Financed under a specific grant agreement no 2018/402-850 from EU IPA II Multi-Beneficiary Programme for Albania, Bosnia and Herzegovina, North Macedonia, Kosovo*, Montenegro and Serbia

Western Balkans Investment Framework Infrastructure Project Facility Technical Assistance 8 (IPF 8)

TA2018148R0 IPA

Mediterranean Corridor, Bosnia and Herzegovina - Croatia CVc Road Interconnection, Subsection: Konjic (Ovcari) - Prenj Tunnel - Mostar North

Gap Analysis & ESIA Disclosure Pack

WB20-BiH-TRA-02 Component 1

Volume 1: Environmental and Social Impact Assessment Report

Chapter 18 ESMP

October 2023

COWI | IPF

Western Balkans Investment Framework (WBIF)

Infrastructure Project Facility Technical Assistance 8 (IPF 8)

Infrastructures: Energy, Environment, Social, Transport and Digital Economy

TA2018148 R0 IPA

Volume 1: Environmental and Social Impact Assessment Report

Chapter 19 ESMP

October 2023

The Infrastructure Project Facility (IPF) is a technical assistance instrument of the Western Balkans Investment Framework (WBIF) which is a joint initiative of the European Union, International Financial Institutions, bilateral donors and the governments of the Western Balkans which supports socio-economic development and EU accession across the Western Balkans through the provision of finance and technical assistance for strategic infrastructure investments. This technical assistance operation is financed with EU funds.

PROJECT NO.	DOCUMENT NO.
WB20-BiH-TRA-02	

VERSION	DATE OF ISSUE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1	25/09/2021	ESIA Report	Team of experts	Irem Silajdžić Konstantin Siderovski	Richard Thadani
2	21/11/2022	ESIA Report – Chapter 19 ESMP	Team of experts	Irem Silajdžić	Richard Thadani
3	03/03/2023	ESIA Report – Chapter 19 ESMP	Team of experts	Irem Silajdžić	Richard Thadani
4	18/04/2023	ESIA Report – Chapter 19 ESMP	Team of experts	Irem Silajdžić	Richard Thadani

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List of abbreviations

Abbreviation	Meaning
AESR	Annual Environmental and Social Report
BE	Biodiversity Expert
BHMAC	Bosnia and Herzegovina Mine Action Center
BMP	Biodiversity Management Plan
BOP	Biodiversity Offsetting Plan
CESMP	Construction Environmental and Social Management Plan
CH	Critical Habitats
CHA	Critical Habitat Assessment
CSOP	Construction Site Organisation Plan
CWMP	Construction Waste Management Plan
DCWMP	Detailed Construction Waste Management Plan
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EIA	Environmental Impact Assessment
EPRP	Emergency Preparedness and Response Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FBiH	Federation of Bosnia and Herzegovina
GHG	Greenhouse gas
GMP	Groundwater Monitoring Plan
IEC	Information, Education and Communication
ISMP	Invasive Species Management Plan
JPAC	Motorways of the Federation of Bosnia and Herzegovina
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
LCO	Local Community Office
LHRP	Land and Habitat Restoration Plan
MMP	Materials Management Plan
NGO	Non-governmental Organisation
OEPRP	Operational Emergency Preparedness and Response Plan
OESMP	Operational Environmental and Social Management Plan

Abbreviation	Meaning
OHS	Occupational Health and Safety
PBF	Priority Biodiversity Features
PR	Performance Requirement
RCMP	River Crossing Management Plan
SEP	Stakeholder Engagement Plan
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TMP	Traffic Management Plan
TSMP	Topsoil Management Plan
UXO	Unexploded Ordnance

19 Environmental and Social Management Plan

19.1 Biodiversity

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Habitats						
19.1.1	Pre-construction	Adverse impacts due to inadequate planning of works and Main Design requirements	> During the development of the Main Design for the motorway, include the recommendations given in BMP regarding viaducts over River Neretva. No construction should be allowed in the riverbed or the riparian area due to their sensitivity. > Prior to commencement of construction, select inert waste disposal sites and borrow pits and access roads for them, machinery parking spaces, other access roads, service plateaus, fuel containers, construction worker camps and other (temporary) infrastructure. Selection of these localities must be based on minimal impact on environmental and social receptors, including natural habitats. Infrastructural elements must not be established in critical habitats (CH) or within priority biodiversity features (PBF) unless there is no other viable option based on analysis of environmental, social and financial criteria, which must be agreed upon by the Lenders and accompanied by mitigation and compensation (if necessary). Maps of all CHs and PBFs are provided in the CHA. > Permanent structures with potential negative impact on biodiversity such as gas stations	Designer to include requirements in the Main Design, JPAC to monitor and review	Revision of Main Design. Inclusion of relevant BMP, ISMP design recommendations in Main Design.	Main Design includes the requirement for the motorway viaduct over Neretva and revitalization of habitats after the construction with planting autochthonous plant species No temporary or permanent structures with potential impact on biodiversity are located within PBF or CH Developed Invasive Species Management Plan

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			and billboards with bright lights must not be planned within PBFs or CHs. > Design viaducts as passable structures in the Main Design so to keep habitat connectivity. > Include the requirement for reinstatement of habitats along the inert waste disposal sites, access roads and motorway layout, after the construction is finalised with planting autochthonous plant species characteristic for the area (e.g., Dalmatian laburnum, Bosnian pine, oak etc.) and prevent growing and spread of invasive species in the Main Design. The requirements regarding restoration must be outlined within Land and Habitat Restoration Plan (LHRP), whole issues regarding invasive species shall be further elaborated in Invasive Species Management Plan (ISMP).			
19.1.2	Pre-construction	Lack of up-to-date baseline conditions	> If the construction phase begins more than three years after the completion of the detailed surveys performed for the ESIA Study (2021 and 2022), additional baseline surveys need to be conducted before commencement of works.	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Expert supervision over the research activities.	Completed habitat surveys if works are set to start later than three years after detailed surveys
8.1.3	Construction	Habitat loss due to preparation of construction site and during the performance of construction works,	> Develop Land and Habitat Restoration Plan (LHRP) and Invasive Species Management Plan (ISMP) as part of CESMP. Guidelines and recommendations for LRHP and ISMP development are included in the BMP.	Contractor	The monitoring of cleared vegetation areas is to be regularly performed during	Employed Biodiversity Expert No disturbed habitat outside of the area necessary for construction

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		fragmentation of habitats Potential additional and unplanned disturbance of habitats (habitat loss, pollution)	> Implementation of mitigation measures during the construction stage will be the responsibility of the Contractor in accordance with the contract specifications and loan requirements. JPAC is responsible of including the obligation for implementation of mitigation measures in the Contract with the Contractor and to further ensure their adequate implementation through supervision. As the project is located in ecologically sensitive area, adequate and timely implementation will be ensured by employment of a suitably qualified Biodiversity Expert (BE) specifically to coordinate the implementation and monitoring of the ESMP and BMP. > During the vegetation clearance and earthworks, the disposal of the material is to be well managed in line with CWMP submitted as a part of the 2022 ESIA Disclosure package, in order to prevent the degradation of natural vegetation and invasion of non-native species into the natural habitats. Removed topsoil rich in organic matter must be deposited in controlled way and later used for arrangement of embankments, cuts and for restoration purposes. > Motorway route only needs to be used for construction activities and organisation of construction site. Should any need for additional areas to be used occur, e.g., access roads to the motorway route, natural areas such as woodland, meadows and grassland		the construction phase. Monitoring of implementation of pollution and control measures. Environmental supervision of the contractor's work: weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the external supervising engineer.	Decrease in the number of invasive species of the project area where invasive species are found No chemical pollution events noted Reports on regular cleaning of the pollution control equipment Monitoring of effluent quality from the oil separators

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			shall be avoided and only already modified areas may be used (e.g., existing roads or degraded non-natural habitats). > Implement pollution prevention measures at construction site, e.g., spill containment bunds to prevent any leakage from the oil tanks. Construction site is to be well organized (e.g., inorganic waste that could trigger possible injuries) and organic waste (because of accessible food source, this represents a threat of possible diseases) need to be adequately managed, as given in the Construction Waste Management Plan. > Construction materials must be stored and maintained away from watercourses. Chemicals and fuels must be stored in secure containers located away from watercourses or water bodies. No refuelling of parking of machinery should take place near the watercourse. > Surface water runoff from the construction sites into the watercourses must be avoided and a system of cut-off ditches, silt fencing and/or bunds should be installed if required. > Prevent erosion and minimize washing and leaking of solids from surrounding area by grass plantation, interception and drainage, application of mulch coverage, use of lattice plots, concrete prefabricated panes or gypsum.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Prevent the negative impacts on habitats, especially on aquatic habitats, caused by tunnelling works by implementing measures given under 19.2.2 and 19.3.5 of the ESMP. > Employed BE must monitor all works with potential to harm wildlife and act accordingly if any sensitive biodiversity features have to be removed in line with the BMP requirements.			
19.1.4	Construction	Spread of invasive species	> Actively manage and maintain vegetation of areas marginal to the construction site to prevent drastic edge effect and spread of invasive species. > Continuously implement measures given in the BMP provided as a part of 2022 ESIA package and detailed in Invasive Species Management Plan that is to be developed. > Any soil contaminated with invasive species will be stripped and stored separately on plastic or terram. The materials must be fenced. During reinstatement, the material will be placed in the exact location it was taken from, to prevent the spreading. > Depending on the species encountered and if deemed necessary, any surplus material contaminated or suspected of being contaminated with invasive species will be disposed of at an approved and licensed waste facility. > Depending on the species encountered and if deemed necessary, the buckets, blades,	Contractor	Monitoring of Invasive Species Management Plan implementation Monitoring of invasive species spread	No new invasive species registered No spread of invasive species Invasive species eliminated when found

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			tracks and tyres of all plant and machines that have been in contact with invasive species will be sprayed down, to ensure that rhizomes are not transported to uncontaminated areas. > A site-wide ban on workers bringing vegetation or soil from outside the site area must be imposed to prevent dispersion of non-native invasive species.			
19.1.5	Operation	Habitat fragmentation	> Develop and implement Biodiversity Offsetting Plan (BOP). The guidelines and recommendations for development of BOP are given in the BMP. > Implementation of habitat clearance that aims to minimise habitat loss to the extent practicable. Clearance must be performed only in areas necessary for adequate workflow and functioning of the construction site – along access roads, road alignment, service plateaus and accompanying objects. Sensitive areas must be avoided as given in maps in Annex D to the ESIA.	Contractor	Monitoring of habitat restoration	Success of habitat restoration and revegetation efforts Conditions and regular maintenance of habitat edges
Vegetation and flora						
19.1.6	Pre-construction	Adverse impacts due to inadequate planning of works and Main Design requirements Lack of up-to-date baseline conditions	> Prepare an Invasive Species Management Plan with measures regarding how to control the spreading of invasive species with focus on species with the A2 and A3 invasive codes as given in the Annex A to the ESIA. Guidelines for development of the plan are provided in the BMP. JPAC is obliged to include the Plan in tender documentation.	JPAC or JPAC to transfer the responsibility to the contractor per Contractual Agreement	Quality of the Invasive Species Management Plan	Invasive species Management Plan prepared prior to construction commencing Compliance with timing and undertaking of

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> If the construction of the motorway begins more than three years after the completion of the detailed surveys performed for the ESIA Study (2021), additional baseline surveys need to be conducted before commencement of works. Measure applies to the construction of Konjic bypass as well. As the surveys in the area of Konjic bypass were completed in 2022, if construction works start later than June 2025, additional surveys are needed.			mitigation measures Conducted surveys along the access roads and motorway if works on the motorway alignment start later than June 2024 Conducted surveys along the Konjic bypass road if works on it start later than June 2025
19.1.7	Construction	Vegetation removal and clearance of flora species in the phase of preparation of construction site and during the performance of construction works	> Develop Land and Habitat Restoration Plan (LHRP) and Invasive Species Management Plan (ISMP) as part of CESMP. Guidelines and recommendations for LRHP and ISMP development are included in the BMP. > Implementation of mitigation measures during the construction stage will be the responsibility of the Contractor in accordance with the contract specifications and loan requirements. As the project is located in ecologically sensitive area, adequate and timely implementation will be ensured by employment of a suitably qualified Biodiversity Expert (BE) specifically to	Contractor JPAC for large-scale revegetation	During the construction phase, the monitoring of the status of invasive species and their spread into natural habitats should be undertaken. Inspection by ecologist during construction. Environmental supervision of the contractor's work:	Employed Biodiversity Expert No increase in invasive species coverage compared to the level detected in Baseline of the ESIA study Forestation as a part of anti-erosion works, compensated for the woodland that will be directly affected (65.65 ha)

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			coordinate the implementation and monitoring of the ESMP and BMP. > BE employed by the Contractor to clearly mark areas for vegetation clearance, with biodegradable paint of high visibility, undertake temporary fencing to prevent unnecessary loss of vegetation in the Project area. > There must be no loss of plant species of conservation importance. If they are found, they must be moved to a suitable undisturbed habitat nearby that is not exposed to risk, e.g. away from roads, construction works and settlements. The relocation must be carried out by an expert, under the supervision of a federal inspector for nature protection and a professional expert for a given species, as prescribed by the *Rulebook on protection measures for strictly protected species and subspecies and protected species and subspecies* (Official Gazette of FBiH, No. 21/20). > Contractor to recultivate the inert waste disposal sites by using autochthonous species in order to preserve the domestic gene pool. > The excess inert construction waste must be re-used to level the road route and the remaining material shall be disposed only at designated disposal sites, in order to prevent degradation of other natural vegetation and no temporary landfills are to be formed		weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the external supervising engineer.	by the construction of the motorway Afforested same or larger area than the degraded one in the Project area Success of revegetation: The aim is to have at least 50% vegetation coverage within 3 months of cessation of works. If this is not achieved remedial actions may be required, such as additional tree planting if after year 1, 2 or 3, there has been a loss of 30% of planted trees or more, or less than 90% coverage of vegetation (not trees). Any dead vascular plants will be replaced as 'like for like' during this timeframe Installed drainage

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			elsewhere, as these act as focal points for dispersion of invasive species. > A total of 65.65 ha (58.14 ha of G1 Broadleaved deciduous woodland, 0.9 of G2.1 Mediterranean evergreen *Quercus* forest, 1.58 ha of G3 Coniferous woodland and 5.03 ha of G4 Mixed deciduous and coniferous woodland) will be directly affected by the project. The same or bigger area needs to be afforested/revegetated within one month upon completion of works and the requirements for the process of afforestation will be included in the Biodiversity Offsetting Plan (BOP). Revegetation must be done with species characteristic for said habitats, species that are common and suitable for the area such as, but not limited to, Dalmatian Laburnum, Bosnian pine, black pine, oaks etc. The guidelines for development of the BOP, the recommended location and structure is provided in the BMP. > It is necessary to establish forest order immediately after cutting the trees along the alignment, i.e., remove the stumps, create, and export all the felled timber (where not required to leave them for saproxylic beetles). At the same time, cut down and repair all damaged trees, so that they do not become a source of disease. This especially applies to black pine cultures in Konjic bypass area, which are particularly sensitive to damage. The establishment of forest order will allow the remaining trees, especially those on the			No increase and spread of invasive species caused by construction works

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			new forest edges, to build a new protective edge more quickly, which will be able to protect the stand from direct and indirect harmful effects. > Install drainage infrastructure to prevent erosion. > Minimise possibility of fire occurrence to preserve vegetation by implementing measures e.g., careful handling of flammable materials and open flame. Follow guidelines regarding protecting forests from forest fires and measures outlined under 19.4.1 and 19.4.2 of the ESMP. > Continuously implement the mitigation measured as given in Invasive Species Management Plan.			
19.1.8	Operation	Chemical pollution	> Adequate storage location of chemicals used in motorway maintenance must be carefully selected to prevent impact on biodiversity. Selected location must not be in or near sensitive receptors (as given in CHA), including water bodies, PBFs and CHs. > Avoid the use of herbicides and hazardous substances and materials, as to protect the environment from their potentially harmful impacts. > Undertake regular maintenance and cleaning of the drainage structures and oil separators. > Regular maintenance must include all surfaces adjacent to the motorway and must include	JPAC Management and Maintenance Department as well as selected Contractors for operation and maintenance activities	Monitoring of adherence to measures.	Decrease in the number of invasive species of the project area where invasive species are found. No chemical pollution events noted. Reports on regular cleaning of the pollution control equipment.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			elimination and control of weeds and invasive species.			Monitoring of effluent quality from the oil separators.
Fauna						
19.1.9	Pre-construction	Adverse impacts due to inadequate planning of works and Main Design requirements	> No construction activities in the riverbed of Neretva. The bridges shall be constructed without any disturbance of the riverbed. > In order to protect fish species and their habitats, including species at risk, from development activities it would be necessary to reduce or eliminate constriction of flow through structure design. No river training of Neretva and its shoreline is allowed, and no interference of the natural flow rates is allowed. > Design and install culverts near streams to prevent creation of barriers to fish movement. > The viaducts along the motorway route must be constructed as open passages for wildlife. > The design requirements are to be included in Main Design by the Designer and JPAC is in charge for ensuring the measures are implemented.	Designer to include requirements in the Main Design, JPAC to monitor and review	Revision of Main Design	Main Design developed in accordance with the recommendations
19.1.10	Pre-construction	Lack of up-to-date baseline information	> Additional rapid field research for amphibians must be undertaken during early spring season of the year of construction in order to confirm/exclude the presence of *Hyla arborea* and *Rana temporaria* which can be expected north of Mt. Prenj.	JPAC or JPAC to transfer the responsibility to the contractor per	Monitoring to be done before the beginning of the construction to include all findings from the	Additional small-scale rapid surveys completed for amphibians, reptiles, and birds

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Additional rapid field research for reptiles must be undertaken in the year of construction in order to confirm/exclude the presence of *Telescopus fallax* and *Zamenis situla* which can be expected south of Mt. Prenj where they have suitable habitat. > If presence of aforementioned amphibian and reptile species is confirmed, EAAAs must be identified as these species have the potential to meet the criteria for PBF and/or CH of EBRD and EIB. If it is determined they might be under direct impact of the Project, it is necessary to perform critical habitat accounting and update CHA and BMP documents with measures to ensure NNL/NG. > Surveys conducted over 10 months of the year, although covering all ornithological aspects, are insufficient to fully valorise the area and assess the impact of the motorway on birds, which is why it is desirable to conduct additional research for all bird groups, especially during the spring migration from February to May as follows: > An inactive nest of a Golden Eagle (*Aquila chrysaetos*) was found in the area of Klenova Draga in 2021 and one individual was registered in flight at the same location in 2022. Before construction, it is necessary to conduct additional research in order to determine whether there is another location in the immediate environment where this species nests. Depending on survey results, updating of BMP and ESMP might be required.	Contractual Agreement	additional fauna surveys into project planning.	BMP section on fauna updated prior to construction CHA updated with new information if necessary

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			If inhabitet nest(s) of the golden eagle is (are) registered, risk assessment must be performed to identify potential adverse impacts the project might have. If adverse impacts are likely to occur, mitigation measures must be provided and implemented. Measures may include restriction of works, establishing a feeding site in order to attact the eagle to an area away from the project etc. Monitoring of such nests most be performed throughout the construction phase. > Rocks and cliffs in the area of Klenova Draga and Badnjena Draga are potential habitats for the Peregrine Falcon (*Falco peregrinus*), which is one of the 10 rarest and most endangered species in Bosnia and Herzegovina, and the Eurasian eagle-owl (*Bubo bubo*), which has not been fully explored due to the curfew established by the government to prevent the spread of the Coronavirus. Additional rapid survey of these species in potential habitats is required and it is to be performed in 2023. If Peregrine falcon and Eurasian eagle-owl are confirmed during the surveys, they must be brought forward for critical habitat assessment as they potentially meet the PBF/CHA criteria as stipulated by the EBRD Policy and EIB Standards. If criteria are met, CHA and BMP must be updated with collected data and potential impacts on species' EAAA(s) identified. Direct impacts may result in habitat loss which is not allowed for PBF/CH			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			and critical habitat accounting must be done in order to ensure NNL/NG. > In the year of construction, but before any works commence, perform eDNA analysis in order to valorise underground fauna not accessible by standard invertebrate surveying methods. Focus on the area where works are planned near and in Mountain Prenj. > Additional baseline surveys with the aim to confirm findings from 2020-22 should be planned for all fauna if the pre-construction phase begins more than three years after the completion of large-scale ESIA Study surveys (2021). > Should any other threatened species or species of conservation concern be identified in pre-construction phase, BMP update process must include additional mitigation measures to avoid any impacts and further assessment of possible residual impacts. If residual impacts are expected, no net loss accounting should be updated. BMP needs to be updated prior to finalisation of the Main Design to enable potential additional mitigation measures to be included in the Main Design. The requirement stipulated by the EBRD and EIB for no net loss of priority biodiversity features and net gain of critical habitat must be clearly given in the Main Design documentation.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.1.11	Construction	Disturbance of fauna	> Mitigation measures in the construction period regarding fauna are reduced to avoiding works in the area of forest ecosystems within the zone of indirect physical impact, and it should be especially emphasized that it is necessary to plan works in a manner to avoid additional deforestation and ecosystem damage. The planning of works and marking sensitive areas to be avoided must be done by the Biodiversity Expert employed by the Contractor. > Restrict the movement of construction machinery, mechanization and means of transport exclusively in the designated roads and construction area for the purpose of maximal habitat protection without any additional disturbance of habitats. > Motorway route can only to be used for construction activities and organisation of construction site. Should any need for additional areas to be used occur, e.g., access roads to the motorway route, natural areas such as woodland and dry grassland need to be avoided and only already modified areas may be used (e.g., existing roads or degraded non-natural habitats). Sensitive areas are mapped in the CHA and Biodiversity Expert is responsible for marking of such areas. > During the construction period, underground cave systems and caverns with cave organisms may be encountered. In case of encountering underground structures, it is obligatory to suspend the works immediately,	Contractor	Inspection by Biodiversity Expert during construction Environmental supervision of the contractor's work: weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the external supervising engineer.	Construction site well management reported

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			as soon as safe to do so. All cases of such systems opening must be reported to the Lenders. Pending approval, a speleological company, NGO, or other competent entity must be hired to examine the significance of open systems and to safely seal and separate underground habitats from tunnel systems. Sealing must be done following good practice guidelines. Improper closure of such systems by backfilling may cause an unacceptable pressure on valuable and unique underground habitats and animals. Any such findings should be included in further planning and, if data on species of conservation importance is gathered, updated in BMP and CHA upon EBRD's and EIB's approval. > Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of riverbanks. > Restrict riparian vegetation removals only to the area necessary for performing construction works and machinery access. > Project construction will not be undertaken at dusk, dawn and at night to avoid disturbance to nocturnal and crepuscular fauna (i.e., bats) from increased noise and vibration. > Where lighting is required, it will be directional, non-UV and used only when necessary.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Hunting and collection of medicinal plants by workers is strictly prohibited for their safety and prevention of negative impact any exploitation may have.			
19.1.12	Construction	Potential disturbance of nests/roosts of species that have a seasonally variable vulnerability due to breeding, feeding times or seasonal migrations	> Develop Land and Habitat Restoration Plan (LHRP) as a part of CESMP. Guidelines and recommendations for LRHP development are included in the BMP. > Regarding mammals, mitigation measures during the construction period refer to avoiding tunnelling and extensive excavation works in the period from March to May, when the largest number of species give birth to offspring. This ensures peace in the hunting area and a period of wildlife getting used to the new conditions in the habitat. > It is necessary to plan the clearance works on all parts of the Corridor Vc subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North, to begin in the period July - March, i.e., outside the bird breeding period. No large-scale works are allowed in June and July. > Prohibit work near water bodies during the spawning period and migrations of fish (April and May). > A safety fence shall be placed along construction site near watercourses. > Prohibit works near ponds, streams and canals (reproductive centres) during the	Contractor	Inspection by Biodiversity Experts during construction. Environmental supervision of the contractor's work: weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the external supervising engineer.	No nests/roost affected Construction site well management reported Presence of alternative roost sites

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			reproductive period of amphibians (March and April). > It is necessary to install protective panels on the bridges over the Tresanica River in Ovcari, over the Neretva River and in Mladeskovici. At these localities, a high frequency of birds feeding high in the sky is noticeable, which is why it is possible for them to get hurt due to collisions with moving cars. Protective panels must be placed on both sides of the road at a height of 1.5 m. In order to reduce the collision of birds with protective panels, it is necessary to stick black and white foil over the transparent plexiglass, which increases the visibility of the panels for birds, or silhouettes of birds of prey, which would scare the birds and move them away from the route. > On the part of the route between 9 + 1920 km and the Prenj tunnel in the zone of direct impact, one territory of the white-backed woodpecker and two territories of the black woodpecker have been registered. Both species are indicators of old and preserved forests with a lot of rotten trees on the ground. In order to protect these species, it is necessary to reduce removal of the forest cover to the required minimum for the machinery movement. Designation of the required minimum is to be marked by the employed Biodiversity Expert. > In the area of Klenova Draga, an abandoned nest of a Golden Eagle has been registered. If			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			it is established that in the following seasons the couple is active at the given locality, it is necessary to apply a number of protective measures: > Continuously monitor the nest through the construction phase. > It is necessary to break through the access roads and work on the Tunnel Klenova Draga in the off-breeding period from July to February, i.e., to suspend the works from the beginning of incubation to the take-off of the fledglings (beginning of March-end of June). > Remove trees from access roads only to the width of the road. The existence of a living barrier made of trees will significantly absorb noise, and tree canopies will reduce the visibility of machines, which could reduce the negative impact of disturbance. > On the part of the route between 24+100 km and 31+100 km, the habitat is dominated by garrigue with thorns and wild pomegranate, as well as young, dense, low coppice forests of white hornbeam, thorns, and black ash. No species of birds that feed by hunting in low flight above the ground have been registered in this area. Singing birds inhabiting thickets and shrubs are present. The noise made by cars is a very important factor that negatively affects the reproductive success of these species. Singing males, due to noise, are less noticeable and harder to find females. It is desirable to remove woody and shrubby			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			vegetation in the belt of 30-50 m on both sides of the route and maintain this condition in the future. Removal of vegetation will make habitats less tempting, and cars will be easier to spot, which should reduce bird mortality due to collisions with moving cars. > Potential roost sites are one of the most important features for the bat species conservation, therefore shall be preserved and not to be disturbed. Pre-clearance checks of trees to support roosting bats must be undertaken by Biodiversity Expert prior to the commencement of works to avoid causing disturbance or injury to roosting bats. The expert will initially walk the alignment and mark trees with features that may potentially support roosting bats (i.e., holes and crevices, over 100 mm in diameter). The detected bats will be translocated to a receptor roost following a method statement prepared by the BE. > If not in use during construction activities, and if adequate alternative natural roost sites are available in the wider area, then no further action will be required. If not in use during construction activities, and if no other roost sites are available, then it will be necessary to provide artificial roost sites. The artificial roost should be suitable for they species/number of bats that use the roost that will be lost; expert input should be provided to inform this. If the roost is in use during construction works, and if these works			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			cannot be delayed long-term until the bats have vacated the roost, then a suitably experienced bat worker should be consulted to attend site and remove the bats prior to work. In advance of this an alternative roost site should be identified (whether natural or artificial). The bats should be moved to a suitable new roost site. It is important than an experienced bat worker is engaged to complete this work. > Should any roosts be accidentally disturbed by negligence of the Contractor or as the result of an accidental situation, habitat restoration shall be done after the construction phase is finished. Alternative roost sites in the vicinity shall be built in case of any being destroyed by the construction works. > Employed BE must monitor all works with potential to harm wildlife and act accordingly if any sensitive biodiversity features have to be removed in line with the BMP requirements. > Appropriate education targeted at the needs of different construction personnel can help to achieve minimal impact on species occupying areas of construction, as well as to ensure safety of the construction personnel in case of encounter with reptiles.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.1.13	Construction	Potential fatalities or injuries to fauna species due to vegetation removal and movement of heavy machinery	> On-site speed limits must be enforced to avoid direct mortality of animals. > Habitat clearance will be undertaken by the contractors in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat. > In the time frame from 48 to 24h before commencing vegetation clearing, BE shall do a walkover of the site. > Machinery operation should be restricted to daylight hours to minimise the risk of vehicle collisions with nocturnal and crepuscular wildlife. > Avoid unnecessary cutting of older trees and removal of dead wood in the zone of project area of influence, particularly oak, from habitats as they are important for saproxylic species. > Fragmented and small habitats suitable for amphibians found in the area of Ovcari, Mladeskovici, Klenova draga, Zelenika and Bosnjaci must not be disturbed by heavy machinery during construction. > In order to prevent fauna from entering, all construction sites within candidate Emerald sites and potential Natura 2000 site must be fenced with a wire fence at least 1,5 m tall, the bottom 30 cm of the fence must be made of preformed metal sheets, recycled plastic	Contractor	Inspection by ecologist during construction. Environmental supervision of the contractor's work: weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the external supervising engineer.	No fatalities of fauna recorded on site. Construction site well management reported.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			lumber or (perforated) scored plastic and will prevent smaller fauna from entering the site. > It is necessary to perform daily checks for the presence and removal of individuals of the species fire salamander (*Salamandra salamandra*) and Hermann's tortoise (*Testudo hermanni*) within the motorway subsection under construction, and, if species are found, the commissioned BE must safely remove them from the area to the adjacent habitat of the same type away from machines, local roads and other dangers. If tortoise nests with eggs are found during construction, it is necessary to ensure they are not disturbed or destroyed, and BE must safely remove them from the location. > Construction site is to be well organized (e.g., inorganic waste that could trigger possible injuries) and organic waste (because of accessible food source, this represents a threat of possible diseases) need to be adequately managed, as given in Waste Management Plan and Construction Waste Management Plan. > During the construction period sites will be managed so that they do not provide suitable habitat for reptiles (shelter and hibernation). Measures would involve not stockpiling rubble and only undertaking works to move rubble when temperatures are above 7 degrees Celsius, i.e., when reptiles are not in hibernation.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> During the construction phase, significant construction work such as excavation and trenching works will be carried out in the area of physical and direct area of influence of the motorway. It is expected that in the conditions of disturbed habitat structure and fauna movement, there will be fauna mortality. It is recommended that the contractor fences all parts of the area where significant earthworks and excavations will be carried out, with focus on forested areas and area near watercourses. > All surplus material that will not be used in construction works must be stored on previously planned disposal sites and construction waste must be systematically transported to disposal sites to prevent fatalities of fauna due to inadequate material management. > Regarding mammals, mitigation measures during the construction period refer to avoiding tunnelling and excavation works in the period from March to May, when the largest number of species give birth to offspring. This ensures peace in the hunting area and a period of wildlife getting used to the new conditions in the habitat. The fence along the motorway should be constructed properly (1m-high wire fence which in the lower parts (at least 50 cm from the ground) has a diameter of 2cm or less), to ensure there would be no collision of these species during operation phase. The use of a dense			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			net in the lower part of the fence will prevent the passage of mammals to the motorway route. This measure is to be constructed during construction phase, however, will act as a mitigation measure during operation phase. The use of a dense net in the lower part of the fence will prevent the passage of fauna to the motorway route. > During the construction period, whenever possible, and after completion of the construction of the Prenj tunnel, it is necessary to recultivate the inert material disposal sites, which will compensate for the loss of habitats that will be buried in landfills. Recultivation should be done with indigenous species.			
19.1.14	Operation	Habitat fragmentation	> Develop and implement Biodiversity Offseting Plan (BOP). The guidelines and recommendations for development of BOP are given in the BMP. > Revegetation must be done as stated in the mitigation measures regarding habitats. > The viaducts along the motorway route, which are constructed as open passages for wildlife, should be kept passable during operation phase via adequate maintenance. > In locations Streams no. 1 and 2 in Ovcari, artificial pond in Zelenika and artificial pond in Bosnjaci (maps and coordinates provided in BMP, CHA), due to identification of a large number of amphibians and potential habitat	JPAC Management and Maintenance Department as well as selected Contractors for operation and maintenance activities	Monitoring of revegetation success Status and maintenance of buffer zones during motorway observation int he first three years of operation Status and maintenance of passages under the viaducts and	Success of revegetation as given in the BMP Records of amphibians using the tunnels and other fauna using the passages under the viaducts

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			fragmentation, tunnels should be set up to allow the unimpeded passage of animals. To encourage use by amphibians and reptiles, all terrestrial crossings should have a natural substrate on the tunnel floor that consists of soil, sand, branches and other natural materials. The precise design, dimensions, and factors that may affect tunnel placement are listed in the Guidelines for Amphibian and Reptile Conservation During Road Building and Management Activities in British Columbia[1] and should be taken into consideration when designing and planning. > Plant high trees on chainage 10+580.00 in the form of hop-overs for bats. The aim with hop-overs is to reduce the mortality risk by guiding the bats across the roads above the traffic. The chosen locality is placed in forested area where bats are present, and where embankments narrow down and the road cuts into the slope. This will be utilized as a natural guidance for bats along with trees.		tunnels for amphibians	
19.1.15	Operation	Potential collision of fauna species due to high speed of vehicles	> Possible negative pressure on the invertebrate species caused by the construction of the Prenj Tunnel comes down to the aggregation of insects in the lighting and the death of insects when in contact with cars moving at high speed. The ecotone along the motorway can play a significant role in the expansion of	JPAC Management and Maintenance Department as well as selected	Monitoring of adherence to measures.	Bird panels and protective fence with no observed damages

[1] http://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=15141

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			the habitats of butterflies and other insect species that inhabit marginal habitats. The importance of the ecotone along the motorway will be reflected through the increase of the habitat area of indigenous species of open habitats, such as the species *Euplagia quadripunctaria*. However, the effects of ecotones and habitat fragmentation are much more significant for forest species (such as *Lucanus cervus*) that fly from forest to open habitats, thus increasing the likelihood of individuals being killed by cars. If monitoring in operation phase determines that the frequency of dead individuals is high, the installation of high barriers (mesh materials) is necessary. > Undertake regular maintenance of protective bird panels. > The motorway needs to be fenced and the fence maintained properly throughout the operation phase. The fence must be fixed to the ground. All damage to the fence is to be promptly repaired, therefore regular inspections are required. > Should any fatalities of birds be observed during regular maintenance of the road in operation phase, protective barriers should be placed at such locations in consultation with the local ornithological society. > The motorway maintenance service is obliged to record mammal's injury cases in order to respond timely with additional protection	Contractors for operation and maintenance activities		Register in place for registering of potential roadkill. No fatalities of species registered, zero roadkill.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			measures, during first three years as given in the BMP. > The fence along the motorway should be constructed properly (1m-high wire fence which in the lower parts (at least 50 cm from the ground) has a diameter of 2cm or less), to ensure there would be no collision of these species during operation phase. The use of a dense net in the lower part of the fence will prevent the passage of reptiles to the motorway route. This measure is to be constructed during construction phase, however, will act as a mitigation measure during operation phase.			
19.1.16	Operation	Negative impacts of pollution, increased light and noise levels on sensitive fauna species such as bats	> Adequate cleaning and maintenance of drainage structures and oil separators (EN 858-1 and 858-2) to ensure their efficiency regarding the pollution prevention by engaging an authorised third party to ensure their efficiency regarding the pollution control. > All species of bats are nocturnal animals. The light near the colony will affect their behaviour and reduce the amount of outings intended for hunting. Strong light will reduce social flight and cause the species to move to another darker location. Illumination of the bat litter leads to disturbances that cause the bats to leave the litter. Also, light causes insects to accumulate allowing bats to aggregate in those places. As mitigation measures replacement bulbs may be used such as low-pressure sodium lights, high-	JPAC Management and Maintenance Department as well as selected Contractors for operation and maintenance activities	Monitoring of adherence to measures.	No auxiliary facilities, such as gas stations, resting places, billboards etc.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			pressure sodium bulbs or mercury bulbs as elaborated in the BMP. These bulbs must meet the technical parameters outlined by the *Set of instructions for design, purchase, installation and maintenance of elements, objects or parts of objects on the motorway.* The instructions give minimal requirements that can be improved upon if the Project allows, taking into consideration the cost and environmental impact of alternative options. > Avoid placing the artificial streetlights and unnecessary lightened traffic signs, auxiliary facilities, such as gas stations, resting places, billboards etc. Preferably use only red lights for signalization which will not attract insects. > Motor vehicle noise is a constant but not limiting factor. Adapting to noise and conditioning to emerging conditions is a phase in adaptation for local populations of mammal species. It is not necessary to implement mitigation measures.			

19.2 Groundwater

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Groundwater[2]						
19.2.1	**Pre-construction**	Limited information on groundwater quality and quantity in the zone of motorway construction	> Conduct a detailed inventory to identify all wells for public water supply, wells for individual water supply (drinking or other purposes), newly built wells for supplying construction locations with drinking or technical water, and piezometers installed at the referenced locations related to motorway construction. During the detailed list of wells, use data from the Groundwater cadaster of FBiH.[3] *Note: Possible locations of piezometers are (i) in the area of the entrance portal of the Prenj Tunnel, in the valley of the Konjicka Bijela, at location of Rakov laz (700-750m a.s.l.), (ii) in the zone of the exit portal of the tunnel Prenj - Podgorani region (400 m a.s.l.), and (iii) on the axis of the motorway in the hinterland of the spring "Bosnjaci" in Potoci. The predicted depth of the piezometer on the portals of the Prenj Tunnel is approximately 100 m, and in the hinterland of the source "Bosnjaci" approximately 60 m.*	JPAC in cooperation with the selected Contractor	Engineering supervision over the investigation activities and preparation of the GMP. Licenced laboratory to perform baseline groundwater sampling and testing. The groundwater testing should be performed for drinking water parameters defined in the *Rulebook on*	GMP revision report. Baseline groundwater monitoring reports. Recommendations for the designers and contractors based on the results of groundwater monitoring during construction.

[2] The protection measures in the III protection zone of the Bosnjaci and Salakovac springs are formulated on the basis of the measures prescribed in the Studies on the protection of the Salakovac and Bosnjaci springs and the Decision on sanitary protection zones and protective measures for the Salakovac spring, which are harmonized with the *Rulebook on the method of establishing conditions for determining sanitary protection zones and protective measures for water sources for public water supply* (Official Gazette of the FBiH, No. 88/12), as well as conditions from the Preliminary Water Consent for the Konjic-Mostar North section issued by the Adriatic Sea Watershed Agency (UP/40-1/21-2-129/21 from March 15, 2022).
[3] Groundwater cadaster of FBiH is available at the Adriatic Sea Watershed Agency, Mostar

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Prepare a **Groundwater Monitoring Plan (GMP)** to cover baseline monitoring and monitoring in the construction phase The GMP shall include: > inventory of the wells with information on name, location, type and other available information on each well. > monitoring protocol including information on the frequency and method of sampling, sampling parameters, methods of analysis and reporting > response plan in case of contamination > risk management and remediation plan. The GMP shall be prepared in line with the rules set in the Rulebook on drinking water safety (Official Gazette of BiH 40/10, 43/10, 30/12, 62/17). The monitoring programme during the construction shall include the construction period and the warranty period. Monitoring shall include both quality and groundwater level in the wells/piezometers. > Conduct the baseline monitoring of water quality and levels in the wells/piezometers at all identified wells according to the GMP.		*Safety of Drinking Water*[4].	

[4] Official Gazette of BiH, No. 40/10, 43/10, 30/12, 62/17

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Note: The frequency of sampling during the construction will depend on the dynamics of works progression.			
19.2.2	**Construction**	Intrusion of groundwater in tunnel tubes during excavation that can impact stability of the structure and cause the safety risk	> Establish systematic monitoring of water levels throughout tunnel lifetime (as in 19.2.1) > Do not discharge groundwater that penetrates the tunnel tube to discovered caverns or karst canals as this may lead to groundwater pollution. > Capture the groundwater that penetrates the tunnel tube and drained it out of the tunnel with pipes or channels. Horizontal passages and passages with smaller slopes are drained by ditches or channels, if necessary, also with use of pumps. The ditches or channels must be deep enough and positioned in a way not to endanger the safety of workers. Passages with larger longitudinal slopes are drained with pipes. Ditches, channels with pumps, and drainage pipes must be regularly cleaned and maintained in good condition. Drainage of the tunnel is performed in a way that it does not undermine the supports of protective structures, does not erode the tunnel walls or tunnel lining, does not wash away rock material in the excavation and does not damage devices and auxiliary traffic signals. The workplace, movement of workers, and traffic areas must stay dry and not under water. > Treat the captured groundwater before discharging into the environment (usually	JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Engineering supervision during the construction works. Testing of tunnel drainage quality to be performed by a licenced and accredited laboratory.	Monthly engineering supervision reports. Photographs from the site. Results of tunnel drainage quality testing. Inspection reports, if any.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			settling only; to be decided based on results of water testing testing as stipulated by the *Regulation on the conditions for the discharge of wastewater into the environment and public sewage systems Official Gazette of the FBiH, No, 26/20 and 96/20*). The water from the tunnel may be loaded with suspended solids and other pollutants so the special attention should be paid that it is not discharged untreated anywhere upstream of the spring Bijela or in the water protection zones of the Salakovac and Bosnjaci springs. > The tunnel can be sealed only after the tunnel has been built and all safety measures are taken so that the sealing of the penetration does not cause dangerous or harmful consequences for the workers in the tunnel and the environment. > Areas of fractured/faulty zones will be identified in advance with predrilling with preventors and using geophysics in the predrilled horizontal boreholes. > Areas which will be identified as aquifers will have temporary reduction of ground water pressure. > Top down grouting will be used in order to have the area stable and the inflows manageable (minimised) for construction and operation reasons as well as environmental reasons.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.2.3	**Construction**	Impact on the direction of ground flow and recharge by cutting the underground streams by tunnelling	> In case of cutting off underground streams (karst channels or caverns with water) during tunnel excavation, construct a bypass (migration flowpath) to its extension so that the groundwater continues to move and at the same time reduce the pressure on the tunnel tube and prevent damage to the tunnel lining. > If the tunnel tube cuts through a cavern of larger dimensions, build a supporting structure (bridge in the tunnel) to bridge the cavern. > When large caverns appear, avoid filling the caverns with any material as this will decrease permeability. Caverns and caves shall not be infilled without prior inspection and approval by an expert (hydrogeologist, karstologist or speleologist).	JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Inspection of caverns and underground channels by a hydrogeologist, karstologist or speleologist.	Monthly engineering supervision reports. Expert report on investigation results. Photographs from the site.
19.2.4	**Construction**	Impact on groundwater quality due to: > direct release of intercepted tunnel drainage water without treatment > turbidity caused by erosion and excavation or blasting of the rock mass	> Ensure presence of hydrogeological engineers every day on the site, preferably with experience in similar projects, in order to take execution of works and groundwater monitoring under strict control and anticipate and prevent negative impact of motorway construction (excavation or blasting of the rock mass, erosion of material from cuts and embankments, accidental spills) on groundwater quality. This is particularly related to drilling of the tunnels Prenj, Klenova Draga, Gradina and Orlov Kuk, which are located in catchment areas of Konjicka Bijela, Salakovac and Bosnjaci springs. > Provide a special method of blasting so as not to disrupt the water flow regime in sections	JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Daily inspection of works by hydrogeological supervision engineer. Licenced laboratory to perform baseline groundwater sampling and testing. The groundwater testing should be performed for drinking water parameters	Monthly engineering supervision reports. Photographs from the site. Inspection reports, if any. Groundwater monitoring reports.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		> accidental spills in the springs area	where the route passes through the areas of water pumping stations or near water facilities and according to the conditions of the Preliminary Water Consent. The following measures are proposed: › In accordance with the actual situation on the ground where the works will be carried out and the available data on the working environment, it is necessary to create a detailed Blasting Plan (Contractor of drilling and mining works), › Work on drilling mine holes and blasting should be planned in such a way that the diameter, depth, and geometric arrangement of the mine holes are carried out in a selective (gradual excavation) manner in the smallest possible volume up to the excavation depth provided for in the project (more frequent drilling and blasting within a certain period), › The filling of mine holes must be carried out with a system of millisecond non-electric detonators and connectors for surface blasting (DUAL MS), so that each mine charge - borehole has a separate detonation effect in the minefield activation system and with the minimum possible amount of explosives per mine hole, which prevents seismic (earthquake)		defined in the *Rulebook on Safety of Drinking Water*[5]	

[5] Official Gazette BiH, No. 40/10, 43/10, 30/12, 62/17

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			reduces the effect to a minimum. In this connection, and against the planned depths of the mine holes, discontinuous filling can also be used (multiple detonators in one mining hole with intermediate plugs made of inflated material). › It is mandatory for the authorized company to apply measurement of the seismic impact with certified instruments for every blasting, with the preparation of a report after the measurement. > Install waterproof foils before the formation of embankments to prevent further penetration of any spills of harmful substances into the ground both during the construction phase and later during the operation of the motorway. > Do not drain tunnel runoff (water used for drilling mining holes) into open channels or caverns in order to avoid jeopardising the quality of groundwater. Instead, evacuate tunnel run-off outside the tunnel using a piping system and discharge it into the recipient after treating in sedimentation basins. > Apply the same measures as under 19.2.2. > Monitor the quality of groundwater as per the GMP (see measures under 19.2.1). > Save and protect the locally sourced capture point for the needs of up to 30 households in Gornja Bijela by building a supporting structure in line with the solution proposed in			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			Preliminary Design. In case of unforeseen circumstances, provide an alternative source of drinking water to households that use this source by connecting to the Gornja Bijela reservoir. > Regulate the natural course of the Bijela river for a length of approx. 600 m to further ensure that the Crno Vrelo catchment is not endangered. > In the area of local spring captured for the need of up to 30 households in Gornja Bijela, provide the households using this source with an alternative source of drinking water by connecting them to the Gornja Bijela reservoir. > To protect the Konjicka Bijela and Salakovac springs, fully pave the access roads with asphalt and equip with stormwater collection systems (gutters, drains, manholes). Treat the collected run-off in oil and grease separators up to the quality defined by the law. Discharge the treated run-off outside the zone of influence, downstream from the Konjicka Bijela spring, and outside of the III water protection zone of the Salakovac spring. > Implement collection and treatment measures for tunnel run-off and captured groundwater from the Orlov Kuk tunnel (as described under item 19.2.2) and discharge treated water outside the III water protection zone of this spring.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Ensure regular contacts with water utilities and agree on the option of temporary disconnection of the source from the water supply network in the event of an accidental pollution or temporary turbidity until the quality returns into the legally prescribed limits. > To prevent accidental releases of oil and grease during construction of viaducts install oil collection tanks under the machines. To prevent material washing away during construction of viaduct pillar foundation install anti-erosion barriers. In case of groundwater being pumped from foundation pits, ensure that these waters are treated in oil and water separators before discharge to the environment. > Treat collected wastewater from concrete batch plants up to the quality defined by the law. Discharge the treated runoff outside the zone of influence, downstream from the Bijela and Gornja Bijela springs, and outside of the III water protection zone of the Salakovac spring. > Apply all mitigation measures for surface waters defined in section 19.3.			
19.2.5	**Operation**	Impact on groundwater quality resulting from release of treated run-off from the motorway surface	> Design and construct closed system for controlled collection of storm water from the motorway surface, toll and rest areas, and its treatment in oil and grease separators (for surface run-off) and/or biological treatment	JPAC to transfer the design and construction responsibility to the Contractor as per	Engineering supervision during the design and construction.	Design revision report. Monthly engineering supervision reports.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		in the proximity to the springs and their water protection zones	units (for sanitary wastewater) to the required quality before discharge into the recipient. > Do not discharge treated water in the spring area. The water should be taken out of the influence zone so that there is no impact on the quality of the water from these sources. The water shall be discharged downstream from the zone of influence of Konjicka Bijela spring and outside the III sanitary protection zone of Salakovac and Bosnjaci springs. In case any new wells are identified during the pre-construction phase, treated water should not be discharged in their vicinity. > Perform regular testing of treated storm water quality (before its discharge) in line with the Water Permit obtained for the Project. > According to the conditions specified in the Preliminary Water Consent, it is envisaged to install warning signs for passage through the high-risk water zone, as well as signs indicating speed limits for vehicles and signs prohibiting stopping for vehicles carrying hazardous and water-damaging substances in high-risk zones[6].	Contractual Agreement JPAC to perform monitoring activities in the operational phase	Licenced laboratory to perform quality testing of treated storm water.	Photographs from the site. Reports on technical acceptability and readiness to use of installed oil and grease separators. Treated storm water quality monitoring reports. Inspection reports, if any.

[6] According to the definition in the Preliminary Water Consent, the area located within the III protection zone of the source falls within the high-risk zone where the implementation of standard and additional protective measures is required, while the area within the IV protection zone of the source is in the moderate-risk zone where the implementation of standard protective measures is necessary.

19.3 Surface water

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Surface water						
19.3.1	Pre-construction	Perform the pre-construction water quality measurements from which change can be assessed as construction works progress	Due to the timespan between preparation of this Study and start of construction works, up-to-date information on water quality in the Project area will be needed to determine baseline conditions. The following actions must be implemented: > Carry out pre-construction water quality analysis of Tresanica, Neretva and Konjicka Bijela before construction starts. > Use the same monitoring parameters and points as described in this ESIA. > Carry out water quality analysis in at least two hydrological cycles (low and high flows). *Note: The measure is in line with the Preliminary Water Consent.*	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Refer to results of water quality monitoring described in Chapter 5.3.3 to check for locations and parameters to be analysed	Environmental baseline report on water quality
19.3.2	Pre-construction/Construction	Increased pollution risks to surface water bodies from works within riverbed	> Prepare a **River Crossing Management Plan (RCMP)** that includes a Specific Method Statement. This statement shall provide details of the methods proposed to ensure dry working conditions and minimise risks to water quality as well as to aquatic flora and fauna. Include the following measures in the RCMP: > Limit the clearance of vegetation on the channel banks. Where works are required on the watercourse banks, or in-water, vegetation clearance should be restricted to the working area and	JPAC to transfer the responsibility to the Contractor through Contractual Agreement	Revision of the RCMP by the Supervision Engineer	Revision report Design adopted

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			should be undertaken only immediately prior to the commencement of those works. Vegetation should be re-established as soon as practicable following construction. Use seeded biodegradable fibre matting to encourage re-vegetation after works on, or near, the banks. > Until the beginning of the in-water works, preserve at least 20m depth of bankside vegetation from the channel bank to protect bank stability. > Avoid works to watercourses during high flow season and during heavy rainfall to reduce the risk of fine sediment release, watercourse erosion and increased flood risk. > Create a dry-working area for works within a watercourse channel or within the floodplain wherever possible using structures such as cofferdams. > Use in-channel coffer dams where appropriate and or silt management systems such as silt curtains within watercourses that require diversion or in-channel construction works. > Direct access of vehicles to watercourses should restricted to those vehicles required as part of the construction activities. If it is			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			necessary for any vehicle to enter a watercourse, it should be inspected in advance and, if required, remedial action taken to prevent contamination from oil/fuel leakages. All drivers should be instructed in the use and safe disposal of clean up equipment and carry absorbent materials in their vehicles and be trained for spill response. > In accordance with the conditions specified in the Preliminary Water Consent, in locations where the route is closely situated next to watercourses or intersects them, on sections that pass through areas of moderate and high risk, it is mandatory to design vertical barriers to prevent vehicles from veering off the highway corridor (such as guardrails, blocks, New Jersey barriers, etc.).			
19.3.3	Pre-construction/Construction	Change in the river flow and recharge by cutting or diverting permanent and intermittent streams around the motorway structures	> Hydraulic connectivity of all surface water bodies must be maintained. > When cutting off or otherwise controlling the water flow, ensure appropriate dimensioning of culverts for all identified intermittent streams that are crossed by motorway on embankment. > When watercourse diversion is required maintain a temporary channel to maintain flow and connectivity whilst the permanent channel is prepared. Preserve the natural characteristics of the riverbed morphology. Avoid to a degree possible: (1) changes in the	JPAC to transfer the responsibility to the Contractor through Contractual Agreement	Revision of the Main Design for drainage systems	Revision report Design adopted

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			planned and realized length of intervention; (2) spatial and temporal variation in channel morphology; (3) changes in cross-section measurements; (4) changes in hydraulic parameters. > In case of Suhi potok and Bijela river, construction of training structure shall be performed in the low flow season when the creek bed is dry.			
19.3.4	Pre-construction/Construction	Reduction in water quality of the Tresanica and Neretva rivers due to discharge of surface-runoff from the asphalt surfaces in the operational phase	> Design and construct a closed surface drainage collection and treatment system. > Treatment units (oil and grease separators) to specifically cover the two viaducts over Tresanica and Neretva and the bridge over Neretva in Donje Selo. > Design and construct connections between toll stations/rest areas and local water supply and sewerage systems, wherever they are available. > If local water supply and sewerage systems are not available, design and construct a collection and treatment system for sanitary wastewater that uses biological treatment units before discharging the treated water into the environment. > The treated wastewater shall meet the standards specified in the Regulation on the conditions for the discharge of wastewater into the environment and public sewage systems	JPAC to transfer the responsibility to the Contractor through Contractual Agreement	Revision of the Main Design for drainage and sanitary systems.	Revision report Design adopted Facilities constructed and certified for use

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			(Official Gazette of FBiH, No. 26/20 and 96/20). > Treated wastewater shall not be discharged in the III protection zone of the Salakovac and Bosnjaci springs, as well as in the direct influence zone of the unprotected Bijela spring			
19.3.5	Construction	Reduction in water quality in river systems due to: > sediment release during bridge construction in riverbed and on the banks > accidental pollution by hydrocarbons or other substances from the construction site including concrete batching plant and asphalt mixing plant > localised discharge of wastewater from	> In accordance with the conditions specified in the Previous Water Consent, prepare a construction site organization project and construction technology and schedule that should include: ○ Site boundaries that should take into account, among other things, the need to protect sensitive areas from erosion, oil spills, water pollution, etc. ○ A system for the drainage of wastewater and stormwater from the construction site. ○ The most suitable locations for workshops, machinery bases, fuel and lubricant storage, and asphalt bases. Placing these facilities in high-risk water pollution zones is prohibited. ○ The construction work plan and construction technology must completely avoid the possibility of partially or fully filling up watercourses that the route intersects with or is located alongside. Sediment release > Avoid the positioning of stockpiles near to watercourses (minimum 50m recommended) and ensure they are located outside areas at fluvial flood risk.	Contractor	Engineering supervision of the contractor's work based on CSOP, RCMP, CESMP, CWMP, DCWMP: visual supervision of (a) sanitary and drainage facilities and (b) work of concrete batching plant (c) waste management practices (d) construction works on Tresanica and Neretva (e) disposal of spoil on designated landfills. Records should be kept of these visual inspections	Plans and method statements prepared, reviewed, and approved by the Supervising Engineer. Completion of weekly inspections. Quality of water in Tresanica, Neretva and Bijela. No direct discharge of untreated wastewater to rivers No inappropriately disposed waste in and around the site No works in the riverbed or on the banks Disposal of spoil on designated landfills

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		construction site and worker's camp > depositing of waste such as construction waste, municipal waste, and other special waste categories near or into the surface waters	> Contain stockpiles with bunds or sediment fences and cover stockpiles when not in use. > Control runoff during construction. Provide sediment barriers between earthworks and the watercourse to prevent sediment from washing into the river. Use of silt fences, silt traps, filter bunds, settlement basins and/or proprietary units such as a "siltbuster" to treat sediment laden water generated on site before discharge should also be implemented. > Pass any water generated by dewatering processes through silt busters or sediment tanks, prior to discharging this water to the any watercourse. Additional treatment may be required if other pollutants are present or if these measures are not effective. > Additional measures and pre-treatment required prior to discharging potentially polluted water from tunnel dewatering to include use of non-ecotoxic additives and oil separator. Sampling may be required prior to discharge to evaluate effluent quality in line with the conditions prescribed in the Regulation on the conditions for the discharge of wastewater into the environment and public sewage systems (Official Gazette of the FBiH, No, 26/20 and 96/20). > Access roads inside the construction camp should be located 60m from watercourses as far as practicable. Site roads and approaches to watercourse crossings should be kept free		and submitted in the monthly reports prepared by the external supervising engineer. Monitoring of water quality of Tresanica, Neretva and Konjicka Bijela in line with the Decision on the Approval of the EIA Study. Reports to be checked by engineer supervision.	Proofs of waste delivery to licenced operators No community grievances raised relating to water pollution or waste disposal.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			from mud and cleaning water should not be discharged to the watercourse. > It is necessary to anticipate the use of only clean material for embankments near watercourses, in accordance with the conditions specified in the Preliminary Water Consent. Accidental pollution > Prepare Operational Plan of Intervention measures in case of different accidental situations (e.g. oil spills), as given in the Preliminary Water Consent. > Fuels and potentially hazardous construction materials should be stored in bunded areas with external cut-off drainage and fuel should be stored in double skinned tanks with 110% capacity. No materials should be stored within 50m of a watercourse. > Waste fuels and other fluid contaminants should be collected in leak-proof containers prior to removal from site to an approved processing facility authorised by the Cantonal ministry responsible for environmental protection in accordance with the *Rulebook on issuing a permit for small business activities in waste management (Official Gazette of the FBiH, No. 9/05)*. > Machine repairs and oil replacement must not be carried out on the construction site but in designated areas outside the zones defined as			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			high-risk pollution zones. Oily waters must be treated to the level prescribed by the *Regulation on the Conditions for Discharging Wastewater into Natural Recipients and the Public Sewerage System* (Official Gazette of FBiH, No. 26/20, 96/20), in accordance with the conditions specified in the Preliminary Water Consent. Fuelling and maintenance of construction vehicles and plant (including washdown) shall be done on hard standing or on haul roads, with appropriate cut-off drainage and located away from watercourses. Drip trays should be placed beneath static plant such as generators and plant not in use. No plant should be stored within 50 m of a watercourse and no maintenance should be undertaken within 50m of a watercourse. > Spill kits in the form of oil absorbent booms and other spill containment equipment to be kept on site to be deployed in the event of a spillage, and site staff trained in their use. > Concrete mixing and washing areas should be located more than 500m from any watercourse. Wastewater from these areas shall be intercepted and hauled to a licenced disposal facility authorised by the Cantonal ministry responsible for environmental protection in accordance with the Rulebook on issuing a permit for small business activities in waste management (Official Gazette of the FBiH, No. 9/05).. > Set up settling tanks at the concrete batching plant to treat the wastewater before			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			discharging it. Treated wastewater shall meet the standards specified in the Regulation on the conditions for the discharge of wastewater into the environment and public sewage systems (Official Gazette of the FBiH, No. 26/20 and 96/20). > No surface water runoff from construction working areas or sites that may contain fuels or other harmful substances shall be discharged to surface water receptors unless first subject to robust pre-treatment (physical and chemical treatment of harmful substances). Wastewater from construction site and worker's camps Used water from the construction site must be safely managed through a sewage system, collected in appropriate reservoirs, and treated either on-site or at remote facilities in accordance with the *Regulation on the Conditions for Discharging Wastewater into Natural Receivers and the Public Sewerage System* (Official Gazette of FBiH, No. 26/21, 96/20) as specified in the Previous Water Consent. This includes, among other things: > Design and construct a system for collection and treatment of drainage water and sanitary wastewater inside the camps capable of treating water to national and project standards.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> No surface water runoff from construction compounds should be discharged to surface water receptors unless first subject to pre-treatment (physical and chemical treatment of harmful substances). > Provide portable toilets at construction site outside the worker's camp. > For the locations of construction bases, maintenance operations, and asphalt bases, separate water permits must be requested in accordance with the conditions specified in the Preliminary Water Consent. Waste disposal > Develop and implement a **Detailed Construction Waste Management Plan (DCWMP)** and put in operation waste management procedures to avoid inappropriate deposition of construction waste in and around the construction site. The content of a DCWMP is prescribed by the Rulebook on construction waste (Official Gazette of the FBiH, No. 93/19). > Implement measures for waste management specified under section 0. This includes the measure of prohibiting the disposal of excavation materials within the water pollution risk zones (along the banks of watercourses, sanitary protection zones), as specified in the issued Preliminary Water Consent.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> All measures to be included in the **Construction Environmental and Social Management Plan (CESMP)** and implemented accordingly. > Daily visual monitoring of surface waters during the construction phase shall be maintained. The monitoring will visually detect inappropriate waste disposal and any visible changes in water colour or appearance, caused by increased release of suspended solids or accidental material spillage into the water.			
19.3.6	Operation	Reduction in water quality in river system resulting from: > direct release of intercepted surface run-off including de-icing agents > direct release of sanitary water from toll station > accidental spill of hazardous material	> Include in the **Operational Environmental and Social Management Plan (OESMP)**[7] operational maintenance plan which will include the measures to properly operate and regularly maintain sanitary and drainage facilities. This includes regular cleaning of the separators, and regular monitoring of effluent quality in line with the requirements from the water permit. Operational Maintenance Plan also must contain the measures for mowing/herbicide treatment of neglected areas and their impact on water (if used), in line with the Preliminary Water Consent. > In accordance with the Preliminary Water Consent, the OESMP should also include a plan for winter maintenance procedures, taking into account the type of de-icing agents that must	JPAC	Procedures for operation of the sanitary and drainage facilities. Monitoring of effluent discharge in line with the OESMP and the Water Permit. Setting up preparedness and response procedures in line with the EPRP.	Procedures for operation and maintenance of sanitary and drainage facilities set up. Procedures for emergency preparedness and response set up. Effluent quality in line with the Federal regulations for effluent discharge.

[7] The purpose of the OESMP is to ensure compliance with the EBRD's Performance Requirements (PRs) and relevant national and EU legislation during the operational phase. The minimum content is stipulated in the ESAP.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		resulting from traffic accidents	be compatible with the designated treatment facilities. The plans should define the locations of chemical storage facilities, which need to be outside high-risk zones. > In the **Operational Emergency Preparedness and Response Plan (OEPRP)**[8] prepared for the motorway include procedures to prevent contamination of waters from accidental spills.			Annual report on effluent quality to be submitted to relevant ministry/agency at federal level in line with issued Decision on the Approval of the EIA Study and Water Permit. No spills affecting water quality.

19.4 Climatic factors

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Climatic factors						
19.4.1	Pre-construction/ Construction	Landslides and rock falls can endanger the stability of the terrain, with harmful consequences for water quality, people	> Conduct pre-construction rockfall analysis and implement mitigation measures to prevent soil erosion and dewatering, as stipulated under item *Soil* below (19.8). Implement the same mitigation measures to prevent negative impacts on terrain stability by intrusion of groundwater and change of surface and	JPAC or JPAC to transfer the responsibility to the contractor per Contractual Agreement	Conducted landslide sensitivity assessment Performed geotechnical monitoring	Field reports on implementation of activities defined by the Preliminary Design and Main Design

[8] The EPRP sets out policies, laws, and standards related to emergency response in order to reduce harm to society or the environment. The minimum content is stipulated in the ESAP.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		and construction equipment	groundwater flows, as stipulated above under *Groundwater* (19.2) and *Surface water* (19.3). > Perform periodic geotechnical monitoring with the aim of landslide control. > Implement recultivation and restoration as stipulated by BMP and where possible reforest land within the Project area of influence. > Prepare and implement **Emergency Preparedness and Response Plan (EPRP)** as part of CESMP for the construction phase. The Plan: > Sets out key national and EU policies, laws and standards related to emergency response to reduce negative landslides and fire related impacts on society or the environment > Defines roles and responsibilities > Identifies and classifies potential landslide- and fire- related emergencies in the construction phase, including spill management and fire response > Lists the activities, measures and equipment needed to respond to emergencies > Defines the implementation of trainings for emergency preparedness > Defines media ways of communication in emergency situations		Reforested surfaces as targeted in BMP. Main Design to include measures to increase climate resilience. Engineer supervision to review Construction Management Plan for resilience increasing measures. Prepared EPRP Installed culverts to drain accumulated waters. Installed temporary or permanent channels and pipelines. Set up traffic signals	Reports on conducted landslide assessment, geotechnical test, and monitoring, with positive results Percentage of reforested and recultivated area. Inspection reports Regular reports of the supervising engineer on the implemented landslide protection activities

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Defines the procedure of mitigation and recovery after emergency situations > Defines the maintenance and control of this plan. > In case of noticeable wetting of the terrain in the lowest zones, make culverts in places to drain the accumulated waters. > In case of noticeable torrential flow of water from larger catchment areas on the construction site, collect and channel water through temporary or permanent channels and pipelines. > In case of rock falls, mark the terrain and set up appropriate traffic signals.			
19.4.2	Construction	Fires can cause thick smog, dangerous to human health and the environment, due to greenhouse gas emissions.	> Regularly control the state of fires in the project area by visual inspection and monitoring of news in local media, including monitoring of the index of danger from the occurrence and spread of forest fires on the website of Federal Hydrometeorological Institute[9]. > Store flammable materials in special heat-resistance containers. > In case of least fire danger, suspend works. > Prepare and implement **Emergency Preparedness and Response Plan (EPRP)**, as specified under item above.	JPAC or JPAC to transfer the responsibility to the contractor per Contractual Agreement	Periodical visual inspection of construction site. Engineer supervision to review Construction Management Plan for resilience increasing measures. Checking the storage of	Reports on the periodical visual inspection of construction site Reports on the delivery and storage of flammable substances Reports of the supervising engineer on the implementation of

[9] https://www.fhmzbih.gov.ba/latinica/AGRO/pozar.php

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
					hazardous substances. EPRP prepared.	fire protection activities on the construction site
19.4.3	Operation	Landslides and rock falls can cause physical damage to transport infrastructure, with traffic disruption and destruction of vehicles, as well as interrupted plumbing roads and underground installations.	> Perform periodic geotechnical monitoring with the aim of landslide control. > In case of reconstruction, implement recultivation and restoration as stipulated by BMP and where possible reforest land within the Project area of influence > Prepare and implement **Operational Emergency Preparedness and Response Plan (OEPRP)** for the operational phase. The Plan shall: > Sets out key national and EU policies, laws and standards related to emergency response to reduce negative landslide- and fire- related impacts on society or the environment > Defines roles and responsibilities > Identifies and classifies potential emergencies in operation phase, including landslide occurrence, spill management and fire response > Lists the activities, measures and equipment needed to respond to emergencies (e.g., The following protection measures should be applied: in case of minor landslides in the Project area, carry out a risk assessment and, if necessary, stop and/or diverse traffic;	JPAC or JPAC to transfer the responsibility to the sub-contractor per Contractual Agreement	Performed geotechnical monitoring Reforested surfaces as targeted in BMP. Prepared OEPRP Conducted regular inspection of plumbing installations Conducted regular inspection of drainage system Installed temporary or permanent channels and pipelines Marked the terrain and set up traffic signals Established program of regular maintenance and inspection of road infrastructure	Reports on conducted geotechnical test and monitoring, with positive results Percentage of reforested and recultivated area. Inspection reports Traffic reports Evidence of the performed verification of the correctness of the drainage system, as well as regular maintenance and control of road infrastructure

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			in case of traffic accidents and spillage of hazardous substances – suspend and/or diverse traffic, catch leaking liquid into intervention vessels, use special sorbents and others substances for decontamination of the terrain and remediation of consequences at the place of spillage of hazardous substances, use fire-protection equipment) > Defines the implementation of trainings for emergency preparedness > Defines media ways of communication in emergency situations > Defines the procedure of mitigation and recovery after emergency situations > Defines the maintenance and control of this plan. > Regular inspection of plumbing installations to prevent leaks. > Regularly check the drainage system for the management of surface and rainwater from the road in order to prevent overflow in the form of concentrated torrents. > In case of noticeable torrential flow of water from larger catchment areas, collect and channel water through temporary or permanent channels and pipelines.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> In case of rock falls, mark the terrain and set up appropriate traffic signals. > Establish an appropriate program of regular maintenance and inspection of road infrastructure.			
19.4.4	Operation	Droughts, or high temperatures, cause the heating of the asphalt and thus cause higher emissions of greenhouse gases. Droughts can lead to the melting of the road surface mask, which further leads to the formation of ruts that destabilize the movement of vehicles.	> Prepare Operational Emergency Preparedness and Response Plan (OEPRP). > In case of reconstruction, use high quality road construction materials, which are resistant to high temperatures. > Set appropriate signals or motivating messages to help drivers adapt to driving conditions on the road and according to their psychophysical abilities. > Control water leakage, to prevent its disappearance in extremely dry periods, which can cause land subsidence. > Restrict the movement of vehicles transporting dangerous substances during periods of high temperatures. > Establish an appropriate program of regular control maintenance and inspection of road infrastructure.	JPAC or JPAC to transfer the responsibility to the sub-contractor per Contractual Agreement	Prepared OEPRP. Used road construction materials, which are resistant to high temperatures. Set appropriate road signs. Regular inspections of water leakage Limited vehicle movement Established program of regular maintenance and inspection of road infrastructure.	Reports on used construction materials Inspection reports Traffic reports Reports on conducted inspections and monitoring Reports on the implemented activities on road infrastructure maintenance, which are related to the reduction of the risk of high temperatures and droughts
19.4.5	Operation	Fire smoke reduces the visibility and can cause physical damage to transport infrastructure, with traffic disruption or	> Regularly control the state of fires in the project area by visual inspection and monitoring of news in local media, including monitoring of the index of danger from the occurrence and spread	JPAC or JPAC to transfer the responsibility to the sub-contractor per	Periodical visual inspection of project area. Prepared OEPRP	Reports on the periodical visual inspection of construction site Inspection reports

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		even death of road users.	of forest fires on the website of Federal Hydrometeorological Institute[10]. > Prepare Operational Emergency Preparedness and Response Plan (OEPRP) for the operational phase. > Install fire extinguishers in tunnels. > Restrict the movement of vehicles transporting dangerous substances in the period possible for fire. > Avoid planting resinous trees along road section. > In case of least fire danger, divert traffic.	Contractual Agreement	Installed fire extinguishers in the tunnel. Limited vehicle movement. Resinous trees are not planted near the road.	Traffic reports Confirmation of installed fire extinguishers in tunnels and reports on regular verification of their correctness Reforest and recultivation reports, which indicate that no resinous trees have been planted near the road
19.4.6	Operation	A significant increase in GHG emissions in the project area is expected, with the commissioning of the motorway section, which has an adverse effect on the environment.	> Implement recultivation and restoration as stipulated by Biodiversity Management Plan (BMP) and where possible reforest land within the Project area of influence. > Encourage drivers with motivational messages on electronic displays to maintain a consistent speed of 110 km/h for the benefit of reducing GHG emissions	JPAC	Reforested surfaces as targeted in BMP. Implemented messages on speed control.	Percentage of reforested and recultivated area. Traffic reports.

[10] https://www.fhmzbih.gov.ba/latinica/AGRO/pozar.php

19.5 Air quality

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Air quality						
19.5.1	Pre-construction	Due to the timespan between preparation of this Study and start of construction works, up-to-date information on air quality in the project areas will be needed to determine baseline conditions	> Repeat the analysis of air quality in the project area, possibly in two seasons (summer and winter).	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Refer to results of water quality monitoring described in Chapter 5.3.3 to check for locations and parameters to be analysed	Environmental baseline report on air quality prepared
19.5.2	Construction	Emissions of construction dust Emission of exhaust gases from combustion processes in generators and other construction equipment and vehicles	> The CESMP is to include a chapter on air quality management that shall contain: > identification of all air emission sources including motorway construction activities, concrete and asphalt production facilities, sourcing and transport of construction materials, and other emissions generating facilities, > identification of all types of emission from each source, > details of mitigation measures for each source, > specific location and schedule where such measures shall be implemented to minimise impacts to sensitive receptors due to the presence construction work (details are given after this table),	Contractor	Engineer supervision of the Contractor's work based on CESMP (TSMP, MMP): weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures. Records should be kept of these visual inspections and submitted in the monthly reports prepared by the	Plans and method statements prepared, reviewed, and approved by the supervising engineer. Completion of weekly inspections. Implement a regular vehicle maintenance and repair program. No community grievances raised

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> monitoring and reporting. > Specific mitigation measures to be included in the chapter on air quality management shall include, but will not be limited to: > for dust from construction activities, implement the schedule of active wetting of soil on the corridor when the unfavourable weather conditions are present (presence of wind, low humidity) and emission-intensive activities are taking place on the corridor according. Active wetting shall be performed according to the schedule given in the table that follows. > avoid overwatering as this may make the surrounding muddy, > earthwork operation to be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community, > ensure proper state of maintenance machinery and vehicles to minimise air emissions, > smoke emitting vehicles and equipment shall not be allowed and shall be repaired or removed, > undertake immediate repairs of any malfunctioning construction vehicles and equipment,		external supervising engineer.	relating to construction dust.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> use construction equipment and vehicles that meet national emission standards, > wherever possible, use electrically powered equipment rather than gas or diesel-powered equipment, > give priority to fuel efficient machinery, > ensure that all diesel and petrol running machinery use equipped with catalytic convertors, > position any stationary emission sources (e.g., portable diesel generators, compressors, etc.) as far as is practical from sensitive receptors, > provide truck-washing facilities at tunnel portal and viaduct construction sites to prevent truck-out of mud and dust; above ground option is deemed to be the priority, > rock crushing plant equipment shall be fitted with water sprinklers that will run while the plant is operational, > if the sprinklers stop working, the plant shall also cease operation until the sprinklers are functioning, > avoid water runoff on the site. In case of a runoff decrease water flow rate from the sprinklers, or fix			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			the sprinklers if not functioning properly (there is a leak), > emissions from on-road and off-road vehicles shall comply with national or regional programs, > regardless of the size or type of vehicle, owners and operators should implement the manufacturer recommended engine maintenance programs, > drivers should be instructed on a routine basis by the Contractors Health and Safety Specialists on the benefits of driving practices that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits, > implement a regular vehicle maintenance and repair program, > conveyor belts (e.g., at batching plants and rock crushing plants) shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimise dust emissions, > all trucks used for transporting materials to and from the site will be covered with canvas tarpaulins.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.5.3	Operation	Emission from exhaust gases from vehicles using the motorway	> If measurement of standard air quality parameters show that values exceed maximum allowed values prescribed by national regulation, the following protection measures must be undertaken: > construction of barriers to prevent spreading the pollutants; best are wide leafed green plants, > if this is not sufficient protection or these species cannot grow on the Project area, artificial barriers are also acceptable, e.g. noise barriers also prevent spread of air pollution, and their efficiency depends on their height (see Table 19-1 for details).	JPAC	Standard set of parameters to include CO, SO_2, O_3, NO, NO_2, NOx, PM_{10} and $PM_{2.5}$.	Air quality report

Table 19-1: Locations on the route where mitigation strategies should be applied

Location	GPS coordinates		Mitigation strategies	Scenario for which the measures should be taken	Phase during which the measures should be taken
	Starting point	Ending point			
1	1+100	1+800	Wetting of the soil	Wind	Construction
2	0+900	1+800	Wetting of the soil	Windless	Construction
3	3+800	5+400	Wetting of the soil	Wind	Construction
4	3+700	4+800	Wetting of the soil	Windless	Construction
5	24+750	25+450	Wetting of the soil	Wind	Construction
6	29+150	30+000	Wetting of the soil	Wind	Construction
7	30+900	31+900	Wetting of the soil	Wind	Construction
8	34+750	35+100	Wetting of the soil	Wind	Construction
9	Konjic Bypass Connecting Road – from km 0+000 to km 1+000		Wetting of the soil	Wind and windless	Construction

Location	GPS coordinates		Mitigation strategies	Scenario for which the measures should be taken	Phase during which the measures should be taken
	Starting point	Ending point			
10	Ovcari Loop Connecting Road – from km 0+000 to km 0+400		Wetting of the soil	Wind	Construction
11	Ovcari Loop Connecting Road – from km 0+000 to km 1+000		Wetting of the soil	Windless	Construction
12	24+750	25+450	Construction of barriers to prevent the spreading of air pollution	Wind and windless	Operational
13	29+150	30+000	Construction of barriers to prevent the spreading of air pollution	Wind and windless	Operational
14	30+900	32+400	Construction of barriers to prevent the spreading of air pollution	Wind and windless	Operational

19.6 Noise

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Noise						
19.6.1	Pre-construction	Due to the timespan between preparation of this Study and start of construction works, up-to-date information on ambient noise levels in the project area will be needed to determine the baseline conditions	Repeat the analysis of ambient noise in the Project area, possibly in two seasons (summer and winter).	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Refer to results of ambient noise levels described in Chapter 11 to check for locations and parameters to be analysed	Environmental baseline report on ambient noise levels prepared
19.6.2	Pre-construction	Inadequate planning of noise barriers may cause impacts on residents from increased levels of noise from motorway traffic	> Confirm the noise modelling results and proposal for noise barrier locations given in Chapter 11 after the Main Design is completed. > Confirm the technical details of noise barriers considering also the JPAC Technical standards for noise barriers. > The locations of noise barriers will also be reconsidered in consultation with the local community of Konjic and settlements Tresanica, Gornje Polje, Glavicine, Bijela, Podgorani, Kutilivac and Vrapcici, since these settlements are most likely to experience negative impacts of increased level of noise.	Contractor	Revision of the Main Design.	Main Design to include definite selection of noise barriers at appropriate locations.
19.6.3	Construction	Impact on workers and residents from increased levels of noise during construction works	> Include noise control measures in the CESMP to avoid the exceeding of permitted values in accordance with the Law on protection against noise, such as:	Contractor	Engineering supervision of construction works. Monitoring of ambient noise in accordance with	Noise control measures implemented and recorded as implemented in

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> restriction of works to day-time only (period of day: 06:00 to 22:00, period of night: 22:00 to 06:00), > on unpaved roads, maximum speed of vehicles should be restricted to 20 km/h to minimise load-rattle, > haul routes should avoid passing dwellings at distances closer than ten metres, > equipment and machinery to be shut down when not in use, > in case of noise increase complaints by residents, simultaneous use of machines that generate noise over 70 dB should be limited to reduce negative cumulative impacts of noise levels generated during construction works and to ensure that noise levels are within legally defined values, and all noise complaints shall be investigated, > all equipment and vehicles will be maintained in good working order - implement a regular equipment maintenance and repair program, > machines and vehicles to be used in construction activities must have use/operation permits,		the provisions of the issued Decision on the Approval of the EIA Study (at least once a year near housing facilities and additionally upon complaints of the local residents, if any). Monitoring of the ambient noise should be performed by an authorized company (a third party). Weekly site walkover inspections to consider if noise mitigations being appropriately implemented.	monthly reports prepared by the external supervising engineer. No noise related complaints received. Equipment maintenance and repair program implemented. Noise barriers installed and Engineering revision approved the installation.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> noise monitoring to be done at the edge of industrial areas and construction sites, > noise monitoring to be done in settlements, > monitoring upon complaints during the construction phase of the Project to confirm compliance with legally prescribed values or to identify where additional mitigation is required. > Installation of noise barriers based on the results of noise modelling and local community consultations in the pre-construction phase. See Chapter 11 for details. Since the traffic models suggest a gradual increase in vehicle circulation, a two-step deployment of the noise barriers is possible based on traffic flow monitoring and motorway noise monitoring programs: > At the beginning of motorway operation: N01, N03, N05 > When increase of vehicle circulation is identified: N02, N04, N06			
19.6.4	Operation	Impact on residents from increased levels of noise from motorway traffic	> It is possible that traffic intensity during motorway use will be higher than originally planned. If this would be the case, perform control measurements of the noise level along the complete motorway length annually, during the first	JPAC	Periodical monitoring of ambient noise in accordance with the provisions of the	Noise control measures implemented and recorded.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			three years of the operation of the motorway, in order to determine the noise emission level. If the allowed levels were exceeded, additional protection measures must be planned in the form of additional noise protection barriers, preserving the road and the tarmac in a good condition, pavement curtain which absorbs noise, green belts etc. > Noise monitoring upon complaints during the operation phase to confirm compliance or to identify where additional mitigation is required.		Decision on Approval of EIA Study. Monitoring of ambient noise should be performed by an authorised company (third party). If the monitoring shows that the measured values are below the limit values specified by the Law on Protection Against Noise, then the monitoring can be performed once in three years.	Annual report to be submitted to FMET in line with the Decision on Approval of EIA Study. No complaints received.

Table 19-2: Locations on the route where noise barriers should be applied

Mo.	Location	Length	Height	Position
Barriers on the right side of motorway (sensitive receivers WEST of motorway)				
N01	at west of motorway, from km 3+710 (end of right tunnel tube T-1) to km 10+500 (start of right tunnel tube T-2),	6,790 m	3-5m	as close to the road surface as allowed
N02	at west of motorway, from km 27+200 (end of overpass 1) to km 29+200 (section P584)	2,000 m – 25 m for spans of overpass 2 and overpass 3	3m	as close to the road surface as allowed
Barriers on the left side of motorway (sensitive receivers EAST of motorway)				
N03	at east of motorway, from km 3+733 (end of left tunnel tube T-1) to km 4+611 (section P93)	878 m	5m	bridge & embankment: as close to the road surface as allowed cut: top of cut

N04	at east of motorway, from km 6+500 to km 7+000	500 m	3m	as close to the road surface as allowed
N05	at east of motorway, from km 33+980 (end of left tunnel tube T-5) to km 34+941 (section P700)	961 m + 250 m overlap at interchange "Mostar North"	3m	as close to the road surface as allowed
Barriers on north side of Connecting Road 1 (to I/C "Mostar North")				
N06	at north of Connection Road 1, from km 0+000 to km 0+540 (toll station)	540 m	4.5m	as close to the road surface as allowed
Barriers on Neretva bridge of Konjic Bypass				
NO7a (left)	from km 0+330 to km 0+560	230 m	5m	as close to the road surface as allowed
NO7B (right)	from km 0+430 to km 0+560 (toll station)	130 m	3m	as close to the road surface as allowed

19.7 Vibration

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Vibration						
19.7.1	Construction	Structural damage from vibration caused by equipment and operation methods employed including use of explosives	> Respected recommending safety distances for tunnel drilling and bridge foundations in the identified vibration hotspots: bridge M-2 and north portal of tunnel T-1, bridge M-3 and south portal of tunnel T-1, bridge south of Konjic South I/C, bridge ~23+600, bridge ~24+250, bridge on "east access road to Konjic North I/C", bridge in "Konjic Bypass" ~0+760, bridge in "Konjic Bypass" ~0+420. See the ESIA Chapter 12 Vibrations for details. (Recommended safety distances are between 16m and 29m for pile-driving, between 10m to 17m for drilling and 17m	Contractor	Engineering supervision of construction works. Weekly site walkover inspections to consider if vibration mitigations being appropriately implemented.	Vibration control measures implemented and recorded as implemented in monthly reports prepared by the external supervising engineer. Appropriate communication with local community established.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			for operation of heavy-duty vibrator rollers) > If sensitive receivers are acknowledged within the safety zone buffers, then other methods of construction should be used, such as low vibration sonic pile drivers or pre-digging holes for piles, less powerful excavation machinery, compacting rollers without vibration, etc. > In case of usage of explosives for the tunnel mining (tunnels T1, T2, T3 and T6), the same limit of 10 mm/s peak particle velocity applies to nearby sensitive receivers. The contractor shall deliver, prior to construction, a detailed study that accounts for the soil in each area of interest and the explosive charges he is planning to use. Controlled explosions should also take place prior to construction, as a test to validate the study's forecasts for the vibration levels to the receivers. > Continuous vibration monitoring during construction works involving the above operations is highly recommended, as well as a detailed pre- and post- construction condition assessment and crack survey for any existing structures in a distance up to 40m from the relevant works. > Before carrying out any inevitable activities that produce vibrations near receivers that are sensitive to noise and vibration, communicate properly with			No vibration related complaints received. Equipment maintenance and repair program implemented.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			those affected, inform them in advance of the tasks to be performed, and of the expected duration. > All machinery and equipment must be maintained at high levels of optimum operation. Machinery and operational equipment (including excavators, crushers, loading/unloading, generators, concrete plants, etc.) will be placed as far away from noise and vibration-sensitive areas as possible. > Design activity planning to avoid the effects, e.g., avoiding the simultaneous use/operation of equipment that produces vibrations and not using it during quiet hours. > The choice of equipment will consider the vibration level. Where possible, electrical equipment will be used instead of diesel or petrol engine equipment and must comply with European Directive 2000/14/EC on project machinery noise. Regular maintenance of equipment and vehicles is recommended in accordance with manufacturers' recommendations. Any broken parts should be replaced immediately. > In the event of any complaint, the source of the excessive vibration will be identified and measures such as the location of the equipment and the operating hours will be assessed.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Regularly check that all installations, machinery, and vehicles are operated efficiently and according to the specifications of manufacturers, by trained and qualified operators. In addition to increased safety, this process also affects the proper maintenance and as quiet operation of the machinery as possible.			

19.8 Soil

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Soil						
19.8.1	Pre-construction	Due to the timespan between preparation of this Study and start of construction works, up-to-date information on soil quality in the project area will be needed to determine the baseline conditions	> Repeat the analysis of soil quality in the project area, possibly in two seasons (summer and winter).	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Refer to results of soil quality monitoring described in ESIA to check for minimum locations and parameters to be analysed. Increase the number of samples if deemed necessary to cover more specific points of interest.	Environmental baseline report on soil quality prepared
19.8.2	Pre-construction	Occurrence of rockfall due to instability of	> Carry out a rockfall analysis to determine position and length of Rock Fall	JPAC to transfer the responsibility to the	Revision of the rockfall analysis	Installation of RockFall Protection Fence

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		terrain and the nature of construction works	Protection Fence in the Klenova Draga valley	Contractor through Contractual Agreement	and approval by the Beneficiary	
19.8.3	Construction	Soil erosion resulting from excavation works and use of heavy machinery and equipment	The detailed design of the Project shall incorporate following measures to reduce the likely release of loose material or material with the potential to become loose in-situ: > Slope stabilisation - including mulching (straw mulching), brushwood mulching, erosion control blankets, soil binders and gravelling. > Retaining walls - to retain loose materials on slopes where it would naturally be held. > Sediment traps and basins - which will intercept and retain sediment-laden runoff. > Drainage channels – which will divert run-off water. > Treatment system – to remove material contained within the run-off water. > Revegetation in line with the **Land and Habitat Restoration Plan (LHRP)** that will be constituent of the CESMP. This plan will be read and implemented in combination with the Topsoil Management Plan and Waste Management Plan. This plan will include measures to increase the stability of loose materials and surfaces which	JPAC or JPAC to transfer the responsibility to the Contractor as per Contractual Agreement	Engineering supervision of the contractor's work.	Monthly engineering supervision reports. Photographs from the site.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			become exposed during construction phase. It will also include measures restoration of the borrow pits and their surroundings, if any, and recultivation of the construction waste landfill.			
19.8.4	Construction	Loss of fertile topsoil Deforestation may cause soil erosion Soil dewatering	> Prepare a **Topsoil Management Plan (TSMP)**. This plan will be constituent of the CESMP and shall describe topsoil stripping procedures and rules, topsoil stripping depth and volumes, topsoil stripping supervision, transportation and stockpiling requirements, stockpile location, topsoil stockpile design, stockpile management, erosion hazard and erosion control, runoff drainage/diversion, soil protection measures at the storage area, maintenance of the stockpile and topsoil application procedure. > In the TSMP, provide for the proper removal of the fertile and potentially fertile soil layer, in accordance with the provisions of the *Law on Agricultural Land*, Article 55 (O.G. FBiH, No. 52/09).	JPAC to transfer the responsibility to the Contractor through Contractual Agreement	Engineering supervision of the contractor's work in line with the TSMP.	Monthly engineering supervision reports. Photographs from the site.
19.8.5	Construction	Accidental spills Direct discharge of wastewater from maintenance of construction vehicles at the site and sanitary waters from construction camp may	> Implement the same measures as under Geology and Groundwater > Implement the same measures as under Surface Water > Implement the same measures as under Waste and Materials Management.	JPAC to transfer the responsibility to the Contractor through Contractual Agreement	The same as under *Water* and *Waste*.	The same as under *Water* and *Waste*.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		lead to soil contamination Inappropriate waste disposal may lead to soil contamination				

19.8.6	Operation	Direct discharge of surface run-off without treatment
		
		Accidental fuel and oil spills
		
		Use of de-icing agents
			> Include in the Operational Environmental and Social Management Plan (OESMP) and implement the following measures:
			  > maintenance and clean up the drainage system to prevent impact on erosive sliding of the soil or flooding,
			  > monitoring of slopes, in particular after strong rains for identification of possible traces of erosion,
			  > implementation of mitigation measures defined for works during road repair/maintenance works,
			  > analysis of soil for identification of the impact caused by ice breaking salt with subsequent organic amendment and/or amendments to adjust pH or nutrient deficiencies.
			> Implement the same measures as under *Surface Water*.
				JPAC Management and Maintenance Department as well as selected Contractors for operation and maintenance activities	Monitoring of adherence to measures.	No records on land contamination.

19.9 Landscape

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Landscape						
19.9.1	Construction	Changes to the existing landscape and visual impacts due to the construction works	> In the Construction Environmental and Social Management Plan (CESMP) include a **Land and Habitat Restoration Plan**. The Plan sets out how a development will maintain the retained landscape and existing ecology of the site. It should include actions to ensure the designed landscape fulfils its roles, including providing habitats and recreational space. The Plan shall contain: > Overall vision for the habitat adjacent to the motorway, > Management responsibilities, > Identification and description of landscape components, including existing and proposed vegetation, > Litter removal. > Implement measures relating to the proper organization of construction site defined in Construction Site Organisation Plan (CSOP). Mitigation can be achieved by keeping the construction site cleaned after the construction works, if the machinery is parked on the route of motorway, not around it.	JPAC and Contractor	Engineer supervision.	Completion of weekly inspections. No community grievances raised relating to visual impacts due to the construction works.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Disposal of inert material on designated disposal sites and recultivation afterward. > Recultivation with autochthonous species characteristic for the area in order to preserve gene pool and amenity. > Implement recultivation and restoration as stipulated by Biodiversity Management Plan (BMP) and where possible reforest land within the Project area of influence. > All planting will be of local provenance and in keeping with the local character. > During the construction phase of the works, restricted hours of working will be proposed within built up areas, where the construction phase of the works is considered to impact on residential properties, avoiding the of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view. > Upon completion, areas used as construction compounds will be returned to their original use and state.			
19.9.2	Operational	Changes to the existing landscape and visual impacts due to the presence of permanent motorway structures	> N/A (There is no applicable measure because permanent change is due to the fact that the motorway is a linear structure that remains permanently in space)	N/A	N/A	N/A

19.10 Waste and materials management

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Waste and materials management						
19.10.1	Construction	Contamination of environment due to inappropriate management of spoil and other types of waste generated in construction	> Seek to maximise reuse or recovery of waste arisings on-site. This may include generation of hardcore material from excavated foundations, reuse of earthworks, recycling of other removed or demolished features. > Separation of materials and substances, including construction materials products, which are not waste (e.g., excess material at construction or reconstruction of a building or separated substance or materials or building products such as brick or a tile from a building that is being removed or reconstructed), if they can be used without processing for the same purpose in which they were produced. > If the excavated material is not contaminated with hazardous substances in such a way that it is classified as hazardous construction waste, the investor can reuse it on the construction site. > Prevent the mixing of certain types of dangerous of construction waste with other waste or substances and materials that are not waste.	Contractor	Engineering supervision of construction works. Supervision by environmental inspection authorities. Keeping record on waste types and quantities. Keeping waste shipment documentation.	Engineering supervision reports. Contract with waste collection companies' and proofs of waste transfer. Complaints Log containing no entries on poor waste management. No negative inspection reports.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Prevent the release of asbestos fibres into the air from asbestos waste and spills of liquid waste which may contain asbestos when asbestos waste is present in construction. > The reprocessing of asbestos into recycled materials is not allowed, as it is not permitted to use it again as a raw material or substance. > The investor and/or Contractor must provide information on the quantity and composition of excavated materials from the construction site, as well as details about excavation methods and testing procedures in accordance with waste management regulations, EPRD PRs, and EIB standards. This data must be recorded in mandatory documentation at the construction site and utilized in the preparation of a report on construction waste and waste management. The report should be kept for at least three years after obtaining authorisation for use and made available to competent inspectors upon request. > Cut trees and stumps should be disposed of along the route in places accessible for the trees to be removed by the competent authorities and where it will not disturb the works. The Contractor will temporarily place this waste at a sufficient distance from the watercourse.			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			These activities will be performed by the competent (local) forestry authority > Develop and implement **Detailed Construction Waste Management Plan (DCWMP)** based on the Preliminary Construction Waste Management Plan. DCWMP is to be developed prior to construction in accordance with the principles of Law on Waste Management, EBRD PRs and EIB standards, with special emphasis on management of hazardous waste and demolition waste from expropriated facilities. The DCWMP should be developed taking in consideration procedures related to waste management. The DCWMP shall include measures for: > on-site separation and selection of different types of waste, > proper temporary storage of waste (adequate storage of different types of both hazardous and non-hazardous waste), > site selection and site management of temporary storage of waste must be carried out in accordance with the EBRD PRs and EIB standards, > final disposal of hazardous waste should be conducted by			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			engagement of authorized third parties, > special emphasis is placed on adequate treatment and disposal of asbestos waste, > the authorized company is obliged to keep a proper record of the generated asbestos waste, and waste streams, and to keep and provide record of how and where the waste has been disposed. > The DCWMP should be implemented in conjunction with a **Topsoil Management Plan** (TSMP) and a **Biodiversity Management Plan** (BMP). > Where on-site reuse (or other forms of recovery) cannot be achieved, the arisings should be sent to licenced off-site reuse, recycling, or recovery facilities. If it is not possible to use the materials off site, then they should be temporarily stored on site, in locations approved by the relevant authorities and in line with provisions of EBRD PRs and EIB standards. > JPAC is obligated to engage authorized companies for waste management, and also to verify the validity of their permits. Additionally, JPAC must conduct a thorough review to ensure that their			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			practices align with international best practices, EBRD PRs and EIB standards. > Ensure appropriate number of containers and bins in all areas of the construction site. > Educating workers and employees about the waste generated and its management in accordance with the adopted procedures at the site. > The contractor will be required to define the disposal and generation of waste. > Introduce the principle of waste reduction and recycling. > Daily collection and temporary storage of hazardous and non-hazardous waste. > Municipal waste shall be collected by a local utility company. > Hazardous waste shall be collected and treated by a licensed waste operator. > Hazardous waste before it is handed over to an authorized person must be packaged and stored in such a way as to prevent any contact of waste with the environment. > Segregate waste streams to prevent cross contamination and maximise recovery. > If waste for which the contents are unknown is stored, measures should be taken that include testing and analysis to			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			examine the characteristics of the waste. Until its characteristics are determined, this waste is considered hazardous. > Liquid waste and wastewater must not be discharged into drains or sewers. > Avoid blowing, spilling, or dropping waste outside the construction site into the environment. > Prevent the outflow of rainwater that has come into contact with hazardous waste on the ground, in water, and underground water. > Prevent liquid waste from flowing onto the ground, into water, and underground water.			
19.10.2	Construction	Environmental damage caused by improper materials/chemicals management	> It is necessary to arrange and to plan the transport and unloading of different materials, such as: > Materials will be brought by dump trucks or tippers. > Machines for spreading, planning and compaction of imported excavated material should be provided at the sites. > Material compaction will be done in layers with vibro rollers. > Filling of the material should be done up to the projected slopes, while respecting the projected	Contractor	Engineering supervision of construction works. Keeping records on (i) licenses and permits of suppliers or vendors, (ii) material resources tracking, treatment, disposal, and delivery notes records, and (iii) records of any contingency arrangement for	Engineering supervision reports. Complaints Log containing no entries on poor material management. No negative inspection reports.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			slopes which will ensure the drainage of the landfill surfaces. > When excavation works are done, the sites will be flattened and closed. > During transport, trucks should be covered with a tarpaulin, and the wheels should be washed before using the main road. > To minimise the effect of construction traffic on the City of Konjic, Viaducts No. 3 and No. 4 shall be prioritised in the tender documentation to be built first. > Tunnels T1 and T2 north of the Neretva River shall also be prioritised in the tender documentation for construction to aid in the transportation of surplus material. > Contractor must avoid traffic of the trucks with construction material crossing Konjic. Particular constrains are to be arranged between JPAC, Constructor and the City of Konjic. > Programming/procurement of the construction works for Prenj Tunnel needs to be considered in a way to allow for complete reuse of the excavated material from the tunnel in the embankments for the northern motorway subsection. JPAC has to define the scope of activities in the		material resources and waste arisings.	

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			tender documentation for the construction of Prenj Tunnel. > Ensure that the specification of recycled and secondary content in imported materials (such as earthwork, stone and aggregate, cement, and asphalt), is set out during detailed design. > A **Materials Management Plan (MMP)** shall be developed by the appointed contractor and will include details on how the site construction materials would be managed. The Plan shall include planning and controlling of all materials and equipment in advance, procuring them at a reasonable cost, storing them adequately and making them available as needed. The Plan shall be based on best practices and all the requirements of this ESIA such as: > capturing project requirements early in the process, including a written scope of requirements that identifies deliverables, equipment and materials needed, > involving construction team early in the process for effective material management in construction, especially during the design phase, > evaluating proposals from suppliers or vendors based on			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			their performances on past and present projects, > adequate storage planning where each material requisition is planned with a level of storage and preservation based on the equipment type and manufacturers' preservation requirements. Specific storage measures should be planned for chemicals/hazardous materials. > materials on-site quality assurance and quality control > keeping records of: (i) licenses and permits of suppliers or vendors, (ii) material resources tracking, treatment, disposal, and delivery notes records, and (iii) records of any contingency arrangement for material resources and waste arisings that had to be implemented will also be detailed.			
19.10.3	Construction	Environmental damage caused by opening of borrow pits	In case the Contractor decide to open the borrow pits instead of material purchase, the following measures shall be implemented: > Develop and implement a **Borrow Management Plan**, which should include locations of proposed extraction sites, plan for access, dust management on access roads, stockpile locations and management, and plan for rehabilitation	Contractor	Engineering supervision of construction works. Keeping record on material purchase. Implementation of measures from the permits.	Engineering supervision reports. No complaints received. Copies of permits.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			of sites, commitments to obtain all regulatory approvals following approval from JPAC. > Materials shall not be borrowed from the Neretva River. The Contractor is not permitted to open new extraction pits within this river basin. > Borrow pits may not be opened in protected areas in line with the national and EBRD and EIB requirements. > Before putting in operation a borrow pit, all necessary water related, and construction related permits must be obtained. > If Contractor decides to purchase construction materials from the market, it is allowed to subcontract only licenced material providers that have valid water management and working permits. > Constraints concerning eventual itineraries through the City of Konjic must be discussed and agreed between JPAC, Contractor and the City of Konjic.			Copies of the purchase documentation.
19.10.4	Construction	Environmental damage caused by inadequate management of disposal sites	> Excavated material that will not be used in construction activities must be deposited outside the water pollution risk zones, as stipulated in the Preliminary Water Consent. > The disposal of excavation material must not be carried out along the banks of watercourses, in sanitary protection	Contractor	Engineering supervision of construction works. Supervision by environmental inspection authorities.	Engineering supervision reports. Complaints Log containing no entries on poor disposal management.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			zones, or in water resources, as specified in the Preliminary Water Consent. > After the formation of the disposal areas, it is necessary to carry out humification in a layer of 20 cm. To carry out this process, the humus that has been removed from the site will be utilized together with fresh humus, if needed. > Peripheral ditches shall be constructed along the perimeter of the disposal sites to collect rainwater from external sources and the closed section of the sites, directing it towards the nearest recipient. On the opposite side, the planned ditch runs alongside the sites and connects to the existing road's drainage ditch, leading to the recipient. In areas where the ditch's slope exceeds 4%, concrete elements must be used to line the ditch. > Areas of the landfill closing plateau have to be projected horizontally. The slope of the scarp between the two layers shall be given in a slope of 1:2 so that the scarp of each subsequent surface is pulled by 2.00 m towards the middle of the landfill. > Specific studies shall be undertaken to ensure integration within the surrounding environment.			No negative inspection reports.
19.10.5	Operation	Effects of inappropriate waste generation and disposal during	Operation	JPAC for operation	Supervision by JPAC's Senior	Contract with waste collection companies

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
		operation and maintenance activities	> waste bins for separate waste collection at rest areas and toll stations will be provided, > waste will be transferred to licenced operators for waste management for final treatment/disposal. Maintenance > The same measures as under the construction phase (19.10.1-19.10.3), as applicable.	Contractor for maintenance	Associate for Environmental Policy. Keeping waste shipment documentation. Engineering supervision of maintenance works.	and proofs of waste transfer. No negative inspection reports.

19.11 Community impacts

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Community health and safety						
19.11.1	Design Pre-construction Construction	Community health and safety	> In the final design stage, organise consultations with City level authorities and LCOs on all issues of significance for the communities, including but not limited to the issues of planned disposal sites for construction waste, planned new local roads and underpasses/overpasses (considerations of sufficiency, dimensions and safety) with the aim of clearly presenting all planned additional	JPAC	Consultation reports	Consultation meetings organised and documented

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			infrastructure, hear the views of local residents in relation to access to their land and make changes, as far as practicable,, to accommodate their needs. > In the pre-construction phase, ensure the approvals and permits from all relevant authorities and, if necessary, install barriers for the safety of traffic participants. > During the construction phase, JPAC and the Contractors to organise at least one public consultation meeting for each subsection (in Mostar or in Konjic – whichever is closer to the subsection) to present the Project progress and receive feedback regarding the impacts of construction works.			
			> Include in CESMP provisions on workers accommodation (camps) in accordance with PR provisions and the EBRD/IFC Guidance Note "Workers' accommodation: processes and standards" 2009 referred to in PR 2, including the requirements for developing disease prevention measures by the Contractor, including communicable diseases and Sexually Transmitted Diseases (STD) - or Sexually Transmitted Infections (STI), as well as with EBRD Briefing Note on Workplace Risk Assessment including provisions for Covid-19 (2020).	JPAC to include in the Contractual Agreement	Supervising engineer to randomly check at least once per week during construction activities	Workers' accommodation provisions included in CESMP. Provisions implemented during construction works. Periodic checks including site visits and reports on contractors performed. Training and campaigns on

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Ensure that medical staff, first aid facilities, sick bay and ambulance services are available at all times at the site and at any accommodation (camps) for Contractor's personnel and ensure that all suitable arrangements are made in line with necessary welfare and hygiene requirements enabling prevention of epidemics. > Throughout contract implementation: > provide education/awareness raising activities in the form of online presentations and brochures for communicable diseases and STDs, STI and HIV/AIDS on screening, diagnosis, counselling as well as provisions for COVID19, > provide education/awareness raising activities in the form of online presentations or brochures for the workforce about refraining from unacceptable conduct toward local community members, specifically women, and inform workers about local laws that make sexual harassment and gender-based violence and harassment a punishable offence which is prosecuted, > cooperate with law enforcement agencies as needed in			workers' code of conduct, STDs, STI and HIV/AIDS, COVID-19 performed. Construction Workers' Code of Conduct and Construction Labour and Employment Plan developed and implemented.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			investigating complaints about gender-based violence and harassment. > during construction works create safe crossing points, provision of flagmen and site security to ensure that interaction between construction workers and all project vehicles and equipment, and the public, are limited. > Develop a Construction Workers' Code of Conduct, which will be clearly displayed at different Project areas and posted in the Contractors' vehicles and machinery driving cabs. Contractors' and subcontractors' personnel will be made aware of and acknowledge their understanding of the Code of Conduct by initialling it prior to the start of any physical work at any Project Area. Compliance with the Code of Conduct shall be a condition in all workers' employment contracts. The Code of Conduct will include provisions intended to combat gender-based violence and harassment. It will include a list of acts considered as requiring a disciplinary procedure by the Contractors, or by the Supervision Engineer if the Contractors is not acting in due course. The Contractors will conduct Information, Education and Communication (IEC) campaigns on workers' code of conduct vis-a-vis the			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			local community, at least every other month, addressed to all the site staff and workers (including all the Contractor's employees, all Subcontractors and any other Contractor's or Employer's personnel, and all truck drivers and crew making deliveries to site for construction activities) > Develop and implement a Construction Labour and Employment Plan which will include: > Details of: (i) employment opportunities for locals; (ii) how employment opportunities will be advertised; (iii) the recruitment process which will be transparent and fair, non-discriminatory and provides equal opportunities for both men and women; (iv) the training opportunities which will be provided for graduates and employees on technical, health and safety and manual work where suitable. > A requirement that all workers (including sub-contractors) have employment contracts and that these contracts are in line with national legislation, applicable ILO standards and PR2;			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> A requirement that all workers have access to human resources policy and procedures; > A requirement that all workers (including sub-contractors) must comply with Compliance with the Construction Workers' Code of Conduct (this will be included in the employment contracts); Details of the grievance mechanism for all workers (including sub-contractors) in line with Lenders' requirements.			
			> Develop and implement an Emergency Preparedness and Response Plan for construction (EPRP) (as part of the CESMP) to identify and address all major hazards for workers and the local community during the motorway construction. > Prevent unauthorised access of the public to construction sites and contact with dangerous locations and equipment and hazardous materials by establishing a fenced safety zone around the facilities during construction of Project infrastructure.	JPAC to include in the Contractual Agreement	JPAC to review Contractor's EPRP to ensure continuity with commitment in this ESMP. Supervising engineer to randomly check at least once per week during construction activities.	EPRP for construction developed and implemented.
			> Develop and implement a Traffic Management Plan (TMP) for the construction phase (as part of the CESMP) containing traffic organisation measures.	JPAC to include in the Contractual Agreement	Supervising engineer to randomly check at least once per week	TMP for construction developed and implemented.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
					during construction activities.	TMP implemented throughout construction phase.
			> Implement SEP, in particular the provisions on providing timely information to local communities on the extent of works and duration prior to the commencement of construction works, as well as information on access to land on the other side of the motorway and the contact details of the Contractors for any grievances. > Carry out a detailed pre- and post-construction condition assessment and crack survey for any existing structures (residential, cultural/religious or commercial assets) in a distance up to 40m from construction works (*see 19.7 Vibrations above*). > Place a panel with all relevant data about the construction (names of investor, contractor and designer; name and type of structure; time of commencement and completion of construction works). Panel to include information regarding contact details for environment, safety, and community matters.	JPAC to include in the Contractual Agreement	Development of quarterly monitoring reports on SEP implementation. Monthly review of external grievances.	Reports on SEP implementation developed and submitted to EBRD (containing indicators on stakeholder engagement). Project-specific grievance mechanism in place Grievance Registry established and all received grievances recorded in the Registry. A panel with all relevant data about the construction placed near the construction site.
19.11.2	Operation	Community health and safety	> Develop and implement an Emergency Preparedness and Response Plan (EPRP) for operation (as part of the OESMP) to identify and address all major hazards for	JPAC	JPAC	EPRP and TMP (as part of the OESMP) developed and implemented.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			workers and the local community during the motorway operation. > Develop and implement a TMP for the operation phase (as part of the OESMP) to identify and address all major hazards for workers and the local community during the motorway operation. The Plan should also include details on safety and stakeholder engagement measures relating to road safety to be applied.			
			> Implement SEP, in particular provisions on providing timely information to local communities on the extent of works and duration prior to the commencement of maintenance works, as well as provisions on ongoing implementation of the grievance mechanism.	JPAC	Development of quarterly monitoring reports on SEP implementation. Monthly review of external grievances.	Reports on SEP implementation developed and submitted to EBRD (containing indicators on stakeholder engagement). Project-specific grievance mechanism in place. Grievance Registry established and all received grievances recorded in the Registry.
Job creation						
19.11.3	Construction	Job creation	> To enhance beneficial impacts associated with job creation during the construction phase, the following measures will be implemented:	JPAC to include in the Contractual Agreement	JPAC to check	Hiring guidelines (as part of CESMP) developed and

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Hiring guidelines for recruitment will be in place to promote transparency of the recruitment process. > Equal opportunities and non-discrimination will be guaranteed in the recruiting process. > There will be no distinction, exclusion or preference in the recruitment made based on "race, colour, gender, religion, political opinion, marital status, national extraction or social origin, disability, age, sexual orientation, and/or HIV status". > Selection criteria will include minimum age and skills requirements. > All job vacancies will be listed clearly with skills and experience required to fill the position, as well as the duration of the employment contract > Clear information on the recruiting process and the selection criteria will be publicly available and easy to access to promote transparency of the process and ensure workers are fully aware of the short-term nature of contract during construction period.			implemented by all contractors.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Emphasis on employing local personnel residing in the Project area (preference to the employment of local population during construction to the extent possible, in cooperation with local public agencies for employment).			

19.12 Disruption to public utility services (electricity, water, sewage, telecommunication)

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Disruption to public utility services (electricity, water, sewage, telecommunication)						
19.12.1	Construction	Disruptions to public utility services (electricity, water, sewage, telecommunication)	> Implement mitigation measures for identified collision points contained in the preliminary consents from competent authorities and public utility companies, responsible for transport/transmission, communications and infrastructure (such as additional construction activities for collision resolution). > Ensure emergency and prompt reaction in case of disruption.	Contractor	Supervising engineer to randomly check at least once per week during construction activities.	Implemented all mitigation measures for identified collision points contained in approvals from competent authorities and public utility companies, responsible for transport, communications, and infrastructure.
			> Implement SEP, in particular provisions on providing timely information to local communities (both residents and private commercial facilities) on planned cuts in public utility services and contact points in case of accidental disconnections, and (ii) provisions on regular communication	JPAC	Development of quarterly monitoring reports on SEP implementation. Monthly review of external grievances.	Reports on SEP implementation developed and submitted to EBRD (containing indicators on

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			with utility companies regarding ground disturbance works near public utility installations to reduce the risk of accidental disconnections and to ensure any issues are flagged with these utility companies.			stakeholder engagement). Project-specific grievance mechanism in place. Grievance Registry established and all received grievances recorded in the Registry.

19.13 Impacts on water

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Impacts on water						
19.13.1	Pre-construction Construction	Impact on groundwater quality and water supply	> Implement all appropriate engineering measures as described in detail in *Chapter. 7 Geology and groundwater* to prevent cutting off underground streams and contamination of groundwater, as well as ensuring the Project does not impact the supply of drinking water in any village.	Contractor	Supervising engineer to randomly check at least once per week during construction activities.	Implemented all mitigation measures for identified collision points contained in approvals from competent authorities and public utility companies, responsible for transport, communications, and infrastructure.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
						In case of disruption, emergency and prompt reaction ensured.
			> Implement SEP, in particular the provisions on communicating with water utilities and providing timely information to local communities on planned water supply cuts and deteriorated water quality in case of an accidental pollution or temporary turbidity.	JPAC in cooperation with Contractor	Development of quarterly monitoring reports on SEP implementation. Monthly review of external grievances.	Reports on SEP implementation developed and submitted to EBRD (containing indicators on stakeholder engagement). Project-specific grievance mechanism in place. Grievance Registry established and all received grievances recorded in the Registry.

19.14 Land acquisition, restrictions on land use and involuntary resettlement

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Land acquisition, restrictions on land use and involuntary resettlement						

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.14.1	Pre-construction Construction	Land acquisition, restrictions on land use and involuntary resettlement Temporary occupation of private land and temporary losses of business income, loss of wages (of hired labor/employees) during construction works	> Develop and implement the LARPs for the subsections: Konjic (Ovcari)-Prenj Tunnel, for the Prenj Tunnel itself, for Prenj Tunnel-Mostar North and for the Konjic Bypass, in line with the developed LARF. Given the low levels of income and other vulnerabilities of the households living or owning land in the Project area, it will be necessary for JPAC to take this into account during the development of the LARPs, provision of direct support to vulnerable households, and the implementation of the land acquisition process, and ensure transparency and measures to improve the livelihoods and standards of living of affected persons. > Develop and implement site-specific LARP in line with the developed LARF, if privately owned, used or occupied land take is required for construction of new local roads. > Set up and implement a Project-specific grievance mechanism as elaborated in LARF/LARPs and SEP.	JPAC	Biannual reports on the progress achieved with the implementation of the LARPs. Development of quarterly monitoring reports on SEP implementation. Report on LARP and SEP implementation in AESR to EBRD and EIB. Monthly review of external grievances.	LARPs developed and submitted to EBRD and EIB. Reports on LARP and SEP implementation developed and submitted to EBRD and EIB (containing indicators on land acquisition and physical displacement, and stakeholder engagement). Project-specific grievance mechanism in place. Grievance Registry established and all received grievances recorded in the Registry.
			> Develop and implement a Traffic Management Plan (TMP) for the construction phase (as part of the CESMP) containing traffic measures. The TMP will need to consider phasing off the works to ensure local access is retained, as access restrictions may cause	Contractor	JPAC to review Contractor's TMP to ensure continuity with commitment in this ESMP.	Documented TMP (as part of CESMP). TMP implemented throughout construction phase.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			temporary losses of business income during construction works.		Supervising engineer to random check at least once per week during construction activities. Complaints relating to access restrictions.	Log of complaints relating to access restrictions.
			> Implement the Detailed Construction Waste Management Plan (DCWMP) and put in operation waste management procedures to avoid inappropriate deposition of construction waste in and around the construction site.	Contractor	Supervising engineer to random check at least once per week during construction activities.	DCWMP implemented throughout construction phase. Log of complaints relating to inappropriate deposition of construction waste.

19.15 Road damage and impacts on local traffic

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Road damage and impacts on local traffic						
19.15.1	Construction	Local road damages Traffic congestions Access restrictions	> Implement SEP, in particular the provisions on providing timely information to local communities about the Project, risks and disturbances associated with the construction and operational phases, timing of any disruptions, and alternative access routes	JPAC	Development of quarterly monitoring reports on SEP implementation. Monthly review of external grievances.	Reports on SEP implementation developed and submitted to EBRD (containing indicators on stakeholder engagement).

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			(with maps) during any periods of restricted access. > Provide information on alternative access roads as needed and informing relevant local communities about these options.. > Organise consultations with City level authorities and LCOs on all issues of significance for the communities, including but not limited to the issues of planned disposal sites for construction waste, planned new local roads and underpasses/overpasses (considerations of sufficiency, dimensions and safety) with the aim of clearly presenting all planned additional infrastructure, hear the views of local residents in relation to access to their land and make changes, as far as practicable, to accommodate their needs.			Project-specific grievance mechanism in place. Grievance Registry established and all received grievances recorded in the Registry.
			> Develop and implement a TMP for construction phase (as part of the CESMP) containing traffic management measures. The TMP will need to consider phasing off the works to ensure local access is retained, including public transport.	Contractor	JPAC to review Contractor's TMP to ensure continuity with commitment in this ESMP. Supervising engineer to random check at least once per week during construction activities.	Documented TMP (as part of CESMP). TMP implemented throughout construction phase. Log of complaints relating to road damages and traffic congestion.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
					Complaints relating to road damages and traffic congestion.	
			> Prior to construction works, document the status of all local roads which will be used by the Contractors during construction works. All local roads used for purpose of construction machines and vehicles movement should be fully restored to at least pre-project state, prior to demobilisation of construction teams if traffic during the construction phase caused any damage. > Construct new local roads to enable local inhabitants to reach their land plots and other locations in case local roads are interrupted by the motorway section. If no state-owned land free from private users is available for construction of these new roads, prepare site-specific LARPs in line with the developed LARF for any occupation of privately owned, used or occupied land take.	Contractor	Supervising engineer to random check at least once per week during construction activities.	Local and main road restored to at least pre-project state. New local roads constructed.

19.16 Health and safety risks for workers

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Health and safety risks for workers						

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
19.16.1	Construction	Health and safety risks for workers	Develop and implement an OHS Plan and Fire and Explosion Management Plan and implement specific OHS measures with special focus on (but not limited to): unexploded ordnances, installing safety fences and warning signs at all critical work areas (e.g. open trenches, excavations, material and equipment staging areas, etc.), movement of vehicles and traffic management, influx of workers into the local area including general measures, health surveillance, code of conduct of workers etc.; sufficient provision of medical care facilities and resources for workforce; working at heights, working in confined spaces, working with hazardous material (e.g. explosives); management of electrical hazards, prevention of unintended ground movements and collapse, and biological hazards (poisonous snakes). Follow the FBiH legislation on labour and OHS, as well as PR 2 provision on grievance mechanism for workplace concerns. Organise workers' camps in line with EBRD/IFC Guidance Note "Workers' accommodation: processes and standards" 2009.	Contractor	JPAC to review Contractor's CSOP to ensure continuity with commitment in this ESMP. Supervising engineer to random check at least once per week during construction activities.	Fire and Explosion Management Plan and OHS Plan (developed and implemented. Provisions on applying the relevant requirements of FBiH legislation and PR2 incorporated into contracts with Contractor. OHS statistics reported monthly.
19.16.2	Operation	Health and safety risks for workers	> Include in OESMP specific health and safety requirements for road maintenance. It should include (but not be limited to): hazardous materials management, traffic accidents, traffic management, working at heights, working in confined spaces, electrical hazards, etc.	JPAC or subcontractor (if engaged)	JPAC to review contractual conditions of all sub-contractors to ensure continuity with commitment in this ESMP.	OESMP containing specific health and safety requirements developed and implemented. OHS statistics reported monthly.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)

19.17 Cultural, historical, and archaeological heritage

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Cultural, historical, and archaeological heritage						
19.17.1	Pre-construction Construction Operation	Damage to visible and buried cultural, historical, and archaeological heritage	> Submit the requests for obtaining prior consents on the Preliminary Designs from Federal Institute for Protection of Monuments. > Include in the Main Design all the measures as instructed by the Institute and undertake any preventive archaeological surveys as required by the Federal Institute for Protection of Monuments and notify the Institute of survey results. > Ensure the presence of an archaeologist in the pre-construction phase in the area of the settlement Kuti (Kutilivac), where earlier research has indicated the presence of a larger necropolis with approximately 27 medieval tombstones (stecak) near the old Orthodox cemetery in Kuti. This is to ensure proper field research before the commencement of construction work.	JPAC	Record of (any) use of chance finds procedure.	Preventive archaeological surveys conducted as required by the competent authorities CESMP includes measures for protection of cultural heritage Chance Find Procedure developed and shared with EBRD and Contractor.

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Communicate with the Konjic Parish and Islamic Community through individual meetings about the Project, risks and disturbances associated with the construction and operational phases, timing of any disruptions, and alternative access routes (with maps) during any periods of restricted access > Ensure alternative access to the mosque and Orthodox cemetery in the Donje Selo settlement, Orthodox cemetery in the Mladeskovici settlement and the Muslim cemetery in the Kutilivac settlement in case of any access restrictions. > Post community grievance mechanism information on the entrances to the mosque and cemeteries as well as construction sites. > Post info-panels placed on construction sites and places of worship. > Ensure that the Contractor develops a Chance Find Procedure and trains relevant staff and in its requirements prior to any site preparation and construction works. The provisions of the Chance Find Procedure need to include: > Notification of relevant competent bodies of found objects/sites;			

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Alerting project personnel to the possibility of chance finds being discovered; > Fencing off the area of finds to avoid any further disturbance or destruction. > Having a person responsible for cultural heritage available and present during land disturbance activities. > Implement SEP, in particular the provisions on ongoing consultations and engagement with affected stakeholders prior to, during and after works being conducted near sites of interest.			

19.18 Danger from UXOs

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
Danger from UXOs						
19.18.1	Pre-construction	Danger from UXOs	In case of any mined areas, ensure demining before construction works in cooperation with BHMAC specialists	BHMAC	JPAC to obtain the approval/verification from BHMAC that the field does not have suspected areas and mine risks	Demining activities finalised Approval from BHMAC received

No.	Phase	Impact to be addressed	Management / Mitigation/ Enhancement	Responsibility	Monitoring	Key Performance Indicator (KPI)
			> Arrange the execution of construction works only after JPAC receives approval/verification from BHMAC	Contractor	JPAC to submit a copy of the approval/verification that the field does not have suspected areas and mine risks to the Contractor	
19.18.2	Construction	Danger from UXOs	> Ensure that equipment operators receive training for identification of potential UXOs during construction works. Pay special attention during earth moving works and blasting works. In case of any doubt, stop the works and send a notification to BHMAC for consultations and further instructions	Contractor for construction / JPAC to include in the contractual agreement with the Contractor	Supervising engineer to check regularly	Works stopped in case of doubt related to potential UXOs presence on construction site and BHMAC notified