Environmental Management Plan

August 2018

Viet Nam: Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project - Thua Thien Hue Subproject

Prepared by the Provincial People's Committee of Thua Thien Hue for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 20 May 2018)

currency unit	=	Vietnamese Dong D
D1.00	=	$0.000044
$1.00	=	D22,767

ABBREVIATIONS

ADB	-	Asian Development Bank
PAH	-	Project Affected Household
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
DOLISA	-	Department of Labour, Invalids, and Social Assistance
DONRE	-	Department of Environment and Natural Resources
DDSSC	-	Detailed Design and Safeguards Support Consultant
DCST	-	Department of Culture, Sport and Tourism
EA	-	Executing Agency
EIA	-	Environment Impact Assessment
EMP	-	Environment Management Plan
EO	-	Environment Officer of Contractor
ESS	-	Environmental Safeguards Specialist
IA	-	Implementation Agency
IEE	-	Initial Environmental Examination
IES	-	International Environment Specialist
MCST		Ministry of Culture Sport and Tourism
NES	-	National Environment Specialist
GOV	-	Government of Viet Nam
OHS	-	Occupational, Health & Safety Officer of Contractor
PMU	-	Project Management Unit
PPC	-	Provincial Peoples Committee
PPSC	-	Provincial Project Steering Committee
ESS	-	Environmental Safeguards Specialist
UXO	-	Unexploded Ordnance

WEIGHTS AND MEASURES

km	kilometre
kg	kilogram
ha	hectare
mm	millimeter

NOTE

In this report, "$" refers to US dollars unless otherwise stated.

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I. INTRODUCTION

1. The environmental management plan (EMP) provided herein addresses the Hon Chen Temple Access Improvements subproject, the Huong River Tourist Piers Improvement subproject, and the Da Bac Access Improvements subproject in Thua Thien Hue province. This EMP is one of the five EMPs that have been prepared for the nine subprojects of the Second GMS Tourism Infrastructure for Inclusive Growth Project in Viet Nam. The other EMPs address subprojects in the provinces of Hoa Binh, Nghe An, Quang Binh, and Quang Tri.

2. A single Initial Environmental Examination (IEE) of the nine subprojects was prepared separately. The five provincial EMPs for the subprojects are comprehensive and developed as separate stand-alone management tools that is supported by the parent IEE. The subprojects in Thua Thien Hue are described below.

A. Hon Chen Temple Access Improvements

3. The southern access road to the temple will be upgraded with an improved surface, lateral footpaths and parking.

B. Huong River Tourist Pier Improvements

4. Five piers on the Huong river in Hue and two piers in the Tam Giang lagoon will either be upgraded or constructed. The concrete piers will include shoreline public amenities such as waiting and ticket areas, small commercial space, toilets, and parking.

C. Da Bac Access Improvements

5. The access road from NH#1 to the existing parking lot of the Meditation Centre will be upgraded. Electric cars will be provided to transport tourists from the parking lot to the boat pier to the Meditation center. The tourist stop-over on NH#1 will be upgraded with amenities such as toilets, better parking, kiosk space, and landscaping. A floating pier landing will be provided on shore of Tam Giang lagoon.

6. The three subprojects of the TIIG in Thua Thien Hue province in Table 1.

Table 1. Subprojects of Thua Thien Hue

Subproject	Description
Hon Chen Temple Access Improvements	• Upgrading the 1.2 km southern access road from national highway #1 to DBST condition with 7m carriageway, footpaths, and 5,000 m^2 parking area.
Huong River Tourist Pier Improvements	**Huong River** • Bao Vinh Heritage Village Pier: (i) construct a new 30 m concrete pier; (ii) 20m^2 parking area for bicycles; (iii) 100m^2 service building with waiting space, ticketing, and toilets; and (iv) 188m^2 yard and green area;

Subproject	Description
	• Than Pier: (i) construct new 60 m concrete pier; (ii) 830 m^2 parking area; (iii) 200m^2 service building with waiting rooms, commercial space, ticketing, and toilets; and (iv) 1,120m^2 landscaped yard; • Le Loi Pier: (i) construct 120 m concrete pier; (i) 250m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 3,000 m^2 landscaped yard; (iv) upgrade the 0.18 km access road (9 m carriageway) with road side access to the pier; • Voi Re/Ho Quyen Pier: (i) construct a new pier 60 m concrete pier; (ii) 520 m^2 parking; (iii) 175m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 950 m^2 landscaped yard; (iv) upgrade 0.11 km concrete road (5m with) and construct 110m new road (3m wide); • Thanh Tien Pier: (i) construct new 40 m concrete pier; (ii) 270 m^2 parking area; (iii) 245m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 730 m^2 landscaped yard; (iv) upgrade 0.2 km concrete access road (3.5m wide) and new 35m pier access road (5.5 m wide); **Tam Giang Lagoon** • Can Toc Pier: (i) construct new 80 m concrete pier; (ii) 1,340 m^2 parking; (iii) 270m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iv) upgrade 0.2 km foot path and construct 270m new road (13.5 m wide); and • Vinh Tu Pier: (i) construct new 70 m concrete pier; (ii) 350 m^2 parking; (iii) 230 m^2 service building with waiting rooms, commercial space, ticketing, and toilets; and (iii) 400 m^2 landscaped yard.
Da Bac Access Improvements	• Upgrade 6km X 5.5m wide carriageway with 1m shoulders to DBST condition from NR#1 to existing car park near boat pier • Provide electric shuttle cars to transport passengers from car park to boat pier • Improve existing Da Bac rest stop with sealed 260 m^2 parking area, construct 300 m^2 of kiosks for local vendors, toilets, and a 70 m long, 3,970 m^2 concrete and floating pier, with hard and soft landscaping and lighting.

II. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

7. At the feasibility design stage, the main management framework for the implementation of the EMP is summarized as follows.

8. The Thua Thien Hue Provincial Peoples Committee is the project owner and Executing Agency (EA) who ultimately will be responsible for the successful implementation of the EMP, and for compliance with environmental loan assurances. A provincial inter-departmental Provincial Project Steering Committee (PPSC) will be formed (e.g., DCST, Transport, Construction Environment & Natural Resources, Finance, Planning and Investment, and Womens Union) which will assist the EA with any environmental safeguard matters as needed.

9. The EA will assign Department of Planning and Investment (DPI) as project Implementing Agency (IA) which will assign a Project Management Unit (PMU). The IA with support from the PMU will, *inter alia,* on behalf of EA lead the implementation of the EMP and all communications and reporting to the ADB for EMP implementation. The PMU will assign an Environmental Safeguard Specialist (ESS) to take responsible for day-to-day management of the provincial EMP in conjunction with the Environmental Officer(s) (EO) of the construction contractor(s). The requirement for an experienced EO will be included in contractor tender documents. On behalf of the EA, the PPSC will provide operational guidance to the IA/PMU and liaise with the ADB as needed for implementation of the EMP. The ESS of the PMU will oversee the work of the EO of the contractor on the implementation of the CEMP for each construction package.[1]

10. External support to the IA/PMU for implementation of the EMP will be provided by the International Environment Specialist (IES) and National Environment Specialist (NES) of the Detailed Design and Safeguards Support Consultant (DDSSC) and an external Environmental Monitoring Institute (EMI).[2] The EMI will conduct the field sampling and laboratory analyses of environmental quality (e.g., water quality, air quality) that cannot be performed by the contractor or DDSSC.

11. The responsibilities of the different agencies shown in the management framework are listed in Annex 1. Provided below is a summary of responsibilities for implementation of the EMP.

12. The responsibilities of the EA as supported by PPSC for environmental safeguards, include:

- Provide coordination for environmental and social safeguards, and monitoring to the IA/PMU/ESS;
- Liaise with ADB on the implementation of the EMP;
- With assistance from IA/PMU submit semi-annual environmental monitoring reports to ADB;
- Resolve with the IA/PMU, and ADB if necessary, issues arising from the implementation of EMP;
- Oversee successful operation of Grievance Redress Mechanism (GRM) and support resolution of any submitted stakeholder grievances at project level if possible;
- With support from IA/PMU prepare report on Grievance Redress Mechanism (GRM) to be included in the semi-annual environmental monitoring report;

13. The responsibilities of the ESS/PMU include:

- Assist the DDSSC consultant with updating the EMP to meet final detailed subproject designs;
- With PMU/IA and in coordination with DONRE, notify PPC to confirm DONRE requirements approvals of project are met;
- Assist the DDSSC to include updated EMP in contractor tender documents, and to specify CEMP requirements for contractor bid documents;
- Undertake day-to-day management of EMP implementation activities;
- In conjunction with EOs ensure contractors meet requirements of their CEMPs and the EMP;

[1] Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

[2] The DDSSC will have budget to contract an EMI to conduct the environmental monitoring as required by EMP.

- Work with the EMI on implementation of monitoring plan of EMP;
- Ensuring compliance with environmental loan covenants and assurances in respect of all subprojects;
- ESS assists PMU with coordination of the Grievance Redress Mechanism (GRM), and disclosure activities additional public consultation activities
- Lead follow-up meetings with all affected stakeholders;
- Prepare and submit quarterly reports on EMP implementation to EA;
- Oversee implementation of the CEMP by contractor;
- Coordinate with environment specialists to ensure EMP implementation;
- Undertake regular construction site inspections to ensure the contractor implements the CEMP properly; and
- Ensure the contractor's EO submits monthly environmental monitoring reports on implementation of construction mitigation and monitoring measures.

14. The responsibilities of the international and national environmental specialists of the DDSSC firm are detailed in the Terms of Reference for the two positions in Annex 2. Key responsibilities for the EMP are listed below:

- Update the EMP according to final detailed designs of subprojects;
- Assist ESS/PMU with including EMP to in bidding documents;
- Assist ESS to review CEMPs submitted with contractor bid documents;
- Provide technical direction and support to the ESS for implementation of the EMP;
- Oversee the design and delivery of capacity development and training for the PMU and EO of contractor(s);
- Assist the PMU prepare semi-annual environmental environmental/social safeguards monitoring reports for submission to ADB and government;
- Provide advice and support to the EMI to conduct their monitoring activities;
- Review all reports prepared by the ESS/PMU, EMI, EA; and
- Review the location of any possible contaminated sites near subprojects.

15. The responsibilities of contractor's Environmental Officer (EO):

- Implement their CEMP during construction; and
- Prepare and submit monthly reports on mitigation and monitoring activities of their CEMP and any environmental issues at construction sites.

16. The responsibilities of Environmental Monitoring Institute (EMI) include:

- Implement the environmental sampling required in the EMP's monitoring plan that cannot be conducted by the contractor and PMU.
- Perform required laboratory analyses for the monitoring program detailed in the EMP; and
- Prepare and submit quarterly reports to the IES/NES and ESS/PMU on monitoring activities.

17. The Thua Thien Hue Department of Environment and Natural Resources (DONRE) is the provincial agency which oversees environmental management of the project. The DONRE will provide direction and support for environmental protection-related matters, including approval of IEE/EMP, and periodic compliance of the project with the approved EMP.

18. The ADB provides guidance to EA/IA/PMU with any issues related to IEE and EMP, and

receives and reviews the semi-annual environmental safeguards/social monitoring reports on EMP activities submitted by the EA.

A. Worker and Community Health and Safety

19. The Thua Thien Hue Department of Labour, Invalids and Social Assistance (DOLISA) prescribes regulations and guidelines governing worker and public safety in the workplace and complying with Law on Occupational safety and Health No. 84/2015/QH13.[3] The directives of DOLISA must be implemented by the contractor's Occupational, Health and Safety (OHS) program throughout the construction and operational phases of the subproject.

B. Regulatory Framework and Guidelines

20. Key environmental laws and regulations for the subproject drawn from the IEE are summarized in Table 2. See the IEE for the complete legal and regulatory framework and environmental standards for environmental management.

Table 2. Key laws and regulations applicable to subproject[4]

- Law on Environmental Protection No. 55/2014/QH13, passed by the National Assembly on 23th June 2014, in effect on January 01, 2015;
- Decree No.18/2015/ND-CP, and Circular 27/2015/BTNMT (2015), on environmental protection planning, Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment;
- Land Law No. 45/2013/QH13, passed by the National Assembly dated November 29, 2013, in effect on July 01, 2014;
- Decree No. 43/2014/NĐ-CP dated May 15, 2014 of the Government, detailing implementing some articles of Land Law, in effect on July 01, 2014;
- Law on Water Resources No 17/2012/QH13
- Law No 29/2004/QH11 on forest protection and development, passed by the National Assembly on December 03, 2004, in effect on April 01, 2005;
- Biodiversity Law 20/2008/QH12 dated 13th November 2008;
- Law on Occupational safety and Health No. 84/2015/QH13, passed by the National Assembly dated June 19th, 2015, in effect on July 1st, 2016;
- Decree No. 39/2016/ND-CP dated May 15th, 2016 On detailing the implementation of a number of Articles of the Law on Occupational Safety and Health.

III. SUMMARY OF POTENTIAL IMPACTS

21. The potential impacts of the construction and operation of the three subprojects (Table 1) are summarized in Table 3 followed by a detailed description of potential impacts and impact mitigation measures from the IEE. The mitigation measures for the potential impacts of the subprojects are detailed in the Mitigation Plan of the EMP.

22. The potential impacts of the three subprojects are caused primarily from the civil works activities during the construction phase of the subprojects. The short-term construction disturbances concern noise, dust, soil erosion and surface water sedimentation, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and construction

[3] E.g., Law on Occupational safety and Health No. 84/2015/QH13, passed by the National Assembly dated June 19th, 2015, in effect on July 1st, 2016; and Decree No. 39/2016/ND-CP dated May 15th, 2016.

[4] Abridged from IEE.

solid and liquid waste, and potential chance finds and exposure of physical cultural resources of the World Cultural Heritage Centre of Hue area, which includes the Hon Chen Temple. Other heritage buildings and sites in the Hue area are not near the three piers.

23. The mitigation measures are particularly sensitive to the different physical cultural and heritage resources in the Hue area. The ongoing access and use by local community and tourists of Hue's cultural centers will be protected so that tourism will not be disrupted.

24. Mitigation measures that will permanently become part of the infrastructure such as landscape planting and re-vegetation, culverts and lateral drains, road signage and markings are included in the main civil work contract costs. Temporary mitigation measures during the construction stage (e.g. dust suppression by watering, use of quiet / well maintained mechanical equipment, provision of soil erosion berms and silt curtains to prevent or contain surface water sedimentation, provision of sanitary facilities for construction workers, etc.) will be included in the tender documents to ensure that contractors include them in their budgets.

Table 3. Summary of potential impacts subprojects

Pre-construction Phase
• Some resettlement, land acquisition, and asset loss will be required for the three subprojects as follows. The Hon Chen Temple subproject will: (i) cause impact on lands and assets on land of 24 households and one private business, including seven severely affected households; (ii) require the acquisition of 14,196 m^2 of residential and agricultural lands; and (iii) require the removal of 470 timber trees. The Huong River piers subproject will permanently impact on 2,251 m^2 of agricultural and public lands and 10 fruit trees. One household will have house-cum-shop entirely affected due to land acquisition of the subproject. The Da Bac Access subproject will: (i) require the acquisition of 22,336 m^2 residential, agricultural and public lands; (ii) require removal of 5,205 trees; and (iii) cause severe impact on land of one household. See separate LAR reports for details of impacts and compensation.
Construction Phase
Hon Chen Temple Access Improvements • The upgrading of the short southern access road to the Temple from NR#1 and construction of the new parking lot will create common construction and civil works disturbances along the southern road alignment such as noise, dust, traffic congestion, soil erosion, production of solid and domestic construction waste. No surface water will be impacted. • Normal access to the Temple will not be disrupted because use of the northern access road from Hue along the Huong river will not be affected.
Huong River Tourist Piers Improvement • The upgrades to existing and the construction of new piers in the Huong river and Tam Giang Lagoon will temporarily damage and disrupt benthic aquatic habitat inside the pier construction footprints. • Water quality will be temporarily degraded with the resuspension of bottom sediments causing high TSS and turbidity when the pier works are conducted. • Local boat traffic and uses of the river and lagoon such as fishing and aquaculture will be disrupted close to the pier locations. • The construction of tourist facilities at the piers such as small buildings, parking lots, and public toilet blocks will create construction and civil works disturbances such as noise, dust, traffic congestion, soil erosion and possible sedimentation of the Huong river, production of solid and domestic construction waste.

Da Bac Access Improvements

- The upgrading of the access road to the existing parking lot for the Meditation Centre will create common construction and civil works disturbances such as noise, dust, traffic congestion, soil erosion and possible sedimentation of the stream flowing near the Meditation Centre parking area, and production of solid and domestic construction waste. Excavated soil and stockpiled construction aggregate is the major potential source of erosion.
- Similarly, but to a much smaller magnitude, the upgrades to the parking lot, and the construction of the information center and public toilet blocks at the existing stop-over and rest area on NR#1will create the same on land construction disturbances.
- The construction of the new floating boat landing in the estuary adjacent to the rest-stop will temporarily affect water quality from re-suspension of bottom sediment and will temporarily damage benthic aquatic habitat.
- Travel and access to the Meditation Centre and use of the stop-over may be temporarily disrupted during the construction phase.

Operation Phase

- The upgraded road access to the Hon Chen Temple and Meditation Centre will result in increased traffic and risk of traffic accidents. Road dust and noise will also increase.
- The increased visitation of the sites, along with the presence of public toilets could produce solid waste and sanitation issues.
- Increased boat traffic to/from the piers will increase the risk of oil and gas spills into the river and estuary.

A. Public Consultation

25. The stakeholder consultation strategy for the two subprojects developed for the IEE will be continued with the start of the pre-construction phase of the subprojects. The first step will be the disclosure of the draft IEE to the affected stakeholders that were consulted to obtain their review and comments.

1. Follow-up Consultation

26. As indicated in IEE, major concerns of the public and private stakeholders of the Hon Chen Temple access subproject are disrupted access and reduce visitation of the Temple caused by the road construction, damaged Temple property landscape, and construction impacts of noise, dust and vibration. Issues with the Huong river tourist piers are disrupted boat traffic and reduced income from disrupted livelihoods, and land erosion and sedimentation of Huong river. The public and private stakeholders consulted for the Da Bac Access subproject identified disruption of school children transport along road, disruption of use of the road by all communes along the alignment, loss of some roadside agricultural crops such as Jack fruit, and risks of traffic accidents during construction as the key issues of subproject. These issues plus the other expected temporary impacts and disturbances identified above and further below will be reviewed during follow-up consultations during pre-construction ahead of construction phase. The indicative follow-up public consultation plan is provided in Table 4.

Table 4. Indicative Public Consultation Plan

Organizer / support	Format	Frequency	Topic	Attendees
Pre-construction - Construction Stage				
PMU / DDSSC	Same Public consultation format used during IEE, including site visits and informal interviews as needed	Once near end of pre-construction stage just before construction commences (public meetings), and as needed (site visits, informal interviews) thereafter during construction phase	Review of disclosed IEE. Presentation of planned activities and schedule; anticipated impacts and mitigation measures; GRM	Affected households, district representatives, and participants from consultations during IEE
Operational Stage				
PMU / DDSSC	Public consultation, and site visits if necessary	Once in the first year	Effectiveness of mitigation measures, impacts of operation, comments and suggestions	Affected households, district representatives, participants of consultations during IEE
DDSSC / PMU	Public satisfaction survey if requested or needed	Once just before Project Completion Report issued	Public satisfaction with EMP implementation Comments and suggestions	Affected households, district representatives, participants of consultations during IEE

IV. IMPACT MITIGATION PLAN

27. The impact mitigation measures of the EMP are presented in the Mitigation Plan for the three subprojects. Following the structure of the IEE, the Mitigation Plan is organized by the three development phases of the subprojects as defined by pre-construction, construction, and the post-construction operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

28. The mitigation plan combines construction phase impacts common to both subprojects for which single mitigation measures are prescribed. In this way redundant mitigation measures are not re-stated numerous times. However, impacts and required mitigations specific to a subproject are also identified. Or, common mitigations that are particularly important for a subproject are emphasized.

A. Impact Mitigation Guidance for Contractors

29. Contractors will be required to prepare a construction EMP (CEMP) for construction packages and submit the CEMP as part of their bidding documents. The CEMPs will be developed from the EMP provide herein which will be included in the contractor tender documents. As indicated above, the CEMPs will be reviewed by the DDSSC and approved and ESS/PMU prior

to commencement of construction. Provided below, to assist the contractors are common impacts and mitigation measures from the IEE that will guide contractors to develop their specific construction package CEMPs for the three subprojects in Thua Thien Hue.

30. Potential environmental impacts of the subprojects occur during construction phase from temporary disturbances and impacts caused by the construction of individual subproject components. Common potential impacts of the civil works for the access roads to Hon Chen Temple and Da Bac will consist of reduced and/or blocked public access to areas, disrupted small business and recreation, noise, dust caused by increased truck traffic and heavy equipment use, soil and surface water pollution caused by equipment operation and maintenance, public and worker accidents, increased traffic congestion and traffic accidents, land erosion and surface water sedimentation, localized temporary drainage and flooding problems, solid waste and domestic pollution from worker camps, and communicable diseases and other social problems caused by migrant workers. Whereas, the temporary construction impacts of the 7 piers will be sedimentation in the Huong river and Tam Giang lagoon when the pier foundations are constructed, and potential disruptions to local boat traffic and fishing activities.

31. Construction management measures to mitigate common potential impacts associated with the construction phase of subproject components are presented below. The common impact mitigation measures presented below are to be developed by the contractors into their CEMPs for their construction packages for the subprojects. These generic construction impact mitigation measures are comprehensive to ensure that a mitigation measure is identified for the potential impact of all design features of the final detailed designs of the subproject. The impacts and impact mitigation measures described below are to be used by contractors to prepare the mitigation subplans of their CEMPs which are identified in the Mitigation Plan of Table 5.

32. **Air pollution control**. Contractors shall include all necessary measures to prevent or minimize air pollution and dust development by implementing the following air quality control measures. Most of these generic measures are applicable to all construction sites and construction activities as good practice and are also described in the World Bank Group's EHS guidelines (2007).

(i) Build access and aggregate hauling roads at sufficient distances from residential areas, especially schools and hospitals.
(ii) Assign haulage routes and schedules to avoid transport occurring in the central areas, traffic intensive areas, or residential areas. For the areas with high-demand for environmental quality, transport should be arranged at night.
(iii) Spray water or other wetting agents such as calcium chloride ($CaCl_2$) regularly on unpaved haul roads and access roads (at least once a day) to suppress dust; and erect hoardings around dusty activities.
(iv) Cover material stockpiles with dust shrouds or tarpaulin. For the backfill earthwork management measures will include surface press and periodic spraying and covering. The extra earth or dredge material should be cleared from the project site in time to avoid long term stockpiling.
(v) Minimize the storage time of construction and demolition wastes on site by regularly removing them off site.
(vi) Site concrete batching stations at least 300 m downwind of the nearest air quality protection target.
(vii) Equip asphalt, hot mix and batching plants with fabric filters and/or wet scrubbers to reduce the level of dust emissions.
(viii) Install wheel washing equipment or conduct wheel washing manually at each exit of

the works area to prevent trucks from carrying muddy or dusty substance onto public roads.

(ix) Keep construction vehicles and machinery in good working order, regularly service and turn off engines when not in use.

(x) Vehicles with an open load-carrying case, which transport potentially dust-producing materials, shall have proper fitting sides and tail boards. Dust-prone materials shall not be loaded to a level higher than the side and tail boards and shall always be covered with a strong tarpaulin.

(xi) In periods of high wind, dust-generating operations shall not be permitted within 200 m of residential areas. Special precautions need to be applied near sensitive receptors such as schools, kindergartens and hospitals.

(xii) To avoid odor impacts caused by shoreline sediment dredging for pier or bridge foundations, transport dredged sediment in closed tank wagons to contain odor and prevent scattering along the way.

(xiii) Unauthorized burning of construction and demolition waste material and refuse is prohibited.

33. **Construction noise**. Contractors will be required to implement the following mitigation measures for construction activities to meet QCVN 26:2010/BTNMT – National Technical Regulation on Noise or IFC/WHO environmental noise standards, whichever are most stringent, to protect sensitive receptors. Some measures are generic and are applicable to all construction sites and activities. They represent good practice and are effective measures and are in line with IFC's EHS guidelines.

(i) During daytime construction, the contractor will ensure that: (1) noise levels from equipment and machinery conform to the IFC EHS Standards, and properly maintain machinery to minimize noise; (2) equipment with high noise and high vibration are not used near residences and only low noise machinery or the equipment with sound insulation is employed; (3) sites for concrete-mixing plants and similar activities will be located at least 300 m away from the nearest noise protection target; and (4) temporary noise barriers or hoardings will be installed around the equipment to shield residences when there are residences within 20 m of the noise source.

(ii) No construction should be allowed between the night time hours of 20:00 to 07:00.

(iii) Regularly monitor noise levels at construction site boundaries. If noise standards are exceeded by more than 3 dB, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation.

(iv) Provide the construction workers with suitable hearing protection (ear muffs) according to the worker health and safety requirements of Viet Nam.

(v) Control the speed of bulldozer, excavator, crusher and other transport vehicles travelling on site, adopt noise reduction measures on equipment, step up equipment repair and maintenance to keep them in good working condition.

(vi) Limit the speed of vehicles travelling on site (less than 8 km/h), forbid the use of horns unless absolutely necessary, minimize the use of whistles.

(vii) Maintain continual communication with the villages and communities near the construction sites and avoid noisy construction activities during school examination periods.

34. **Surface water (river & lagoon) pollution**. The contractors will implement the following measures to prevent water pollution:

(i) Portable toilets and small package wastewater treatment plants will be provided on

construction sites and construction camps for the workers and canteens. If there are nearby public sewers, interim storage tanks and pipelines will be installed to convey wastewater to those sewers.

(ii) Sedimentation tanks will be installed on construction sites to treat process water (e.g. concrete batching for bridge construction) and muddy runoff with high concentrations of suspended solids. If necessary, flocculants such as polyacryl amide will be used to facilitate sedimentation.

(iii) Construction machinery will be repaired and washed at special repairing shops. No onsite machine repair and washing shall be allowed near the Huong river or Tam Giang lagoon.

(iv) Material stockpiles will be protected against wind and runoff waters which might transport them to surface waters.

(v) Dedicated fuel storage areas must be established away from the Huong river or Tam Giang lagoon, and all public areas and marked clearly.

(vi) Storage of bulk fuel should be on covered concrete pads away from the public and worker camp, and 300m from the Huong river or Tam Giang lagoon. 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.

(vii) Mitigation of water quality impacts during construction works at both subproject sites will be based on water quality monitoring results.

(viii) Berms and/or silt curtains should be constructed around all excavation/trench sites, along the shorelines, and around the piers in the Huong river and Tam Giang lagoon to prevent soil erosion and surface water sedimentation.

35. **Earthworks & soil erosion mitigation**. The contractors will implement the following measures related to earthwork management:

(i) 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.

(ii) Confirm location of the borrow pit and temporary spoil storage and final disposal sites, securing permits from relevant DONRE.

(iii) Develop borrow pit and spoil disposal site management and restoration plan, to be approved by responsible authority; obtain permit for the clearance of excavated earthworks.

(iv) Construct intercepting ditches and drains to prevent runoff entering construction sites and diverting runoff from sites to existing drainage.

(v) Construct hoardings and sedimentation ponds to contain soil loss and runoff from the construction sites.

(vi) Limit construction and material handling during periods of rains and high winds.

(vii) Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on.

(viii) Stockpiles shall be short-term, placed in sheltered and guarded areas near the actual construction sites, covered with clean tarpaulins, and sprayed with water during dry and windy weather conditions.

(ix) All earthwork disturbance areas shall be stabilized with thatch cover within 30 days after earthworks have ceased at the sites.

(x) Immediately restore, level and plant landscape on temporary occupied land upon completion of construction works.

36. **Terrestrial ecological impacts**. The contractors will implement the following measures to prevent ecological impact during construction:

(i) Protect existing trees and vegetation where no construction activity is planned.
(ii) Protect existing trees, vegetation, and grassland during construction; where a tree must be removed, or an area of grassland disturbed, replant trees and re-vegetate the area after construction.
(iii) Remove trees or shrubs only as the last resort if they impinge directly on the permanent works or necessary temporary works.
(iv) Prior to commencement of construction, tag and conspicuously mark all the trees to be preserved to prevent damage to these trees by construction workers.
(v) Construction workers are prohibited from capturing any wildlife in the project areas.

37. **Occupational health and safety**. The construction industry is considered hazardous. The civil works contractors will implement adequate precautions to protect the health and safety of construction workers and the public, complying with Law on Occupational Safety and Health, and as per DOLISA requirements. Contractors will manage occupational health and safety risks by applying the following measures:

(i) Care must be taken to ensure that sites for all earthworks (e.g., excavations, trenches) and dredging that are suspected to have unexploded ordnance (UXO) are surveyed by the expert authorities prior to construction. If such ordnance is detected clearing work will need to be commissioned prior to undertaking civil works.
(ii) Construction site sanitation: (1) Each contractor shall provide adequate and functional systems for sanitary conditions, toilet facilities, waste management, labor dormitories and cooking facilities. Effectively clean and disinfect the site. During site formation, spray with phenolated water for disinfection. Disinfect toilets and refuse piles and timely remove solid waste; (2) Exterminate rodents on site at least once every 3 months, and exterminate mosquitoes and flies at least twice each year; (3) Provide public toilets in accordance with the requirements of labor management and sanitation departments in the living areas on construction site, and appoint designated staff responsible for cleaning and disinfection; (4) Work camp wastewater shall be discharged into the municipal sewer system or treated on-site with portable system.
(iii) Occupational safety: (1) Provide appropriate personal protective equipment (PPE) to all construction workers e.g. safety clothers, safety hats and safety shoes to all construction workers; (2) Provide safety goggles and respiratory masks to workers doing asphalt road paving and tunnel blasting; (3) Provide ear plugs to workers working near noisy PME.
(iv) Food safety: Inspect and supervise food hygiene in canteen on site regularly. Canteen workers must have valid health permits. If food poisoning is discovered, implement effective control measures immediately to prevent it from spreading.
(v) Disease prevention, health services: (1) All contracted labor shall undergo a medical examination which should form the basis of an (obligatory) health/accident insurance and welfare provisions to be included in the work contracts. The contractors shall maintain records of health and welfare conditions for each person contractually engaged; (2) Establish health clinic at location where workers are concentrated, which should be equipped with common medical supplies and medication for simple treatment and emergency treatment for accidents; (3) Specify (by the PMU and contractors) the person(s) responsible for health and epidemic prevention responsible for the education and propaganda on food hygiene and disease prevention to raise

the awareness of workers.

(vi) Social conflict prevention: No major social risks and/or vulnerabilities are anticipated because of the project. The project construction workers will be engaged locally. Civil works contracts will stipulate priorities to (1) employ local people for works, (2) ensure equal opportunities for women and men, (3) pay equal wages for work of equal value, and to pay women's wages directly to them; and (4) not employ child or forced labor.

38. **Community health and safety**. Temporary traffic diversions, continual generation of noise and dust on hauling routes, and general hindrance to local accesses and services will be common impacts associated with construction works within or nearby local settlements of the area. The project may also contribute to road accidents by heavy machinery on existing roads, temporarily blocking pavements for pedestrians etc. The potential impacts on community health and safety will be mitigated through many activities defined in the EMP. The contractors will implement the following measures:

(i) Temporary traffic management: A traffic control and operation plan will be prepared together with the local traffic police prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning in advance.

(ii) Information disclosure: Residents and businesses will be informed in advance through media of the construction activities, given the dates and duration of expected traffic disruption.

(iii) Construction sites: Clearly marked signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues. Heavy machinery will not be used at night and all such equipment will be returned to its overnight storage area/position before nightfall. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate. Open excavations should be fenced, and trenches covered where public walkways or vehicles must cross.

1. Subproject-specific construction impact mitigations

39. Listed below are the key subproject-specific mitigations for potential impacts that are detailed in Mitigation Plan of EMP. The technical scope of the mitigations will be updated by the DDSSC and PMU to meet the detailed designs of the subprojects. All mitigation measures must comply with the current relevant QCVN & TCVN environmental standards of the government that are identified in the IEE and reproduced in Annex 3.

Hon Chen Temple Access Improvements

- The Hue Monuments Conservation Centre (HMCC) will be engaged during pre-construction phase to review detailed designs, and compliance with the rules and guidelines for development near the heritage monuments in Hue area.
- No construction activities or any construction equipment will occur on Hon Chen Temple property.
- All construction sites must be clearly signed notifying residents of construction schedule, provision of hotline phone number to allow residents to contact PMU if desired.
- Safe vehicle and pedestrian detours must be continually provided around construction sites

along access road to prevent or minimize disruption of local traffic. The use of safe detours, application of enforced speed limits must form a traffic management plan for the access road during construction phase that is finalized at DED.

- Use of regular wetting agents (e.g., water calcium chloride $CaCl_2$) on entire road to suppress dust from AH#1 to terminal new parking area.
- Aggregate piles must not be placed outside the widened road alignment, or on the property of the Hon Chen Temple, and must be covered to prevent wind erosion.
- Earth berms or plastic fencing must be placed at edge of widened road alignment to prevent or minimize soil erosion on to adjacent farmland.
- Construction vehicles and equipment must not be parked or maintained outside the new road alignment in adjacent agriculture lands, or on the property of the Hon Chen Temple.
- All equipment fuels and oils must be stored in closed containers inside the road alignment on temporary concrete pads away from Hon Chen Temple property.
- All construction waste must be collected daily, temporarily stored on site away from agricultural and homestead areas, and regularly transported to DONRE-approved disposal sites in the Hue area. These management actions for construction waste must form part of a construction waste management plan that is finalized at DED.
- Temporary work camps or rest areas must not be established on Hon Chen Temple property on outside the widened road alignment.

Huong River Tourist Pier Improvements

- The Hue Monuments Conservation Centre will be engaged during pre-construction phase to review detailed designs, and compliance with the rules and guidelines for development near the heritage monuments in Hue area.
- All pier construction activities and equipment will not occur near, or on the properties of any Hue monuments near the river such as Hon Chen temple and Thien Mu pagoda.
- All pier construction sites must be well signed on adjacent shore and in the river/estuary to provide clear indication to local boat traffic and fisherman of construction activities including clearly posted telephone hotline for the public to contact the PMU if desired.
- Aquaculture and fishing operations near the pier sites must be notified ahead of construction to enable operators to move away from affected areas.
- In-river/estuary silt curtains must be placed around all pier construction sites to contain re-suspended bottom sediment and turbidity to construction sites.
- Shoreline earth berms must be built between all shore-based construction of tourist support facilities (e.g. ticket offices, restroom areas, parking areas) and the river/estuary to prevent or minimize soil erosion to the surface waters.
- All construction waste must be kept out of the river/estuary and collected daily, temporarily stored on site away from agricultural and homestead areas, and regularly transported to DONRE-approved disposal sites in the Hue area. These management actions for construction waste must form part of a construction waste management plan that is finalized at DED.
- Special protection measures such as barriers will be in place to protect the Pomelo gardens at Pier 3.
- Control of the spread of invasive exotic aquatic species (e.g. *Mimosa*) at Pier 5 at Thanh Tien village to rest of river will occur with silt curtains.
- Where possible, restoration of mangrove trees will occur at the two pier sites in the Tam Giang lagoon

Da Bac Access Improvements

- All construction sites along access road must be clearly signed notifying residents of construction schedule, provision of hotline phone number to allow residents to contact PMU if desired.
- Safe vehicle and pedestrian detours must be provided around construction sites along access road to prevent or minimize disruption of local traffic and to maintain access to the existing terminal Meditation Centre parking lot. The use of safe detours, application of enforced speed limits must form a traffic management plan for the access road during construction phase that is finalized at DED.
- Use of regular wetting agents (e.g., water calcium chloride $CaCl_2$) on entire road to suppress dust from AH#1 to terminal new parking area.
- Aggregate piles must not be placed outside the widened road alignment and must be covered to prevent wind erosion.
- Earth berms or plastic fencing must be placed at edge of widened road alignment to prevent or minimize soil erosion on to adjacent farmland.
- Construction vehicles and equipment must not be parked or maintained outside the new road alignment in adjacent agriculture lands.
- All equipment fuels and oils must be stored in closed containers inside the road alignment on temporary concrete pads away homesteads.
- All construction waste must be collected daily, temporarily stored on site away from agricultural and homestead areas, and regularly transported to DONRE-approved disposal sites in the Hue area. These management actions for construction waste must form part of a construction waste management plan that is finalized at DED.
- Aquaculture and fishing operations near the new boat landing site must be notified ahead of construction to enable operators to move away from affected areas.
- An in-estuary silt curtain must be placed around floating boat landing construction site to contain re-suspended bottom sediment and turbidity to construction site.
- A shoreline earth berm must be built between the shore-based civil works and the estuary to prevent or minimize soil erosion to the estuary.
- All construction waste must be kept out of the estuary and collected daily, temporarily stored on site, and regularly transported to DONRE-approved disposal sites. These management actions for construction waste must form part of a construction waste management plan that is finalized at DED.

2. Subproject-specific operation phase impact mitigations

Hon Chen Temple Access Improvements & Da Bac Access Improvements

- Enforced speed limits with lower limits for trucks should be posted at the beginning and midway along both access roads. Road surfaces should be kept clear of sand with periodic motorized truck sweepers to minimize dust.
- Septic tanks at toilet facilities at rest-stop on NR#1 must be pumped as needed with septage disposed at DONRE-approved disposal sites.

Huong River Tourist Pier Improvements

- Tourist boat approach-departure lanes at new piers must be identified to prevent risk of collisions. Enforced boat speed limits new piers will be posted.
- Tourist boats must be maintained in working condition close to new. Boat refueling and maintenance must be conducted away from new piers.

40. The impact mitigation measures defined above for the subprojects are defined further in the Mitigation Plan of Table 5, which will be reviewed and updated where necessary to meet the detailed designs of the subprojects. The EMP will be incorporated into construction tender documents. Each contractor will be required to prepare a site-specific Construction Environmental Management Plan (CEMP) based on the EMP and submit the CEMP as part of their bid documents. The CEMP shall specify the responsibilities, location, associated costs, schedule/timeframe and other relevant information for implementing its provisions, and will address the environmental issues and concerns raised at the public stakeholder meetings. Before civil works commences the CEMPs will be reviewed and validated by the DDSSC and PMU against the subproject EMP and shared with the ADB. As indicated, the mitigation plan is comprehensive at the feasibility design stage so that the scope of individual mitigation measures identified in the plan cover all potential subproject impacts, which will be finalized to meet the final detailed designs of the subprojects.

Table 5. Environmental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase the Three Subprojects								
Land acquisition for subproject construction	Affected persons are not informed ahead of subproject implementation.	1. Confirmation of required resettlement, relocations, & compensation	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	EA/PMU/ESS	Resettlement/ compensation committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance Redress Mechanism of IEE[6]	For all construction sites.	Beginning of project	Quarterly	No marginal cost[7]	PMU/ESS	ESS/PMU
Engage Hue Monuments Conservation Centre (HMCC) in detailed designs	No cultural heritage impacts	3. Contact HMCC to engage Director of Centre (Mr. Phan Thanh Hai) in the review and contribution to detailed designs of Hon Chen Temple and Huong River subprojects.	Pier subproject sites and Hon Chen Temple subproject site	Beginning of project	Once	No marginal cost	PMU/ESS	ESS/PMU
GoV approvals	No negative impact	4. 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

[5] Costs will need to be updated during detailed design phase.
[6] GRM for three subprojects presented in IEE
[7] 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	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Detailed designs of subproject	Further prevention & minimization of negative environmental impacts	5. Work with DDSSC[8] to complete detailed designs of the individual subproject components**.** Ensure the following measures are included: a) finalize spill management prevention plans, and emergency response plans for all construction sites; b) confirm no disturbance or damage will occur to culture property and values to the Hon Chen Temple and pagodas near piers; c) ensure no cutting of trees if possible; d) locate required new 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 in affected areas and along the roadways, Huong river, and Tam Giang lagoon; and i) include climate change resilience measures from CRVA into final designs of the subprojects	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	DDSSC/PMU	ESS/PMU

[8] Project Management and Detailed Design Supervision (DDSSC) consultant to be determined by EAs

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Update EMP to meet detailed designs	Positive environmental impacts	6. Review finalize alignments for new and upgraded road sections to minimize impact on forests and agriculture lands 7. Review measures (e.g., construction berms and placement of silt curtains) that will ensure minimal to no erosion and sedimentation of Huong river, and nearshore Tam Giang Lagoon 8. Finalize plan for managing safe boat traffic in Huong river and Tam Giang Lagoon during pier works 9. Identify any new potential impacts of subproject and include in EMP 10. Confirm solid waste disposal site(s) with DoNRE according to regulations 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 subproject component sites	Before construction initiated	Once with detailed designs documents		DDSSC	ESS/PMU
	Positive environmental impacts	14. Update environmental baseline at all 3 subproject sites where necessary to meet detailed subproject designs	All subproject component sites	Before construction initiated	Once with updated EMP	See Monitoring Plan below	DDSSC/PMU	DDSSC/ESS

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Confirm GoV approved construction waste disposal sites	No negative impact	15. Notify DoNRE to confirm locations of existing borrow pits and disposal areas for construction for subprojects and obtain required permits.	Entire subproject	Before construction	As required	No marginal cost	PMU/DoNRE	PMU
UXO survey, & removal	Injured worker or public	16. Ensure GoV military is consulted and clears all subproject areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	ESS/PMU	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	DDSSC	PMU
Create awareness of physical cultural resources in area	No negative environmental impact	19. ESS/PMU to review potential locations of physical cultural resources including areas of southern Hue Tombs of Kings near/across from Hon Chen Temple, and explain possible cultural resources to contractors	All subproject areas	Before construction begins	Once	No marginal cost	DDSSC/PMU	PMU
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	DDSSC	PMU & contractors
Capacity development	No negative environmental impact	21. Develop and schedule training plan for PMU/ESS/EO to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 22. Create awareness and training plan for contractor environment officer (EO) whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	DDSSC/PMU	ESS/PMU

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
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	ESS/PMU	Contractor's bid documents
Construction Phase of Three Subprojects								
Initiate EMP & sub-plans,	Prevent or minimize impacts	24. Initiate updated EMP & CEMPs 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	DDSSC	PMU & contractors
Worker camps	Environmental Pollution caused by domestic wastewater and solid waste from construction workers; and social problems	25. Locate worker camps away from human settlements at all subproject sites. 26. Ensure adequate temporary worker housing and waste disposal facilities including pit latrines and garbage cans. 27. A solid waste collection program will be established and implemented that maintains a clean worker camps in consultation with DONRE 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 must be provided to worker camps. Guns and weapons not allowed in camps. 32. Interaction of transient workers with the local community will be discouraged. HIV Aids education must be given to workers. 33. Work camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	DDSSC/PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Training & capacity	Prevent of impacts through education	34. Implement training and awareness plan for PMU/ESS/EO and contractors.	PMU office, construction sites	Beginning of construction	After each event	No marginal cost	DDSSC	DDSSC/PMU
Implement Construction materials acquisition, transport, and storage sub-plan	Environmental pollution (dust, water pollution, soil erosion and impact on ecosystem), from borrow pits, quarries or construction material storage and transportation; Increased risk to labour and community health and safety/ Injury; Increased construction traffic congestion and traffic acidents	35. All borrow pits will 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 calculated prior to extraction to prevent wastage. 38. Pits and quarries will not be located near surface waters, houses, or cultural property or values. 39. All topsoil and overburden that is removed for civil works at all subproject sites will be stockpiled for later restoration. 40. All borrow pits and quarries will have a fence perimeter with signage to keep public away. 41. After use pits and quarries will 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 will 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 be transported and handled. 45. All aggregate loads on trucks must be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	DDSSC/PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Double Bitumen Surface Treatment (DBST) pavement production, and application	Air pollution, land and water contamination, and traffic & access problems,	46. Aggregate piles at sites must 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 must be isolated. 48. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 49. All spills must be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations. 50. Bitumen must be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities. 51. Bitumen must not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	DDSSC & PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Implement Spoil (excavate) management sub-plan	Pollution of land and surface waters from sedimentation, 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. At all subproject sites, 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 such as Hon Chen Temple or in buffer zone of Bach Ma National Park. 54. Where possible spoil must 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. Any 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	DDSSC & PMU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (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 must be catalogued for type, estimated weigh, and source. 62. Construction sites must 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 must 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 must 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	DDSSC & PMU & DoNRE	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Implement Noise and dust sub-plan	Air Pollution from Dust generation; Noise Pollution	69. Regularly apply wetting agents such as water or calcium chloride ($CaCl_2$) to exposed soil and construction roads. 70. Cover or keep moist all stockpiles of construction aggregates, and all truckloads 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 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	DDSSC & PMU	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	DDSSC & PMU & Utility company	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Implement Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	81. Consult DARD for direction and existing regulations on how to minimize damage to trees and vegetation. 82. Prevent tree removals and install protective physical barriers around trees that do not need to be removed. 83. 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	DDSSC & PMU	contractor
Implement Erosion control sub-plan	Land erosion	84. Berms, and plastic sheet fencing must be placed around all excavations and earthwork areas. 85. Earthworks must be conducted during dry periods. 86. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 87. Protect exposed or cut slopes with planted vegetation and have a slope stabilization protocol ready. 88. Re-vegetate all soil exposure areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSSC & PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Implement worker and public safety sub-plan	Public and worker injury, and health (worker and community safety/health hazards from: dust, noise, vibration, gas emission, water deterioration, inadequate waste management, spillage of hazardous substance, increased traffic/transportation, open excavations, unsafe access, rise of communicable diseases, ….)	89. Proper fencing, protective barriers, and buffer zones must be provided around all construction sites. 90. Sufficient signage and information disclosure, and site supervisors and night guards must be placed at all sites. 91. Current worker and public safety guidelines and regulations of DoLISA must be followed (Law on Occupational Safety and Health). 92. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns must be developed, posted, and enforced on all roads used by construction vehicles. 93. Standing water suitable for disease vector breeding must be filled in. 94. Worker education and awareness seminars for construction hazards must be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program must be developed and distributed to workers. 95. Appropriate PPE, e.g. safety clothing and footwear must be mandatory for all construction workers. 96. Adequate medical services must be on site or nearby all construction sites. 97. Drinking water must be provided at all construction sites. 98. Sufficient lighting be used during necessary night work. 99. All construction sites must be examined daily to ensure unsafe conditions are removed.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSSC & PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Civil works / dredging	Degradation of water quality & aquatic resources	100. Protective berms, plastic sheet fencing, or silt curtains must be placed between all earthworks and all lakes and rivers to be dredged, and around dredging operations. 101. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 102. Earthworks must be conducted during dry periods. 103. All construction fluids such as oils, and fuels must be stored and handled well away from all surface waters 104. No waste of any kind is to be thrown into affected rivers and lakes 105. No washing or repair of machinery near surface waters. 106. Pit latrines to be located well away from all surface water	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSSC & PMU	contractor
Civil works	Degradation of terrestrial resources	107. All construction fluids such as oils, and fuels must be stored and handled well away from all surface waters	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSSC & PMU	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	DDSSC & PMU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (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 water courses. 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 stream	Design & construction phases	Monthly	No marginal cost	DDSSC & PMU	contractor
Civil works & Chance finds sub-plan	Damage to cultural property or values, and chance finds	117. As per detailed designs all civil works must be located away from all cultural property and values. ESS identified potential sites and types of cultural resources. 118. Chance finds of valued relics and cultural values must be anticipated by contractors. Site supervisors must be on the watch for finds. 119. Upon a chance find all work stops immediately, find left untouched, and PMU 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	DDSSC & PMU	contractor
Huong River Tourist Piers Improvements								
Huong river and Tam Giang lagoon pier developments	Extensive area of maximum suspended sediment (TSS)	121. Silt curtains must be hung offshore around all pier construction sites to contain and allow sediment to fall out of suspension in as small an area as possible. 122. Temporary shore berms must be installed between Huong river and Tam Giang Lagoon and shoreline civil works to prevent or minimize shoreline soil	Huong river and Tam Giang lagoon					

Subproject Activity	Potential Environmental Impacts	Mitigation Measures and Process	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		erosion into the surface waters.		At the start, and throughout construction phase	Monthly	No marginal cost	DDSSC & PMU	contractor
	Interrupted river use, transportation, and collision management	123. Warning signs for fisherman and other boaters of pier operations must be placed at 100 m above and below all pier sites in Huong river and Tam Giang lagoon. 124. In narrow sections of Huong river clearly boomed boat lanes with speed low speed limits must be placed to guide boat traffic past the pier construction sites.						
	Disruption of access to cultural or heritage sites	125. Warning signs and temporary shoreline walkways around pier construction activities must be installed to maintain ease of flow of pedestrian traffic to cultural and religious centres						
Operation of New and Upgraded Roads and Tourist Piers								
Operation of upgraded and new roads and piers	Reduced risk of vehicle and boat traffic accidents	126. Enforced, well-marked specific speed limits for cars, trucks, and boats must be placed along subproject roads, and in approach and departure lanes of all piers. Large fines must be levied for speeding infractions. 127. Maximum truck loads on the subproject roads must well-posted and strongly enforced. 128. Speed limits and boat size lanes in the Huong river and Tam Giang estuary must be put in place if significant increases in boat traffic occurs because of new piers.	Along all new and upgraded roads and bridges, and in Huong river and Tam Giang Estuary	Fulltime	Biannual	O&M	Department of Transport / Police	
	Minimal increase in noise and dust	129. Local bylaw must require vehicles and boats must be in good working order close the new condition. Road surfaces in urban areas must be cleaned or watered regularly.						

V. ENVIRONMENTAL MONITORING PLAN

41. The environmental monitoring plan for the EMP is provided in **Error! Reference source n ot found.**. The plan focuses on environmental effects monitoring (e.g. air, water, noise, and dust) during pre-construction, construction and operation phases of the subprojects, and is delimited by environmental indicators, sampling locations and 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 any unexpected positive or negative environmental impacts of the subproject.

42. The GoV environmental standards on which the monitoring plan is based from the IEE are listed in Annex 3. The following directives guide the sampling and analyses of environmental quality:

- Circular No. 28/2011/TT-BTNMT: Regulation of technical procedures of environmental monitoring for ambient air and noise.
- Circular No. 29/2011/TT-BTNMT: Regulation of technical procedures of environmental monitoring for surface water.

43. The independent environmental monitoring institute (EMI) will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The safeguards specialists of the DDSSC and ESS/PMU will coordinate with the EMI. The DDSSC/PMU will provide logistical support to the EMI where necessary for the implementation of environmental monitoring plan.

A. Performance Monitoring

44. Performance monitoring is required to assess the overall performance of the EMP implementation and effectiveness. A project performance management system will be developed by the EA for the project. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans in **Error! Reference source not found.**.

VI. REPORTING

45. Regular reporting on the implementation of mitigation measures, and on monitoring activities during construction phase of the subproject is required. Satisfactory reporting is the ultimate responsibility of the EA with direct support from the IA/PMU. Reporting should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. A report on environmental monitoring and implementation of EMPs will be prepared quarterly for the EA by the IA/PMU. The ESS/PMU report will compile monthly reports provided by the EO of contractor, the reports of the EMI on monitoring, and input from the IES/NES of the DDSSC. The IA/PMU reports will also be sent to the DONRE and consolidated to ADB in semi-annual safeguards monitoring reports. The reports will contain all indicators measured with the monitoring plan of EMP including performance monitoring indicators (**Error! R eference source not found.**) and will include relevant GoV environmental quality standards. On behalf of the EA, a mid-term review report and an end-of-project report are prepared in addition to the monitoring plan reports by the IA/PMU and DDSSC. While these two reports focus on overall project implementation the reports also include a summary of environmental safeguard performance of the project. Templates for the monitoring reports to be used by the PMU, EMI, and EOs will be developed by the IES of the DDSSC at detailed design.

Table 6. Environmental Effects Monitoring Plan

Environmental / Social Indicators	Location	Means of Monitoring & Standard	Frequency	Responsibilities		Estimated Cost
				Supervision / Compliance	Implementation	
Pre-construction Phase (update baseline profile)						
Surface water quality: pH, DO, TSS, oil & grease, total coliform	At 7 pier sites	Analytical method: 29/2011/TT- BTNMT Surface water quality standard: QCVN 08:2008/BTNMT	Once prior to construction	PMU/DDSSC	Subcontracted monitoring institute	7 X 2 mio D = 14 mio D, or USD $622.00
Noise monitoring (integral noise level): 24-h; Day time (7am-10pm, and night time (10pm-7am) noise levels dB (A)	At all piers sites and 1-2 sites at roads upgrades	Analytical method: 28/2011/TT- BTNMT Relevant noise standards: (i) QCVN 26:2010/BTNMT; (ii) QCVN 26:2010/BTNMT – TCVN 5948:1999; (iii) IFC EHS Guidelines (2007)	Once prior to construction	PMU/DDSSC	Subcontracted monitoring institute	10 X 2 mio D = 20 mio D, or USD $888.00
Ambient air quality monitoring: SO_2, NO_2, TSP (1 hr average)	At all piers sites and 1-2 sites at roads upgrades	Analytical method: 28/2011/TT- BTNMT Air quality standards: (i) QCVN 0 5:2013/BTNMT; (ii) IFC standard (2007)	Once prior to construction	PMU/DDSSC	Subcontracted monitoring institute	10 X 1.5 mio D = 17 mio D, or USD $667.00
Review existing sensitive receptors (e.g., cultural property, rare/ endangered wildlife, critical habitat), and resume information disclosure / consultation	At all subproject sites, and at PMU office	Consultation with community, and DONRE	Once	EA/DDSSC	PMU	USD $3,000.00
Construction Phase						
Ambient air quality monitoring: SO_2, NO_2, TSP, (1 hr average)	Pre-construction sites	Analytical method: 28/2011/TT-TNMT Air quality standards: (i) QCVN 05:2013/BTNMT; (ii) IFC standard (2007)	Monthly during construction period	PMU/DDSSC	Subcontracted monitoring institute	12 X 10 X 1.5 mio D = 297 mio D per works contract (assuming 12 months construction period), or USD $8,000.00
Noise monitoring (integral noise level): Day time (7am-10pm,	Pre-construction	Analytical method: 28/2011/TT-BTNMT Relevant noise standards: (i) QCVN 26:2010/BTNMT; (ii) QCVN	Monthly during construction	PMU/DDSSC	Subcontracted	12 X 10 X 2 mio D = 396 mio D per works contract (assuming 12 months

Environmental / Social Indicators	Location	Means of Monitoring & Standard	Frequency	Responsibilities		Estimated Cost
				Supervision / Compliance	Implementation	
and night time (10pm-7am) noise levels dB (A) (24 hours measuring)	sites	26:2010/BTNMT – TCVN 5948:1999; (iii) IFC EHS Guidelines (2007)	period		monitoring institute	construction period), or USD $10,666.00
Surface water quality: pH, DO, TSS, oil & grease, total coliform	Pre-construction sites	Analytical methods regulated in Vietnam Standards for surface water Quality monitoring Surface water quality standard: QCVN 08:2008/BTNMT	Quarterly during bridge construction activities	PMU/DDSSC	Subcontracted monitoring institute	12 X 7 X 2 mio D = 140 mio D per works contract (assuming 12 months construction), or USD $7,466.00
Public consultation & issues grievance redress[9]	All construction sites and PMU office	Following GRM	As needed	EA/PMU	PMU	USD $3,000.00
Operation Phase (until Project Completion Report Issued)						
Ambient air quality monitoring: SO2, NO2, TSP, (1 hr average), PM10 (24h average)	Pre-construction sites	Analytical method: 28/2011/TT- BTNMT Air quality standards: (i) QCVN 05:2013/BTNMT; (ii) IFC standard (2007)	Semi-annual, until final report is issued.	PMU	Subcontracted monitoring institute	10 X 2 X 1.5 mio D = 15 mio D, or USD $1,333.00
Noise monitoring (integral noise level): Day time (7am-10pm, and night time (10pm- 7am) noise levels dB (A) (24 hours measuring)	Pre-construction sites	Analytical method: 28/2011/TT- BTNMT Relevant noise standards: (i) QCVN 26:2010/BTNMT; (ii) QCVN 26:2010/BTNMT - TCVN 5948:1999; (iii) IFC EHS Guidelines (2007)	Semi-annual, until final report is issued.	PMU	Subcontracted monitoring institute	10 X 2 X 2 mio D = 20 mio D, or USD $1,777.00
Surface water quality: TSS, oil & grease	Pre-construction sites	Analytical methods regulated in Vietnam Standards for surface water Quality monitoring Surface water quality standard: QCVN 08:2008/BTNMT	Semi-annual, until final report is issued.	PMU	Subcontracted monitoring institute	10 X 2 X 1.5 mio D = 15 mio D), or USD $1,333.00

[9] See GRM in IEE

Table 7. Performance Monitoring Indicators for Subprojects

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	EMP updated for detailed designs	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP)[10]	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of IA/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
Huong river and Tam Giang lagoon quality	pH, DO, TSS, oil & grease, total coliform	Document baseline conditions as per Monitoring Plan	Survey
Noise levels	As pre-construction phase of Monitoring Plan	Document baseline conditions as per Monitoring Plan	Survey
Ambient air quality	SO_2, NO_2, TSP (1 hr average)	Document baseline conditions as per Monitoring Plan	Survey
All subproject areas	Critical habitat, rare or endangered species ***if perceived present***	All *present* critical habitat and species if unchanged, and unharmed	Monitoring by Institute[11]
Construction Phase			
Huong river and Tam Giang lagoon quality	pH, DO, TSS, oil & grease, total coliform	Levels never exceed pre-construction baseline levels	Institute & contractor monitoring reports
Ambient air quality	SO_2, NO_2, TSP (1 hr average)	Levels never exceed pre-construction baseline levels	Institute & contractor monitoring reports
Noise levels	As pre-construction phase of Monitoring Plan	Levels never exceed pre-construction baseline levels	Institute & contractor monitoring reports
Public & worker safety	Frequency of injuries	Adherence to GoV OHS regulations/policy to prevent accidents[12]	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is	Public input, contractor reports,

[10] Contractor Environmental Management Plan developed from EMP in contractor bidding document
[11] Licensed Institute hired by EA/DDSSC to implement Environmental Monitoring Plan
[12] MoLISA GoV Regulations and Policy

Major Environmental Component	Key Indicator	Performance Objective	Data Source
		harmed in any way	public input, Institute reports
Traffic	Frequency of disruptions & blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, Institute reports
Operation of New and Upgraded Roads			
Traffic congestion & accidents	Frequency of accidents or traffic jams	No significant increase due to adequate traffic management	Public/PPC

VII. ESTIMATED COST OF EMP

46. The marginal costs for implementing the EMP are for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. The preliminary costs for the implementation of the EMP for the subproject are summarized in Table 8. These estimated costs include per diem technician fees for the environmental and social/cultural monitoring, and information gathering in Table 6.

47. An estimated budget of USD $7,000 is identified for capacity building and training for the PMUs and contractors in environmental management in conjunction with other capacity development activities of the project such. The costs to implement the EMP will need to be updated by the DDSSC in conjunction with the EA and IA/PMU during the pre-construction phase. The costs will become part of the budget assigned to the DDSSC by the EA which will be used to contract the EMI to do the field monitoring and required laboratory analyses of certain parameters.

Table 8. Estimated Costs for Environmental Monitoring Plan

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors & continued consultation	$3,000.00
environmental quality	$2,177.00
Construction Phase	
environmental quality	$26,132.00
public consultation	$3,000.00
Post-construction Operation Phase	
environmental quality	$4,443.00
public input	--
Capacity Development and training	$7,000.00
Total	**$45,752.00**

VIII. EMERGENCY RESPONSE PLAN

48. 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 must 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.

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

Table 9. 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.

50. 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.

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

52. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PMU/ESS, will meet with the 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

53. The objective of this meeting is to provide the 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.

54. 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) plan 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.

55. 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

56. Means of communicating, reporting and alerting an emergency 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 first shall immediately:
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency 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 must 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:

(i) The names and contact details of the relevant persons and institutions must 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
- IU Office, SO

(ii) All subproject sites must 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 must also be equipped with the appropriate communication facilities.

B. Emergency Response Situations

57. 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 10. 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 11. 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 12. 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 must be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) ▪ report/communicate the emergency 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 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.

Procedure	Remarks
	▪ 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.

IX. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

58. The experience and capacity for environmental assessment and management by national counterparts responsible for EMP implementation. i.e., IA/PMU in Thua Thien Hue province is weak. No dedicated environmental staff exists in the IA. The DDSSC with assistance from the safeguards specialists will develop and deliver training courses to the IA/PMU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the IA/PMU to oversee implementation of the EMP by construction contractors and the EMI.

59. The safeguard specialist who will be full-time environmental member of the PMU as well as the EOs of the contractors will attend training courses as required. Costs for training should be included with costs for implementation of the EMP.

51. 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. The training topics are listed in Table 13. An indicative budget of USD $7,000 has been assigned which is included in Table 8.

Table 13. Indicative training on EMP Implementation

Course Theme	Target	Period
Introduction to EIA, Viet Nam EIA policy framework, procedures, and environmental standards, ADB Safeguard Policy	EA, PMU/ESS,	Pre-construction phase shortly after DDSSC is hired
Purpose, development, and implementation of the EMPs for the subprojects, implementation of CEMP	EA, PMU/ESS, contractor EOs	Construction phase shortly after construction packages are let
Protection of river and terrestrial habitat from road and pier construction	PMU/ESS, contractor EOs	Construction phase shortly after construction packages are let
Grievance Redress Mechanism, Public consultation	PMU/ESS, contractor EOs	Construction phase shortly after construction packages

Course Theme	Target	Period
		are let
Occupational and community health and safety	PMU/ESS, contractor EOs	Construction phase shortly after construction packages are awarded
Traffic management on roads and on Huong river and Tam Giang lagoon.	PMU	Operation phase shortly before subprojects are completed

ANNEX 1: INDICATIVE RESPONSIBILITIES FOR PROJECT MANAGEMENT AND EMP

EMP Implementation organizations	Roles and Responsibilities
Executing agency (EA) (PPC)	➢ Overall responsibility for the successful execution of the project & EMP ➢ Reviews the project implementation progress ➢ Reviews and endorses any proposed change in the project scope or implementation arrangements ➢ Oversees compliance with environmental loan covenants
Provincial Project Steering Committee (PPSC)	➢ Provide support to EA/IA for EMP implementation issues ➢ Project preparation, including the setting up of financial and management systems and procedures, and the procuring of PMU office equipment ➢ Consultant recruitment and supervision ➢ Review and approval of goods and civil works contracts, including bid documents ➢ Coordination between the concerned agencies at the national and provincial levels ➢ Coordination of activities of the PMU and the inputs of concerned stakeholders ➢ Coordination of all reporting aspects of the project ➢ Coordination of institutional strengthening measures ➢ Ensuring compliance with ADB Loan covenants, assurances and safeguard requirements, as well as with national and provincial policies and regulations ➢ Provision of administrative and technical support to the PMU ➢ Preparation of consolidated project accounts to be forwarded to ADB ➢ Advise PMU on revenue-enhancing activities related to the recovery of costs of constructing, operating, and maintaining project facilities and equipment; ➢ Coordination of project audits ➢ All specified monitoring, evaluation and reporting activities ➢ Communication of project's outcomes, outputs, and activities to all stakeholders ➢ Provide coordination for safeguards and monitoring for PIM
Project Management Unit (PMU) inside IA	➢ Coordination and supervision of consultants' inputs on the appraisal of feasibility studies, and conceptual and detailed designs construction ➢ Procurement of goods and civil works contracts, including the preparation of bid documents and bid evaluations ➢ Approving payments to contractors and maintaining disbursement records ➢ Ensuring that institutional-strengthening and capacity-building initiatives involving are implemented in line with agreed project designs, schedules and budgets ➢ Ensuring compliance with loan covenants and assurances in respect of all subprojects, including updating of IEEs, EMPs, GAPs, resettlement plans ➢ ESS oversees implementation of EMP by contractor EO, and EMI ➢ ESS prepare quarterly reports on EMP implementation for IA/EA ➢ Coordinate with DDSSC to design and deliver capacity development & training. ➢ Coordinating the process of establishing appropriate cost-recovery mechanisms

EMP Implementation organizations	Roles and Responsibilities
	➢ Meetings with all concerned stakeholders ➢ Quarterly progress and monitoring-and-evaluation reporting to the EA
Detailed Design and Safeguards Support Consultants (DDSSC)	➢ Completes detailed designs of subprojects with PMU ➢ With PMU update EMP to meet final detailed designs of subprojects ➢ With PMU review CEMPs of contractors ➢ Supervises and assists PMU with contractor management ➢ Provides technical advice and support when needed to PMU and EMI ➢ Designs and oversees delivery of all training and capacity development of PMU for construction and operation of completed subprojects including EMP. ➢ Provides advisory role for implementation of EMP by PMU and EMI
Environmental Monitoring Institute (EMI)	➢ Implements environmental sampling for EMP ➢ Conducts laboratory analyses of environmental quality samples from field sampling ➢ Prepares periodic monitoring reports for PMU
Environmental Officer (EO) of Contractor	➢ Implements the CEMP for the construction phase ➢ Maintains a daily log of environmental issues at the construction sites ➢ Prepares brief monthly summaries of mitigation activities and environmental issues at constructions site to PMU.
ADB	➢ Assists EA/PPSC through timely guidance at each stage of project implementation following agreed implementation arrangements ➢ Review all documents that require ADB approval ➢ Review of monitoring reports on EMP implementation to ensure EMP meets SPS (2009) ➢ Approval of procurement activities ➢ Periodic project review missions, a mid-term review and a completion mission for the project ➢ Ensuring compliance of all loan covenants ➢ Timely processing of withdrawal applications and release of eligible funds ➢ Ensuring compliance of financial audit recommendations ➢ Regularly updates project information disclosure on the ADB website

ANNEX 2: INDICATIVE TORs FOR ENVIRONMENTAL SPECIALISTS and EMI

International Environmental Specialist. With assistance from the national environmental specialist (NES), the international environment consultant be responsible for updating the provincial EMP at detailed design and assisting the PMU with overall environmental management of the implementation of the relevant subproject in Viet Nam. The consultant will:

(i) update environmental management plan (EMP) to ensure that EMP addresses the detailed design and engineering of subproject. Updates to EMP include mitigation and monitoring plans, budget, and capacity development needs of executing and implementing agencies (EA/IA) and ESS/PMU);
(ii) design comprehensive training plan for ESS/PMU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMP highlighting environmental issues of subproject;
(iii) ensure that all relevant safeguards of the EMP are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts;
(iv) Coordinate and work with the PMU to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMP and the actual site conditions;
(v) oversee the implementation of the EMP 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 DCST and DONRE on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc);
(vii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PMU consult Government authorities to assist with TOR development and implementation;
(viii) with PMU, prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the preliminary design, on issues and concerns arising during project construction;
(ix) prepare TOR(s) for external national environment monitoring institute (EMI) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the EMP;
(x) coordinate with PWDT to address vehicle traffic issues during construction;
(xi) advise IA/PMU on environment-related concerns arising during sub-projects construction, and recommend corrective measures;
(xii) with PMU, 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;
(xiii) assist EA and IA/PMU prepare regular reports the PMU must submit to the EA on implementation of EMP, environmental, issues, and corrective actions;
(xiv) assist IA/PMU/ prepare report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and
(xv) prepare a quarterly status report on implementation of EMP, environmental issues, and public safety protection to be submitted through the PMU and EA to the ADB.

The consultant should have an advanced university degree the environmental sciences and 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. Assist the international environmental specialist (IES), including acquisition of new information to update the EMP at detailed design, and work with the PMU with overall environmental management of the implementation of the subproject in Viet Nam. The national consultant will assist with:

(i) updating environmental management plan (EMP) to ensure that the EMP address the detailed design and engineering of subproject.;
(ii) deliver initial training on the purpose, content, and roles and responsibilities for implementation of updated EMP;
(iii) ensure relevant safeguards of the EMP are addressed in the bid documents and in evaluation criteria for awarding contracts;
(iv) help PMU to ensure that contractors prepare their respective site-specific plans based on the updated EMP and the actual site conditions;
(v) help the international consultant oversee the implementation of all safeguards of the EMP 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 DOT on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc);
(vii) with PMU, prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the preliminary design, on issues and concerns arising during project construction.
(viii) assist to address vehicle traffic issues, respectively during road upgrades;
(ix) with the international consultant advise the PMU on environment-related concerns arising during sub-projects construction, and recommend corrective measures;
(x) with PMU, 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 EMP reporting.

The consultant should have a university degree in the environmental sciences and at least 5 years with environmental assessment of infrastructure projects in Vit 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.

Environmental Monitoring Institute (EMI). Under the direction of the IES/NES and PMU, the EMI will assist with implementation of the EMP by providing field sampling and laboratory analysis support for the air quality and water quality variables of the Environmental Monitoring Plan that require scientific sampling and handling, and laboratory analyses. The EMI will do the following:

(i) be contracted by the PMU/ DDSSC to support the NES/IES with the implementation of

Environmental Monitoring Plan (MP) of EMP;

(ii) review and confirm with DDSSC the scope of the updated MP that must be implemented by the EMI;

(iii) conduct the field sampling of environmental variables and perform associated laboratory analyses on field samples for the updated MP in consultation and under direction of the with IES/NES;

(iv) conduct the field sampling and laboratory analyses following the procedures of the GoV (e.g., Circular No. 28/2011/TT-BTNMT, and Circular No. 29/2011/TT-BTNMT), as supplemented when necessary by APHA (2013)[13];

(v) prepare and submit to the NES/IES, reports on field sampling and laboratory analyses activities and results according to the report formats and schedule pre-agreed with the NES/IES including QA/QC results for field & laboratory data as per AWWA (2013).

(vi) if requested assist IES/NES with training of project counterparts as part of the capacity & training program for environmental management and protection; and

(vii) if requested provide ad hoc in-field guidance to EOs of contractors with their qualitative environmental monitoring activities of their CEMPs.

[13] (America Public Health Association, 2013). Standard Methods for the Examination of Water & Wastewater, Vol .4

ANNEX 3: ENVIRONMENTAL STANDARDS FOR VIET NAM

- Labour hygiene standards issued via Decision No. 3833//2002/QĐ-BYT dated October 10, 2002 of the Ministry of Health.
- QCVN 05:2013/BTNMT – National technical regulation on quality of ambient air.
- QCVN 26:2010/BTNMT – National technical regulation on noise.
- QCVN 27:2010/BTNMT – National technical regulation on vibration.
- QCVN 03-MT:2015/BTNMT - National regulation on heavy metals concentrations in soil.
- QCVN 08-MT:2015/BTNMT - National technical regulation on quality of surface water.
- QCVN 09-MT:2015/BTNMT - National technical regulation on quality of groundwater.
- QCVN 14:2008/BTNMT - National technical regulation on quality of domestic wastewater.
- QCVN 40:2011/BTNMT- National technical regulation on industrial wastewater.
- TCVN 5948:1999. Acoustics. Noise generated by road traffic vehicles when increasing speed. Maximum allowable noise;
- TCVN 6438:2001: Maximum permitted emission limits of exhausted gases from vehicles.