air quality) as required. Provided below is a summary of key responsibilities for implementation of the EMP.

8. The responsibilities of the EA as supported by PSC include:

1. Coordinate environmental and social safeguards implementation and monitoring undertaken by the IA/PMU;
2. Liaise with ADB on the implementation of the EMP; and
3. Coordinate resolution with IA/PMU, and ADB if necessary with issues arising from the implementation of EMP.

9. The responsibilities of PMU/PIU Safeguards Officer include:

1. Assist PMIS with updating the EMP to meet final detailed subproject designs;
2. Notify IA/EA to verify GoV approvals of project are met, and that EMP is compliant with requirements of LEP (2014) as implemented by Decree 18/2015/ND-CP, and Circular 26/2011/TT-BTNMT.
3. Assist PMIS with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
4. Undertake day to day management of EMP implementation activities;
5. Work with EMC on implementation of monitoring plan of EMP;
6. Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as IPPs, GAPs, REMDP);
7. Lead follow-up meetings with all affected stakeholders;
8. Prepare and submit quarterly reports on EMP implementation to PSC;
9. Oversee implementation of CEMP by contractor;
10. Coordinate with ES of PMIS for EMP implementation;
11. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
12. Ensure EO/CCW of contractor submits monthly reports on construction mitigations and monitoring.

[3] Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

[4] PMIS to be defined.

10. The responsibilities of the environment specialists (international and national) of the PMIS are detailed in the Terms of Reference for the two positions, as set out in Appendix A. The consultant's key responsibilities for the EMP are:

1. Update the EMP to meet final detailed designs of subprojects;
2. Provide technical direction and support to PIU/SO for implementation of EMP;
3. Oversee design and delivery of capacity development and training of PIU-SO and EO of contractor(s);
4. Provide advice and support to EMC with their monitoring activities;
5. Review all environmental reports prepared by PIU/PMU/IA and EMC for ADB; and
6. Review location of any possible contaminated sites near subprojects.

11. The responsibilities of Environmental Monitoring Consultant (EMC) include:

1. Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and PIU.
2. Perform required laboratory analyses for monitoring program detailed in EMP; and
3. Prepare and submit quarterly reports to IA/EA on monitoring activities.

12. The responsibility of Chief of Construction Work (CCW) of contractor with assistance from Environmental Officer (EO) includes:

1. Ensure implementation of the CEMP during the construction phase; and
2. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.

13. The implementation of the EMP as part of the overall environmental due diligence (DD) of the subproject is conducted alongside the separate parallel DD of the government. Table 2 reproduces the summary of environmental due diligence from the IEE which shows that the government must approve the ADB IEE and EMP by formal letter, and that approval of the ADB IEE/EMP is not contingent on compliance with any specific government regulation other than the Project Detailed Outline (PDO) which is required by the Prime Minister.

Table 2. Summary of environmental due diligence during project implementation

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
Feasibility design				
Initial stakeholder disclosure & consultation	PPTA	EA assists		
Draft IEEs and EMPs	PPTA			Draft IEEs & EMPs completed
Preparation of Project Detailed Outline (PDO)		EA		Approval by Prime Minister
Finalize IEEs and EMPs	ADB review & approves IEE/EMPs			ADB approved IEE/ EMPs as per SPS (2009).

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
		EA reviews and approves IEE/EMPs		EA approved IEE/ EMPs with formal letter only. ***Compliance with specific GOV / EA regulations not required***
Loan documents (PAM/RRP)	Document preparation, approval by ADB	Review & approval of PAM		Loan approval
Initiation of Viet Nam environmental DD		EA leads with oversight from DONRE		MONRE or DONRE approved IEE or EIA follows independently after VIE DD begins
Detailed engineering design				
Continued stakeholder disclosure & consultation		IA/PIU lead	ES support to PMIS	As per PCP (2012)[5] stakeholder disclosure and consultations continue throughout construction phase coincident with initiation of GRM[6]. ***Also satisfies consultation requirement of GOV*.**
Update EMPs		Support to ES	Lead by ES	Approval of updated EMP by EA and ADB
Tendering / contract award				
EMPs included in tender documents		Lead by EA/IU	Support by ES	
Tenders let and bids prepared		Lead by EA	Contractor drafts CEMP[7]	CEMPs prepared and included in contractor bids
Construction packages	Input from ADB		CEMPs reviewed by ES/PMIS	Construction package awards
Construction & supervision				
Implementation of mitigation and monitoring plans		Support from IU/PIU	By contractor	CEMP implemented by contractor, other

[5] ADB Public Communication Policy (2012)
[6] Grievance Redress Mechanism (see below)
[7] Construction Environmental Management Plan based on EMP in tender documents (see EMP)

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Viet Nam	PMIS / Contractor	
			with support from ES	aspects of EMP overseen by ES
Continued stakeholder disclosure and consultation		IA/PIU lead	Support from ES	As part of GRM
Monitoring reporting	To ADB	IA/PIU lead preparation of regular reports to ADB	Support from ES	Reports provide input for review missions

14. The Department of Natural Resources and Environment (DONRE) oversees environmental management of Lao Cai province The DONRE with district staff in Sa Pa town provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2014) as implemented by Decree 29/2011/ND-CP, and Circular 26/2011/TT-BTNMT, and national environmental standards and criteria. The environmental standards and criteria for Viet Nam are listed in Appendix B. See IEE for complete legal and regulatory framework for environmental management in Viet Nam.

15. The ADB provides guidance to EA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by EA which are disclosed on ADB website pursuant to ADB Policy on Public Communication (2011).

A. Worker and Community Health and Safety

16. The Ministry, and counterpart provincial Department of Labour, Invalids and Social Assistance (DoLISA) prescribes regulations and guidelines governing worker and public safety in the workplace[8]. The directives of M/DoLISA must be followed throughout the construction and operational phases of the subprojects. To supplement the M/DoLISA the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should be consulted when necessary.

III. SUMMARY OF POTENTIAL IMPACTS

17. The potential impacts of the construction and operation of the Sa Pa subproject components (Table 1) from the IEE which are summarized in Table 3 arise primarily from the civil works during the construction phase of the different subproject components. The short-term construction disturbances concern noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and local soil erosion & surface water sedimentation, and solid and liquid waste. These short-term impacts can be managed and mitigated with Mitigation Plan provided below.

[8] Example, Decree 110/2002/ND-CP, supplementing some Articles of Decree 06/1995 on Labour Code of Occupational Safety and Health, Decree 06/1995, Elaborating Provisions of Labour Code on Occupational Safety and Health.

Table 3. Summary of potential impacts of Sa Pa subproject components

Pre-construction Phase
• Some loss of agriculture/production/residential land, assets, and some relocation
Construction Phase
<u>Road 1 – Route 152 Upgrade</u> • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution caused by increased truck traffic and heavy equipment use, soil pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion & western Red river tributary sedimentation, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers, and loss of trees along widened roadway shoulder.
<u>Two new WWTPs and Drainage</u> • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution caused by increased truck traffic and heavy equipment use, soil and two Red river tributaries pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion & two Red river tributaries sedimentation, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers, and loss of trees from northeast WWTP raw WW pipeline.
<u>Town Centre Enhancements</u> • Disturbances and impacts from civil works defined by dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution from increased truck traffic and heavy equipment use, public and worker accidents, disruption of roads traffic, increased traffic accidents, short-term drainage and flooding problems, solid and domestic waste construction workers, social issues and community problems caused by migrant workers.
Operation Phase
New WTTPs and stormwater improvements • Land, and two Red river tributaries pollution caused from improperly maintained WWTPs systems, and design effluent quality • Raw wastewater or chemical spills on WTTPs property from unmaintained equipment Upgraded Route 152 • Increased vehicle & pedestrian accidents from increased traffic and vehicle

speeds
- Increased noise and air pollution from increased vehicle traffic and speeds

Enhanced Town Environment

- n/a

A. Public Consultation

18. The stakeholder consultation program that was developed for the IEE will be continued with the start of the pre-construction phase of both subprojects. The first step will be to disclose the draft IEE to the affected stakeholders that were consulted to obtain their review and comment.

Follow-up Consultation

19. As indicated by the IEE a concern of the public and stakeholders of the subproject were disturbances to movement along Road 152 during upgrades, access to adjacent agriculture land and during construction, and the effect of the upgraded Road 152 on traffic, and traffic accidents. These issues plus any others will be reviewed during follow-up consultations throughout the pre-construction, construction, and operation of the completed subproject components.

IV. MITIGATION PLAN

20. The impact mitigation measures of the EMP are presented in a comprehensive mitigation plan for the subproject in Table 4. Similar to IEE the mitigation plan is structured by the three development phases of the subproject defined by the pre-construction; construction; and post construction operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

21. The mitigation plan combines construction phase impacts common to all three subproject components for which single mitigation measures are prescribed. In this way common mitigation measures are not re-stated numerous times. However, impacts and required mitigations that are specific to a subproject component are also identified. Or, common mitigations that are particularly important to a subproject component are underscored.

22. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan by design is comprehensive in order for the plan to be updated easily to meet the final detailed designs of the subproject.

Table 4. Environmental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase of Sa Pa Subproject (Wastewater & Drainage, Route 152 Upgrades, Town Enhancements)								
Confirmation of required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement and ethnic minority development plans	See resettlement and ethnic minority development plans	EA/IA	Resettlement/ compensation committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE	For all construction sites.	Beginning of project	Quarterly	No marginal cost[10]	PMU	PIU
GoV approvals	No negative impact	3. Notify DoNRE of subproject initiation to complete EA requirements, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoNRE	DoNRE

[9] Costs will need to be updated during detailed design phase.
[10] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Detailed designs of subproject,	Minimize negative environmental impacts	4. Work with PMIS[11] to complete detailed designs of the individual subproject components. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) no cutting of trees if possible; d) locate any required aggregate borrow pits away from human settlements with fencing and access barriers; e) no, or minimal disruption to town water supplies, utilities, and electricity with contingency plans for unavoidable disruptions; f) no, or minimal disruption to normal pedestrian and vehicle traffic along all construction roads with contingency alternate routes; g) for public areas include specific plan to notify & provide residents and merchants of construction activities & schedule to minimize disruption to normal commercial and residential activities.	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	PMIS//IA	PMU/PIU

[11] PMIS is project implementation consultant to be determined

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Update EMP	Positive environmental impacts	5. Review finalized sites for two new WWTPs and pipelines to minimize cutting of trees forests and damage to agriculture lands, with special concern of site for northeastern WWTP & pipeline 6. Review effluent quality design of both new WWTPs to ensure discharged effluent meets appropriated QCVN standard (#14, 2008) 7. Re-clarify with DoNRE that no known rare or endangered wildlife inhabit the subproject areas 8. Identify any new potential impacts of subproject and include in EMP 9. Confirm solid waste disposal site(s) with DoNRE 10. Confirm WWTP sludge disposal site(s) with DoNRE 11. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments. 12. Submit updated EMP with new potential impacts to ADB to review. 13. Develop individual management sub-plans for CEMP: a) Construction drainage; b) Soil erosion; c) Noise and dust; d) Contaminated spoil disposal; e) Solid and liquid waste disposal; f) Construction & urban traffic congestion; g) Utility and power disruption; h) Worker and public safety; i) Tree and vegetation removal and site restoration; j) Construction materials acquisition, transport, & storage, and k) Cultural chance finds.	All sites with special reference to new WWTPs	Before construction initiated	Once with detailed designs documents		PMIS	PMU/PIU
Update EMP	Positive environmental impacts	14. Update baseline water quality & presence of aquatic biota in two red river tributaries that will receive treated effluent from two new WWTPs	Two red river tributaries	Before construction initiated	Once with updated EMP	See Monitoring Plan below	PMIS/PIU	PMIS/SO

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Confirm GoV approved construction waste disposal sites	No negative impact	15. Notify DoNRE to confirm locations of sites for borrow pits and disposal areas for construction for subprojects, and obtain required permits.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoNRE	PIU
UXO survey, & removal	Injured worker or public	16. Ensure GoV military is consulted and clears subproject areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	PMU/PIU	GoV military
Develop bid documents	No negative environmental impact	17. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of EMP must be budgeted. 18. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMIS	PIU
Create awareness of physical cultural resources in area	No negative environmental impact	19. PMU/PIU to review potential locations of physical cultural resources, and explain possible PCR to contractors and PMIS	All subproject areas	Before construction begins	Once	No marginal cost	DCST	DCST
Obtain & activate permits and licenses	Prevent or minimize impacts	20. Contractors to comply with all statutory requirements set out by GoV for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Capacity development	No negative environmental impact	21. Develop and schedule training plan for PIU/SO/EO to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 22. Create awareness and training plan for contractors (EO) whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PMIS	PMIS
Recruitment of workers	Spread of sexually transmitted disease	23. Use local workers as much as possible thereby reducing #s of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	EA/PIU	Contractor's bid documents

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Construction Phase of Wastewater and Drainage, Route 152 Upgrades, and town Centre Enhancements								
Initiate EMP & sub-plans,	Prevent or minimize impacts	24. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Worker camps	Pollution and social problems	25. Locate worker camps away from human settlements. 26. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 27. A solid waste collection program must be established and implemented that maintains a clean worker camps 28. Locate separate pit latrines for male and female workers away from worker living and eating areas. 29. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 30. Worker camps must have adequate drainage. 31. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 32. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers. 33. Camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor
Training & capacity	Prevent of impacts through education	34. Implement training and awareness plan for PIU/SO/EO and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMIS	PMIS/PIU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Construction materials acquisition, transport, and storage sub-plan	Pollution, injury, increased construction traffic congestion	35. All borrow pits should be reviewed by DoNRE. 36. Select pits in areas with low gradient and as close as possible to construction sites. 37. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 38. Pits and quarries should not be located near surface waters, houses, or cultural property or values. 39. All topsoil and overburden removed should be stockpiled for later restoration. 40. All borrow pits and quarries should have a fence perimeter with signage to keep public away. 41. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil. 42. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting. 43. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites. 44. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled. 45. All aggregate loads on trucks should be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
DBST (pavement) production, and application	Air pollution, land and water contamination, and traffic & access problems,	46. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non- traffic areas 47. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 48. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 49. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations. 50. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities. 51. Bitumen should not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Spoil management sub-plan	Contamination of land and surface waters from excavated spoil, and construction waste	52. Uncontaminated spoil to be disposed of in GoV-designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified. 53. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature. 54. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits. 55. A record of type, estimated volume, and source of disposed spoil must be recorded. 56. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal. 57. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoV regulations. 58. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMIS & PIU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	59. Management of general solid and liquid waste of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 60. Areas of disposal of solid and liquid waste to be determined by GoV. 61. Disposed of waste should be catalogued for type, estimated weigh, and source. 62. Construction sites should have large garbage bins. 63. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 64. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 65. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations. 66. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 67. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 68. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Noise and dust sub-plan	Dust Noise	69. Regularly apply wetting agents to exposed soil and construction roads. 70. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 71. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed. 72. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving. 73. Maintain equipment in proper working order 74. Replace unnecessarily noisy vehicles and machinery. 75. Vehicles and machinery to be turned off when not in use. 76. Construct temporary noise barriers around excessively noisy activity areas where possible.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	77. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 78. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 79. Contact affected community to inform them of planned outages. 80. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU & Utility company	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	81. Contact DARD for advice on how to minimize damage to trees including mangroves, and vegetation. 82. Restrict tree and vegetation removal to strict WWTP site and pipeline alignments RoW area. 83. Prevent tree removals, and install protective physical barriers around trees that do not need to be removed. 84. All areas to be re-vegetated and landscaped after construction completed. Consult DARD to determine the most successful restoration strategy and techniques. Aim to replant three trees for each tree removed.	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Erosion control sub-plan	Land erosion	85. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 86. Earthworks should be conducted during dry periods. 87. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 88. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 89. Re-vegetate all soil exposure areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement worker and public safety sub-plan	Public and worker injury, and health	90. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 91. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 92. Worker and public safety guidelines GoV should be followed (DoLISA regulations & guidelines). 93. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles. 94. Standing water suitable for disease vector breeding should be filled in. 95. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers. 96. Appropriate safety clothing and footwear should be mandatory for all construction workers. 97. Adequate medical services must be on site or nearby all construction sites. 98. Drinking water must be provided at all construction sites. 99. Sufficient lighting be used during necessary night work. 100. All construction sites should be examined daily to ensure unsafe conditions are removed.	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Civil works	Degradation of water quality & aquatic resources	101. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and streams and Red River tributaries and all other surface waters. 102. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 103. Earthworks should be conducted during dry periods. 104. All construction fluids such as oils, and fuels should be stored and handled well away from streams and Red River tributaries and other surface waters 105. No waste of any kind is to be thrown into streams and Red River tributaries No washing or repair of machinery near surface waters. 106. Pit latrines to be located well away from streams and Red River tributaries. All irrigation canals and channels to be protected the same way as Red River tributaries	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works	Degradation of terrestrial resources	107. All construction fluids such as oils, and fuels should be stored and handled well away from streams and Red River tributaries	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Implement Construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	108. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights. 109. Post speed limits, and create dedicated construction vehicle roads or lanes. 110. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 111. Demarcate additional locations where pedestrians can develop road crossings away from construction areas. 112. Provide construction road and walkway lighting.	All construction sites	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Implement Construction Drainage sub-plan	Loss of drainage & flood storage	113. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 114. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby streams and Red River tributaries. 115. Install temporary storm drains or ditches for construction sites 116. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing stormwater storage capacity..	All areas near streams and Red River tributaries	Design & construction phases	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works & Chance finds sub-plan	Damage to cultural property or values, and chance finds	117. As per detailed designs all civil works should be located away from all cultural property and values. EA identified potential sites and types of PCR in pre-con phase. 118. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 119. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DCST notified by telephone if valuable. 120. Work at find site will remain stopped until DCST allows work to continue.	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Construction of Northeastern WWTP								
Construction of WWTP	Destruction or damage to forests and terraced gardens	121. Extra care to locate WWTP site and alignment of raw WW pipeline away from forests and gardens east of Sa Pa. Pipeline must be placed along existing access road that goes close to WWTP site	At eastern WWTP site & pipeline	Through construction phase	Monthly	No marginal cost	PIU/PMIS	contractor
Construction of Upgrades to Route 152								

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Civil works to upgrades to Route 152	Disrupted traffic, and increased traffic accidents	122. Clearly marked lower speed limits must be enforced. Construction vehicles relegated to dedicated lane if possible in wide section of road.	Entire length of Route 152	During all river civil works activities	Monthly	No marginal cost	PIU/PMIS	contractor
Operation of New WWTPs								
Operation of WWTPs	Reduced effluent quality leading to pollution two Red river tributaries	a) The quality of treated effluent of both WWTPs should be monitoring regularly to ensure that it always meets effluent quality design criteria	At WWTPs	Quarterly	Biannual	O&M	WWTP operators / DONRE	
	Equipment failure at WWTPs causing chemical spills, and raw WW discharge	b) Sufficient annual O&M budget must be provided to ensure all equipment stays in good working condition. c) All staff must be properly trained on new WWTP s operations		Fulltime			WWTP operators	

V. MONITORING PLAN

23. The environmental monitoring plan for the EMP is provided in Table 5. The monitoring plan focuses on three phases (pre-construction, construction, post-construction operation) of the subproject and consists of environmental indicators, sampling locations & frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document unexpected positive or negative environmental impacts of the subprojects.

A. Environmental Quality Standards for Subproject Components

24. Environmental quality standards and criteria for Viet Nam are listed in Appendix B. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) should be consulted to supplement GOV standards if required.

25. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program under the supervision and coordination of the PMIS/PIU. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SO and EO will coordinate monitoring work with the EMC. The PMIS/PIU will also provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

26. After construction is completed and the new WWTPs are in operation the treated effluent quality of the WWTPs should be monitored regularly either by the WWTP operators or by DONRE. Monitoring of the success of any minor compensation will be undertaken as part of the separate REMDP prepared for the subproject. Table 2 summarizes the responsibilities for monitoring during the construction-implementation of the subproject.

1. Performance Monitoring

27. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the entire subproject. Select indicators of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 6.

2. Reporting

28. Regular reporting on the implementation of mitigation measures, and monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 4 and 5) summarize proposed timing of reporting. Appendix C provides a monitoring report template for the PIU that the PIU with assistance from the PMU and PMIS must complete and attach as part of regular PIU reporting to the PMU/IA.

29. A report on environmental monitoring and implementation of EMP for the subproject component sites will be prepared quarterly for the EA/PSC by the PIU. The PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PMIS. The PIU report will also be sent to the DoNRE and ADB. The reports will table all indicators measured with the monitoring plan of EMP including

performance monitoring indicators (Table 6), and will reference relevant GoV environmental quality standards.

Table 5. Environmental Monitoring Plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision	Implementation	
Pre-construction Phase – Update Environmental Baseline Conditions							
Review baseline of existing sensitive receptors (e.g., cultural property & values, rare/ endangered species, critical habitat) for affected buffer zone areas	At all subproject sites	Consultation with community, and DONRE and Director of Hoang Linh National Park	Once	Once	PMU/PIU	Environmental Monitoring Consultant	$1,000.
A) Update baseline qualitative air quality: dust, noise, and vibration levels B): Update baseline water quality of two Red river tributaries: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform	A): Along Road 152, at both WWTP sites, and at area for town enhancement B): Two tributaries of Red river and streams below discharge points of both WWTPs.	Using field and analytical methods approved by DoNRE.	A & B: One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PIU	Environmental Monitoring Consultant	A) $1,500. B) $6,000.
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once	Once	PIU	Environmental Monitoring Consultant	$500.
Construction Phase of all Subproject Components							

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision	Implementation	
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease, hydrocarbons).	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once if needed	Once	PIU	Environmental Monitoring Consultant	$2,500.
A) Qualitative air quality: dust, , noise, and vibration levels B: two Red river tributaries and streams quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform C) Analysis of soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons. D) Domestic (worker) and construction solid waste inside & outside construction sites including worker camps. E) Public comments and complaints F) Incidence of worker or public accident or injury	A), B): Baseline sites of pre-construction phase. C) At sites where contaminated soil is suspected. D) All construction sites and worker camps E) Using hotline number placed at construction areas F) At all construction areas	A – C : Using field and analytical methods approved by DoNRE. Include visual observations of dust and noise from contractor & public reports . D) Visual observation E) Information transferred by telephone hotline number posted at all construction sites. F) regular reporting by contractors/PIU	(A – B): Quarterly during construction periods Daily visual records C) Once at start of excavations D) Monthly E) Continuous public input F) Continuous	Monthly	(A - D):		
					PIU	EMC	A & B: $30,000../yr C: $2,000./yr D: no marginal cost
					(E & F) & daily observations:		
					PMU/PIU	contractor	E: $1,000./yr F: no marginal cost
Operation of New WWTPs							

ENVIRONMENTAL EFFECTS MONITORING						
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility	Estimated Cost (USD)
					Supervision / Implementation	
TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, coliform	Two Red river tributaries and streams below discharges of northern and southern WWTPs Effluents of both WWTPs before discharged to rivers	Using field and analytical methods approved by DoNRE	Quarterly	Biannually	WWTP/DONRE	$14,000. /yr
Operation of Upgraded Road 152						
Incidence of road accidents	Along Road 152	Regular reporting by police	Biannually	Biannually	PPC/DOT	$1000./yr

Table 6. Performance Monitoring Indicators for Subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation & Disclosure	Affected public & stakeholders	Meetings with stakeholders contacted during IEE & new stakeholders convened for follow-up consultation & to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Updated EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP[12])	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of PIU/PMU	Training course(s) & schedule	By end of P-C phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Red river tributaries and streams quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Document baseline conditions as per Monitoring Plan	Survey
Planned WWTPs effluent quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S	Compare with original design criteria	desktop
Construction Phase			
All subproject areas	Critical habitat, rare or endangered species ***if present***	All *present* critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC[13]
Red river tributaries and streams rivers quality	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S [14]	Levels never exceed pre-construction baseline levels	Monitoring by EMC
Qualitative air quality	Dust, noise, vibration[15]	Levels never exceed pre-construction baseline levels	EMC & contractor monitoring reports,
Soil & surface quality	Solid & liquid waste	Rigorous program of procedures & rules to collect and store all waste from construction camps and sites	Contractor and EMC monitoring reports

[12] Contractor Environmental Management Plan developed from EMP in contractor bidding document
[13] Environmental Monitoring Consultant hired by PMIS to assist implementation of Environmental Monitoring Plan
[14] See Appendix B for list of available environmental quality standards
[15] Footnote 10

Major Environmental Component	Key Indicator	Performance Objective	Data Source
		practiced.	
Hazardous materials & waste	Oil, gasoline, grease, alum, chlorine, soda	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public & worker safety	Frequency of injuries	Adherence to GoV OHS regulations/policy to prevent accidents[16]	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports
Traffic	Frequency of disruptions & blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Operation of New WWTPs			
Aesthetics, solid waste	Odour, uncontained garbage	Clean pond and WWTP areas, no aesthetic issues	Public/PPC
Air quality	dust, noise on property roads	Levels never exceed pre-construction baseline levels	Public/DoNRE,
Red river tributaries and streams river quality below WWTPs	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S) [17]	Levels never exceed pre-construction baseline levels	DONRE
Treated effluent of WTTPs	TSS, metals (Pb, Fe, As), parameters of TP, TN, fecal coliform, H_2S)	Effluent quality meets design criteria, and QCVN standards	WWTPs/DONRE
Operation of Upgraded Road 152			
Risk of accidents, noise, dust	Incidence of accidents, and dust & noise levels	Levels never exceed pre-construction baseline levels	DOT/PPC

VI. ESTIMATED COST OF EMP

30. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. From Table 5 the preliminary costs for the

[16] MoLISA GoV Regulations and Policy
[17] See Appendix B for list of available environmental quality standards

implementation of the EMP for the subproject are summarized in Table 7. These costs include per diem technician fees.

31. An estimated budget of USD $10,000.00 is required for capacity building and training for environmental management in conjunction with other capacity development activities of the project such as occurring as part of overall the capacity development component of the PPTA. The costs to implement the EMP will need to be updated by the PMIS in conjunction with the PIU during the pre-construction phase.

Table 7. Estimated Costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	$1,000.00
environmental quality	$8,000.00
Construction Phase	
environmental quality	$68,500.00
public consultation	$2,000.00
Post-construction Operation Phase	
environmental quality	$30,000.00
public input	none
Capacity Development and training	$10,000.00
Total	**$119,500.00**

VII. EMERGENCY RESPONSE PLAN

32. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;
ii) the District fire and police departments, emergency medical service, the Department of Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

33. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 8. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary & requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools & funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of Subproject progress.

34. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

35. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

36. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PCU/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) Subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used; i
iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
v) the Contractor's Emergency Management Plan
vi) names and contact details of the ERT members

37. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

38. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and vi) conducted drills for different possible situations.

39. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

A. Alert Procedures

40. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:

- Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
- EERT institutions/organizations
- Concerned village authority/ies
- PIU Office, SO

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.
(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

B. Emergency Response Situations

The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 9. Evacuation Procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.
▪ If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 10. Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: ▪ Safety first of both the rescuer and the victim. ▪ Do not move an injured person unless: ▪ victim is exposed to more danger when left where they are, e.g., during fire, chemical spill

Procedure	Remarks
	▪ it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure ▪ instructed or directed by the EERT. ▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.
▪ Call the EERT emergency medical services &/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: ▪ an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. ▪ Other ERT members to clear access road for smooth passage of the EERT.
▪ If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 11. Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: ▪ call the attention of other people in the site, ▪ sound the nearest alarm, and/or ▪ Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) ▪ report/communicate the emergency situation to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control fire from spreading.	▪ Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
▪ Call the nearest fire & police stations	▪ When alerting the EERT, ERTL will

Procedure	Remarks
&, if applicable, emergency medical services.	give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: ▪ an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. ▪ some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

VIII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

41. Currently there is insufficient experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP. i.e., PPC/PIU/PMU in Sa Pa province. No dedicated environmental staff exists in the PIU and thus the PMU. The PMIS with assistance from the designated SO/PIU will develop and deliver training courses to the PIU/PMU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/PMU/SO to oversee implementation of the EMP by construction contractors, and EMC

42. The SO who is a full-time environmental member of the PIU as well as the EO of the contractor should attend training courses as required. Costs for training are included with costs for implementation of the EMP.

43. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

APPENDIX A: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF PMIS

International Environmental Specialist. With assistance from the national environmental specialist the international consultant will be responsible for updating the subproject EMPs at detailed design, and assisting the PIU with overall environmental management of the implementation of the three subprojects (Bac Giang, Mong Cai, Sa Pa) in Viet Nam. The consultant will: (i) update the three environmental management plans (EMP) for the three three subproject towns to ensure that EMPs address the detailed designs and engineering of subprojects. Updates to EMPs include mitiation and monitoring plans, budget, and capacity development needs of executing agencies (PPC) and PIUs (CPCs and DPI); (ii) with national consultant design comprehenisve training plan for safeguards officer/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) coordinate and work with the SO/PIUs to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMPs and the actual site conditions; (v) oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) coordinate with the three provincial Departments of Environment and Natural Resources (DONRE) on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PIUs consult GoV authorities to assist with ToR development and implementation; (ix) with SO/PIUs prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction; (x) prepare ToR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the three subproject EMPs; (xi) coordinate with PIU/DoTs when necessary to address vehicle traffic issues during road upgrades; (xii) advise SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (xiii) with SO/PIUs ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and SO/PIUs prepare a table of contents for regular reports PIU must submit to the EA on implementation of EMPs, environmental, issues, and corrective actions; (xv) assist SO/PIUs prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of all EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the PPCs and ADB. The consultant should have at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Viet Nam) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, project implementing units.

National Environmental Specialist. Provide assistance to the international environmental specialist including acquisition of information new information to update the three EMPs at detailed design, and work with the PIU with overall environmental management of the implementation of the three subprojects in the three corridor towns of Viet Nam. The national consultant will assist with: (i) updating all environmental management plans (EMP) for the three subprojects to ensure that EMPs address the detailed designs and engineering of subprojects.; (ii) deliver initial training to EA/PIU/PMU on the purpose, content, and roles and responsibilities for implementation of updated EMPs; (iii) ensure relevant safeguards of the EMPs are addressed in the bidding documents in accurate local language and in evaluation criteria for awarding contracts; (iv) help SO/PIUs to ensure that contractors prepare their respective site-specific plans based on the updated EMPs and the actual site conditions; (v) help Int'l ES consultant oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with the three provincial DoNREs on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with SO/PIUs, prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. (viii) assist PIU/DoT when necessary to address vehicle traffic issues during road upgrades; (ix) with Iint'l ES consultant advise the SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (x) with SO/PIU ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have at least 5 years with environmental assessment of infrastructure projects in Viet Nam including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to provincial project implementing units.

APPENDIX B: ENVIRONMENTAL STANDARDS AND CRITERIA FOR VIET NAM

Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of about coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigational purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: - National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: - National regulation heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: national technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

International Guidelines

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement & Analysis Environmental Quality

APPENDIX C: MONITORING REPORT TEMPLATE FOR PROJECT IMPLENTATION UNIT

Safeguards Monitoring Report

This report is to be completed by the PIU with assistance from the PMIS and PMU. The report forms part of the regular reporting of PIU to PMU and ultimately to the EA and ADB.

1. Introduction and Project Overview

Project Number and Title:		
Safeguards Category	Environment	B
	Indigenous Peoples	B
	Involuntary Resettlement	B
Reporting period:		
Last report date:		
Key sub-project activities since last report:	*This section can include, among others, the following:* • *Activities of PIU/PMU* • *Progress of work (% physical completion)* • *Changes of surrounding environment* • *Status of permits / consents*	
Report prepared by:		

2. Environmental Performance Monitoring

a. Summary of Compliance with EMAP Requirements (Environmental Performance)

Monitoring Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use tabled performance monitoring indicators of EMP			

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of monitoring or mitigation measures or activities not completed			

(last column of previous table)			
New Issues from This Report			

c. Other activities

- Other issues not covered by mitigation or monitoring plans of EMP
- Any additional environmental monitoring required (e.g., air quality, water sampling)

3. Occupational, Health and Safety (OHS) Performance Monitoring

a. OHS for worker

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

b. Public Safety

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			

New Issues from This Report			

4. Information Disclosure and Socialization including Capability Building

Prepare brief summary of the information below where applicable

- Field visits conducted (sites visited, dates, persons met)
- Public consultations and meetings conducted (date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training conducted (nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media releases
- Material development/production (e.g., brochure, leaflet, posters)

5. Grievance Redress Mechanism

Summary:

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

6. Conclusion

- Important results from the implementation of mitigation and monitoring of EMP

- Recommendations to improve EMP implementation

7. Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Photographs
- Maps