

QUANG BINH PROVINCIAL PEOPLE'S COMMITTEE
COASTAL CITIES SUSTAINABLE ENVIRONMENT PROJECT (CCSEP)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

DRAFT
EXECUTIVE SUMMARY

DONG HOI CITY SUB-PROJECT



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1. INTRODUCTION

The Coastal Cities Environmental Sanitation Project (CCESP) was implemented from 2007 to 2014 in three coastal cities, including Dong Hoi (Quang Binh province), Quy Nhon (Binh Dinh province), and Nha Trang (Khanh Hoa province). The Dong Hoi City sub-project helped to reduce flooding problem significantly in the city center, improve the city's capacity to collect, transport and treatment of solid wastes and wastewater. In addition, the project has contributed to improve Dong Hoi city urban landscape and promote sustainable socio-economic development.

To ensure optimal efficiency of the CCESP, the Government of Vietnam has requested the World Bank to finance a new project named "Coastal Cities Sustainable Environment Project" (CCSEP), covering four cities, including Dong Hoi, Quy Nhon, Nha Trang, and Phan Rang – Thap Cham.

2. PROJECT DESCRIPTIONS

The CCSEP Dong Hoi Sub-project includes four components, including :

- Component 1 – Sanitation infrastructure: This component consists of drainage, wastewater collection and treatment, dredging and embankment lining 427 m left over from the CCESP in the Cau Rao river; enhancing solid waste collection capacity; installation of public toilets and construction of school toilets.
- Component 2 – Urban Connectivity: 1.44 km new road including drainage and sewer will be constructed.
- Component 3 – Compensation and site clearance: This component will provide compensation for the households affected under components 1 and 2.
- Component 4 – Technical assistance and institutional reform.

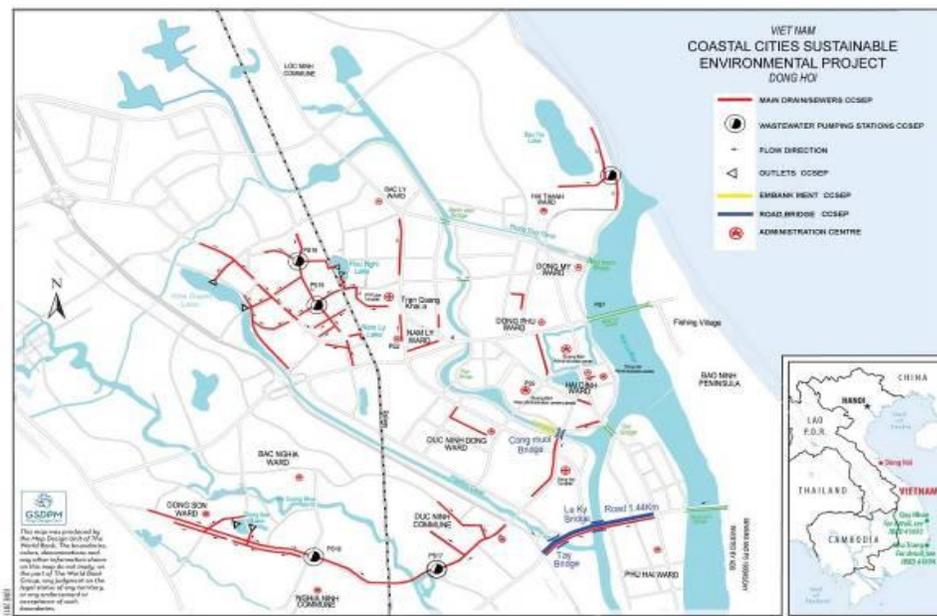
The proposed investments are listed in Table 1 below:

Table 1: Proposed Investments of Dong Hoi sub-project

Component	Item	Main technical specification
Component 1: Sanitation infrastructure	Install, build drainage and sewers combined	9.82 km D600-1500 reinforced concrete (RC) drains or box culverts B x H =3000 x 1500.
	Build stormwater outfalls	6 D1500 RC stormwater outfalls
	Install sewers	14.07 km D150 – 500 HDPE pipes at 1m – 4m deep
	Install R3 tertiary drains	41.1 km D300 uPVC pipes, at 1-2 m deep
	Build wastewater pumping stations (PS)	Build 5 PSs, reinforced concrete structures, dimension 2.5 x 2.5 m to 4 x 4m, pump chambers are at 6.5 - 8m deep
	Dredge and embankment lining of Cau Rao river	475 m
	Rebuild Cong Muoi bridge	- Demolish the existing Cong Muoi bridge and build a new one at the same location - L = 48.50m; B = 17m - Three spans, 01 arch span and 02 beam spans
	Provide supplement equipment for the WWTP	Supply and install 16 aerators using wind/solar energy
	Provide supplement equipment for solid waste collection and treatment	- 05 compactor trucks - 500 waste bins with capacity 240 – 500 liters; - 500 hand carts;

Component	Item	Main technical specification
		- 1 tank truck
	Install public mobile toilets and build school toilets	- 11 school toilets and 06 mobile public toilets.
Component 2: Environment Infrastructure	Road construction	- 1.44km road, B = 36m wide including 2x6m pavement. Drains, sewers, technical box, lighting system, trees included
	Bridge construction	02 new bridges on the are constructed along the 1.44 km road alignment: - Le Ky bridge: 212m long, including six (06) 33m-long spans, 30m wide; - Tay bridge: 24 m long with 01 span, 21 m wide.
Component 3	Land acquisition and site clearance	- Compensate for HHs affected by the project
Component 4	Technical support and utilities reform	- Support project monitoring and implementation and operation

The Locations of the proposed investments are shown in Figure 1.



▪ **Figure 1.1: Overall Map of the CCSEP**

3. APPLICABLE LAWS AND POLICIES

The project will comply with Vietnamese laws and regulations on environmental management. For example, the Law No. 55/2014/QH13 on Environmental Protection; Law No. 84/2015/QH13 on Occupational Safety and Health; Law No. 17/2012/QH13 on Water Resources; Decree No. 18/2015/ND-CP dated 14/02/2015 by the Government prescribing environmental protection master

plan, strategic environmental assessment, environmental impact assessment and environmental protection plan.

The project will also comply with the safeguard policies of the World Bank as presented in the Table 2 below:

Table 2: Safeguard Policies of the World Bank

Safeguard Policy	Actions
Environmental Assessment (OP/BP 4.01)	<ul style="list-style-type: none"> • Category A project. A full ESIA including an Environmental and Social Management Plan (ESMP) has been prepared for Dong Hoi City subproject • Social Assessments have been conducted for the Dong Hoi subproject; social impacts were also considered in the EIAs
Natural Habitats (OP 4.04);	<ul style="list-style-type: none"> • Screening for critical natural habitats conducted in Dong Hoi city subproject. •
Physical Cultural Resources (OP. 4.11);	<ul style="list-style-type: none"> • Chance find procedures for addressing the cases where artifacts exposed during construction phase have been prepared and will be included in bidding documents and contracts
Involuntary Resettlement (OP/BP 4.12)	<ul style="list-style-type: none"> • Resettlement Action Plan (RP) have been prepared for the city
Public consultation and information disclosure	<ul style="list-style-type: none"> • Intensive, culturally-sensitive consultations were carried out in all communities in the subproject areas • The final draft of the EAIA and RAPs will be disclosed prior to project appraisal

4. SOCIAL AND ENVIRONMENTAL BASELINE

Quang Binh is one of the poor coastal provinces in the North Central of Vietnam. Dong Hoi is a Class II city with total land area of 155.71 km², and a population of 113,722 people. Dong Hoi has 16 administrative units including 10 wards and 6 communes. The city is the political, administrative, cultural, economic, education and tourism center of Quang Binh province. Dong Hoi is located along the National Highway 1A, Thong Nhat North-South railway and Ho Chi Minh National Highway. The CCSEP – Dong Hoi city sub-project will be implemented in 11 wards and communes.

Dong Hoi city is a typical coastal plain, which is low-lying and formed by accumulated marine sediments and river silt. The main formation is sandy soil and clay, and limited amount of gravel with different sizes intersects between different soil layers. The weather is governed by tropical monsoon climate. Dong Hoi city has been often suffered from serious typhoons and floods annually. The four main water bodies in Dong Hoi are Nhat Le, Phu Vinh, Cau Rao and Le Ky River; all of these rivers originate and flow within Quang Binh territory. Cau Rao is a man-made river.

Air quality in Dong Hoi is still good with all parameters are within allowable limits. Surfacewater in the main water bodies such as the Cau Rao, Le Ky and Nhat Le rivers, the Khe Duyen and Dong Son reservoirs, has total suspended solids (TSSs), COD, and BOD₅ higher than the limits specified in QCVN 08-MT:2015/BTNMT Column B1. This is due to domestic wastewater from local households and tourism activities have been discharged into these water bodies; Salinity of surface water in Nhat Le, Le Ky, and Cau Rao rivers varies from 7.5 to 16.3‰ because these water bodies are connected to the sea through the Nhat Le estuary. Groundwater quality is within the allowable limits specified in QCVN 09: 2008/BTNMT. The sediment in Cau Rao River is saline with salinity at 10.4 – 10.7‰, heavy metal contents are within allowable limits.

Biological settings in the Project area is simple as this urban areas has been subted to extensive human interventions for long time.

Local people have access to good culture, healthcare, and education services. 97.36% of the population in Dong Hoi city has access to piped drinking water supply. Upon completion of the CCESP in 2014, 60 - 70% of the wastewater generated in the city has been collected and treated at the Duc Ninh WWTP, 85% of solid wastes has been collected, and 100% of local households have access to the national power grid.

5. POTENTIAL IMPACTS AND RISKS

5.1 Positive Impacts

Upon completion, the Dong Hoi sub-project will bring about the following significant impacts:

- Environmental and sanitation conditions in the city will be improved, thus, living conditions of the urban population will be enhanced. The installation of additional drains and sewers, the provision of additional equipment for the Duc Ninh wastewater treatment plant will allow more wastewater to be collected and treated before being discharged into the environment, surface runoff will be better drained after rains. Therefore, surface and groundwater pollution will be reduced, localised flooding issues will be addressed, and urban landscape will be improved. Local people will be safer during rainy season;
- The provision of new solid waste collection equipment, construction of new school toilets or installation of public toilets will contribute to improving sanitation conditions in the city, public areas, schools, and residential areas. These will bring about positive health impacts for the citizen of the city;
- The newly constructed roads will create favorable conditions for the people in Bao Ninh peninsula to evacuate to higher locations in the city in weather-extremet events such as floods;
- Dredging and embankment lining the remaining section of Cau Rao river will solve completely localized flooding issues in the surroundings of the Cau Rao river, improving the city view;
- The project would bring about additional job opportunities and incomes during construction phase for local people which help to improve their living conditions.

5.2 Potential Negative Impacts and Risks

Although the proposed Project will bring about mainly positive impacts during operation phase, there will also be potential negative impacts and risks during the implementation of the project, particularly during construction phase. These potential impacts and risks are summarised below.

5.2.1 Pre-Construction Phase

The main potential negative impacts and risks during pre-construction phase are related to land acquisition and UXO.

85 households with a total of 454 people will be affected by the acquisition of 141,655.20 m² of land. The types of land to be acquired as listed in Table 3 below:

Table 3: Land Areas Acquired by Dong Hoi Sub-project

No.	Commune/ Ward	Agricultural land (m ²)	Aquatic production land (m ²)	Public land (roads, irrigation cannels) (m ²)	Total affected land area (m ²)
1	Duc Ninh Dong	17,933.00	16,729.00	22,876.40	
2	Phu Hai	7,753.40	14,681.20		
3	Duc Ninh	140.00	21,300.00		
4	Bac Ly	24,333.00	6,545.00		
5	Dong Phu	9,364.20			
Total		59,523.60	59,255.20	22,876.40	141,655.20

Quang Binh was affected severely by bombing during the war. Therefore, there are risks that some UXO are left at in the project areas. If uncleared before site clearance, these may cause serious damages and loss in both human and properties to the subproject during construction phase.

5.2.2 Construction Phase

The potential negative impacts and risks related to construction activities are summarized in Table 4 below:

Table 4: Negative Impacts during Construction Phase

No.	Impact/Risks	Descriptions	Objects/ areas affected	Magnitude	Duration
1	Air quality reduction: increased dust and exhaust gas, odor, noises, vibration	Dusts generated from transportation, loading and unloading, temporary storage of construction materials and wastes including soil, sand, stones, cement, excavated and dredged materials.	- People living around the construction areas and material transport routes;	Medium	Short

No.	Impact/Risks	Descriptions	Objects/ areas affected	Magnitude	Duration
		<ul style="list-style-type: none"> - Exhaust gas from cars, construction plants such as excavators, cranes; - Odor from sludges and materials dredged from existing sewers and Cau Rao River; - Noises from construction plants, dumping rock on temporary material yards, pile driving during construction of bridge; - Vibration due to pile driving during construction of bridge. 	<ul style="list-style-type: none"> - Workers on sites; - Infrastructure and landscape around the construction areas. 		
2	Wastewater generation	<ul style="list-style-type: none"> - Stormwater runoff through construction sites and rolling up sludge; - Domestic wastewater generated daily from workers camps and contractors site offices ; - Wastewater generated from washing of vehicles and construction plants. 	Surface water sources in the project areas, especially water of Cau Rao and Le Ky rivers	Low	Short
3	Solid wastes generation	<ul style="list-style-type: none"> - Solid wastes generated from excavated soil, dredged materials from the Cau Rao River, demolition of the existing Cong Muoi bridge. Total 151,796 m³ (229,150 tons) of solid waste will be disposed at Cau Cup landfill; - Domestic and construction solid wastes from workers camps and construction sites; - Hazardous wastes generated during cleaning and maintenance of construction and transportation vehicles, plants, and equipment. 	Direct impacts to the bio system at Cau Cup Landfill	Medium	Short
4	Water quality reduction (Surface water)	<ul style="list-style-type: none"> - Stormwater runoff around the construction sites, solid wastes rolled up by stormwater; - Wastewater generated by workers' daily activities; - Wastewater generated by washing of construction vehicles and plants; <p>The above objects intrude into surface water and increase turbidity and oil.</p>	Decreasing surface water quality in Cau Rao and Le Ky rivers	Low	Short
5	Biological resources	<ul style="list-style-type: none"> - Loss of trees and vegetation cover due to site clearance; - Loss of aquatic habitats along 427 m of river due to river dredging and bridge 	- Terrestrial ecosystems at Cau Cup landfill;	Small	Medium

No.	Impact/Risks	Descriptions	Objects/ areas affected	Magnitude	Duration
		construction at the man-made and polluted Cau Rao river:	- Aquarium in Cau Rao and Le Ky rivers.		
6	Urban landscape	- Urban landscape would be negatively affected by temporary loading and transportation of construction materials and wastes during the execution of earthwork, construction of drains, manholes, pumping stations. Sensitive locations include tourism area along the Nhat Le coastline, locations near schools, hospitals, office;	Sewer construction routes, dredging area of Cau Rao River and Cong Muoi Bridge	Significant	Short
7	Flooding, sedimentation, erosion	- Earthworks activities, construction of drains and pipeline connection can cause localized flooding and sedimentation at the construction sites during heavy rains due to: - existing drains blocked during dredging at the Cau Rao river can cause limit drainage capacity in the rainy season and results in localized flooding; - The 2-3m high new road will function as a dyke in the area, If drains are not properly installed, surfacerunoff between two sides of the road will be blocked and cause localised flooding	Along construction routes	Low	Short
8	Soil Subsident and and landslide risks	- The risks will be mainly at the walls of deep holes created for construction of sewers, pumping stations, toilet foundation, bridges; - Landslide risk is related to the construction of road base which is 2-3m high.	Safety risks for the workers, the residents and the surrounding infrastructure	Medium	Short
9	Traffic disturbance and Increased Safety Risks	- Road excavating for drain and pipe laying, and temporary material parking areas can obstruct traffic in urban roads; - Transportation of materials and wastes affects traffic; - Construction of Cong Muoi bridge will disrupt traffic in Le Loi road; - High risks to traffic participants and vehicles at the intersection between Quang Trung road and the National Highway No. 1 road.	Risks to traffic participants	Medium	Short

No.	Impact/Risks	Descriptions	Objects/ areas affected	Magnitude	Duration
10	Damages or interrupt existing infrastructure and related services	<ul style="list-style-type: none"> - 23 km of roads along the proposed drainage and sewer would be affected with road excavation. Roadside electrical systems, water supply and drainage pipes, and some underground works along the routes may be affected, damaged and related services could be interrupted; - Dredging at Cau Rao River affects 7 stormwater outfalls; - Trees on sidewalks (shade trees, 4-6 m high, no old trees) would be affected by crane and materials movements; - 4-6 m deep excavation may cause cracks to the existing weak structures in the surroundings; - Separation of paddy fields and irrigation canals cause impacts on agriculture farming of local people. 	People living at the construction sites of Component 1 and the existing infrastructure along the construction routes	Low	Short
11	Social impacts	<ul style="list-style-type: none"> - Drain and sewer construction cause disruption to daily life and business activities of HHs, administrative agencies, and tourist activities along both sides of the construction roads; - Concentration of workers at the sites may lead to social disorder due to differences in behaviour, income levels and construction impacts; 	People living along both road sides;	Medium	
12	Community Health and safety	All construction activities are likely to contain safety risks to the local people around the construction areas	People in the surroundings of the construction sites	Medium	
13	Health and safety of workers	All construction activities are likely to contain safety risks to the workers and local people around the construction areas	The workers in the project areas.	Medium	

5.2.3 Operation Phase

The key potential impacts and risks during operation phase include:

- Reduced air quality: Gases emitted from the exhausts of the traffic mean running along the 1.44 km-long road will cause localized air pollution, reduce cultivation productivity of nearby aquaculture farming ponds and rice fields.
- Solid wastes generated from wastewater treatment process at the Duc Ninh WWTP.

- Flooding and erosion risks might occur at the slopes of the new road if not protected and maintained properly.
Failure of the sewer pipes installed along the 1.44 km for conveying wastewater from Bao Ninh peninsula to Duc Ninh WWTP will cause pollution to the Le Ky river water.

5.3. Mitigation Measures

Proposed mitigation measures are incorporated throughout the project implementation, from the design stage, pre-construction phase, construction phase, and operation phase of the project.

Mitigation measures are integrated into the project design includes minimising land acquisition, application of use environmental-friendly and safe materials, etc.

Resettlement Action Plan (RAP) has been prepared at project preparation and will be implemented before site clearance. Mine clearance will be carried out before site clearance.

5.3.1 Common Mitigation Measures Proposed for Construction Phase

Mitigation measures for general construction impacts are detailed in the ECOP and mitigation measures for site-specific impacts. ECOP are listed in Table 5 below

Table 5 - Environmental Codes of Practices (ECOP)

Environmental & social impact	Mitigation measure
I. Pre-construction phase	
Land acquisition	Implement RAP
UXO risks	Arrange for bomb and mine clearance prior to site clearance
II. Construction phase	
Air Quality Reduction	<ul style="list-style-type: none"> • Only use the vehicles having valid registration date; • Spay water • Arrange workers to collect and gather construction materials, wastes by end of each day or work shift; • Cover the vehicles carrying waste, bulk materials • Cover the pile of waste materials, • Transport waste from the construction site, gather at temporary collection places for recycling or at landfills as soon as possible; • Do not burn waste on construction site; • Do not leave the car, machine idle run for more than two minutes. • Keep noise sources about 300 - 500m sensitive receptors.
Wastewater generation	<ul style="list-style-type: none"> • Mobilize local workers to reduce f generated waste water volume • Encourage contractors to rent local houses instead of building temporary camps • Provide septic tanks for toilets for camps; Treat waste water from kitchen, washing and bathing areas before releasing to the environment

Environmental & social impact	Mitigation measure
	<ul style="list-style-type: none"> • Clear ditches around camps weekly. • Build sedimentation traps where applicable
Generated solid waste	<ul style="list-style-type: none"> • Promote recycling. Implement waste classification at source • Provide garbage bins for camps and construction sites. collect domestic waste regularly. Cover refuse bins and water tanks • before transporting to landfill as stipulated by design documents and accepted by Supervision Engineer. • Reuse top soil for tree plantation, excavated soil for grading • Recycle wood, bricks for other purposes. Sell recycling waste such as iron, steel, packing... to purchasers. • Clean, tidy up waste by end of each day/shift and transport waste out of construction site as soon as possible. • Manage dredged sediment of Cau Rao River as stipulated in the special mitigation measures.
Reduced water quality	<ul style="list-style-type: none"> • Ensure that pre-sedimentation pits are available on drainage routes in construction site and camping areas. • Provide mobile toilets or arrange reasonable latrines for workers on construction sites. • Gather, collect and transport waste to the designated sites as soon as possible. • Do not store loose construction materials or mix concrete 20 m from ponds, lakes, rivers or other water sources • Store unused petroleum, oil on waterproof materials, with roof and embankment to control and for easy cleaning up when leakage occurs. Do not store petrol, oil within an area of 100m from rivers, lakes, ponds. • Arrange for vehicle repair, maintenance and washing in garages.
Impacts on organism, aquatic system	<ul style="list-style-type: none"> • Minimize disturbance caused by construction activities, especially at areas having green trees or vegetation. Do not use chemical substances to clear vegetation; • Do not pile up materials, wastes on vegetation covered areas. • Embank construction areas to limit impacts on water sources • Do not destroy vegetation, green trees outside construction areas • If possible, transplant green trees to other places before constructing pipelines on pavement
Impacts on urban landscapes,	<ul style="list-style-type: none"> • Shield carefully and clean periodically transportation vehicles of materials and waste • Do not locate temporary waste, construction materials within 20 meters from the gates of works such as schools, offices, medical facilities, temples etc.; • When conducting construction works near the cultural and historical venues, such as temples, church, temple, contractors will be responsible for planning the construction to avoid full moon days, holidays.... • Tidy up areas for storing construction materials, waste; • Dismantle of tents, camps, conduct ground restoration and disturbed areas before works handing over. Fill up and cover temporary sanitation pits, septic tanks, ditches
Sedimentation, flooding risks	<ul style="list-style-type: none"> • Gather construction materials and waste neatly to limit the amount of materials being washed out by stormwater; level the ground after temporary material storage; • Avoid disturbing and damaging vegetation and existing trees

Environmental & social impact	Mitigation measure
	<ul style="list-style-type: none"> • Clean up soil, rock from ditches, sewers inside and around the construction areas periodically. • Level the surface after disposing waste materials on landfill
Landslide, erosion risks	<ul style="list-style-type: none"> • Minimize disturbance caused by construction activities, especially at areas having green trees or vegetation; • Prop up walls using Larsen landmarks when digging from 2.5m deep; • Reinforce, protect sloping roof by sand sacks when high risks of erosion, landslide occur, or when small ditches appear;
Traffic risks	<ul style="list-style-type: none"> • Install, maintain traffic instruction signs, warning signs for people and vehicles travelling during construction time; • Install speed limit sign within 50m from construction site; • Set up fences and warning boards at excavated pits, ditches, especially pumping stations and outfalls; • Cover trucks tightly, do not pile materials too high. Collect dropped soil and materials at construction areas, prevent slippery conditions; • Do not stop vehicles longer than needed. Do not let construction plants, materials to block roads. • Assign staff to instruct traffic at school opening or closing time; • Ensure adequate lighting for construction sites at night.
Existing infrastructures and utilities	<ul style="list-style-type: none"> • Cooperate with local authorities managing power and water supply services for relocation of water, reconnection of affected structures; • Contractors only use vehicles, loads at permissible loading capacity of roads • When constructing under power lines, assign observers and instructors for cranes, excavators to avoid causing trouble for power lines, telecommunication lines.... • If the damages caused by the contractor, the contractor shall proceed to repair, restore, compensate for any damage or loss at contractor's expense. Recoveries of damages must be approved by the Supervision Engineer. • Restore pavement and sidewalks in the construction areas after drains installed, funds for site restorations are included in contract price.
Social impacts	<ul style="list-style-type: none"> • Register with local government list of workers in camps, rent houses; Inform communities at least two weeks prior to commencement; • Limit construction activities at night. If impossible to avoid construction at night or disrupt services (electricity, water ...), inform communities at least two days, and remind one day in advance. • Place planks over trenches constructed but not yet reinstated to ensure traffic currents for HHs along construction routes. • Mobilize local people for simple works. Organize training courses on environment, safety and health for workers before assigning tasks. • Prepare and apply code of conducts for workers and contractors
Impacts on cultural heritatges	<ul style="list-style-type: none"> • Do not locate temporary wastes, construction materials within 20 meters from the gates of cemeteries, monuments, astemples etc.; • Folow Chance Find Procedures if relics and artifacts are exposed during construction phase
Safety and health for community	<ul style="list-style-type: none"> • Locate trashes at camps and collects domestic and construction waste daily; • Clear ditches around camps, prevent stagnant water; • Fence the construction site of pumping stations and the WWTP by at least 2-meter-high metal sheets;

Environmental & social impact	Mitigation measure
	<ul style="list-style-type: none"> • Prop up fences, use reflective strips, and place warning signs at excavation pits and open channels, ensure lighting at night during construction on roads; • Limit the vehicle speed at 20km/h within 200m from the construction site so as to restrict dust and noise; • Arrange plants and vehicles generating noise at suitable distance so that noise transmitted to residential areas is not higher than 70dBA; • Apply static compacting method when constructing the road base near areas with many HHs and temporary works to restrict vibration.
Safety and health for workers	<ul style="list-style-type: none"> • Arrange proper camps with water supply, electricity and sanitation. Sleeping bed must have screens to prevent mosquitoes, which cause dengue fever. • Clean camps, kitchens, bathrooms, toilets regularly. collect garbage daily from camps. Clear ditches around camps regularly to prevent stagnant water. • Provide adequate protective clothes for workers and forcing them to use; • Train workers on environment, safety and health, enhance their awareness about HIV/AIDs and infectious diseases. • Arrange power lines at offices and construction sites safely • Limit speed of vehicles when moving inside construction sites • Provide fire-extinguishers, first-aid bags, and medical cabinets with all medicines to treat diseases commonly seen at the locality • Store fuels and chemicals safely in areas having waterproof ground, roofs and surrounding edges, and locate safety warning signs at least 20m from the camps and at the end of the prevailing winds; • Follow pre-set procedures in case of chemical and fuel leakage, perform following steps: • Stop all construction activities in case of storms, accidents or breakdowns;

5.3.2. Mitigation Measures for Site-Specific Impacts

Mitigation Measures along Drains, at Pumping stations, and Manholes

- Successive construction method will be applied..
- Barriers, warning signs, warning signals, lights, and fences shall be provided along the in-progress-construction roads as per applicable regulations. Flag persons must be employed to control traffic at sites, especially when construction equipment is entering or leaving the work areas and stop for loading materials and wastes.
- Materials and wastes shall be stocked neatly without encroaching existing roadways, drains, and stormwater manholes
- Excavated soil must be transported immediately to designated disposal sites outside construction sites.
- Contractors will co-ordinate with competent authorities to plan proper traffic lanes, if needed, before constructing road-crossing drains and pipes. In the roads where traffic lanes are applied during the construction process, sufficient advisory signs, barricades, fences, and flag persons must be provided;
- Larsen sheet piles will be deployed to stabilize excavated holes and trenches of which the depth is 2.5m or more. Reinforcing piles must be checked and maintained to ensure stability of excavated trenches and holes.

Table 5.13: Site-specific Mitigation Measures at site along the Pipelines

No.	Road	Site-specific impacts	Mitigation measures
1	Ly Thai To road	<ul style="list-style-type: none"> - Traffic disturbance - Social impacts on retail merchants along two road sides; - The deepest excavated depth is 4.3m, hence, high depression and slide risks towards nearby facilities and houses <p>Sensitive receptor: Dong Son and primary school, Cộn market;</p>	<ul style="list-style-type: none"> - Install sign boards and temporary access in case of traffic disruption; - Avoid construction at school and market at peak hours, stock construction materials neatly, wastes are not stored temporarily at the primary school and Cộn market; - Employ flag persons to direct crane operators at sites where large pipes are stocked.
2	Le Hong Phong road	<ul style="list-style-type: none"> - Traffic disturbance - Dong Son No. 1 primary school is a sensitive receptor regarding to exhaust emission, dust, noises, and view-looking; 	<ul style="list-style-type: none"> - Separate traffic lanes; Provide sign boards; - Ensuring the shortest transport time at Dong Son No. 1 primary school - Avoid construction at peak times, stocking construction materials neatly, and wastes are not stored temporarily at the primary school; - Employing flag persons to direct crane operators at sites where large pipes are stocked
3	Ton That Tung road (Nam Ly)	<ul style="list-style-type: none"> - Traffic disturbance - densely populated area with retail shops along two road sides; - Vietnam - Cuba hospital is a sensitive receptor - The deepest excavated depth is 2.2m, hence, minor depression and slide risks 	<ul style="list-style-type: none"> - Separating traffic lanes; - Providing boards and temporary access in case of traffic disruption; - Ensuring the shortest transport time at Vietnam – Cuba hospital - Stock construction materials neatly, and wastes are not stored temporarily at the hospital site.
4	Trung Truong road	<ul style="list-style-type: none"> - Traffic disturbance; - traffic safety risks at the cross road where large pipes are stored temporarily; - Impacts on electricity lines, relating to pipe craning. 	<ul style="list-style-type: none"> - Provide boards; - Barriers, warning signs, and traffic advisory signs. - Employing flag persons to direct crane operators at sites where big pipes are stocked
5	Ngo Gia Tu road	<ul style="list-style-type: none"> - Traffic disturbance; - populated are, lots of trees along two road sides - The deepest excavated depth is 3.35m, hence, depression and slide risks 	<ul style="list-style-type: none"> - Provide boards and Divert traffic - Barriers, warning signs, and traffic advisory signs. - Employing flag persons to direct crane operators at sites where big pipes are stocked
6	Huu Nghi road	<ul style="list-style-type: none"> - populated area and many agencies along two road sides: the DONRE, the Fire Station, and Huu Nghi hospital 	<ul style="list-style-type: none"> - Separating traffic lanes; Providing sign boards - minimise construction duration at office area - Avoid construction at peak times, - Avoid loading construction materials near the offices and hospitals
7	To Huu road	<ul style="list-style-type: none"> - Impacts on crowded population and food stalls/ restaurants, Nam Ly bus station 	<ul style="list-style-type: none"> - Separating traffic lanes; - Providing boards and temporary access to shops/ food stalls/ restaurants. - Stock construction materials neatly, and wastes are not stored the gate of Nam Ly bus station

8	Le Truc road	<ul style="list-style-type: none"> - Impacts to operation of Hoa Hong kinder garten and the City People's Committee 	<ul style="list-style-type: none"> - Separating traffic lanes; Providing boards "We are sorry for any inconveniences" - Avoiding construction at peak time - minimise construction duration at office area and the kinder garten; - Avoiding stocking construction materials at the areas of the kinder garten and public agencies.
9	Phan Dinh Phung road	<ul style="list-style-type: none"> - impacts on daily activities of local people and shops/ houses; - Bac Ly No. 1 primary school and Bac Ly No. 1 secondary school are sensitive receptors <p>The alignment is long, hence, impacts on traffic, sensitive receptors, and social life will be significant</p>	<ul style="list-style-type: none"> - Separating traffic lanes; Providing boards and temporary access in case of traffic disruption; - Ensuring the shortest transport time at school areas. - Avoid construction at school peak times, stocking construction materials neatly - Employing flag persons to direct crane operators at sites where big pipes are stocked;
10	Hoang Dieu (Nam Ly) road	<ul style="list-style-type: none"> - Traffic is disrupted; - Impacts on daily activities of local HHs and shop houses; - Risks imposed to electricity lines on the road 	<ul style="list-style-type: none"> - Separating traffic lanes; - Providing boards and temporary access in case of traffic disruption; - Employing flag persons to direct crane operators at sites where big pipes are stocked;
11	Le Loi road	<ul style="list-style-type: none"> - Traffic is disrupted - Impacts on daily activities of local HHs and many shop houses; - Dong Hoi General Hospital and Dai Giac Pagoda are sensitive receptors to dust, noises, and exhaust fumes. 	<ul style="list-style-type: none"> - Separating traffic lanes; - Providing appropriate sign boards - Ensuring the shortest transport time at the hospital and pagoda areas; - Avoiding construction at school peak times, stocking construction materials neatly, and wastes are not stored temporarily at the school area;
12	Sub-zone 9, Bac Ly	<ul style="list-style-type: none"> - Traffic is disrupted - Impacts on daily activities of local HHs and many shop houses; - Risks imposed to electrical lines during craning of large pipes - Depression and slide risks when excavating deep down to 3m. 	<ul style="list-style-type: none"> - Divert traffic (by creating a temporary bypass via Le Anh Xuan road), the remaining road can support only non-motorized vehicles. - Providing boards and temporary access to local houses; - Using Larsen sheet piles for deep excavated trenches, surveys local HHs and other infrastructure before constructing
13	Phan Huy Ich road	<ul style="list-style-type: none"> - Traffic is disrupted - Impacts on daily activities of local HHs along two road sides 	<ul style="list-style-type: none"> - Diverting traffic flows to Diem Tan, Tran Nhat Duat, and Phan Phu Tien roads; - Providing boards "We are sorry for any inconveniences" and temporary access to local houses;
14	Tran Nhat Duat road	<ul style="list-style-type: none"> - Traffic is disrupted - Risks imposed to electricity lines on the road 	<ul style="list-style-type: none"> - Separattraffic lanes; Providing boards "We are sorry for any inconveniences" and temporary access in case of traffic disruption;
15	Nguyen Van Troi road	<ul style="list-style-type: none"> - Traffic is disrupted; - Risks imposed to electricity lines on the road. 	<ul style="list-style-type: none"> - Separating traffic lanes; installing traffic signs - Providing boards and temporary access in case of traffic disruption; - Using Larsen sheet piles for 3m-deep excavated trenches

16	Truong Phap road	<ul style="list-style-type: none"> - Traffic is disrupted - Significant impacts to food stalls, restaurants, and hotels (tourism peak season is from March to August); - Impacts on urban landscape and beauty of Nhat Le beach. - coastal sea water quality may be affected 	<ul style="list-style-type: none"> - Separating traffic lanes; - Providing boards “We are sorry for any inconveniences” and temporary access in case of traffic disruption; - Avoid construction during the tourism season; - Stock and cover materials neatly. - Reinstating the road surface, and cleaning wastes right after construction the drain.
17	Hoang Sam road	<ul style="list-style-type: none"> - Traffic is disrupted - Impacts on daily activities of local people 	<ul style="list-style-type: none"> - Separating traffic lanes; - Provid boards “We are sorry for any inconveniences” and temporary access in case of traffic disruption;
18	Extended Dang Thai Than road	<ul style="list-style-type: none"> - Traffic is disrupted 	<ul style="list-style-type: none"> - Separating traffic lanes; and installing signs allowing non-motorized vehicles onl - Provide boards and temporary access in case of traffic disruption;
19	Vu Trong Phung road	<ul style="list-style-type: none"> - Traffic is disrupted - Impacts on daily activities of local HHs along two road sides 	<ul style="list-style-type: none"> - Separate traffic lanes; and install signs allowing non-motorized vehicles only - Providing boards “We are sorry for any inconveniences” and temporary access in case of traffic disruption;
20	Le Duc Tri road	<ul style="list-style-type: none"> Traffic is disrupted - Impacts on daily activities of local HHs along two road sides 	<ul style="list-style-type: none"> - Separate traffic lanes; and install traffic signs allowing non-motorized vehicles only - Providing boards and temporary access in case of traffic disruption;

Mitigation Measures at Dredging and Embankment Lining of Cau Rao River

- The Contractor shall prepare a detailed dredging plan and submit to the Supervision Consultant for approval before carrying out the works.;
- Make a cofferdam for each section before dredging and constructing the embankment to limit impacts on water quality and aquatic species in the Cau Rao river; Prepare a construction plan for the under-water section to avoid construction activities during the rainy season from September to December;
- Provide warning signs at dangerous areas, for example, underflows, erosion points, or deep excavation;
- Install and maintain a Project Information Board at the construction site, including following information: name and contact details of the Site Manager, the Supervision Consultant, and the Employer, construction period and construction area;
- Implement protection measures for the to-be-dredged section before construction commencement;
- Dredging equipment must operate at slow speed at specific time, intervals are needed to allow sedimentation;
- In case of material leaking, the Contractor shall apply all necessary measures to clean polluted areas and prevent spreading of the pollutant. If needed, a specialized agency will be recruited to clean the pollutant;

- Not implement construction activities that generate big noises during noon time, nights, and in the early mornings. If night shifts are required, the Contractor shall inform nearby communities about such plans at least 02 days in advance;
- Provide sufficient lifebuoys to workers and imposing compulsory wear during construction in the water surface. Employing observers throughout work shifts for timely rescue in case of emergency;
- Provide signs and warning signs along the construction route, both in land and on the water surface;
- Cease construction activities, cleaning construction sites, providing false work and protecting measures for construction materials, plants, and equipment when stormy weather is forecasted;
- Dai Giac pagoda locating 200m far from the dredging area is a sensitive receptor. Hence, a proper construction schedule is required to limit construction activities on the first and the full moon days of lunar months, the construction service road passing the pagoda must be clean up.
- Dredged materials has salinity of 10.8‰ will be stored temporarily at the abandoned aquaculture ponds lakes adjacent to the dredging section. Before storing the dredged sediment, the Contractor shall dry the lake water with pumps and cut drainage trenches to discharge sediment water to the Cau Rao river. Accordingly, 0.5m-wide trenches will be cut through a 4m-wide earth road to avoid impacts on construction vehicles and plants operating in this road. Because these lakes used to be deployed for brackish water aquaculture, the bottom sediment layers are saline and exploited for the city parks and tree planting; thus, there will be no impacts on the ambient environment when dredged sediment is stored temporary in such lakes. After 3-5 days in the lake, dredged sediment will be transported to Cau Cup disposal site. Transport trucks shall be covered with tarpaulin sheets or canvas, and washed frequently to mitigate dust release and sediment spillage along the transport route.

Specific Mitigation Measures for Construction of Cong Muoi Bridge

- Provide construction signs and fences around the construction sites at two ends of Cong Muoi bridge and 23-8 road which is 600m far from Cong Muoi bridge;
- Before demolishing the existing Cong Muoi bridge, the Contractor will co-operate with Quang Binh Electricity and Water Companies to prepare a plan for relocating two 24KV electric poles and a water supply pipelines.
- Provide sufficient lifebuoys to workers and imposing compulsory wear during construction in the water, especially during construction of bridge abutments;
- Areas near Dai Giac Pagoda: wastes shall be transported to a disposal site immediately, no temporary storage is allowed; no demolishing or high noise generated activities are allowed on the first and the full moon days of lunar months; workers camp will be 300-400 far from the pagoda. The construction service road passing the pagoda must be clean from spilled materials and wastes and sprayed with water to mitigate dust, and construction plants and vehicles are prohibited from parking and starting off at the pagoda gate;
- The temporary material yard will be >30m from the Cau Rao river side and >200m far from Dai Giac pagoda to limit intrusion of materials into the Cau Rao river water that will decline water quality and impose negative impacts on urban landscape and the pagoda landscape. Wastes and construction materials within the distance of 20m from the construction site of bridge abutments must be cleaned daily.

Specific Mitigation Measures for Pumping Stations

- Provide closed fences around construction sites, the fences are made of sheet metal and at least 2m high;
- Post construction advisory signs, deep-hole signs, and speed limit signs at road sections passing the sites;
- Use Larsen sheet piles to prevent wall depression and slide;
- Install ladders to provide workers with safe access to deep holes;
- Gather materials and excavated soil neatly around foundation trenches, and implementing control measures to ensure minimum disturbance;
- Clean wastes and construction materials daily within 20m around the pumping stations.

Specific Mitigation Measures for School Toilets Construction

- Inform construction schedules in advance to the school board of managers for their co-operation in managing classes and ensuring pupil safety during construction.
- Make fences, posting prohibition notices, covering the construction sites, and spraying water to the existing toilets before demolishing to minimize dust release.
- If possible, separated lanes should be provided for trucks carrying construction materials and wastes.
- Demolish the existing toilets after class time. Covering and water spraying is required to mitigate dust release.
- Not implement activities that generate big noises or vibration during class time, for example, demolishing concrete structures, driving piles.
- Vehicles that carry construction materials and wastes are not allowed to entering or leaving the sites during class time and at school peak times.
- Stock materials and wastes neatly during construction
- Wastes must be moved out of the sites as soon as possible, no later than 24 hours since waste generation.

Specific Mitigation Measures for Road and Bridge construction under Component 2

- Work camps and temporary material parking areas shall be located at least 30m from water sources. Mobile toilets shall be provided for workers to mitigate domestic wastewater spreading to rice fields, aquaculture farming ponds and lakes, and the Le Ky river which will result in decrease of water quality and agricultural productivity. Waste bins shall be provided; discharge of domestic wastes, construction wastes, hazardous wastes into irrigation canals, rice fields, and aquaculture farming ponds and lakes is strongly prohibited.
- Top soil stored at the storage yard shall be rolled out. Irrigation canals cutting the construction roads shall be inspected and cleaned regularly to ensure drainage of rice fields during heavy rains.
- Periodic maintenance of vehicles, plants, and equipment at repair workshops, limiting maintenance work at construction sites.
- Successive construction method shall be applied for road base backfilling and the road base shall be compacted densely before raining. Temporary fences made of geotextile shall be provided during slope backfilling; the fences shall be buried 10cm deep down and reinforced, and re-used for next sections.
- Provide sufficient lifebuoys to workers and imposing compulsory wear during construction in the water surface, particularly during construction of bridge abutments (5-6m high above the water surface). Employing observers throughout work shifts for timely rescue in case of emergency. No construction activities in heavy rains and stormy days.

- Install “Construction site” notice boards at two intersections cutting Quang Trung road and the National Highway No. 1, and at the construction site at Le Ky river. During the traffic peak hours at the intersection cutting Quang Trung road, if material transport trucks enter or leave the site, a flag person shall be engaged to mitigate traffic risks.
- Construct ramps from rice fields to the roads with adequate slopes to ensure safety for farmers during the road operation;
- Use D150 steel pipes for sewerage routes in accordance with standard QCVN 07:2010/BXD to minimize pipe breaking.
- After construction, the contractors shall demolish work camps, collect and move all materials out of the project sites, clearing canal flows, and recovering landscape of the vacant land in front of the cemetery of Phu Hai ward.

Specific Mitigation Measures applied at Disposal Sites

It is planned that excavated and dredged materials of the project will be disposed at Cau Cup landfill (an old landfill which is undergoing a recovery process in Dong Hoi city). Following measures shall be complied with during disposal process of the project:

- Post a speed limit sign at the entrance of the disposal site;
- Provide a notice stating “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site;
- Wash or clean truck bodies before trucks leave the disposal site to ensure that no residual wastes can scatter out in roads;
- Provide a car washing area at the entrance gate, and all cars must be washed before leaving the site;
- After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks;
- Mark clearly natural drainage areas to avoid waste disposal at such areas and to protect the areas from being damaged or disturbed;
- Since the excavated sediment of Cau Rao river has salinity of 10.8%, waterproof materials (plastic canvas) shall be used to cover the bottom layer and the surroundings of the designated sediment disposal area. Besides, a 50-60cm thick cover of excavated soil shall be provided on top of the excavated sediment to mitigate salinity spreading via stormwater overflows which, in turn, can limit development of the floral system at the disposal site.

5.3.3 Mitigation Measures for Operation Phase

Duc Ninh WWTP

Odor released from wastewater pumping stations, waste screens, sand sedimentation tanks, aerobic ponds, and septic sludge treatment tanks shall continue to be collected by the existing odor collection system and sucked to the treatment unit with an odor absorbing process to ensure that no odor will be released to cause air pollution.

More trees shall be planted in the buffer zone to create a beautiful landscape and prevent odor spreading.

732kg of sludge will be generated each day at the WWTP and stayed in the bottom of the facultative pond. Sludge dredging will be implemented twice per year (267,399 tons per year). The dredged

sludge will be temporarily stored in the drying yard for -drying and dumped at Ly Trach landfill later.

School and Public Toilets

Before taking over the school toilets, the receiving agency must make commitments that the facilities will be child-friendly, safe, sanitary, and be operated and maintained as per the O&M manual.

6. ENVIRONMENTAL MANAGEMENT PLAN

6.1 Institutional Arrangements and Responsibilities

The main stakeholders of the project includes:

- The Project owner: PMU of Dong Hoi city (Dong Hoi PMU);
- EIA report appraisal and approval agency: Quang Binh PPC;
- Construction Supervision Consultants (CSC)/Environmental Supervisors (ES);
- Independent Environmental Monitoring Consultant (IEMC);
- Construction Contractors;
- Local communities;
- The schools where toilets are constructed.
- The World Bank (WB): the Don

The roles and responsibilities of key stake holders are summarized in Table 5 below.

Table 5 - Roles and Responsibilities of Environmental Management Agencies During the Project Preparation and Construction Phases

Unit	Environment related responsibilities
Project Management Unit (PMU)	The PMU is the project implementation unit being responsible for the overall supervision of the Project including environmental compliance, and takes main responsibilities for environmental issues in different project phases. PMU ensures that the environmental management system in Figure 3 is established and the responsibilities of relevant stakeholders are reasonable.
Environmental Officer in charge (from Dong Hoi PMU)	The PMU will assign an Environmental Officer (EO) in charge to help solve environmental issues induced by the Project, supervising the environmental compliance with the WB safeguard policies and Vietnam's regulations in various project phases. The EO will advise the PMU leaders on solutions for environmental issues to ensure the compliance with WB's safeguard polices and regulations stipulated by Vietnamese Government.
Construction supervision consultant (CSC)/ Environmental supervisor (ES)	CSC/ES will be responsible for overall monitoring of construction activities and make sure that the contractors undertake requirements given in the contracts and technical instructions. The ES belongs to the Construction Supervision Consultant Team will be in charge of monitoring and supervising construction activities to ensure the compliance of the contractors with requirements mentioned in their contracts signed with Project Owner, in the approved EIA report and EMP. CSC/ES regularly report to PMU on monitoring results.

Unit	Environment related responsibilities
Independent environmental monitoring consultant (IEMC)	<p>The IEMC will support the PMU to establish and operate the EMP. The IEMC will also be responsible for assisting PMU to prepare EMP implementation monitoring reports.</p> <p>The IEMC will conduct monitoring on the compliance to environmental policies and regulations by relevant stakeholders, regular and ad hoc monitoring on construction site on the environmental compliance of relevant stakeholders.</p> <p>The IEMC will conduct regular environmental monitoring and report to PMU, and carry out supplemental surveys when required.</p> <p>The IEMC will provide professional, objective and independent recommendations and proposals on the environmental related activities of the project.</p>
Construction Contractor	<p>Based on the approved EMP, the contractors are responsible to preparation of EMP for each construction sites then submits these plans to the PMU and ES for review and approval before starting construction.</p> <p>The Construction Contractor will commit to fulfillment of environmental protection requirements given in the approved EIA, strictly and properly implementation of prevention and mitigation measures for negative environmental impacts during the construction phase. The EMP will be included in the construction schedule, and Cau Rao River dredging plan must be developed in details before implementation.</p> <p>The Construction Contractor works under the management of the Environmental Supervisor and carries out adjustments or enhancement of measures when required.</p>
Quang Binh DONRE	<p>On behalf of Quang Binh PPC undertaking responsible for state management of environment issues, Quang Binh DoNRE has the following responsibilities:</p> <ul style="list-style-type: none"> - Enforce the implementation of relevant laws, regulations and standards; - Coordinate environmental protection efforts among relevant departments; - Supervise the construction, completion and operation of environmental works.
Local communities (authorities, NGOs, etc....)	<p>Investment monitoring by local communities is a voluntary activity undertaken by the residents inhabiting in the local wards/communes as stipulated by the Decision No. 80/2005/QD-TTg and other relevant regulations in order to:</p> <ul style="list-style-type: none"> - Monitor and evaluate the compliance with investment management regulations of relevant investment decision making authorities, investment owners, PMUs, contractors and project implementing agencies during investment process (including environmental aspects); - Identify and make recommendations to relevant authorities on violations to investment management regulations (including environmental aspects) in order to prevent and address those violations that cause waste and losses of Government investment capital, and harm the benefits of communities.

6.2 Environmental Monitoring and Supervision Plan

6.2.1 Monitoring of Contractor's Environmental Performance

Three levels of monitoring include daily monitoring, periodical monitoring and community monitoring which will be implemented as follows:

1. Daily monitoring: Daily monitoring will be carried out by the Construction Supervision

Consultant appointed by the PMU. The Construction Supervision Consultant (CSC) will present monitoring results in the project implementation progress report.

2. Periodical monitoring (every six months): As a part in the overall environmental monitoring plan (EMP). ESU, with the support of the Independent Environmental Monitoring Consultant (IEMC) will supervise the compliance of the contractors every 6 months, and report the results to PMU and WB.
3. Community monitoring: the local community also monitor the implementation of Government's regulations with the technical supports of PMU.

6.2.2 Environmental Quality Monitoring

Monitoring of environmental quality is carried out in all three project phases. The parameters, frequency and Monitoring Station are summarized in the Table 6 below:

Table 6 -Scope and Parameters of Environmental Monitoring

No	Item	Pre-construction	Construction	Operation
I	Air, noise and vibration monitoring			
	1. Parameters	Dust, noise, CO, SO ₂ , NO _x , H ₂ S, NH ₃	Dust, noise, CO, SO ₂ , NO _x , H ₂ S, NH ₃	Dust, noise, CO, SO ₂ , NO _x , H ₂ S, NH ₃
	2. Frequency	Once before construction	Once every 06 months	None
	3. Applied standards	QCVN 05: 2013/BTNMT, QCVN 06: 2009/BTNMT; QCVN 26: 2010/BTNMT; QCVN 27: 2010/BTNMT		
	4. Monitoring Stations	3 samples	3 samples	
II	Surface water quality monitoring			
	1. Parameters	pH, BOD ₅ , COD, TSS, DO, T-N, T-P, NH ₄ ⁺ , Coliform, oil and grease	pH, BOD ₅ , COD, DO, TSS, T-N, T-P, NH ₄ ⁺ , Coliform, oil and grease	pH, BOD ₅ , COD, DO, TSS, T-N, T-P, NH ₄ ⁺ , Coliform, oil and grease
	2. Frequency	Once before construction	Once every 06 months	Once every 06 months
	3. Applied standards	QCVN 08:2008-BTNMT		
	4. Monitoring Stations	04 samples (Sampling locations given in the annex part)	04 samples	
III	Domestic wastewater quality monitoring at Duc Ninh WWTP			
	1. Parameters	pH, BOD ₅ , COD, TSS, DO, T-N, T-P, NH ₄ ⁺ , Coliform, oil, grease, heavy metals	pH, BOD ₅ , COD, DO, TSS, T-N, T-P, NH ₄ ⁺ , Coliform, oil, grease, heavy metals	pH, BOD ₅ , COD, DO, TSS, T-N, T-P, NH ₄ ⁺ , Coliform, oil, grease, heavy metals
	2. Frequency	Once before construction	Once every 06 months	Once every 06 months
	3. Applied standards	QCVN 14:2008/BTNMT		

No	Item	Pre-construction	Construction	Operation
	4. Monitoring Stations	04 samples	04 samples	04 samples
IV	Sedimentation quality monitoring			
	1. Parameters	As, Hg, Cu, Zn, Pb, salinity	As, Hg, Cu, Zn, Pb, salinity	As, Hg, Cu, Zn, Pb, salinity
	2. Frequency	Once before construction	None	None
	3. Applied standards	QCVN 43:2012/BTNMT		
	4. Monitoring Stations	2 samples	2 samples	
V	Ecosystem (aquatic) monitoring			
	1. Parameters	Numbers, density of plants, planktons, large invertebrates..		
	2. Frequency	01 time before construction		02 during operation phase
	4. Monitoring Stations	- Sample 1: the dredging section of Cau Rao River - Sample 2: bridge construction section of Le Ky river		- Sample 1: the dredging section of Cau Rao River - Sample 2: bridge construction section of Le Ky river
VI	Erosion monitoring		Throughout the construction of embankment	
VII	Solid waste monitoring		Monitor the volume of generated waste and dredged sludge	First year Duc Ninh WWTP operation
VIII	Hazardous wastes monitoring		Monitor the volume at the storage place	First year Duc Ninh WWTP operation

6.2.3 Estimated Costs for the Environmental Monitoring Plan

The total cost for EMP is presented in following Table:

Table 7: Total Cost for EMP Implementation

Items	Cost
Environmental monitoring program implementation	774,021,000
Community monitoring system operation	240,000,000
Independent environmental monitoring consultants	800,000,000
Total	1,814,000,000

Items	Cost
Cost for implementation of mitigation measures (camps, labor safety protection equipment, reinstating road surface, planting trees and grass ...)	Included in civil works contracts

In short, the total cost for implementation of the environmental management plan is VND **1,814,000,000** (One billion, eight hundred and fourteen million Viet Nam Dong).

7. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

In the ESIA process, information disclosure and public consultation on environment ensures the acceptance of local authorities, local NGOs and local affected people in the sub-project areas. Through public consultation, unidentified environmental adverse impacts and mitigation measures can be recognized and included in ESIA report. Public consultation is conducted with two sessions.

Session 1: Public consultation with the authority of Dong Hoi city and 11 affected wards in Dong Hoi city (consultation time, locations, and participants are reported in details in the ESIA).

Session 2: Public consultation with the communities that are directly affected by the project.

Table 6: Summary of public consultation meetings

Time	Purpose	Comment
Session 1		
10/5- 17/5/2016 (54 participants)	<ul style="list-style-type: none"> - Detailed information on each works item at the wards/communes. - Overall map and details of the project works. - The draft ESIA report - The WB safeguard policies on environment and resettlement 	<ul style="list-style-type: none"> - Compensation and site clearance must be completed prior to construction commencement; - Compensation prices must reflect market prices; - Allowances and support should be provided to HHs whose productive land is acquired and livelihoods are affected to allow them to change their livelihoods; - In addition, contractors must implement sufficient environmental protection measures throughout the construction phase to avoid negative impacts on health and daily life of the people, roads, business operation of HHs living adjacent to construction sites of roads, bridges, PSs, drains and sewers. - Recruiting local people as workers during project implementation.
Session 2		
23-27/6/2015 (231 participants)	<ul style="list-style-type: none"> - Detailed information on each works item at the ward/commune. 	<ul style="list-style-type: none"> - The local people strongly support the project

	<ul style="list-style-type: none"> - Overall map, and details of the project works. - Detailed information about HHs affected by land acquisition - The draft ESIA report - Forms for collection of people's comments. - The WB safeguard policies on environment and resettlement. 	<ul style="list-style-type: none"> - The project will bring about positive impacts and improve environmental sanitation for local people - Compensation plans should be reasonable and satisfactory for people whose land is acquired by the project. - Priority should be given to recruitment of local people for project implementation. - Mitigation measures must be implemented during the construction phase . - The HHs who lose their livelihoods wish to receive support for livelihood changes and be recruited for the project operation phase.

The draft ESIA report will be disclosed at the People Committee's office of Dong Hoi city and PCs' offices of affected wards and communes in September 2016. Information about such disclosure will be posted in the website of Dong Hoi CPC. After reviewing the draft ESIA report, local people can provide their comments and inputs for environmental issues of the project.

The final version of this ESIA report will be submitted to the WB and posted in the Infoshop.