PORT OF PLOCE AUTHORITY

REPUBLIC OF CROATIA

TRADE AND TRANSPORT INTEGRATION PROJECT

(IBRD Loan No. 7410-HR)

ENVIRONMENTAL MANAGEMENT PLAN

for the reconstruction of the “No. 1” Road

Ploce – December 2014

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ABREVIATIONS

BiH Bosnia Herzegovina

BCT Bulk Cargo Terminal

CMT Container/Multipurpose Terminal

Corridor Vc A part of Pan-European Corridor V (5) connecting Ploce (CRO) and Budapest (HUN)

EA Environmental Assessment

EBRD European Bank for Reconstruction and Development

EIA Environmental Impact Assessment

EMP Environmental Management Plan

GGP Green Public Procurement

H&S Health and Safety

OG Official Gazette

PPA Port of Ploce Authority

WB The World Bank

1. Introduction

The main objective of the Trade and Transport Integration Project is to develop trade along Corridor Vc by improving the capacity, efficiency and quality of services on the southern end of Corridor Vc with particular focus on the port of Ploce and on coordination aspects among all corridor participants.

This is proposed to be achieved through:

(i) *Construction of new bulk cargo terminal, reconstruction of existing bulk cargo terminal to serve a purpose as a terminal container and supporting port infrastructure.* The works to be carried out are civil works for a bulk cargo terminal and a multipurpose/container terminal with supporting road/rail /energy infrastructure within the port area;

(ii) *Establishing electronic port community system.* Development and rollout of a modern electronic port community system, integrating all members of the port community into a seamless information system;

(iii) *Establishing concessions for new terminals*. Development and services required to support the successful implementation of the project (audit, procurement), to implement PPA business plan and establish the concession for new terminals.

The Government of Croatia has requested the assistance of the Bank both as an advisor and as a lead financier, in partnership with EBRD. The Project requires an integrated approach to corridor development across borders taking into account its physical, financial and operational dimensions for which the Bank is uniquely suited, through its respective programs in Croatia and BiH. The Project brings together the stakeholders and extensive experience of the Bank in Croatia and the Southeast European region in port development (Rijeka, Durres), railway modernization (Croatia, Romania, Macedonia, Bulgaria), and trade and transport facilitation (all Southeast Europe).

Until today, the TTI project has financed following infrastructure: a) construction of container terminal which has been finalized in August 2010, b) construction of bulk cargo terminal to be finalized by July 2015, c) waterbreak (djiga) to be finalized in January 2015, d) entrance gate terminal to be finalized by April 2015. In addition to above mentioned main infrastructure the TTI project will support smaller investments (Supporting Port Infrastructure sub-component) in the port that will facilitate functioning of terminals. One of those investments is reconstruction of the internal port road “No. 1”.

Construction of the internal port road No. 1 (road mark TD 432-P1), which is the subject of the EMP, includes construction of the new pavement (890m long and 11.2 wide), construction of 2 chamber installation AB canal along the road (in the full length), construction of surface run-off water collecting system that uses oil and grease separator at the CT, outdoor lightning in the full length of the road, replacement of existing power cables, water supplying piping as well as telecommunication cable lining.

2. Project Description

2.1. Objective

The main objectives of this **Environmental Management Plan (EMP)** are to:

- Review environmental due diligence procedures related to the reconstruction and rehabilitation of internal Port of Ploce Road, commonly marked "No. 1", together with infrastructure and surrounding surfaces.
- Prepare mitigation measures and monitoring plan. The mitigation plan is designed to anticipate possible environmental impacts in design, construction and operational phase of the project, assess their significance and, furthermore, to describe actions and activities for mitigation of the significant activities. Monitoring part of the plan is focusing on particular impacts as well as prescribing procedures, activities, timeframe and frequency of the overview.

In addition to environmental due diligence, EMP encompasses review of social safeguards such as concerns over impacts to cultural heritage (including assessing the presence of cultural values, cultural land issues, cultural sites, "chance finds" during the construction phase, etc.) and health and safety issues (H&S; regulatory framework and best practices compliance).

Objectives of the EMP have been defined based on the following World Bank's policies: Environmental Assessment (OP/BP/GP 4.01), Natural Habitat (OP/BP 4.04), Projects on International Waterways (OP/BP/GP 7.50).

2.2. Scope

The task report for the preparation of EMP encompasses:

(i) Visit and inspection of the location
(ii) Legal framework review including establishment of the line of responsibility for environmental mitigation measures implementation as well as monitoring activities application of the stakeholders, mainly Port of Ploce Authority (PPA) and concessioners.
(iii) Identify present environmental aspects, significant potential impacts, suggest mitigation measures for each impact as well as monitoring activities (timeframe, frequency, etc.)
(iv) Documentation review
(v) Existing monitoring results review (baseline studies)

The task report covers environmental and H&S issues related to:

- Reconstruction and rehabilitation of internal road "No. 1" including works such as mining, land removal, asphalt removal, road construction, etc.

- Construction of 2 chamber installation AB canal along the road
- Construction of surface run-off water collecting system
- Lightning in the full length of the road
- Replacement of existing power cables and telecommunication cables
- Water supplying piping as well as telecommunication cable lining

The assessment of design, preparation phase, future construction works and operation phas works, has been conducted through document review and interviews with representatives of Port Ploce Authority.

3. Review of Proposed Works

The **CT** will enable to reach yearly equivalent units volume of about 100.000 TEU/year. About 30 % of mentioned capacities will be transported by railroad and 70% by trucks.

For loading and unloading by railroad, new connection tracks are provided from the marshalling yard Ploce, adjacent to the port are of the Port of Ploce. For truck traffic, the existing main gate to the Port of Ploce is provided and connected, by the new road within the area of the Port of Ploce, directly to the terminal.

Traffic on CT:

- The solution of the internal traffic provides for a main collecting multi-lane road located at the edge between the unsheltered and sheltered storage surfaces to which connect the transversal inside process roads, which are located in such way to meet the technological requirements of the loading/reloading operations.
- Parking of the employees and client vehicles is provided at the main gate to terminal, within the port area. The foreseen surfaces provide parking space for 10 - 20 trucks and regular parking of about 60 passenger vehicles, of which 30 for employees and 30 for clients of port services.

Traffic on BCT:

By this project the new Bulk Cargo Terminal will be granted a transport and communication road. The internal road will also be used to deliver equipment during the building of the terminal. There are no special features for the roads required from the BCT, except for the normal issues like lighting and water drains.

3.1. Current Situation

The road No. 1 is located in the central part of the Port Area. It stretches in the North-South direction. The road is a connecting road for the entrance to cargo terminals along the canal Vlaska-Sea.

The total road length is 1500 m and 10,0 wide with the terrain elevation of +1.90m. Electronic installations and water supply piping are dug in along the east curb of the road. These installations are assessed to be in a quite bad shape.

The reconstruction is going to encompass 890 m of the “No. 1” road. This is a part of the road that is passing mostly through undeveloped area. Terrain around the road is a bit lower than the road itself and it has been made mostly out of the material dredged out of the port waters. In addition to road construction installation rehabilitation will be carried out and new power cables, telecommunication cables, water supply pipes and surface run-off collection system. The water collection system will be connected to the existing oil and grease separators at CT (K1) and BCT (K2).

East from the road the new liquid cargo terminal is going to be built, while on the west side of the road a dredged material depot is being formed (up to 6 meters height). On the north edge of the reconstructed road the road is intersecting “C-2” internal port road. This is also where Container Terminal (CT) is located. At the south edge of the soon to be reconstructed road a new entrance gate leading to new Bulk Cargo Terminal (BCT) and Liquid Cargo Terminal (LCT). Parts of the road are 23 m wide and were used as aircraft runway.

The planned works include:

- Reconstruction and rehabilitation of internal road “No. 1”
- Construction of 2 chamber installation AB canal along the road
- Construction of closed surface run-off water collecting system
- Lightning in the full length of the road
- Replacement of existing power cables and telecommunication cables
- Water supply piping as well as telecommunication cable lining.

No geotechnical research was conducted on the location. Data used in construction planning were obtained in geotechnical research of surrounding terminals conducted by Geotechnical Department of IGH institute JSC.

PPA plans to finish the road reconstruction in 7 months (by August 2015).

The project is still in the design phase and the construction works have not yet commenced.

4. Policy, Legal and Administrative Framework

4.1. WB Policies

Specific Investment Loans, as projects proposed for World Bank financing investing in country infrastructure, particularly require preparation of environmental assessment (EA) to help ensure that reconstruction / construction of facilities are environmentally sound and sustainable and as well to improve decision making related to the project. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. In this way risks associated with project actions can be effectively anticipated in advance before project implementation, and addressed by direct mitigation activities in the design, planning and construction supervision process as well as during the operation of the facilities.

Although the CT and BCT constructions are category A projects, the road rehabilitation project has been classified as a category B project, meaning that the project might have potential adverse environmental impacts on human populations and/or environmentally important areas. For all Category B projects and Environmental Management Plan needs to be prepared.

4.2. Croatian legal Framework

Environmental Legislation

According to Annex 1 of Ordinance on Environmental Impact Assessment (OG 61/14) “List of Interventions for Which EIA is Mandatory”, construction of sea ports open to transport of particular (international) economic interest for Republic of Croatia and special purposes sea ports of particular interest for Republic of Croatia are mandatory to conduct EIA.

In accordance with "Ordinance on the criteria for ranking of ports open to public traffic" (NN 31/96) Port of Ploce fills in the criteria for classification of ports open to public traffic under ports of special (international) economic interest for the Republic of Croatia thus the EIA for its reconstruction or extension is required.

The works have been separated to four logical units – (i) construction of CT, (ii) construction of BCT and (iii) internal road construction and (iv) access road construction. Since CT and BCT construction is categorized “Category A Projects” full EIAs were required by WB, and has been carried out. EIAs for these two terminals were also prepared according to National procedures.

However, in addition to that direct EIA requirement for construction and reconstruction of sea ports, there is a number of interventions that are connected to activities in ports for which the EIA is or might be required, as follows:

Annex 1 - Ordinance on Environmental Impact Assessment (OG 61/14) "List of Interventions for Which EIA Is Mandatory"

Inland water ports

Sea ports open to public traffic and of special (international) and economic interest for the Republic of Croatia. Sea ports of special purpose and value for the Republic of Croatia in accordance with special regulation.

International and main pipelines for gas transport, oil and oil derivatives, including terminal, dispatching and measuring-regulation (reduction) station that is connected to the pipeline

Storage buildings:

- Oil terminals and LPG terminals
- Underground storage of natural gas
- Oil and liquid derivatives storage as independent building of 50,000 t and more
- LPG storage as independent building of 10,000 t and more
- Chemical products storage as independent building of 50,000 t and more.

Annex 2 - Ordinance on Environmental Impact Assessment (OG 61/14) "List of Interventions for Which Assessment of Need for EIA Is Carried Out"

Surface storages for natural gas and other fossil fuels 5,000 m^3 capacity or more

Underground storages of flammable gases 5,000 m^3 capacity or more

Storages for oil, petrochemical and chemical products 10,000 t capacity or more

Railway tracks construction (except city and suburban) and railway terminals for combined cargo loading and unloading

Dikes and other constructions with a purpose of water retention or accumulation (with more than 1.000.000 m3 newly added water quantity)

Sea ports with over 100 berths

All interventions that include silting, sea bed dredging, draining and construction in sea of 50m length and more

All interventions related to waste management requiring waste management permits

Urban interventions and other interventions for which the developer asks for an assessment of need for EIA for the purpose of acquiring international financial support

Design changes for the interventions listed in Annex 1 and Annex 2
Reconstruction of existing installations and equipment for which Environmental Permit had been issued in the case the works could have adverse impact on the environment.

Annex 3 - Ordinance on Environmental Impact Assessment (OG 61/14) "List of Interventions for Which Assessment of Need for EIA Is Carried out Where the Authority Body is County or City of Zagreb"

Construction of parking spaces size of 2 ha or larger

Canals, embankment and other construction used as flood or erosion defenses

Designing of the port access road (road C1 – B connecting the Port road entrance to the Highway) and Adriatic Highway section to Ploce, as well as the EIAS preparation thereof, are in progress (financed by HAC, Croatian Highway Corp.). Based on current and planned status of these activities, the licensing process (location permit, construction permit) and later on the construction of the access road and delivery of stone to the Port area, is expected to be largely harmonized with the CBT Ploce planned schedule of licensing and development activities.

Location permit

Location permit is administrative document defined by the Physical Planning and Building Act (Off. Gazette No. 76/07, 38/09, 55/11, 90/11, 50/12, 55/12, 80/13). It is issued based on Physical Planning document and on special related laws and regulations.

Location permit defines important characteristics of planned intervention like: form and size of construction lot, purpose, size (height, number of floors) and area of the constructed object, auxiliary objects on construction site (garages, storages, septic tanks, etc.), architectural form of the object (roof, materials and other factors depending on surroundings), site organization, methods and conditions of connection of the object to public traffic surface (including parking lots) and communal infrastructure, mitigation measures related to environment (if intervention notably effect environment by its operation) and other elements important for spatial intervention. Location permit needs to be issued for every spatial intervention, except for cases specially defined under regulations (The Ordinance on Spatial Intervention that do not Require Procurement of Location Permit - Off. Gazette No. 21/09, 57/10 126/10 48/11 81/12).

According to The Ordinance on Spatial Intervention that does not Require Procurement of Location Permit (OG 21/09, 57/10 126/10 48/11 81/12), following activities do **not require issuance of location permit: a)** adaptation and maintenance without any changes of profile, size and purpose of the project, **b)** construction or installation of connection of the building to low-voltage and telecommunication grid, water supply line, sewerage, gas pipeline, cable TV and heating system. However official approval of service provider with its instructions are required and need to be acquired prior any works, and **c)** site restoration, construction of water cistern and septic tank, alignment of solar plates, construction of underground or ground storage of fuel up to 10 m^3.

Since the intervention in the port is within the existing location and size and it does not assign the road a new purpose or location conditions, the Ministry of Construction and Physical Planning issued the Decision (Class: 350-01/13-02/67; Ref. No. 531-05-1-13-2) that the new location permit is not necessary and the road works can be conducted under the existing one.

Construction permit

Construction permit is administrative document defined by the Law on Construction Physical Planning and Building Act (OG 76/07, 38/09, 55/11, 90/11, 50/12, 55/12, 80/13). After verification and issuance of the permit construction may start. Construction permit confirms that the Main project is in compliance with Location permit and all special conditions issued by authorized bodies and obtained in the Location permit procurement procedure. In addition, Main project conformity to important construction regulations defined in the Law on Construction is evaluated. For instance: mechanical resistance, stability of building, fire protection, sanitary health and environmental conditions,

operational safety, energy efficiency, thermal insulation, access and mobility in the object. The ownership and the construction rights on the parcel are as well defined.

Construction permit for the reconstruction of the road "No. 1" has been issued by the Ministry of Physical Planning and Construction of the Republic of Croatia on 21st October 2014 (Class: UP/I-361-03/14-01/000120; Ref. No. 531-06-2-1-372-14-0007).

Operation permit

Operation permit is issued after the technical assessment of the constructed object, if proven that the object has been constructed in compliance with Construction permit requirements and the Main project.

EMP and administrative procedures preceding construction

Environmental Management Plan (EMP) comprises procedures whose purpose is to recognize and control the quality of environment and to identify and implement measures in the process of realization of investment, aiming at mitigation of negative environmental impacts and environmental protection.

EMP is not a requirement in Croatian laws and acts, i.e. EMP as an obligatory or binding document does not exist in the preparation of any investment projects, however some elements usually found in EMP are prescribed in permits and documents preceding construction, whose supervision is under the jurisdiction of different Ministries and agencies.

In this case, the Croatian Waters (national water management company) in their Water Regulation Conditions (Class: UP/I-325-01/14-07/0003212; Reference No. 374-24-1-14-3/IB), Article 9 of the Decision, stipulate that "The developer is obliged to anticipate mitigation measures in order to avoid damage or adverse impacts to water resources."

5. Environmental Aspects and Impacts

5.1. Identification of possible environmental issues

Activities encompassed by this EMP are relating to the reconstruction and rehabilitation of internal roads within the Port of Ploce, including the relaed infrastructure such as construction of 2 chamber installation AB canal along the road, construction of surface run-off water collecting system, lightning in the full length of the road, replacement of existing power cables and lining of telecommunication cables, water supply piping. According to Croatian legislation, particularly the Ordinance on Environmental Impact Assessment (OG 61/14) Annex 2 "List of Interventions for Which Assessment of Need for EIA Is Carried Out", "Urban interventions and other interventions for which the developer asks for an assessment of need for EIA for the purpose of acquiring international financial support" and the opinion of the Ministry of Environmental and Nature Protection it is not necessary to conduct an EIA or Evaluation for a Need of EIA for the construction of surface run-off water collecting system (Class: 351-03/13-04/297; Ref. No. 517-06-2-1-1-14-4). In addition, Ministry of Environmental and Nature Protection, issued a Decision (Class:UP/I 612-07/14-60/45; Ref. No. 517-06-2-1-1-14-4) that the intervention (the construction of surface run-off water collecting system) has no adverse impacts to the

Natura 2000 Network. This indicates that the impacts of the environment of this type of projects are limited.

However, environmental aspects exist and adversary impacts to humans and environment are possible especially keeping in mind that endangered bird species have reappeared in the vicinity of the road, e.g. bird nesting places in Vlaska Canal are only in 200m distance and nesting places of kulik and vlastelica in the sedimentation basins are in 400m distance Potential impacts can be grouped in relation to project's phase so can be grouped to design&preparation, construction and operational impacts while the main types of foreseen aspects (possible cause of impacts are):

- Dust and noise emissions
- Construction waste generation
- Hazardous waste generation
- Contaminated surface run-offs
- Potential mining (explosive material usage)
- Light pollution.

Purpose of the EMP is to recognize these aspects and impacts in the pre-design phase and thus effectively foresee possibility of their occurrence, significance as well as create adequate mitigation measures. These mitigation measures are based on precautionary principle eliminating, offsetting, avoiding and reducing the occurrence of impact at best and removing the impact at worst. The measures are also grouped in accordance with project's phase (design&preparation, construction and operational) and should be cost effective. The measure should not only deal with recognized risks, but should, as well, be used as guidance to make facilities more environmentally friendly and sustainable.

5.2. Environmental guidelines

The Environmental Guidelines address environmental and ecological/biologic concept, design and planning of new construction road and present the guideline for construction/rehabilitation as well as operation of the new roads. The guidelines cover issues of the handling of construction debris generated, selection of construction materials and construction methods with limited impact on the environment, energy saving methods as well as the handling of hazardous and non-hazardous wastes, and storage of hazardous materials under project supported activities, light pollution in the operational phase, noise and many other design, construction and road operating issues. The guidelines present a base for design, training, working conduct and procedures and operating procedures.

Design phase

In the design phase many important issues could be approached, investigated and best choices incorporated into design. In this case the designer choices are somewhat limited given that the project purpose is to reconstruct and rehabilitate the internal port road. However, there are choices of type of materials planned for construction as well as degree of protection of certain environmental elements incorporated into design.

<u>Water management design</u>

Although most of the choices presented in this part of the EMP are not mandatory by Croatian legislation or by WB policies, but are just recommended guidelines that should be thought of when designing building and implemented, those requirements presented in the Decision of Croatian Waters from June 2014 (Class: UP/I-325-01/14-07/0003212; Reference No. 374-24-1-14-3/IB) are mandatory. These are as follows:

- Ensure surface runoff to be captured and directed to oil and grease separators. The design should include the sedimentation or retention tank for treated water prior to its release to the natural recipient.
- Integrate a closed drainage system for the surface runoff from the road. This water has to undergo oil and grease separation prior to release to the natural recipient (the sea water).
- Since the intervention area is a part of water stream Vlaska hinterland as well as under the sea penetration risk, the design needs to be adjusted to such circumstances and take into account conditions that might occur in the case of high waters.
- Surface water run-off drainage system needs to be designed and constructed in a way that the finalized parts can function as a singular operating system.
- Water supply piping design should be harmonized with the standards demanded in the water supply system decisions of the area.
- The design should anticipate a location, method and final design of the excavated soil disposal site.
- The design has to harmonize intervention construction with the existing and planned utility infrastructure. Permits, special conditions and opinions need to be obtained for all intersections.
- The developer is obliged to anticipate mitigation measures in order to avoid damage or adverse impacts to water resources.

Light design

According to the Light Pollution Prevention Law (114/11) “light pollution present a light emission for artificial (anthropogenic) sources of light which have an adverse impact to human health and the environment, can cause glare, cause traffic safety risks, cause disruption of living, feed or migration of birds, bats, insects and other animals, disrupt growth of plants, impacts natural balance in the protected areas, interferes with professional and astronomical sky watching or emitting light towards the sky and in that way unnecessary costumes large quantities of energy or disturb night landscapes”.

Croatian Legislation generally envisages measures in design and use of light within the Light Pollution Prevention Law (114/11). Detailed protection measures and requirements (including design requirements) have not yet been prescribed since the sub-law acts (envisaged Ordinance on Standards of Light Management and Rule Book on Lightning Monitoring) are still being in making (discussed).

However, EU regulation in the field of design of street lights and light pollution prevention (e.g. **Commission Regulation (EU) No. 1194/2012 setting Ecodesign requirements for Directional lamps, light Emitting diode lamps and related equipment**, EU GPP Criteria for Street Lighting & Traffic Signals, etc.) as well as good practce in light pollution prevention exists and should be followed. Respectig the following principles in design: the light should not be used when not necessary, light should be adjusted to the purpose it serves and environmentally friendly linumiaris should be used (e.g. use full –cut off lamps).

In addition to EU guidelines, when designing the road lights, PPA should consult the ornithologist keeping in mind the vicinity of Natura 2000 site (Internationally Important Ornithological Area HR100031 Neretva River Delta) and the possibility this site receives an increased level of protection. There are Mediterranean experiences to consult.[1]

Construction/reconstruction phase

In the construction phase the emphasis is on possible environmental impacts that follow construction works. Issues that could be addressed are: construction and other wastes management, minimization of dust and noise, top soil management, procurement of construction material, site restoration, temporary storage of the material, storage of hazardous materials, traffic management plan, working hours, recruitment, encroachment into the neighbor territory, disturbance to nature (birds in particular).

It is essential to mention that prior any start of construction works it is mandatory to facilitate normal work.

Recruitment of workers

Respecting the social component of sustainable development, it is highly advised to hire local workers on the construction of new objects and restoration. The use of local knowledge and crafts is also recommendable.

Health and Safety

Workers should be acquainted, prior to work, on the health and safety measures. An H&S specialist/appointee should be appointed and presented to workers. H&S warnings and instructions should be posted oat visible sites on the construction site. All H&S equipment should be made available and used. Use of good CSR practices is recommendable.

Noise reduction

Before any beginning of the work it is recommended to inform neighbors either directly or through local bulletins or newspapers on the construction of new objects and reconstruction. The noise should be limited by using good management practice and limiting works on regular daily shift. The equipment and machinery used should be calibrated according to the Ordinance on Highest Permitted Levels of Noise in Working and Living Environment (Off. Gazette 145/04) and the Law on Noise Protection (Off. Gazette 20/03).

Dust minimization

Temporary technical solutions and measures for dust minimization during construction should be used. For the transportation of earthlike or any other dusty material to the construction site or of the construction site watering or covering of the cargo should be implemented. Reduction of dust on construction / reconstruction site during dry season of the year can be accomplished by watering the ground surface. Water should not be wasted. Reducing speed can be another applicable measure.

Due to strong winds, especially in the colder periods of the year, all bulk materials should be protected.

Water and soil protection

[1] E.g. Raine, H., et al., 2007, *Light pollution and its effect on Yelkouan Shearwaters in Malta*

Protecting the watercourses is one of the top focuses of the EMP given the fact the site is in the vicinity of Nature 2000 area (an ornithological site of special value).

Measures of reduction of water and soil contamination risk are directed mainly to sources of pollution with fuels, oils and hazardous substances ranging from collecting water run-off from the construction site, reducing possibility of water course penetration to construction site, hazardous chemicals, fuels, oils and other toxic materials leakage and others.

Construction waste and excavated material handling

It is mandatory that contractor prior to start of the works asks the Institution to remove all equipment and material that will no longer, as well as waste found on the site, to be used and to dispose it or recycle it in a proper manner. Wastes where ever possible should be minimized, separated and handled accordingly. It is possible to separate these types of wastes:

1. Old asphalt removed
2. Waste found on the site
3. Construction debris
4. Toxic or hazardous liquids containers
5. Packaging (wooden pallets, PVC foil, PET)
6. Plastic; e.g. drainage matrices
7. Metals: iron bars, armature, etc.
8. Electrical waste: insulation materials, wires, cables
9. Excavated material: soil.

Waste is separated in accordance with Sustainable Waste Management Act (OG. 94/13) and related bylaws.

Top soil management (if any)

Stripped top soil should not be thrown, but kept on the site for restoration after completion of works. Any prevailing trees and valuable vegetation should as well be stored and used later for restoration.

Procurement of construction material

Environmentally sound goods and services should be selected. Priority should be given to products meeting standards for recognized international or national symbols. No new quarries should be opened on the account of these works. All material suppliers (most important in this case being producers of asphalt, cement, aggregate, quarries) should prove their good environmental practices, qualities, licenses awarded by the authorized bodies and operational permits (including the environmental permit if applicable).

Site organization and restoration

Construction sites should be fenced off in order to prevent entry of public, and general safety measures would be imposed. Temporary inconveniences (traffic or other) due to construction works should be

minimized through planning and coordination with contractors, neighbors and authorities. After completion of works the site should be restored as planned in the design. All wastes and machinery should be removed from the location.

Temporary storage of material (including hazardous materials)

Stockpiling of construction material should be avoided if possible. If not, construction material should be stored on the construction site, and protected from weathering. Hazardous materials like paints, oils, enamels and others should be kept on impermeable surface, and adsorbents like sand or sawdust should be kept for handling small spillage. Handling with the material should be consistent with the instructions on Material Safety Data Sheets.

Encroachment into neighboring territory

Encroachment into neighboring territory should be avoided if possible. In case where maneuvering surface is too small, approval for the encroachment should be asked. Any accidental damages of the neighboring properties should be recovered and brought in the condition as it was prior to the construction. This should be in particularly stressed out keeping in mind the vicinity of an ornithological site and Natura 2000 site (Internationally Important Ornithological Area HR100031 Neretva River Delta).

Working hours

To avoid noise and disturbance of fauna (Internationally Important Ornithological Area HR100031 Neretva River Delta, bird nesting places at Vlaska Canal and sedimentation basins) and neighboring areas the works should be conducted in a daily shift, meaning from 6 am to 19 pm. For other working hours special permits are required.

Mining

All necessary permits for mining (plan for use and handling of explosive materials) need to be obtained. Mining should be conducted only when absolutely necessary.

Operation

During the operation the main emphasis in the office building will be on maintenance and waste management.

Maintenance

For the office spaces (and spaces for unspecific activities) it is recommendable to create maintenance manual to plan, schedule and track activities. Works like regular ventilation should be carried out on a schedule. Maintenance of ventilation systems, including duct cleaning, filter cleaning and changes, and cleaning positive plate receivers and ionizing tips should be routine. Exterior green surfaces should be attended, watered and fertilized. Access roads regularly cleaned and maintained.

Light pollution

In addition to measures carried out in the design phase and due to the vicinity of Natura 2000 site (Internationally Important Ornithological Area HR100031 Neretva River Delta) and the possibility this

site receives an increased level of protection, PPA needs to consult the ornithologist for the measures in the operating phase.

Waste management

It is recommendable that the road area is included into the waste management plan for Port of Ploce.

The waste (hazardous and non-hazardous) should be separately stored and collected in accordance with Ordinance on Categories, Types and Classification of Waste (OG 50/05, 39/09). Hazardous waste (which includes fuel containers, oiled clothes and other materials, empty hazardous chemicals containers, etc.) can be on location stored for maximum three months and in the confined storages with leakage or spillage prevention systems and mandatory secondary containment system. The waste should be handed to the hazardous waste authorized company.

5.3. Mitigation

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
DESIGN	**Water quality**	Ensure surface runoff to be captured and directed to oil and grease separators. The design should include the sedimentation or retention tank for treated water prior to its release to the natural recipient. The developer is obliged to design the main project in accordance with the Water Regulation Conditions issued by the Croatian Waters (Class: UP/I-325-01/14-07/0003212; Reference No. 374-24-1-14-3/IB) Integrate a closed drainage system for the surface runoff from the road. This water has to undergo oil and grease separation prior to release to the natural recipient (the sea water). Since the intervention area is a part of water stream Vlaska hinterland as well as under the sea penetration risk, the design needs to be adjusted to such circumstances and take into account conditions that might occur in the case of high waters. Surface water run-off drainage system needs to be designed and constructed in a way that the finalized parts can function as a singular operating system.	Included through the design in bidding documents	Design team	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Water quality	Water supply piping design should be harmonized with the standards demanded in the water supply system decisions of the area. The design should anticipate a location, method and final design of the excavated soil disposal site. The design has to harmonize intervention construction with the existing and planned utility infrastructure. Permits, special conditions and opinions need to be obtained for all intersections. The developer is obliged to anticipate mitigation measures in order to avoid damage or adverse impacts to water resources. Surface water collectors should be calibrated to be able to receive highest rain peaks water and prevent spillages to the natural recipient.			
	Waste	Only attested materials should be used	Not significant	Site engineer	
	Space occupation	To use the old routs and existing infrastructure as much as possible.	Not significant	Design team	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Light pollution	The light should be designed not be used when not necessary, light should be adjusted to the purpose it serves and environmentally friendly linumiaris should be used (e.g. use full –cut off lamps). Advice of the ornithologist on the final light design would be beneficial			
	Biodiversity	Design route to avoid vicinity of Natura 2000 area as much as possible.	Not significant	Design team	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
CONSTRUCTION	**Dust**	Use existing licensed asphalt plants and stone quarries. When transporting dusting-prone materials the trucks (load) must be covered or the load must be sprayed with water and wet. Water the construction site and material storage sites as appropriate (in windy and dry conditions) e.g. during aggregate base construction. Apply wind fences/shields/protection whenever appropriate. If the strong wind occurs, the works with dust prone materials should be stopped (e.g. clearing and excavation, aggregate base piling, etc.). Apply time and quantity management to dust-prone materials. Do not keep large quantities on the site, or for a long period of time. Limit equipment/machinery and transportation vehicles operation speed at site (to 40 km/h).	Could be significant if construction is conducted in the dry period of the year	Contractor	
	Fumes and odor	When transporting asphalt the truck load must be covered. Transportation of odorous materials (such as wastes, sludge, etc.) has to be on the covered trucks.	Not significant	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Workers' H&S	Contractor and subcontractors have valid operating licenses. The local construction and environment inspectorates and communities have been notified of upcoming activities. All legally required permits have been acquired for construction and/or rehabilitation and are kept on site. All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. Workers' personal protective equipment will comply with international good practice (obligatory wearing of hardhats at all times, masks and safety glasses as needed and prescribed, harnesses and safety boots). Appropriate signposting of the sites will inform workers of key rules and regulations to follow. Safe organization of bypassing traffic. Parts of the construction site that are not fenced should be marked with appropriate sign-posts or/and psychological fences (warning tapes). In the case of mining the mining company's team is consisted of well trained and competent employees.	Not significant	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Noise	Working hours are between 6 h and 19 h. In the case for need for night work necessary permits need to be obtained and ornithologist consulted. Contractor should use state of the art machinery with low level of noise emission. In the case of mining the contractor has to obtain permission for use of explosive substances in accordance with Article 16, Rule book on conditions and production of explosives (OG 55/09). The permission is obtained from Croatian Ministry of Internal Affairs. The public and all relevant authorities need to be informed ion the time and manner of mining.	Not significant	PPA Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Biodiversity	Working hours are between 6 h and 19 h. In the case for need for night work necessary permits need to be obtained and ornithologist consulted. Limit/establish the working zone. The workers, machinery and vehicles can use only previously identified and agreed upon roads. Consult the ornithologist for the additional measures in construction. Environmental manager has to be present during the excavation and filling works. Before filling in, the excavated canals have to be checked for fauna and eggs by the environmental manager. Canals cannot be filled in before it is cleared of larger animals and eggs.	Not significant	PPA Contractor	
	Traffic management	Haul materials at off peak traffic hours. The workers, machinery and vehicles can use only previously identified and agreed upon roads. No materials or wastes should be kept on the roads. Part of the road is clear for purposes of port operations thus traffic regulation needs to be in place.	Not significant	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Resource efficiency and landscape conservation	Use existing licensed asphalt plants and stone quarries.	Not significant	Contractor	
	Emissions to Air	Use of water with all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill and demolition activities which may cause dusting and particles emissions. Ensure all transportation vehicles and machinery have been equipped with appropriate emission control equipment, regularly maintained and attested. Ensure all vehicles and machinery use petrol from official sources (licensed gas stations) and on fuel determined by the machinery and vehicles producer. There will be no excessive idling of construction vehicles at sites. Haul materials at off peak traffic hours. Capacity of transport should be harmonized with the excavating capacity.	Could be significant if construction is conducted in the dry period of the year	PPA Contractor	
	Emissions to Water	Organize and cover material storage areas. Minimize storage of materials time and quantity wise. Isolate concrete, asphalt and other works from watercourses. All surface run-off water has to be removed and disposed in the way that would not jeopardize surrounding land, residential	Significant Included in the project cost	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
		buildings and other constructions. In the case the design shows as inadequate for such task the developer or main engineers is obliged to supplement or change the design as well as apply the new solution. Wash trucks, other vehicles and machinery only in predefined suitable areas with water management and treatment (minimally oil and grease separators followed by the sedimentation or retention tank). Machinery and vehicles can be parked (manipulated) only on asphalted or concrete surfaces with surface runoff water collecting system. This water can then be either collected to retention basins or transported to a proper water treatment facility, or the water collecting system has to include oil separator and sedimentation tank. Prevent hazardous spillage coming from tanks (mandatory secondary containment system, e.g. double walled or bunded containers), construction equipment and vehicles (regular maintenance and checkups of oil and gas tanks. Temporarily on site stored waste should be covered or stored on the place only on asphalted or concrete surfaces with surface runoff water collecting system. This water should be collected to retention basins and transported to a proper water treatment. Ensure proper handling of lubricants, fuel and solvents by secured storage and			

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
		following MSDS			
	Waste Management	Waste collection and disposal pathways and licensed sites will be identified for all major waste types expected from site cleanup, demolition and construction activities. All construction waste will be collected and disposed properly by licensed collectors. The records of waste disposal will be regularly updated and kept as proof for proper management, as designed. Existing waste from the location should be removed prior to the construction works start Containers for all types of envisaged (and occurring) wastes on the site have to be available and properly marked (name and assigned waste key-code). A depot for temporary storage of waste materials needs to be identified and marked. Mineral (natural) construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and temporarily stored in appropriate containers. Depending of its origin and content, mineral waste will be reapplied to its original location or reused. Whenever feasible the contractor will reuse and recycle appropriate and viable materials. Discarding any kind of waste (including	Not significant	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
		organic waste) or waste water to the surrounding (especially to the sea and river) is strictly forbidden. Burning waste on site is also strictly forbidden. Construction waste will be disposed in accordance with Rule book on Waste Disposal (OG 117/07) and Rule book on Construction Waste Management (OG 38/08) Excavated materials and construction materials can be deposited only to pre-designated points. In this case appropriate water management needs to be applied in order to avoid erosion and landslides.			

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Toxic/Hazardous Materials and Waste Management	Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information. All hazardous substances should be kept in a leak-proof container to prevent spillage and leaching. This container should poses secondary containment system such as bunds (e.g. bunded-container), double walls, or similar. Secondary containment system must be free of cracks, able to contain the spill, and be emptied quickly. The containers with hazardous substances must be kept closed, except when adding or removing materials/waste. They must not be handled, opened, or stored in a manner that may cause them to leak. The containers holding ignitable, hazardous or reactive wastes must be located at least 15 meters from the facility's property line and at least 30 meters from the water line. Hazardous waste will be collected, transported and disposed by a licensed company contracted by the Contractor of works. The wastes are transported by specially licensed carriers and disposed in a licensed facility. Containers for all types of envisaged (and occurring) hazardous wastes on the site have to be available and properly marked (name and assigned waste key-code). Paints with toxic ingredients or solvents or lead-based paints will not be used.	Significant Included in the project cost	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Soil	Soil work and management will take into account metrological data and conditions when planned and carried out (e.g. temperature of the soil, humidity, snow, ice, etc.) Strip soil only as necessary and store/replace reuse post construction. Use of antifreeze and/or accelerator compounds is not allowed. Protect and restore non-construction areas. Design slopes and retaining structures to minimize risk, provide appropriate drainage and vegetation cover. Carry out surface drainage works to divert the rainwater that would erode the soil. Apply storm water management to minimize erosion and offsite sediment delivery to receiving waters. Parking site has to be respected following the defined place. Prevent hazardous spillage coming from tanks (mandatory secondary containment system, e.g. double walled or bunded containers), construction equipment and vehicles (regular maintenance and checkups of oil and gas tanks.	Significant Included in the project cost	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
		Machinery and vehicles can be parked (manipulated) only on asphalted or concrete surfaces with surface runoff water collecting system. This water can then be either collected to retention basins and transported to a proper water treatment facility or the water collecting system has to include oil separator and sedimentation tank. In the case of leakage, the contaminated soil should be and disposed as hazardous waste.			
	Material supply	Producer of asphalt, concrete, and the stone aggregate quarry has to obtain/hold all required working and emission permits and quality certifications. Producer of asphalt, concrete and the stone aggregate quarry has to present a proof of conformity with all national environmental and H&S legislation. Ensure the subcontractor has all the necessary skills and experience and precautionary systems in place to prevent a wash off of bituminous materials (primer or primer binder). Water in bitumen emulsion production or concrete should not be contaminated with hazardous or toxic chemicals (however, technological water is preferred). Asphalt and bitumen emulsion application will take into account metrological data and conditions when planned and carried out (raining periods, overcast, cooler and dumper weather, etc.)	Not significant	Contractor	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
		Ensure all transportation vehicles and machinery have been equipped with appropriate emission control equipment, regularly maintained and attested. Bitumen emulsion is applied only to adequately compacted and swept surfaces with adequate moisture content. Positioning of the emulsion sprayer should be such so spaying beyond the area to be primed or primer sealed. Ensure that emulsion sprayers are well maintained, operated by trained crew and spray nozzles are operating correctly. Avoid windy conditions when spraying. Equipment should be cleaned in areas where there will be no impact to the environment or danger of surface run-off (e.g. areas where water is collected to retention basins and transported to proper water treatment, and waste is separated and appropriately disposed). All materials have to be approved by the site engineer. Materials temporarily stored on site should be protected and separated. HDPE pipes are not to be in touch or stored next to oil, coatings, solvents, etc.			

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
OPERATION	**Biodiversity**	Consult the ornithologist for the additional measures for the operation phase.	Not significant	PPA Concessionaire	
	Light Pollution	In addition to measures carried out in the design phase and due to the vicinity of Natura 2000 site (Internationally Important Ornithological Area HR100031 Neretva River Delta) and the possibility this site receives an increased level of protection, PPA needs to consult the ornithologist for the measures in the operating phase.	Not significant	PPA Concessionaire	
	Noise	Limit activities to daytime. If working during the night necessary obtain all required permits. Consult with the ornithologist.	Not significant	PPA Concessionaire	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Emissions to Soil and Water	Ensure proper handling of lubricants, fuel and solvents by secured storage. Wash trucks, other vehicles and machinery only in predefined suitable areas with water management and treatment (minimally oil and grease separators followed by the sedimentation or retention tank). Machinery and vehicles can be parked (manipulated) only on asphalted or concrete surfaces with surface runoff water collecting system. This water can then be either collected to retention basins and transported to a proper water treatment facility; or the water collecting system has to include oil separator and sedimentation tank. Prevent hazardous spillage coming from tanks (mandatory secondary containment system, e.g. double walled or bunded containers), vehicles (regular maintenance and checkups of oil and gas tanks. In the case of pollution conduct proper analysis and risk assessment. In the case of leakage, the contaminated soil should be and disposed as hazardous waste.	Significant Included in the project cost	PPA	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Emissions to Air	Ensure all transportation vehicles and machinery have been equipped with appropriate emission control equipment, regularly maintained and attested. Ensure all vehicles and machinery use petrol from official sources (licensed gas stations) and on fuel determined by the machinery and vehicles producer. There will be no excessive idling of construction vehicles at sites.	Not significant	PPA	
	Dust	When transporting dusting-prone materials the trucks (load) must be covered or the load must be sprayed with water and wet. Limit equipment/machinery and transportation vehicles operation speed at site (to 40 km/h) .	Significant during the hot season	PPA	
	Road Safety	Install appropriate traffic signs, posts, equipment (signaling, convex mirrors, etc.) and speed limits Install appropriate warning signs (animal or pedestrian crossing, etc.)	Significant Included in the project cost	PPA	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Waste Management	Waste Management Plan (MWP) for the entire area of Port of Ploce will be produced and implemented. MWP will build its sustainable management practices based on the current waste streams analysis, development projections, commitment of all stakeholders and best practices. Waste collectors – possession of operating permits and licenses Waste collection and disposal pathways and licensed sites will be identified for all major waste types expected from site cleanup, demolition and construction activities. The records of waste disposal will be regularly updated and kept as proof for proper management, as designed. Containers for each identified waste category are provided in sufficient quantities and positioned conveniently. Discarding or burning any kind of waste (including organic waste) or waste water to the surrounding (especially to the sea and river) is strictly forbidden.	Not significant	PPA	

PHASE	ISSUE	MITIGATION MEASURES	COSTS	INSTITUTIONAL RESPONSIBILITY	COMMENTS
	Hazardous Waste and Substance Management	Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information. The containers with hazardous substances should be kept in a leak-proof container to prevent spillage and leaching. This container should poses secondary containment system such as bunds (e.g. bunded-container), double walls, or similar. Secondary containment system must be free of cracks, able to contain the spill, and be emptied quickly. The containers with hazardous substances must be kept closed, except when adding or removing materials/waste. They must not be handled, opened, or stored in a manner that may cause them to leak The containers holding ignitable, hazardous or reactive wastes must be located at least 15 meters from the facility's property line and at least 30 meters from the water line. The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints will not be used.	Significant Included in the project cost	PPA	

5.4. Monitoring

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Design	The developer is obliged to design the main project in accordance with the Water Regulation Conditions issued by the Croatian Waters (Class: UP/I-325-01/14-07/0003212; Reference No. 374-24-1-14-3/IB) A closed drainage system for the surface runoff from the road is integrated to the project. This water has to undergo oil and grease separation prior to release to the natural recipient (the sea water). The design is adjusted to natural conditions (possibility of high waters in sea penetrating area). Surface water run-off drainage system parts can function as a singular operating system. Water supply piping design is harmonized with water supply system decisions of the area. The design anticipates a location, method and final design of the excavated soil disposal site.	On site	Inspection	Previous to construction	Reduce impact to water	Not significant	PPA

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	The design harmonizes intervention construction with the existing and planned utility infrastructure. Permits, special conditions and opinions need to be obtained for all intersections. Design uses the old routes and existing infrastructure as much as possible Road lights are state of the art in eco-design (full cut-off lamps are used) All the used materials are attested and approved by the site engineer. The road lights are designed not be used when not necessary, light should be adjusted to the purpose it serves and environmentally friendly linumiaris should be used (e.g. use full –cut off lamps). Surface water collectors are sufficinetly calibrated for large quantities of storm water.	On site	Documents review	Previous to construction	Reduce impact to water	Not significant	PPA
Construction	Material Supply – Use existing asphalt and concrete plants, stone quarries	Supplier's plant	Inspection	Before work begins	Assure compliance with environmental, health and safety requirements	Not significant	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	Material Supply – Possession of official approval or valid operating license for engaged quarries, asphalt plants, concrete producers.	Supplier's plant	Inspection	Before work begins	Assure compliance with environmental, health and safety requirements	Not significant	Contractor
	Waste management Possession of license and other permits of the disposing site management company	Disposing site management company premises	Inspection	Before work begins	Avoid illegal dumping		Contractor
	Waste management Waste collectors – possession of operating permits and licenses	Submission of required documentation. On site.	Document review	Before work begins	Avoid illegal dumping, leakages and pollution		Contractor
	Asphalt transport Truck load covered	On site	Inspection	Regularly	Avoid dusting and spillages		Contractor
	Materials with odors will be covered during transportation	On site	Inspection	Regularly	Avoid dusting and spillages		Contractor
Construction	Water quality at water treatment outlets	On site positions K1 – CT outlet K2 - CBT outlet	Outsourced: Sampling, analysis, interpreting, recommendations	Quarterly	Reduce impact to aquatic flora and fauna	Not significant	PPA

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	Dust prone materials are stored in minimal quantities and for minimal amount of time. Material is either wetted, or protected by wind fences. Speed of motorized vehicles at the site is limited to 40kmph Works that involve dust prone materials are stopped in the case of strong winds.	On site	Measures implemented and there are no traces of dusting.	Inspection	To prevent air pollution	Moderate	Contractor
	Health and safety Required permits have been acquired Contractor and subcontractors have valid operating licenses as well as construction and rehabilitation licenses	Submission of required documentation.	Documents and permits are in place	Review prior to construction	Ensure safety and good conduct	Not significant	PPA

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Construction	Health and safety : Appropriate signposting is in place Workers use protective equipment Traffic is organized to safely bypass working areas Local construction and environment inspectorates and communities have been notified of upcoming activities. Construction is either fenced or marked or fenced with the warning tapes.	On site	Inspection	Regularly	To prevent accidents	Moderate	Contractor
	Experts' opinions (biologist and ornithologist) have been included to making vibrating machines working schedule. Before filling in excavated canals they are checked for fauna and eggs.	On site	Inspection	Regularly	To prevent accidents	Moderate	PPA Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	Mining team is well trained and experienced. Mining permissions are obtained. All relevant bodies and the public have been informed in the mining time schedule.	At contractor's premises	Document review	Before works	To prevent accidents	Insignificant	Contractor
	Working hours stated in the permit are respected In the case of night work ornithologist is consulted and all permits are obtained Working zone is established	On site	Inspection	Regularly	To prevent disturbing of the wildlife and local community	Not significant	Contractor and PPA
	Materials are hauled during the non-peak traffic hours Capacity of the transport is harmonized with the capacity of excavations (no half empty trucks nor too much traffic) No excessive idling of construction vehicles on site No materials and wastes are kept on the road.	On site	Documentation review Inspection	Regularly	To prevent congestions and manage resources (fuel) efficiently and reduce air emissions	Not significant	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Construction	Vehicles/machinery/equipment are have been attested and equipped with emissions control equipment and use prescribed fuel. Fuel is purchased at licensed gas stations	On site	Documentation review	Regularly	To use resources (fuel) efficiently and reduce air emissions	Not significant	Contractor
	Watercourses are protected from works Storage of materials is minimized time and quantity wise. Materials are separated and covered if appropriate.	On site	Inspection	Daily	Ensure water quality and minimize impact to nature	Moderate	Contractor
	Trucks are washed, parked or manipulated only in designated places equipped with oil and grease separators. This applies to fuel tanks, hazardous compounds, solvents, and other toxic substances.	On site	Inspection	Regularly	Ensure water quality and minimize impact to nature	Moderate	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	All surface run-off water is removed and disposed in a safely manner All hazardous substances are kept in a leak-;roff container to prevent spillage or leaching. The container havs a secondary containment system e.g. double walled or are bunded containers. They are labeled with detailed composition and handling information. Construction equipment and vehicles and regularly maintained. These are parked only on denoted surfaces with runoff collecting systems (connected to oil separators). Temporarily on site stored waste is covered or stored on the place only on asphalted or concrete surfaces with surface runoff water collecting system. This water should be collected to retention basins and transported to a proper water treatment. Lubricants, fuel s, solvents and other hazardous chemicals are kept in secured storage and following MSDS.	On site	Inspection	Regularly	Ensure water quality and minimize impact to nature	Moderate	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	Waste collection and disposal pathways are identified, recorded and archived for all waste types occurring during the construction. Existing waste from the location is removed before the works commenced. Containers are provided for all anticipated waste categories (and those that occur during the works) and are marked with appropriate key-code. Mineral (natural) construction and demolition wastes is separated from general refuse, organic, liquid and chemical wastes by on-site sorting and temporarily stored in appropriate containers. Depending of its origin and content, mineral waste is reapplied to its original location or reused. Reuse and recycling is applied when possible. Waste disposal and burning on site is not practiced. A depot for temporary storage of waste is post-marked. Excavated materials are deposited on the pre-defined and marked points.	On site	Inspection Documentation review	Regularly	Ensure water quality and minimize impact to nature	Moderate	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	The containers with hazardous substances kept closed, except when adding or removing materials/waste. They are be handled, opened, or stored in a manner that may cause them to leak. The containers holding ignitable, hazardous or reactive wastes are located at least 15 meters from the facility's property line and at least 30 meters from the water line. The wastes are transported by specially licensed carriers and disposed in a licensed facility. Paints with toxic ingredients or solvents or lead-based paints are not used.	On site	Inspection	Regularly	Ensure water quality and minimize impact to nature	Moderate	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	In planning the soil work metrological data are taken into account. Soil is removed only as necessary and stored/replaced/ reused. Appropriate drainage and vegetation cover is designed. Drainage works are carried to divert the rainwater that would erode the soil. Storm water management is applied to minimize erosion and offsite sediment delivery to receiving waters.	On site	Inspection	Regularly	Landslides and erosion prevention	Significant	Contractor
	Antifreeze and/or accelerator compounds are not used. Polluted soil is removed and properly disposed	On site	Inspection	Regularly	Soil pollution prevention	Significant	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	Materials supply Producer of asphalt, concrete, and the stone aggregate quarry has to obtain/hold all required working and emission permits and quality certifications. Producer of asphalt, concrete and the stone aggregate quarry has to present a proof of conformity with all national environmental and H&S legislation. Ensure the subcontractor has all the necessary skills and experience and precautionary systems in place to prevent a wash off of bituminous materials (primer or primer binder).	In suppliers premises	Documents review	Prior to ordering	Supply chain management, CSR, Quality management	Not significant	Contractor PPA

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Construction	Bitumen emulsion is applied only to adequately compacted and swept surfaces with adequate moisture content. Positioning of the emulsion sprayer is such so spaying beyond the area to be primed or primer sealed. Metrological data and conditions in planning asphalt and bitumen emulsion application. Emulsion sprayers are well maintained, operated by trained crew and spray nozzles are operating correctly. Equipment is cleaned in areas where there will be no impact to the environment or danger of surface run-off. Water in bitumen emulsion production is not contaminated with hazardous or toxic chemicals. Materials should be kept separately.	On site	Inspection	Regularly	Soil and water protection: resource efficiency	Not significant	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
	On site cement plant: Petroleum is kept on site in the secondary containment system tanks such as bunds (e.g. bunded-container), double walls, or similar. Manage storm-water in a way it does not reach the natural recipient unpurified (water should be collected and transported to water treatment unit) All waste is separately collected and disposed to a licensed facilities. Containers, marked, should be available ion the site for hazardous and non hazardous wastes. Materials such as lime, sand or stone have traceable origin and to licensed quarries. Water used in production is toxins-free and technological water if possible. Quality control is in place. Returns are minimal. Staff members are well trained and knowledgeable	On site	Inspection Document review	Regularly	Soil and water protection: resource efficiency	Not significant	Contractor

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Construction	Transportation trucks are washed only in designated places that are equipped with water collectors and water treatment units. Transportation vehicles are parked only in designated places that are equipped with oil separators.	On site	Inspection	Regularly	Soil and water protection	Not significant	Contractor
Operation	Water quality at water treatment outlets	On site positions K1 – CT outlet K2 - CBT outlet	Outsourced: Sampling, analysis, interpreting, recommendations	Quarterly	Reduce impact to aquatic flora and fauna	Not significant	PPA
	Working hours stated in the permit are respected In the case of night work ornithologist is consulted and all permits are obtained	On site	Inspection	Regularly	To prevent disturbing of the wildlife and local community	Not significant	Concessioner

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Operation	Trucks are washed, parked or manipulated only in designated places equipped with oil and grease separators. This applies to fuel tanks, hazardous compounds, solvents, and other toxic substances. All surface run-off water is removed and disposed in a safely manner All hazardous substances are kept in a leak-proof container to prevent spillage or leaching. The container havs a secondary containment system e.g. double walled or are bunded containers. They are labeled with detailed composition and handling information. Temporarily on site stored waste is covered or stored on the place only on asphalted or concrete surfaces with surface runoff water collecting system. Lubricants, fuel s, solvents and other hazardous chemicals are kept in secured storage and following MSDS.	On site	Inspection	Regularly	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Operation	Storm water management is applied to minimize erosion and offsite sediment delivery to receiving waters. Polluted soil is removed and properly disposed.	On site	Inspection	Regularly	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner
	In the case of pollution analysis and risk assessments are conducted.	On site	Document review	Regularly	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner
	No excessive idling of construction vehicles on site Vehicles/machinery/equipment are have been attested and equipped with emissions control equipment and use prescribed fuel. Fuel is purchased at licensed gas stations	On site	Inspection	Regularly	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner
	Dust prone materials (sand, gravel, stone, cement) are stored in minimal quantities and for minimal amount of time. Speed of motorized vehicles at the site is limited to 40kmph	On site	Inspection	Regularly	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner

PHASE	WHAT Parameter is to be monitored?	WHERE Is the parameter to be monitored?	HOW Is the parameter to be monitored?	WHEN Is the parameter to be monitored (frequency)?	WHY Is the parameter to be monitored?	COST	RESPONSIBILITY
Operation	Appropriate traffic signs, posts and equipment (signaling, convex mirrors, etc.) and speed limits have been installed. Appropriate warning signs (pedestrian crossings) are installed.	On site	Inspection	Prior to use and then occasionally	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner
	PPA consulted the ornithologist for the measures in the operating phase and all recommended measures are applied.	On site	Inspection	Prior to use and then occasionally	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner PPA
	Waste management Waste collectors – possession of operating permits and licenses Waste collection and disposal pathways are identified, recorded and archived for all waste types occurring during the construction. Existing waste from the location is removed before the works commenced. Containers are provided for all anticipated waste categories (and those that occur during the works). Waste disposal and burning on site is not practiced.	On site	Inspection Documents review	Prior to use and then occasionally	Ensure water and soil quality and minimize impact to nature	Moderate	Concessioner

5.5. Public disclosure

Due to the expected low environmental impact it is recommended to put the draft this EMP available to public for comments, questions and suggestions through the website of PPA for two weeks. All received comments will be attached to this document.