

Environmental and Social Assessment for EBRD

CATEGORY A PROJECT

ŽIVINICE REGIONAL SOLID WASTE PROJECT

BOSNIA AND HERZEGOVINA



NON-TECHNICAL SUMMARY

21 June 2018

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Abbreviations

BiH	Bosnia and Herzegovina
CESMP	Construction Environmental and Social Management Plan
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EU	European Union
FBiH	Federation of Bosnia and Herzegovina
OESMP	Operational Environmental and Social Management Plan
RSL	Regional Sanitary Landfill

1 INTRODUCTION

The European Bank for Reconstruction and Development (“EBRD”) is considering providing finance to the Živinice Regional Solid Waste Project (the “Project”).

The Project involves the construction and operation of an EU-compliant regional sanitary landfill (“RSL”) that will serve three municipalities in Tuzla Canton: Živinice, Banovići and Kladanj. The chosen location is “Separacija 1” in Živinice.

The three Municipalities signed an agreement in 2012 on the establishment of an inter-municipal council for implementation of the Project.

The Project will be financed by an EBRD loan of up to EUR 6 million and potentially co-financed with an investment grant. The Borrower will be Bosnia and Herzegovina (“BiH”) and the loan will be provided via a cascade of sub-loans to the Public Enterprise “Eko-Sep” d.o.o. Živinice, Waste Management Centre “Separacija 1” (“Eko-Sep”). Eko-Sep was incorporated in 2013. It is owned by three Municipalities: 60% by Živinice, 30% by Banovići and 10% by Kladanj, and is seated in Živinice.

As this Project involves the development of a greenfield facility, it has been categorised as a Category A project in line with EBRD’s Environmental and Social Policy (2014)¹.

This Non-technical Summary provides a summary of the expected environmental and social (E&S) impacts and measures needed to structure the Project to meet the EBRD E&S Policy (2014) Performance Requirements². The purpose of this document is to provide information to everyone that may be interested in the Project.

¹ According to EBRD, a project is categorised A when it could result in potentially significant adverse future environmental and/or social impacts and therefore requires an environmental and social impact assessment.

² Full Policy available at: <http://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html>

2 PROJECT DESCRIPTION

Description of the Landfill Site

The location of the planned RSL (called "Separacija 1") is shown in Figure 1 below. It is situated in the Municipality of Živinice at a distance of approx. 12 km from the urban zone of Živinice, approx. 4 km from the centre of Municipality of Banovići, and 43 km from the centre of Municipality of Kladanj.

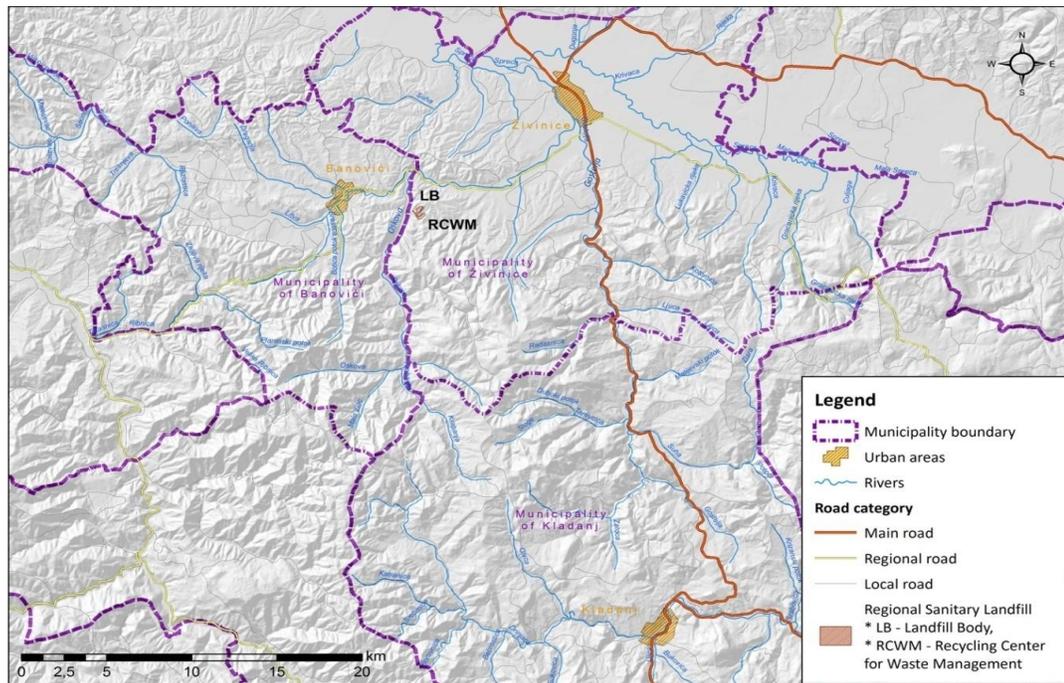


Figure 1: Location of the Future RSL "Separacija 1"

The site had been used for many years as a disposal site for tailings from the local coal mine. The current state of the site is therefore modified and degraded (Figure 2).

The site can be reached from the regional road R-469 Ribnica-Banovići-Živinice which is connected to a 1 km long local paved road. From the local road, an unpaved road leads to the entrance of the landfill site, which is about 1.2 km long and 5-7 meters wide. It is currently in poor condition and will need to be reconstructed. The Oskova River flows at approx. 300 m west from the planned location of the landfill body. The bridge across the Oskova River is planned to be reconstructed to enable access of heavy transport trucks to the landfill site. The nearest settlement "Ježevac" is located at an air distance of approx. 500 m – it is a settlement inhabited by internally displaced persons, currently used by 64 families.



Figure 2: Current State of the Landfill Body at the RSL Site

Description of Planned Activities

The site will be accommodating:

- a landfill body for disposal of municipal non-hazardous waste (5.85 ha, max. 52 m height and with a capacity of 1,269,340 m³), and
- a regional waste management centre consisting of a recycling yard, facility for mechanical and biological treatment of municipal waste and composting unit for treatment of biodegradable waste.

The RSL will be constructed in four phases as described in

Table 1 below.

The EBRD loan will be used to implement Phase 1 and Phase 2 of the Project.

Table 1: Project Phases

PHASE 1	<ul style="list-style-type: none"> • Stage 1: construction of: entry-exit zone (front gate, asphalted road, weighbridge with a canopy, and oil and grease separator and sedimentation tank), part of the fence around part of the landfill, administrative building and associated parking lot, service centre with associated plateau, internal roads, first part of the landfill disposal area with a system for collection and recirculation of leachate and passive degassing system and peripheral roads around the parts of cells, perimeter canal around the landfill to receive storm-water, tank/precipitator to collect storm-water, platform for washing of vehicles, water supply network, sewage and electrical power supply network, and purchase of landfill machines • Stage 2: construction of the recycling yard with canopy • Stage 3: construction of the surface area for treatment of construction waste • Stage 4: construction/installation of a flare for burning of landfill gas (in 2021, or five years after the commissioning of the RSL) • Stage 5: construction of the remaining part of the landfill cell for waste disposal • Stage 6: partial closure of the landfill with final capping layer
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Planned surface: 12.2 ha

PHASE 2	<ul style="list-style-type: none">• Stage 1: construction of a facility for mechanical biological treatment of waste in the reserved part of the site• Stage 2: construction of a composting plant for processing of organic waste in the reserved part of the site• Stage 3: construction of cells for disposal of waste with a system to collect leachate in the reserved part of the site and a canal for collecting storm-water• Stage 4: construction of sorting facility waste in the reserved part of the site• Stage 5: construction of a transfer station in the Municipality of Kladanj at the location of the current municipal landfill "Stanovi" with all the necessary equipment (truck trailers) and equipment necessary for the operation of the station. The location needs to accommodate a loading bay area of about 5,000 m²• Stage 6: construction of a waste management transfer substation in Kladanj
	Planned surface: 8.7 ha
PHASE 3	<ul style="list-style-type: none">• Construction of the facility for processing of leachate and sanitary wastewater in the reserved part of the landfill site
	Planned surface: 0.02 ha
PHASE 4	<ul style="list-style-type: none">• Construction of the system for generation of electricity from landfill gas in the reserved part of the landfill site
	Planned surface: 0.03 ha

3 BACKGROUND

3.1 Rationale of the Project

FBiH and Canton Tuzla have adopted a sound strategic, planning and legal framework for waste management. However, implementation of the requirements in practice remains an issue. Current waste management practices in the Municipalities of Živinice, Banovići and Kladanj pose a risk to human health and the environment and are not in line with current strategic and legal framework, which requires that non-sanitary landfills need to be closed and rehabilitated. All three target municipalities are currently disposing of their waste at non-sanitary landfills without any control of pollution generated by leachate and biogas discharge, with the exception of a part of municipal waste collected from the Municipality of Živinice that is disposed of at RSL "Crni Vrh" in the Municipality of Zvornik (Republika Srpska).

The implementation of this Project will enable the Municipalities to meet the legal requirements and strategic objectives. The Project will also significantly improve the environmental and health situation in these municipalities as well as in the surrounding region sharing the same natural resources.

3.2 Legal Aspects and Compliance with Relevant Environmental and Social Laws

During the implementation of this Project, Eko-Sep is expected to meet the requirements set down by relevant national, EBRD and EU environmental, social, health and safety legislation and standards. The most stringent regulations and/or requirements (whether national, EBRD or EU) will be applied, in order to ensure environmental protection and community health and safety.

Compliance with National Requirements

The national requirements for environmental assessment have been met, through the submission and approval of the local Environmental Impact Assessment (EIA) Study. Based on the EIA, the Environmental Permit was issued in July 2015 by the Federal Ministry of Environment and Tourism.

The national stakeholder engagement requirements have all been met through information disclosure and public hearings held in line with national spatial planning and permitting requirements.

The Main Design for Phase 1 of the RSL was developed based on the requirements of the Directive 1999/31/EC on the landfill of waste and contains health, safety and environmental protection measures for the operation phase.

National requirements regarding the Urban and Construction Permit for Phase 1 of the RSL have been fully complied with. However, Eko-Sep will need to apply for the Construction Permit for Phase 2 of the RSL. In addition, after completion of construction, Eko-Sep needs to obtain Use Permits for both phases.

National requirements regarding water permitting have been fully complied with. Eko-Sep obtained the Preliminary Water Consents for the discharge of industrial water from the RSL and for water use and discharge of sanitary water from the RSL. Water Consents for Phase 1 of the RSL were also obtained. However, Eko-Sep will need to apply for Water Consents for Phase 2 of the RSL before obtaining the Construction Permit for Phase 2 and to apply for two Water Permits upon the completion of construction works of Phase 1 and Phase 2.

Compliance with EU and EBRD Requirements

The Project has been structured to meet the EU Directives relevant to this Project, i.e. the EIA Directive, the Landfill Directive, the Waste Framework Directive, the Birds and Habitat Directives, the Water Framework Directive and the Urban Waste Water Directive, and Occupational Health and Safety Directives.

The Project has also been structured to meet all EBRD's requirements relevant to this Project, as set out in EBRD's Environmental and Social Policy 2014.

An Environmental and Social Action Plan has been agreed between Eko-Sep and the EBRD. It includes a set of comprehensive mitigation measures to bring the Project into compliance with EBRD, EU and national legislation requirements.

3.3 Current Environmental and Social Situation and Considerations

Location: The location of the planned RSL is connected with an unpaved local road with an access bridge over the Oskova River near the "Ježevac" settlement. The length of the road is approx. 980 m. The Oskova River flows at approx. 300 m west from the planned location of the landfill body. The location is a very remote area, which was used as a tailings disposal site in the past. During the time of active use of the tailings in the past, this location was used by local (waste) coal pickers. The site is not used to dispose of tailings anymore and thus the quantities of (waste) coal from the tailings are exhausted. Therefore, no waste pickers visit this site anymore.

Topography: The terrain of the RSL is flat and of irregular shape. Elevation of the RSL site is 360-370 m a.s.l. The surrounding terrain is hilly and inclines more to the south. The Oskova River forms a narrow valley which has a north-south direction. The area planned for the construction of RSL is 21 ha while the total surface of the tailings disposal site is around 23 ha.

Climate: Climate features refer to the Oskova settlement being the area that is the nearest to the RSL. Oskova's climate is classified as warm and temperate, and has a significant amount of rainfall during the year (906 mm of precipitation annually). The average annual temperature in Oskova is 10.9°C and, during the year, it vary by 20.6 °C. According to Koeppen's classification of climate, the area corresponds to Cfb climate.³

Air quality: No sources of air emission are present on the planned RSL site. In the wider area surrounding the site, air emissions are generated by local traffic on the nearby road and heating in the "Ježevac" settlement during the winter season (fire wood and coal as second source of energy are mostly used for heating). There are no industrial emission sources nearby. Based on continuous daily monitoring of air quality in Živinice⁴, air quality parameters CO, SO₂, O₃, NO₂ were below limit values at the time of writing this document.

Noise: No noise emission sources are present on the site. The monitoring of baseline conditions of ambient noise conducted in 2016 showed that the measured values of noise levels are below the thresholds stipulated by the Law on Noise Protection for zone VI - Industrial, warehouse area, service and traffic areas without housing.

Geological and engineering characteristics: Based on geotechnical investigation works undertaken by drilling of four boreholes on the landfill body area performed during the development of the local EIA study, engineering and geological characteristics of the geological substrate is made of peridotite, mostly silicate-based with 45-55% SiO₂ composition. From the engineering and geological aspect, these usually make stable terrains for building constructions. The substrate sediment is covered by tailings which is unfavourable from the aspect of building construction.

Hydro-geological characteristics: The hydro-geological characteristics of the geological substrate are simple and refer to the group of water impermeable rocks. The terrain is anhydrous and mostly impermeable and without registered sources at the surface in the site's inner zone.

³ <https://en.climate-data.org/location/909346/> (accessed on April 19, 2018)

⁴ Official web site of the Tuzla Canton Government, Ministry of Physical Planning and Environmental Protection, <http://monitoringzrakatk.info/zivinice-yesterday.html> (accessed on April 19, 2018)

Seismological characteristics of the terrain and stability: The maximum expected earthquake is 6^o on the MCS scale and 63% probability in the return period of 100 years. Some instability of the deposited tailings has been registered at the stretch towards the alluvium of the Oskova River. Recent dynamic processes were observed near the access road to the planned RSL.

Soil: Various types of soil are present in the wider region, with dystriccambisol, terra rosa, calcocambisol, pseudogley and alluvial soils being most widely represented. A large amount of pseudogley can be found at the upper stream of the Oskova River. No fertile soil was detected during the site visits to the planned RSL. The soil refers to the shallow upper layer of pulverized tailings, thus presenting artificial soil.

Groundwater and surface water: Based on geotechnical investigation works undertaken by drilling of four boreholes on the landfill body area performed during the development of the local EIA study, no ground water was registered. The Oskova River is located near the tailings disposal site, and at the hypsometric level of Oskova alluvial there is a possibility of finding groundwater at the river water level.

Ecosystem services: Based on the site visits during March and April 2018, this ecosystem does not provide any services since the area is highly degraded and modified.

Flora and fauna and biodiversity: As stated above, the Project site is degraded and heavily modified with no potential to sustain rare / endemic / protected areas. Based on the findings from the site visits, the forest surrounding the site is sparse and consists of pine and oak trees. The site-specific terrestrial flora species that are found at boundaries of the planned RSL site or near the access road to the site are: *Quercus petraea*, *Rubus idaeus*, *Juniperus communis*, *Pinus sylvestris* and *Carpinus betulus*. None of the listed flora species are classified as endangered in line with the Habitat Directive or FBiH Red List of Flora. The site-specific terrestrial fauna species found on the site are: *Corvus corax* and *Vespula vulgaris*. None of the listed fauna species are classified as endangered in line with the Habitat Directive, Birds Directive or FBiH Red List of Fauna.

Protected areas: The Protected Landscape "Konjuh" (7 km air distance) or the areas planned for protection (Natura 2000 areas – "Konjuh-Krivaja (2.5 km air distance) and "Modrac-Gornja Spreča" (6.6 km air distance)) are not in the immediate vicinity of the proposed Project.

Landscape: The area of the planned RSL is mostly flat. However, the deep layers of deposited tailings from the local coal mine end with steep slopes on the west. A small river terrace is formed along the Oskova River.

Land use: The current area planned for construction of the RSL is an artificial surface that is modified and degraded compared to its original state. Based on the information from the cadastre, this area was classified as a forest area in the past, before the local mine began disposing of tailings. Given the fact that cadastre data were not updated in terms of land use, Eko-Sep needed to pay a fee for reclassification of the area from forest to construction land. The current classification of the tailings is construction land.

Number of population: According to data sourced from the 2013 Population Census, there are 22,773 people living in Banovići, 12,348 in Kladanj and 57,765 in Živinice.

Nearest settlements: The nearest inhabited settlement is the settlement of the "Ježevac" settlement located on the territory of Municipality of Banovići (at an air distance of 500 m from the planned RSL). There is a larger central building used as an elementary school for a small number of pupils, and 59 small houses, of which 42 houses are occupied by a total of 64 families. According to information provided by the Municipality of Banovići, all inhabitants are planned to be relocated by 2020 to new social housing facilities, co-funded by the Council of Europe Development Bank (CEB II Project), and constructed by the Ministry of Human Rights and Refugees of BiH. The land is used for small-scale agriculture activities, with some orchards and pastures. Some households have

sheep, goats, turkeys and/or chickens. The settlement is connected to the municipal water supply system of the Municipality of Banovići and to an electrical grid.

The landfill is not visible from the settlement. For waste transport to the landfill, the 1 km long local paved road will be used which connects R-469 Ribnica-Banovići-Živinice with the entrance into the settlement. From this point (entrance into "Ježevac"), a 1.2 km long macadam road leads to the landfill. The part of the road before the bridge over the Oskova River is sometimes used by the settlement inhabitants only to reach the settlement, but they use other access roads more often. On the right side, next to the road, there are 3-4 houses, orchards and some land plots used for small-scale agriculture. On the left side of this road, before the bridge, there is a pasture used for occasional sheep grazing.

Cultural heritage: There are no material assets or remains of any cultural and historical heritage sites on the planned RSL location.

3.4 History of Project Development and Planning

Project Preparation

Project preparation is well-advanced due to previous activities on Project preparation. The Project has:

- a Location Study and Feasibility Study prepared by Fichtner in 2012,
- a local Environmental Impact Assessment study prepared by the Mining Institute Tuzla in 2015, with an accompanying Waste Management Plan,
- a Main Design for the RSL, prepared by "IPZ Uniprojekt Terra" Ltd. Zagreb, "AKSA" Ltd. Zenica, "Tomić inženjering" Ltd. Ljubuški, "TZI-inženjering" Ltd. Sarajevo, "TERMOTEHNIKA INŽINJERING" Ltd. Zenica and "ELECTRA" Ltd. Sarajevo in 2016,
- Environmental, Water Management and Construction Permits issued by local authorities.

The Location Study and the Feasibility Study confirmed that the chosen location is the most optimal location for the future RSL. Eko-Sep purchased the land and obtained all the necessary permits for the construction of the RSL.

In addition, having in mind that the local non-sanitary landfills need to be closed, the three Municipalities have been undertaking certain activities to achieve compliance with the legal and strategic requirements both at federal and cantonal level. All three Municipalities have developed documentation for closure and rehabilitation of their municipal landfills in line with the FBiH *Regulation on Content of the Adaptation Plan for Waste Management at Existing Waste Treatment or Disposal Facilities and Activities Undertaken by the Authorized Institution*.⁵

Alternatives Considered

Alternatives considered refer to alternatives regarding the selection of location for planned RSL "Separacija 1" and whether waste treatment will be implemented in the operation phase. Alternative project locations and selection of the most appropriate location were assessed in the Location Selection Study for the Project Region Tuzla Canton.⁶ The site was selected based on geological, hydro-geological, hydrological, seismological, pedological and other terrain features such as traffic connections of the location, vicinity of surrounding settlements, investments, etc.

Seven possible sites for the RSL were considered, and the current site was selected as the most appropriate solution based on a multi-criteria analysis and elimination method. The site is located close to the largest waste producers, it has good transport links, and sufficient space available to store waste for more than 20 years. The sufficient quantity of inert material available at the site itself and surrounding terrain, the geological and hydro-

⁵ Official Gazette of FBiH, No. 9/05

⁶ Fichtner/IPZ Uniprojekt Terra, July 2012

geological aspects are acceptable, the site is environmentally acceptable since it is a modified and degraded area, it is not located in floodplain and wetland areas or protected areas, it is located at a sufficient distance from residential settlements and recreational areas (over 500 m of air distance), urban areas etc. and it will not affect any cultural and historical heritage.

Additionally, in the Feasibility Study for RSL – Tuzla Canton (2012)⁷, the calculation of waste quantities used for assessment of the operation phase was based on three scenarios:

- “Scenario 1” (so called "do nothing" alternative – waste management concept without recycling and biowaste treatment (current situation),
- “Scenario 2” – waste management concept with recycling activities, and
- “Scenario 3” – waste management concept with recycling activities (as in scenario 2) with additional biodegradable waste treatment to achieve the quantitative goals of the EU Directive on waste for the year 2020.

The landfill is designed to meet Scenario 3, after BiH accesses into EU, until which the RSL will fulfil requirements of the Scenario 2.

4 PROCESS

A detailed local EIA study was prepared for this Project in line with national requirements, and approved by the Federal Ministry of Environment and Tourism in 2015. Based on the study, the Environmental Permit was issued in July 2015 and is valid for 5 years. Therefore, EIA Directive requirements for environmental assessment have been met. Public hearings were organised in April 2015 in Živinice by the Ministry as part of the procedure for obtaining the Environmental Permit, and the EIA Study was disclosed to the public, allowing 30 days for receiving comments. However, the EIA Directive demands a longer period of time for EIA disclosure (120 days), compared to the 30-day period stipulated by national legislation. In order to meet both EU and EBRD requirements, the disclosure package for this Project remain disclosed on the website of the three Municipalities and EBRD during a period of 120 calendar days prior to consideration of the Project by the EBRD’s Board of Directors.

In addition, during the adoption of spatial planning documents, in particular the *Spatial Plan of Tuzla Canton 2005-2025* and *Spatial Plan of the Municipality of Živinice 2012-2032*, public consultations were organised through the organisation of public hearings, in line with the local legislation.

Furthermore, public access to the Main Design was provided by the Federal Ministry of Physical Planning during the issuing of the Construction Permit as stipulated by the *Law on Physical Planning and Land Use at the Level of FBiH*.

In addition, a Stakeholder Engagement Plan has been developed for this Project in accordance with EBRD’s Performance Requirement 10, to ensure that all stakeholders have been identified, to disclose sufficient information about issues and impacts arising from the project and to consult with stakeholders in a meaningful and culturally appropriate manner throughout Project implementation.

⁷ Fichtner, Feasibility Study for Regional Sanitary Landfill - Tuzla Canton, November 2012

5 SUMMARY OF PROJECT BENEFITS, ADVERSE IMPACTS AND MITIGATION MEASURES

5.1 Environmental and Social Benefits

The implementation of the Project will result in long-term environmental and social benefits, including the following:

- Discontinuation of the current practice of non-sanitary disposal of municipal waste in Banovići, Kladanj and Živinice, which will lead to improvement of the environmental and health situation. Approx. 100,000 people will benefit from improved waste management
- Fulfilment of strategic and operational objectives defined in the waste management strategies and plans at federal, cantonal and municipal level
- Conversion of existing unused and heavily degraded area into a modern regional centre for waste disposal and recycling
- Improvement of visual characteristics of the existing heavily modified area by planned recultivation of the RSL site
- Improvement of local road infrastructure, including reconstruction and upgrade of the existing access bridge over River Oskova
- Increased employment opportunities for local population (approx. 15-20 workers during operation).

5.2 Environmental and Social Adverse Impacts and Mitigation Measures during Construction

For the construction phase, Eko-Sep will require from its contractors to prepare and implement:

- a **Construction Waste Management Plan**
- a **Construction Site Organisation Plan** including:
 - a) **Construction E&S Management Plan (CESMP)** – At a minimum, the CESMP will cover measures for the following aspects: air emissions, noise and vibration management, soil management, hazardous material management, spill response management, emergency preparedness and response, grievance management for workers and for external stakeholders, security personnel requirements, information disclosure and stakeholder engagement, chance find procedure, community health and safety management, workers' accommodation and traffic management.
 - b) **Occupational Health and Safety, and Fire and Explosion Management Plan** – to define preliminary fire-fighting activities, plans for alerting fire-fighting services, mandatory equipment for occupational health and safety, preliminary medical assistance and plan for alerting the official medical assistance authorities).

A summary of the identified impacts and the planned measures to mitigate such impacts during the construction phase are provided below for each issue.

Issue	Description of impact	Planned mitigation measures
Climate	<ul style="list-style-type: none"> • Increase in emission of exhaust gasses (CO₂, SO₂, NO_x) and particulate matter caused by operation of construction machinery and vehicles used for transportation 	No specific mitigation measures needed to address climate change since it is assessed that the quantities and composition do not have the potential to cause adverse impacts to climatic factors of the site and wider area.
Air Quality	<ul style="list-style-type: none"> • Increase in emission of exhaust gasses (CO₂, SO₂, 	<ul style="list-style-type: none"> • Wetting of surfaces to prevent dust

Issue	Description of impact	Planned mitigation measures
	<p>NO_x) and particulate matters caused by operation of construction machinery and vehicles used for transportation</p> <ul style="list-style-type: none"> • Increase in emission of dust and particulate matter during construction works • Occurrence of accidental situations that may lead to large-scale emission of pollutants into the air 	<ul style="list-style-type: none"> • Covering of transportation vehicles to prevent scattering of materials • Keeping construction machinery and transport vehicles in good technical condition and excluding any faulty equipment from operation to reduce soot emission
Noise	<ul style="list-style-type: none"> • Increased noise levels during construction phase have been identified as part of the assessment of impact on community (please see <i>Community Health and Safety</i> below). 	<ul style="list-style-type: none"> • Prohibiting any night-time works: works may be undertaken until 18:00 h latest • Keeping records on the technical condition of construction machinery and transport vehicles, and excluding any faulty equipment from operation • Keeping records on the use of personal protective equipment by employees at the construction site
Surface and Ground Water	<p>Negative impacts are possible only in cases of:</p> <ul style="list-style-type: none"> • Uncontrolled leakage of oil and fuel from machinery used on the site • Accidental situations and leakages during manipulation of fluids • Inadequate waste management during construction • Inadequate treatment and discharge of wastewater 	<ul style="list-style-type: none"> • Managing wastewater from the construction site in line with the Construction Site Organisation Plan • Undertaking all activities that have a potential to cause contamination with precaution, such as: transportation of liquid fuels, storage of hazardous material and mineral oils, parking places for mechanisation and vehicles, temporary storage of waste to eliminate accidental leakages and contamination • Washing of vehicle wheels to remove any dirt and waste by using a closed system and treatment of such water • Adequate disposal of all waste types • Ensuring receptacles and adsorbents in case of accidental contamination • In the event of contamination, removing the contaminated soil and disposing of it as hazardous waste • Adequate treatment of sanitary wastewater by using mobile toilettes
Ecosystems and Flora & Fauna	<ul style="list-style-type: none"> • Increased noise levels during construction • Increased levels of exhaust gases and particulate matter from construction machinery • Scattering of solid materials at green areas outside the landfill site • Fire and explosions 	<ul style="list-style-type: none"> • Management of excavated material • Rehabilitation of the site upon completion of construction works • A fence to prevent intrusion of animals • Rehabilitation of the site upon completion of construction works by using autochthonous species • Contractor to engage a professional biologist/ecologist to inspect the area of the swamp with regard to presence of amphibians. In case amphibians species are found, the species to be relocated to the nearest moist habitat.
Soil	<ul style="list-style-type: none"> • Degradation of surrounding soil • Accidental situations due to leakage of hazardous materials into soil • Inadequate waste management and wastewater treatment may lead to contamination 	<p>Please see the mitigation measures under <i>Surface and Ground Water</i> above.</p>
Waste Management	<ul style="list-style-type: none"> • Inadequate waste management during the construction period as a risk to contamination of surface and groundwater, as well as flora and fauna. 	<ul style="list-style-type: none"> • Implementation of the Waste Management Plan (part of local EIA study) which includes measures for proper waste management during the construction phase, both for solid and liquid waste, and hazardous and non-hazardous waste. It also includes measures for reducing waste quantities as well as measures on how to record waste quantities • Implementation of the Detailed Waste Management Plan developed as part of the Main Design • Limiting final disposal of waste only to (i) municipal non-hazardous waste and (ii) inert construction non-hazardous waste • Prohibiting the final disposal of special categories of waste

Issue	Description of impact	Planned mitigation measures
		<p>(waste oils, car batteries, tires etc.) and any hazardous waste at the landfill body</p> <ul style="list-style-type: none"> Engaging a third party to undertake final disposal of the aforementioned type of waste
Visual Landscape	<p>Only positive impacts on the existing state of the RSL site during the construction phase have been identified since it is a heavily degraded and modified area.</p>	<ul style="list-style-type: none"> Rehabilitation of the site after completion of construction works Recultivation of areas disturbed by construction activities Plantation of autochthonous flora species is planned.
Community Health and Safety	<ul style="list-style-type: none"> Increased noise levels due to passing of construction machinery Increased emission of flue gases and solid particles as a result of the operation of construction and transport machinery Scattering of solid materials Increased transportation on local roads and damage to local roads during construction 	<ul style="list-style-type: none"> Ensuring that transportation and construction machinery are kept in good working order through continuous control and supervision (silencers, fuel and lubricant installations) Using covers on means of transportation to prevent scattering of materials Perform frequent wetting of roads passing through populated places Rehabilitation of local roads after completion of construction Use of equipment and machinery with the least impacts on the environment and local population
Accidental Situations	<ul style="list-style-type: none"> Activities during construction may cause accidental situations, such as: fire, explosion, etc. 	<ul style="list-style-type: none"> Developing and implementing appropriate operational plans for emergency interventions in case of accidental situations Appointing emergency intervention teams Notifying the competent authorities and the public in case of major accidents and contamination of water, air and soil
Land Acquisition and Resettlement	<ul style="list-style-type: none"> There are no land acquisition related impacts, since the Project does not require the acquisition of privately owned land and will not involve physical or economic resettlement 	-
Cultural Heritage	<ul style="list-style-type: none"> Possibility of chance finds, defined as physical cultural heritage encountered unexpectedly during project implementation, during construction works and impacts on previously unknown archaeological remains 	<ul style="list-style-type: none"> Developing a Chance Find Procedure for managing chance finds, sharing with the Contractor to implement during construction works, and ensuring relevant staff and Contractor is trained in its requirements
Workers' Health and Safety	<ul style="list-style-type: none"> Risks to workers' health and safety associated with construction works, such as the possibility of caving in and the risk of falling into depths during construction works 	<p>The contractor will:</p> <ul style="list-style-type: none"> comply with all occupational health and safety measures required by national legislation governing construction works, environmental protection and waste management provide occupational health and safety training to construction workers ensure and organise evacuation of workers in case of accidents provide medical support to workers construction workers must be provided with toilet and washing facilities on the construction site

5.3 Environmental and Social Adverse Impacts and Mitigation Measures During Operation

Prior to commencement of RSL operation, Eko-Sep will develop an **Operation Environmental and Social Management Plan (OESMP)**. At a minimum, the OESMP will cover mitigation measures for the following aspects: waste management, soil management, air emissions management, noise management, spill response management, hazardous material management, emergency preparedness and response (covering management of possible surplus of leachate), traffic management, security personnel requirements, grievance management for workers and for external stakeholders, information disclosure and stakeholder engagement, and health and safety management.

A summary of the identified impacts and the planned measures to mitigate such impacts during the operation phase are provided below for each issue.

Issue	Description of impact	Planned mitigation measures
Climate	<ul style="list-style-type: none"> Typical impacts on climate during RSL operation are caused by emission of GHG into the atmosphere, such as emission of CH₄ and CO₂ 	<p>The Main Design foresees adequate systems and measures to prevent emissions of CH₄ from the landfill site. Instead of emission of CH₄, methane will be combusted with a gas flare, which will result in emission of CO₂. In phase 4 of the Project, methane will be utilised to produce electricity.</p>
Air Quality	<ul style="list-style-type: none"> Increased emission of exhaust gasses in case of malfunction of equipment and machinery Increased emission of dust and particulate matter due to inadequate waste disposal Emission of landfill gas in case of malfunction of the system for collection of landfill gas 	<ul style="list-style-type: none"> Maintenance of the degassing system Maintenance of sub-pressure in wells for degassing of landfill gas Use of proper degassing wells both horizontal and vertical wells Regular monitoring of the degassing system Minimising the surface of open areas for disposal Compacting, levelling and covering of disposed waste with inert material to prevent odour Repair of all areas that have a damaged cover layer of the cell Use of gas flare and other fuels in case the landfill gas is not sufficient to maintain continuous combustion of gas Undertaking regular periodical examinations of machinery on site to prevent soot emission Wetting of inert material in periods of dry weather to prevent dust Calculation of landfill gas generation Utilisation of landfill gas to produce electricity is foreseen in phase 4, and until that time, collection and combustion of gas with a gas flare is planned Monitoring of landfill gas as specified in the Environmental Permit and the EU Landfill Directive 1999/31/EC
Noise	<ul style="list-style-type: none"> Noise levels at the RSL site will be increased (above 90 dBA) due to the operation of the machinery and transportation vehicles used on the site For increased noise levels as an impact on community health and safety, please see the item <i>Community Health and Safety</i> below. 	<ul style="list-style-type: none"> Prohibiting any night-time works Keeping records on the technical condition of construction machinery and transport vehicles, and excluding any faulty equipment from operation Use of Personal Protective Equipment by employees at the RSL site (such as: ear protection to be used during operation of all machinery and vehicles generating noise above 90 dB (A)) Keeping records on the use of Personal Protective Equipment Placing of a green barrier made from tall autochthonous trees and a safety fence by the Contractor along both sides of the road through the "Ježevac" settlement to partially absorb noise, reduce air emissions and provide a safety barrier for the settlement inhabitants
Soil & Surface and Ground	<ul style="list-style-type: none"> Penetration of leachate into soil Malfunction of the system for collection and 	<p>The RSL will include all systems required for the operation of a safe and sanitary landfill, thus reducing the adverse impact to soil as</p>

Issue	Description of impact	Planned mitigation measures
Water	<p>recirculation of leachate</p> <ul style="list-style-type: none"> • Malfunction of the system for collection of storm-water and sanitary wastewater • Risk of accidental spills of leachate from the lagoon 	<p>well surface and groundwater to minimum, such as:</p> <ul style="list-style-type: none"> • perimeter canals for collection of storm-water • drainage system for collection of leachate • lagoon for collection of leachate • recirculation system of leachate by using two leachate pumps during phase 1 and phase 2 • installation of a facility for treatment of leachate during phase 3 • use of standardised leak-proof materials to isolate the disposed waste from the environment <p>A basin to collect storm-water is foreseen as well, together with other measures such as:</p> <ul style="list-style-type: none"> • all manipulative areas should be leak-proof • all storm-water should be collected and directed to oil separator prior to discharge <p>A closed septic tank without overflow to receive sanitary wastewater is planned.</p> <p>Maintenance of all of the above mentioned systems is required in order to keep the systems working properly. All waste types that may arise from these activities shall be adequately treated.</p> <p>In addition, the Environmental Permit requirements will be implemented, such as:</p> <ul style="list-style-type: none"> • monitoring of the level of collected leachate in the lagoon, especially during the periods of heavy rainfall • using a cistern to collect surplus of leachate from the lagoon during periods of heavy rainfall • monitoring of the quality of leachate and oil separator effluent as specified in the Environmental Permit and the EU Landfill Directive 1999/31/EC
Flora & Fauna	<ul style="list-style-type: none"> • Increased noise levels due to operation of machinery and vehicles • Accidental situations such as malfunction of the degassing system, explosion etc.) 	<ul style="list-style-type: none"> • Recultivation and rehabilitation of closed landfill body areas • Use of autochthonous species • Fencing of the RSL to prevent intrusion of small animals and help control the health situation • During closure of landfill cells, construction of an upper layer of humus with a minimum of 100 cm thickness upon which autochthonous species are to be planted
Waste Management	<ul style="list-style-type: none"> • Inadequate waste management is a potential risk to contamination of surface and groundwater, as well as flora and fauna 	<ul style="list-style-type: none"> • Implementation of the Waste Management Plan (part of local EIA study) which includes measures for proper waste management during the operation phase, both for solid and liquid waste, and hazardous and non-hazardous waste. It also includes measures for reducing wastewater quantities • Construction of a septic tank for receiving sanitary wastewater as foreseen in the Main Design • Implementation of the Detailed Waste Management Plan developed as part of the Main Design • Engaging a third party to undertake final disposal of the aforementioned type of waste
Visual Landscape	<ul style="list-style-type: none"> • Visual landscape is typically affected during RSL operation due to changes to landscape characteristics and degradation of visual values of the landscape 	<ul style="list-style-type: none"> • Recultivation and rehabilitation of closed landfill body areas • Plantation of autochthonous flora species.
Community Health and Safety	<ul style="list-style-type: none"> • Increased noise levels caused by increased transport of trucks through the "Ježevac" settlement • Landfill gas, odours, dust and scattering of solid materials as potential nuisances or hazards for the local population 	<ul style="list-style-type: none"> • Ensuring that transportation and construction machinery are kept in good working order through continuous control and supervision (silencers, fuel and lubricant installations) • Performing frequent wetting of roads passing through populated places • Implementation of Main Design measures to prevent odours,

Issue	Description of impact	Planned mitigation measures
		dust and scattering of solid materials, typical for a sanitary landfill <ul style="list-style-type: none"> • Prohibition of access to the RSL site to unauthorised persons • Planting a green barrier made from tall autochthonous trees and installing a fence along both sides of the road through the settlement to partially absorb noise, reduce air emissions and provide a safety barrier for the settlement inhabitants.
Accidental Situations	<ul style="list-style-type: none"> • Possible accidental situations (fires, explosion, defects in the degassing system, etc.) as a risk during RSL operation caused by insufficient control of waste, self-ignition of waste, human factors, etc. 	<ul style="list-style-type: none"> • Implementation of procedures to prevent fire or explosion (prohibition of smoking or use of open flames on the landfill, placement of warning signs, regular measurements of methane concentrations on the landfill etc.) • Implementation of procedures in case of fire or explosion (responsible persons, evacuation, monitoring of methane concentrations in case of fire, Personal Protective Equipment, etc.) • Installation of fire-fighting devices (number, type, places) and additional equipment (such as barrels, shovels, fire blankets) • Regular maintenance of all devices • Providing continuous education and testing of all employees (at least once every two years) in the field of fire safety • Developing and implementing an Intervention Plan for Accidental Water Contamination for the operation phase
Workers' Health and Safety	<ul style="list-style-type: none"> • Potential occupational health and safety hazards (e.g. electrical shocks, injuries caused by handling of machines and devices, falls from heights, handling hazardous waste, self-ignition of waste, potential infections caused by bites of rodents or insects or contact with infectious bio-waste, increased noise from machinery used in landfilling, etc.). 	<ul style="list-style-type: none"> • Adopting an internal occupational health and safety regulation to define all procedures, protection measures, responsibilities and sanctions • Organising training for employees on work hazards and measures to prevent any hazards, and testing of employees' knowledge, based on a Training Plan and Program to be developed • Providing mandatory medical exams for landfill workers every 6 months • Implementing all general measures required by the Law on Occupational Health and Safety • Providing adequate work conditions for all workers (water and food hygiene conditions, hand washing and disinfection facilities) • Providing Personal Protective Equipment for all workers • Installation of appropriate hazard warning signs within the landfill • Keeping noise levels at work places below 85 dB • Providing noise protection equipment depending on noise levels (cotton wool for up to 75 dB, ear plugs for up to 85 dB, ear muffs for up to 105 dB) • Mandatory vaccinations to prevent infections (abdominal typhus and tetanus) and notifying the health authorities in case of rodent bites on the landfill

5.4 Cumulative Impacts

Cumulative impacts may occur when impacts of new developments are combined with impacts of other past, present or future developments. In order to generally assess cumulative impacts of the Project, the available spatial planning documentation at federal and cantonal level, waste planning documents, reports from public consultation meetings held during the development of the spatial documentation, and other relevant documentation and information were evaluated, with the aim of identifying possible impact interactions with other past, existing or planned facilities/projects/activities. Field observations were also utilised during the assessment.

Construction phase: The locations of disposal sites and borrow sites that will be used to source construction materials are not known at this stage of the Project. Therefore, this impact cannot be assessed at the moment.

Operation phase: During the operation phase, cumulative impacts refer to:

- *Noise.* Noise levels will be increased compared to the present state, especially at the location of the “Ježevac” settlement. The mitigation measure is to plant a green barrier made from tall trees along both sides of the road through the settlement.
- *Air emissions.* Air emissions will occur from everyday traffic on the access road through the “Ježevac” settlement and may act cumulatively with other air emissions resulting from traffic of vehicles visiting the RSL site. The proposed mitigation measure is to plant a green barrier made from tall trees.
- *Water pollution.* No cumulative impacts are expected, as adequate mitigation measures for water quality management are planned.
- *Visual impacts.* Visual cumulative impacts are possible for viewers from the eastern side of the Oskova River valley, since disposed quantities of tailings during the past will act cumulatively with future waste quantities that will require disposal at the same site.
- *Waste generation.* There is an indication that the Municipality of Srebrenik could also join to the RSL site to dispose of its waste, which will result in increased quantities of waste and shortened lifespan of the landfill body. This will be mitigated by recycling activities.
- *Biodiversity.* Cumulative impacts on biodiversity are not expected.

6 MONITORING

Environmental and social monitoring will be implemented both during construction and operation of the Project.

Eko-Sep will require its construction contractors to monitor relevant environmental issues of their operation (e.g. implementation of suggested mitigation measures required to mitigate dust emission, control noise levels, prevention of spills and leakages, proper traffic management etc.). During operation, Eko-Sep will regularly monitor, for e.g. landfill gas, collected leachate levels, the quality of leachate and oil separator effluent, limit values of pollutants and parameters for industrial wastewaters, the degassing system, etc.

The Environmental and Social Action Plan prepared for this Project sets out additional monitoring requirements, particularly in relation to the engagement with stakeholders and management of issues raised by local community. Key monitoring results of the Project will be made publicly available.

7 COMMUNICATIONS

Eko-Sep intends to disclose the following Project disclosure package:

- This **Non-technical Summary**;
- **Stakeholder Engagement Plan**;
- **Project Grievance Form** and **Public Grievance Leaflet**;
- **Local EIA study**;
- **Environmental and Social Action Plan**.

The disclosure package will be publicly available in local language (as well as English where available) immediately upon its availability, on the website of the three involved Municipalities, as follows:

- Municipality of Živinice (www.opcinazivinice.ba)
- Municipality of Banovići (www.banovici.gov.ba)
- Municipality of Kladanj (www.kladanj.ba).

The documents will remain disclosed on the website of the three Municipalities and EBRD during a period of 120 calendar days prior to consideration of the Project by the EBRD's Board of Directors, and will remain publicly available throughout the life of the Project.

In addition, hard copies of the documents will be available at the following locations:

1. Eko-Sep office in Živinice, Maršala Tita bb, 75270 Živinice
2. Municipality of Živinice, Alije Izetbegovića 28, 75270 Živinice
3. Municipality of Banovići, Alije Dostovića 1, 75290 Banovići
4. Municipality of Kladanj, Kladanjske brigade 2, 75280 Kladanj
5. EBRD office in Sarajevo, Fra Anđela Zvizdovića 1, 71000 Sarajevo

Contact information for enquiries and grievances:

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