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COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

Consultancy Services For
Roads Routine Maintenance
For Lot 18 (Zahle Caza)

CDR Contract No. 20833

Final Tender Documents
For
Roads Routine Maintenance

Environmental and Social Management Plan
(ESMP)

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Abbreviations and Acronyms

CAE	Child Abuse and Exploitation
CDR	Council for Development and Reconstruction
CoC	Code of Conduct
CoM	Council of Ministers
DGA	Directorate General of Antiquities
EHS	Environment Health and Safety
ESHS	Environmental, Social, Health and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FHH	Female Headed Households
GER	Gross Enrolment Ratio
GBV	Gender Based Violence
GOL	Government of Lebanon
GRM	Grievance Redress Mechanism
H&S	Health and Safety
IFC	International Finance Cooperation
ILO	International Labour Organization
ITS	Informal Tented Settlements
LULC	Land Use Land Cover
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoWE	Ministry of Water and Energy
MoIM	Ministry of Interior and Municipalities
MoL	Ministry of Labor
MoPH	Ministry of Public Health
MoPWT	Ministry of Public Works and Transportation
MoSA	Ministry of Social Affairs
NER	Net Enrolment Rate
NGOs	Non-Governmental Organizations
OP	Operational Plan
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Administration
PAPs	Project Affected Persons
PHS	Public Health and Safety
PIU	Project Implementation Unit
PM	Particulate Matter
KPI	Key Performance Indicator
REP	Roads and Employment Project
RPF	Resettlement Policy Framework
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
WB	World Bank
WBG	World Bank Group

EXECUTIVE SUMMARY

Introduction

The Lebanon Roads and Employment Project (REP) is a World Bank (WB) funded project that aims through its first component to improve transport connectivity along select paved road sections and create short-term jobs for the Lebanese and Syrians. The project is implemented by the Council for Development and Reconstruction (CDR) in coordination with the Ministry of Public Works and Transport (MoPWT), noting that all the roads under the REP are under the jurisdiction of the MoPWT.

More specifically, the first component of the REP “Roads Rehabilitation and Maintenance” consists of rehabilitating and maintaining of about 500 km of primary roads (including International roads/ Highways) throughout Lebanon.

Considering that the anticipated civil works will result in environmental and social impacts, an Environmental and Social Management Plan (ESMP) shall be prepared under the requirements of OP4.01, which classifies the project as Category B to reduce the footprint of REP’s operations in Zahle. Accordingly, Dar Al Handasah Nazih Taleb & Partners, which was assigned by CDR to prepare all the tender documents needed for the rehabilitation and maintenance works of the roads located within Zahle Caza, developed in year 2020 an ESMP covering roads that were selected by the Lebanese Government for full rehabilitation works. The ESMP was consulted upon, cleared by the WB and disclosed on the CDR and the WB websites.

In this report a stand-alone ESMP report has been developed for Zahle Caza to cover the envisaged routine maintenance activities namely for primary roads/ Highways.

More specifically, to manage the environmental and social risks associated with the new addition, relevant mitigation measures as well as necessary institutional arrangements were covered through this ESMP Report. Relevant stakeholders were consulted as well to prepare adequate management and monitoring plans. The objective is to ultimately achieve REP Environmental, Social, Health and Safety (ESHS) requirements.

Noting that the Project was signed before October 2018, date of effectiveness of the World Bank (WB) Environmental and Social Framework (ESF).

Project Description

The six-month project consists of routine maintenance activities in Zahle Caza namely for primary roads (including International roads/ Highways). Routine maintenance activities include incidental repair works, pavement repair works, concrete repair works, and installation of traffic control and safety devices.

Accordingly, the assessment was conducted at the Caza level concentrating on four representative roads from the total primary road network within the Caza that are likely to be maintained with a total length of 36.3 km:

- Road Z0 (RZ0) (Highway): Mrayjat-Bouarj-Chtoura (8 Km)
- Road Z1 (RZ1) (Primary): Rayak- Ali Nahri (4 Km)

- Road Z2 (RZ2) (Primary): Zahle-Kfarzabad-Ain Kfarzabad (13Km)
- Road Z6 (RZ6) (Primary): Zahle- Hazerta-Tarchich (11.3 Km)

Existing Policies, Legal and Administrative Framework

This ESMP was conducted in accordance with the WB environmental and social standards and the Lebanese laws and regulations namely Law No. 444 (2002) for Environmental Protection.

Routine maintenance activities, while broadly distributed, are generally of a smaller scale when compared to rehabilitation efforts. Consequently, these activities do not warrant a modification of the environmental and social safeguard classifications set forth in the existing REP. Routine maintenance activities will be done under OP 4.01 Environmental Assessment.

The project will comply with the World Bank Policies and Procedures: Compliance with OP/BP 4.01 on Environmental Assessment and OP/BP 4.12 on Involuntary Resettlement. According to OP/BP 4.01, a public consultation with project-affected people and local non-governmental organizations (NGOs) must be conducted for all projects under Category A and Category B.

The WB Group (WBG) Environmental, Health and Safety (EHS) Guidelines are mandatory and need to be adopted throughout the project duration.

Baseline assessment

The assessment recorded the existing physical, biological and socioeconomic conditions within the area of influence prior the project implementation. This data was then analyzed for impact prediction and assessment.

The geology of the Caza was investigated for outcropping formations, subsurface stratigraphy, hydrogeology and hydrology. The analysis was conducted to depict the proportional distribution of hydrogeological classes within the Caza and along road alignments. The findings unveiled that only 31 % consists of karstic and high transmissivity formations with wide and rich water table.

In terms of surface water, the primary river within the Zahle Caza region is the Litani River, which crosses Road Z2 at Zahle Maallaqa Aradi and flows parallel to Road Z6, lying just 212 meters away from it.

Regarding natural habitats and biodiversity, given the nature of the project, the direct influence area concerns existing roads. Consequently, a rapid biological assessment has been carried out to draw the ecological profile at the Caza level and of the adjacent areas to the concerned roads and assess natural habitats that are at added risk from the proposed project. The assessment was based on a Land Use Land Cover (LULC) analysis. Results were then compiled with site visit observations. Assessed roads under study involve a path that is already under anthropogenic influences. It was shown that 35% of the Caza's LULC is comprised of field crops, 11 % of deciduous trees, 17 % of grasslands (mainly degraded grasslands) and the rest is comprised of degraded ecosystems and human settlements. In other words, and more specifically, roads predominantly pass through human settlements, degraded grasslands, line of cultivated trees

(Pseudo Acacia, eucalyptus, umbrella pine, and Cypress trees), crop fields, deciduous trees, vineyards scrublands, open garrigue vegetation, fallow and bare lands, farmland and commercial and residential areas.

Lastly, a socio-economic survey was conducted in the project area focusing on sensitive receptors, specifically hospitals, places of worship, schools, shops, adjacent agricultural lands and nearby residential structures and any type of settlements. The aim is to guarantee the preservation of the well-being of the communities residing near the roads, including any vulnerable groups that may exist. For instance, the assessment showed that assessed roads are in majority bordered by agricultural lands and consequently water spraying and special care is needed not to affect crop production. Furthermore, the assessment highlighted that certain stretches of the roads are narrow and are bordered by churches, mosques, commercial establishments and residential buildings (this encompasses all assessed roads including the Highway (particularly Road Z1)). More specifically, saint George Church is only 1 m away from Road Z0, Imam Ali Mosque is located 72 m way from Road Z2 and Mayas hospital is located 71 m away from Road Z0. Therefore, the successful execution of this ESMP to prevent disruptions and safeguard the well-being of the local community becomes crucial.

Impacts Evaluation

Impacts were assessed at the Caza level, with focus on the representative roads for Zahle Caza, for all activities under the scope of work, and worst-case scenario impacts were considered.

Environmental impacts are expected to be localized, moderate and given that the project aims to upgrade existing roads, environmental impacts are mainly limited to dust emissions and degradation of soil and water quality, if activities were not managed properly. More specifically, despite the temporary and localized nature of routine maintenance works, dust and odor emissions are expected to be high during works execution. Moreover, potential impacts on water and soil quality along assessed roads due to potential accidental spillages and contaminated storm water runoff, are expected to be of low significance (very limited roads/or road segments lie on karstic formation). Yet, for road sections where the subsurface has a high transmissivity and is sensitive in terms of contamination, care should be taken, and activities (including waste management) should be closely monitored to avoid groundwater contamination. In addition to the expected temporary disturbance of the natural ecosystems (dust accumulation on roadside vegetation, noise pollution, increase in traffic, and accidental spills with subsequent ecosystem impairment), direct destruction of vegetation and population might occur if wastes (e.g., excavated materials) were directly discharged into the roadside ecosystems. Special care is needed when adjacent habitats involve rivers (i.e. to protect remaining adapted species). The project should not further affect degraded ecosystems adjacent to roads that will be maintained.

Potential social risks related to the project include (a) labor influx (in case the Contractor didn't recruit labor from the surrounding community), (b) potential risk of labor induced Sexual Harassment (SH) towards female workers and Sexual Exploitation and Abuse (SEA) towards women in the surrounding community; (c) potential risk of child labor; (d) poor labor conditions, (e) dissatisfaction with job allocation; (f) risk of under-participation or underemployment of women; (g) nuisance, traffic disturbance and temporary obstruction of access routes to sensitive receptors (e.g., obstruction of access to residential units, shops and dust accumulation on nearby receptors/receiving environment including agricultural lands). Specifically, the impact

assessment indicates that Gender Based Violence (GBV) risk (SEA/SH) is high due to the close proximity of human settlements to Zahle primary roads. Similarly, traffic disturbance is expected to be significant knowing specifically on Highways (e.g. Road Z0). Consequently, risk of traffic-related accidents and injuries to workers and local communities are expected to be significant, if adequate precautions, control measures, and a proper Traffic Management Plan (including a special TMP for highways) are not implemented. TMP shall be implemented, as first stage before starting works. For example, when executing works on highways, the traffic shall be diverted to the edge lanes or to service lanes in a safe manner, ensuring the continuity of traffic circulation with an acceptable flow.

Potential positive environmental impacts of the routine maintenance activities, if activities were managed properly, are associated with enhanced road conditions. For instance, improved drainage will decrease blockages, improve surface storm water run-off, and control erosion, which in turn reduces the risk of water stagnation which can damage road pavement and is associated with several waterborne diseases. Additionally, the project will improve the safety conditions of the roads through repair of pavements, safety barriers, and retaining walls. Most importantly, the project will create short-term employment opportunities to local residents and Syrian refugees who will execute earthworks.

Development of the ESMP

This ESMP provides avoidance and mitigation measures to identified impacts. The aim is to assist the project Contractor to reduce the footprint of its operations in Zahle and to ultimately achieve REP expectations regarding environmental and social performance.

Measures to control exhaust emissions, dust and odor emissions, and soil manipulation activities during the execution of work are provided. Moreover, proper measures and guidelines on the control of accidental spills of construction materials are provided including specific/stricter measures to critical segments/stretchers of roads (i.e. where roads are crossed or are in close proximity to rivers or particular biotopes). Regarding biodiversity, provided recommendations to guide the project Contractor in reducing the negative impacts on natural habitats and biodiversity are related to activities and waste management. Contractors must be careful so that the direct impacts (direct destruction) on ecosystems and associated fauna would be minimal. In other words, waste should not be dumped into the adjacent natural habitats. Soil and water contamination could have irreversible impacts on biodiversity.

The social risks of this project can be mitigated through periodic monitoring of labor conditions, specific required clauses within contracts that protect workers and the Code of Conduct (CoC) for Gender Based Violence (GBV) issues. This ESMP guides the contractor to preferably hire local workers, not to hire individuals below the legal working age in accordance with the labor law of Lebanon, and ensure proper implementation of the CoC. Further, close coordination with the concerned municipalities is recommended in relation to road obstruction issues and REP GRM must be clearly communicated to all stakeholders during and before project implementation. Similarly, Health & Safety (H&S) risks can be mitigated through precaution and control measures including the development of site-specific safety and traffic management plans.

Further, the ESMP provides key/measurable project indicators to monitor the detected risks. Project monitoring will be undertaken CDR (i.e. Supervisor Consultant) to ensure compliance

and performance. Project progress reports will be prepared by CDR and submitted to the WB for review.

Consultation

This ESMP was publicly consulted with the main stakeholders (citizens, municipalities, and relevant national and international NGOs) to ensure that they agree on sensitive issues and that the project will not be subject to last-minute dispute. More specifically, an inclusive public participation meeting was arranged for the Caza that was held at Zahle Municipality on Monday August 21, 2023. The number of attendees was 11 of which 2 were women.

Invited local NGOs and organizations include Yasa, Abaad, Kafa. and Lost. Caritas was invited as well. As for international NGOs, ACTED, ANERA, DRC and UNHCR were invited. Only Caritas and UNHCR attended the meeting.

During the meeting, attendees were informed about the project objectives, project design, the identified natural, economic, and social resources of importance in the area, the project's possible risks, and the planned mitigation measures. Attendees were informed as well that a multi-channelled GRM was established for REP project in Zahle Caza to register and address grievances and complaints from all project stakeholders. REP GRM was disseminated, and it was explained that for each worksite, a QR code will be added on the project sign board (which includes the project GRM and the online feedback form before the commencement of work). This will ensure addressing/responding to grievances and reporting to stakeholders as indicated in this ESMP (all complaints will be individually followed up).

The discussion primarily focused on the road selection process for routine maintenance activities. Accordingly, the Consultant explained in details the selection process and the collaboration between the Ministry of Public Works and Transportation (MoPWT) and CDR to select the roads for routine maintenance works— MoPWT provides a list of candidate roads to CDR, who will then assess their eligibility for routine maintenance activities, with the Consultant Engineer undertaking the eligibility assessment.

Consequently, the Head of the Zahle municipality proposed the addition of Dahr el Baidar road to the project's scope due to the necessity for lighting and road marking improvements. Attendees also highlighted the significance and heavy usage of Majdel Anjar road. Additionally, recommendations were made for maintenance efforts on the road connecting Zahle to Fakour, as well as the road section from Mrayjat to the Mdayrij bridge.

In a side conversation with UNHCR representatives, discussion focused on the employment mechanisms within REP. Additionally, the consultant elucidated the details of job allocation, as well as the safeguards and legal provisions designed to ensure employee protection throughout the duration of their contract engagement.

Finally, attendees were informed that all relevant municipalities will be informed beforehand, prior to the commencement of works, about the Project (i.e. once roads are determined). Additionally, a public notice will be posted at each relevant municipality, including the GRM procedure, to ensure transparent implementation of the Project's activities.

Project GRM

The purpose of a grievance mechanism is to ensure that all feedback and complaints received from stakeholders, employees, contractor staff and the public in general are documented, considered and addressed in an acceptable and timely manner.

The REP GRM has been established and is already accessible to communities to send their concerns and complaints. This multi-channeled GRM has three levels:

- **Level 1:** If any person has any complaint or concern regarding the project implementation, he/she can lodge an oral or written grievance to the site Manager. In case an oral complaint is made, it should be written by the Contractor Social expert. The issue must be resolved within a maximum duration of one week.
- **Level 2:** If the person is not satisfied with the action of the Contractor, he/ she can send the complaint to the PIU social specialist through Phone: 01980096 ext:317, Email: GRM.REP@cdr.gov.lb or official letter registered at the CDR. The issue shall be resolved within a maximum of two weeks.
- **Level 3:** If the person is not satisfied with the decision of the social specialist of PIU, he or she can bring the complaint to the attention of the PIU Director's Office. Once the PIU Director receives the complaint, it needs to be resolved within a maximum of two weeks. Citizen can also register an official letter at the CDR (Address: Tallet al Serail - Riad el Solh, Beirut – Lebanon).

The GRM for internal employees follows a similar structure, but with different contact people for each level. Level 1 involves the E&S expert and Level 2 is reported to the PIU, with the same resolution timeframe

Conclusion

Assessments showed that the project risks can be mitigated if the Contractor succeeded in implementing this ESMP in an adequate manner, which documents the project's risks management strategy.

In order to achieve that, CDR has to oversee the implementation of this strategy by the Contractor. Accordingly, if the Contractor succeeded in complying with the WB environmental and social standards and in ensuring a safe operation of activities, the project is expected to enhance the safety conditions of the select roads and most importantly create short-term jobs for the Lebanese and Syrians.

1 Introduction

1.1 Project Background

The Lebanon REP is a WB funded project that aims to improve transport connectivity along select paved road sections and create short-term jobs for the Lebanese and Syrians, and support farmers engaged in crop and livestock production. The REP was approved by the WB Board of Executive Directors in February 2017 and ratified by the Lebanese Parliament in October 2018. The Council for Development and Reconstruction (CDR) is acting as the executing agency on behalf of the GOL and its Council of Ministers (COM).

The REP originally had three components. Following its restructuring in March 2021, a fourth component was added to address the impact of the COVID-19 on the agriculture sector. REP components are as follows:

- (i) Roads Rehabilitation and Maintenance (US\$178 million): to finance works and related consultancy services for the rehabilitation and maintenance of about 500 km of primary, secondary, and tertiary roads, including road safety and spot improvements and repair of damaged expansions joints on highways/primary roads;
- (ii) Improvement of the MoPWT' Road Emergency Response Capacity (US\$4.5 million), especially during climate extremes;
- (iii) Capacity Building and Implementation Support (US\$7.5 million): to build the capacity of Lebanese agencies in planning and managing the road sector; and
- (iv) Support to farmers engaged in crop and livestock production (US\$10 million): to support continued agricultural production and vaccination of animals.

Accordingly, the REP ESMF was updated using an Addendum that can be found here https://www.cdr.gov.lb/getmedia/4254c2bd-3c63-4dfc-aeb7-dfb78eaada4f/REP-Component-4-ESMF_Vol-1_for-Disclosure_20210608.pdf.aspx.

This ESMP only deals with the first component of REP that aims at (a) rehabilitating, upgrading, and maintaining selected primary (including International Roads/Highways), secondary and tertiary roads, (b) providing technical assistance for the design, procurement, and supervision of said sub-projects, and (c) preparing safeguards instruments for the Project. More specifically, this ESMP that was prepared by Dar Al Handasah Nazih Taleb & Partners, which was assigned by CDR to prepare all the tender documents needed for the rehabilitation and maintenance works of the roads located within Zahle Caza under CDR contracts No.20833, covers the envisaged routine maintenance activities in Zahle Caza, primarily targeting the maintenance of primary roads/Highways.

It is important to note that REP Environmental and Social Management Framework (ESMF) (<https://www.cdr.gov.lb/CDR/media/CDR/StudiesandReports/Roads%20and%20Employment/ESMF.pdf>), which was cleared by the WB and disclosed in April 2018, identified the potential environmental and social aspects associated with the project as well as the recommended respective management and monitoring measures.

Moreover, the project's Resettlement (RPF) cleared by the WB and disclosed in April 2018 (<https://www.cdr.gov.lb/CDR/media/CDR/StudiesandReports/Roads%20and%20Employment/RPF.pdf>), outlined the principles for resettlement impact mitigation as well as the organizational arrangements needed during project preparation and implementation; it also included the compensation measures that need to be implemented for any Project Affected Persons (PAPs) for any possible loss of land, properties or livelihoods.

Finally, 25 site-specific ESMPs were prepared between 2019 and 2020, consulted upon, cleared by the WB and disclosed on the CDR and the WB websites. This includes this Zahle specific ESMP prepared by Dar Al Handasah Nazih Taleb & Partners covering roads that were selected by the Lebanese Government for full rehabilitation works. ESMP for for Zahle Caza is available on CDR Website via the following link: https://www.cdr.gov.lb/getmedia/4222b3c4-8514-4ee8-81a3-6ca3b93f7fde/Zahle_Final-ESMP.pdf.aspx.

1.2 Project Rationale

According to Schwab, 2017, in terms of road connectivity, Lebanon ranked 95 and achieved a poor connectivity score index of 48.7 out of 100. As for the road conditions, approximately 95% of the roads are paved but lack proper maintenance. In this context, to deal with increasing safety challenges, the Lebanese Government is implementing REP that aims to improve transport connectivity and safety along select roads throughout Lebanon.

However, infrastructure projects can exert a substantial strain on the environment and natural resources. Only with sustainable practices and proper waste management plans enforced, the burden on the environment can be reduced. Sustainable projects can generally be achieved by considering the environmental impact of the construction process (Hoeckman et al., 2012). Similarly, the socio-economic effects of infrastructure projects can be reduced through transparency and fair compensation processes (Morris, 2007). In this context, this ESMP that covers the planned routine maintenance works in Zahle Caza was prepared by Dar Al Handasah Nazih Taleb & Partners for development decision to go hand in hand with environmental and social protection under the requirements of WB OP4.01, that classifies the project as Category B.

1.3 Report Objectives

The main aim of this ESMP for Zahle Caza, is to stipulate the control measures required to manage and monitor the project environmental, social, and H&S risks in accordance with environmental laws and regulations in Lebanon and the WB guidelines.

This ESMP will serve as a practical tool for the project Contractor who is supposed to implement the devised management strategy to (1) reduce the footprint of REP' operations in Zahle Caza and (2) ensure safe operation of activities and prevent injuries to workers or the public. To reach the above-mentioned objective, the ESMP will:

1. Describe all activities of the project
2. Establish environmental and socio-economic baseline within the study area

3. Identify relevant environmental and social National Legal and Institutional Standards & WB Policies and regulations
4. Conduct an inclusive public consultation session that takes into consideration the views of Project Affected Persons (PAPs) to feed the project design and management plan;
5. Identify potential social, environmental, and H&S impacts associated with the implementation of the proposed project;
6. Propose feasible and applicable mitigation measures for the identified impacts;
7. Develop a plan to monitor the identified impacts and their associated mitigation measures;
8. Guide on creating short term jobs for communities within a gender workforce equality environment;
9. Identify the responsible authorities and assign roles for different organizations in the efficient implementation of this ESMP;
10. Implement a robust GRM that is multi-channeled and fully functional and that is clearly communicated to all PAPs.

1.4 Methodology

This Zahle-specific ESMP, that covers envisaged routine maintenance works for primary roads and highways, was prepared by **TIVÈL Consultancy** at the request of Dar Al Handasah Nazih Taleb & Partners, as a fulfillment of the environmental and social requirements stated in component 1 of REP. It documents the project's risk management strategy.

The methods used for setting the data collection, stakeholders' engagement, and impact assessment are elaborated in this section.

1.4.1 Collection of Environmental and Social Baseline information

Baseline data were collected from field surveys, previously conducted assessments in Zahle Caza under REP, and generated GIS maps. Meteorological data, which play a vital role in transport and dispersion of air pollutants, were investigated and collected in shape of a statistical distribution of weather conditions over a period of time. Also, the ambient air quality for the study area was examined to assess the social wellbeing and health status of Zahle community. A geospatial analysis was performed to indicate the percentages distribution of geological outcrops and hydrogeological classes at Zahle Caza and along concerned highways/primary road alignments. Similarly, a Land Use Land Cover (LULC) analysis was conducted to better understand the percentage distribution of LULC at the Caza level and along road alignments. Results were then compiled with site visit observations. Regarding the social assessment, socio-economic information about Zahle Caza was obtained from several national and international sources, as well as from the Ministry of Social Affairs (MoSA) and previous REP studies for Zahle Caza. Finally, a list of main sensitive receptors was generated to better determine the PAPs.

1.4.2 Methodology for Stakeholders Engagement

The Stakeholder Circle methodology (Bourne, 2016) was used for defining the stakeholder community and recognizing the communication needed to influence each stakeholder's prospects and actions. Stakeholders were first identified, prioritized, and then engaged through directed

communication. Emails, letters, and direct phone calls were adopted to personalize the communication with main recognized stakeholders. Finally, a formal invitation letter was sent to all stakeholders in relation to the arranged formal public meeting at the Municipality of Zahle building on August 21, 2023.

1.4.3 Methodology for Impact Assessment

Impacts were assessed at the Caza level, concentrating on the representative primary roads of the Zahle primary road network, for all activities under the scope of work following the grading methodology established by the Lebanese Ministry of Environment, detailed in Decision No 261/1 dated 2015 (refer to classification/grading methods in Annex 3).

More specifically, knowing that drainage works, pavement repair works, and removal/installation of concrete structures are the riskiest of the whole spectrum of routine maintenance activities (Huang et al., 2009), the “worst-case scenario” impacts were considered. Further, given that impacts are directly affected by the environmental and social conditions of the surrounding environment/adjacent areas to target roads, stricter mitigation measures were provided for segments of roads that are critical in terms of transmissivity, proximity to river, proximity to sensitive receptors, and proximity to critical natural habitats.

Based on the above, this ESMP was developed and included a monitoring plan, which is needed to ensure compliance of the project with environmental and social conditions and regulations. Based on the current institutional setup of the REP, the institutional setup and the requirements for capacity development was described to ensure that project implementers have sufficient technical and human resources available to effectively undertake the environmental and social management and monitoring tasks.

2 Existing Policies, Legal and Administrative Framework

2.1 Legal Framework

Similarly, to all the developed ESMPs within the REP project, this ESMP is conducted in accordance with the WB Safeguards and national and international laws/regulations that are related to environmental and social impact assessments (namely law 444 for the protection of environment, Laws 77 and 78 in relation to water and air protection, Law 80 and Decree 5605 on solid waste management, and the decisions on environmental standards that are elaborated in section 2.3). REP works contracts must comply with the national law on labor and the ILO obligations, which have been ratified by Lebanon (Penal code decree 340/1943; Labor Law/1946: The Lebanese Labor Code, Law No. 335/2001: Pursuant to the International Labor Organization ILO Convention No 182; Law 400 – 2002: Ratification of ILO convention No. 138, Decree 8987 – 2012; Law 205 – 2020; Law 28/2017, Decree 6940/2020; Decree 8987/2012: Prohibition of employment of minors under the age of 18; and Decree 3791/2016: Minimum Wage). Finally, Occupational Health and Safety (OHS) laws must be applied as well to avoid adverse impacts on workers.

An overview of the main Lebanese environmental, social and OHS legislations is provided in Table A in Annex 1.

2.2 Institutional Framework

The project is implemented by the CDR in coordination with the MoPWT. The other main national institutions that are in relation to REP include (1) municipalities in Zahle Caza that were consulted at this stage of the project and they will supervise projects' implementation in their municipal territories; and (2) relevant ministries and governmental departments (e.g., Ministry of Environment (MoE), Ministry of Energy and Water (MoEW), Internal Security Forces/traffic department) that must be consulted when needed before and during project implementation in relation to hazardous waste management, water, electricity, and traffic matters (these institutions and their corresponding mandates are presented in Table B, in Annex 1).

2.3 Environmental Standards

Environmental standards that must be respected by the project Contractor are provided in this section. The Lebanese wastewater emission standards are less strict than the WB standards, but stricter for ambient air quality and similar for noise. In this context, during works execution, the stricter limits must be followed.

Allowable Wastewater Discharge

The allowable discharge requirement as specified by WB are presented in Table 2-1

Table 2-1 Allowable wastewater discharge levels (WB requirements)

Wastewater Effluent Pollutants Threshold	
Parameters/pollutant	WB requirements
pH	6 – 9
BOD mg/l	30
COD mg/l	125
temperature Co	-
Total nitrogen mg/l	10
Total phosphorus mg/l	2
Oil and grease mg/l	10
Mercury mg/l	0.01
Total suspended solids mg/l	50
Total coliform bacteria (Most Probable Number/100 ml)	400

Air Emissions Targets

According to Decision 16/1 dated 2022, the maximum allowable limits for generators with capacity ≥ 200 kW (or ≥ 60 kVA) are shown in the below table.

Table 2-2 Reciprocating engine generator with capacity ≥ 200 kW (or ≥ 60 kVA)

Monitoring Parameter	Maximum Allowable Limits (mg/Nm ³)	Fuel type	Measurement Frequency
Dust	50	-	Continuous Mandatory if capacity ≥ 10 MW
CO	100	-	
NO ₂	2,000	-	
SO ₂	10	Diesel	Optional if capacity < 10 MW
	750	Other	

Noise Emissions Targets

The expected noise pollution levels should not exceed the values listed in the MoE Decision 52/1 dated 1996. The limited; values are presented in the table below.

Table 2-3 Sound pressure limits (MoE Decision 52/1, 1996)

Phase	Sound Pressure Level dB(A)
Working Location (less than 8 working hrs.)	90
Working Location (requires good speech hearing)	80

Therefore, the maximum national standard of 90 (dB) for occupational noise exposure limits should not exceed an average duration of 8 hours working days.

If the limits are higher than the acceptable limits, then the exposure duration should be reduced as mentioned in the table below.

Table 2-4 Noise exposure limits (MoE Decision 52/1, 1996)

Sound Pressure Level dB(A)	Exposure Duration (hrs.)
95	4
100	2
105	1
110	0.5
115	0.25

Moreover, the following table indicates the Lebanese noise guidelines in different zones and at different periods of the day.

Table 2-5 Lebanese noise guidelines for different zones (MoE 52/1, 1996)

Area classification	Maximum accepted noise level dB(A)		
	Day ¹	Evening ²	Night ³
Residential area with few construction sites, activities or on a highway	50 – 60	45 – 55	40 – 50
Urban residential area	45 – 55	40 – 50	35 – 45
Residential suburb	40 – 50	35 – 45	30 – 40
Rural residential, hospital, public garden	35 – 45	30 – 40	25 – 35
Industrial zone	60 – 70	55 - 65	50 - 60
⁽¹⁾ 7 a.m. to 6 p.m. ⁽²⁾ 6 p.m. to 10 p.m. ⁽³⁾ 10 p.m. to 7 a.m.			

2.4 World Bank Policies and Guidelines

2.4.1 Safeguard Policies

The ESMP for Zahle Caza should comply with the safeguard policy of the WB, specifically, the OP/BP 4.01 regarding Environmental Assessment. The OP 4.01 is triggered as the project could have impacts on the environment due to the maintenance of road infrastructures and associated civil works. Under the requirements of OP4.01, the proposed project is classified as Category B. Impacts have no severe effects on the environment and can be mitigated via an environmental, safety, and social management plan.

Despite that OP 4.12 was triggered by this project and RPF was accordingly prepared (disclosed on the CDR website), in the context of Zahle and in accordance with site specific plans, no

involuntary resettlement or land acquisition will take place. In other words, the project will be implemented primarily within the existing “right of way” and there will be no displaced persons by the project activities (this includes local and Syrian refugees).

2.4.2 Access to Information, Consultations and Disclosure Policy

The WB allows access to any information in its possession that is not on a list of exceptions. Moreover, transparency is essential to building and maintaining communal dialogue, and increasing public awareness about the WBG’s development role and mission. In this context, a formal consultation process with the public took place during the preparation of this ESMP for Zahle Caza (refer to section 7.1). Moreover, this ESMP will be disclosed on CDR’s and concerned municipalities’ website.

3 Description of the Proposed Project

3.1 Project Scope and Location

The project comprises routine maintenance activities in Zahle Caza, primarily targeting primary roads, including International roads that range from one lane in each direction with low traffic volume to multiple lanes in each direction with high traffic density, known as Highways (Figure 3-1). Secondary roads will be considered if there is sufficient budget.

In order to evaluate the conditions of the roads, the assessment was carried out at the Caza level, concentrating on four selected roads that serve as representative examples from the total primary road network within the Caza as detailed in a separate technical report prepared by Engineer Dar Al Handasah Nazih Taleb & Partners (refer to Table 3-1 and Figure 3-2). The total length of these representative roads is around 36.3 km.

Figure 3-1 Zahle Caza primary roads

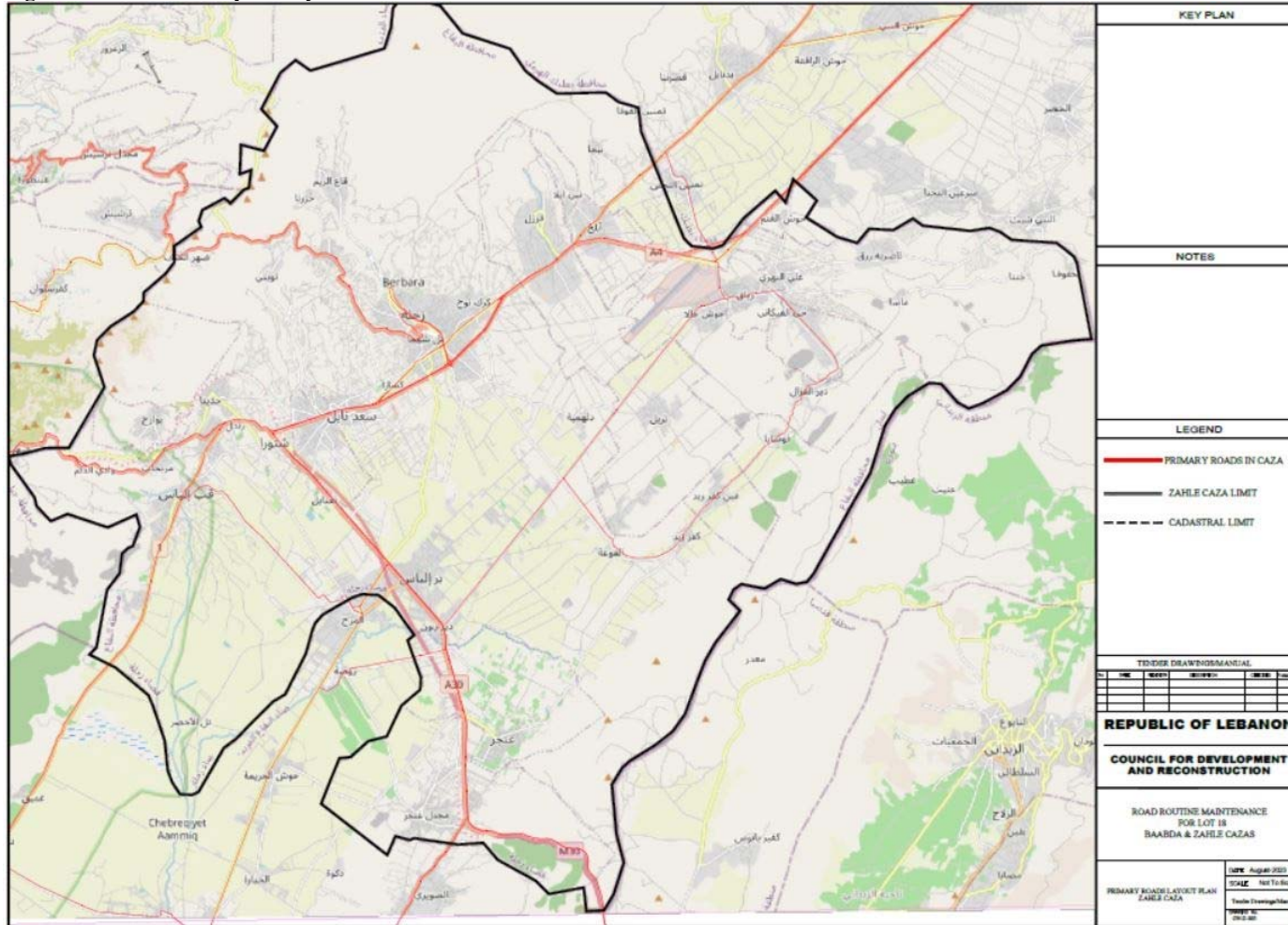


Figure 3-2 Representative roads from the total primary road network within the Caza

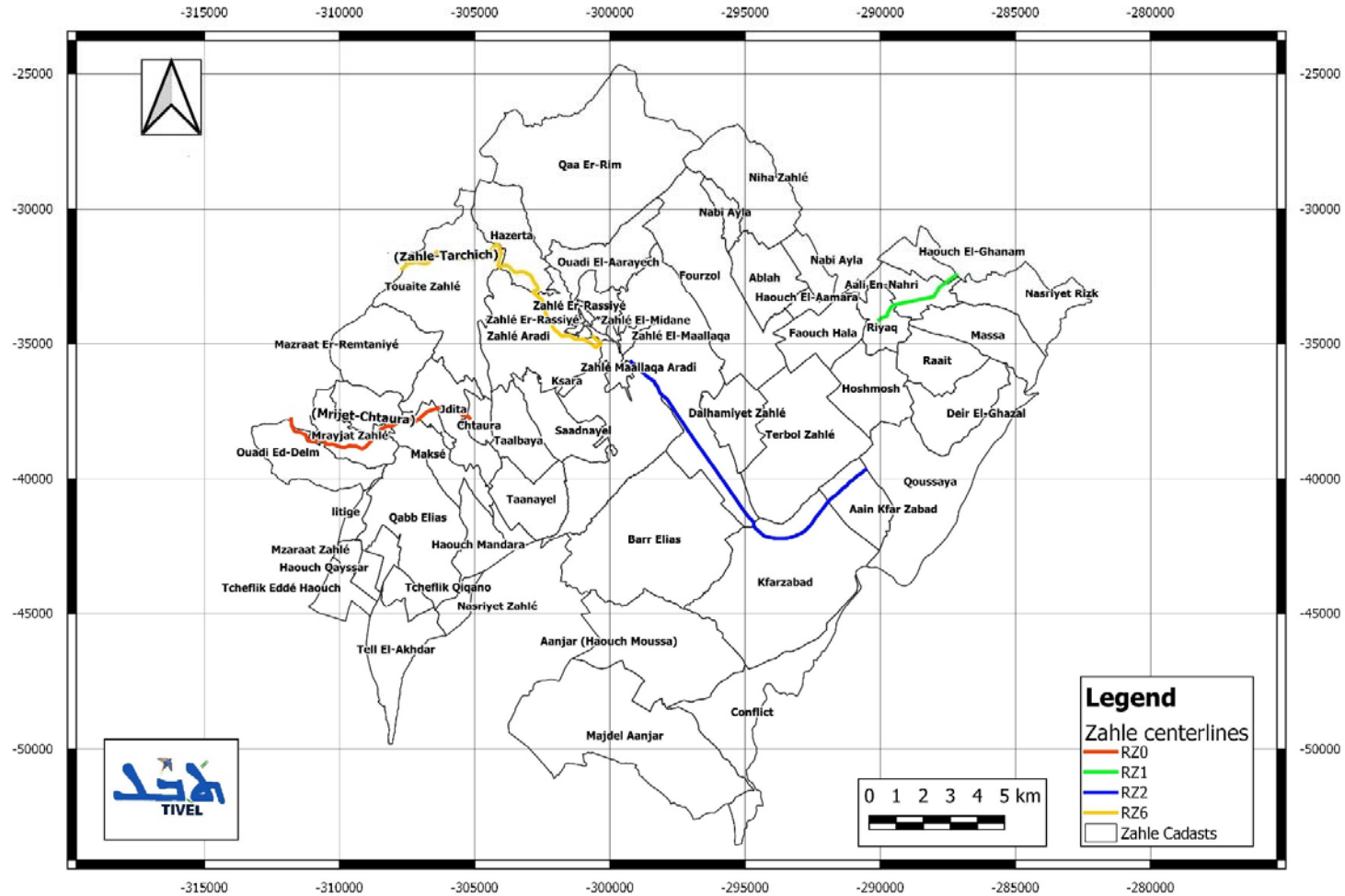


Table 3-1 Representative roads in Zahle Caza

ROAD REF	Road Designation	Road Classification	Length (Km)
Road Z0	Mrayjat-Bouarij-Chtoura	Highway	8
Road Z1	Rayak- Ali Nahri	Primary	4
Road Z2	Zahle-Kfarzabad-Ain Kfarzabad	Primary	13
Road Z6	Zahle- Hazerta-Tarchich	Primary	11.3
Total length of Representative Roads			36.6

3.2 Project Activities

The envisaged general roadway repair works within Zahle Caza were grouped into incidental repair works, pavement repair works, concrete repair works, and installation of channelizing devices and traffic control devices (Table 3-2).

Table 3-2 Envisaged routine maintenance activities for Zahle caza

Category	Maintenance Activity
1. Incidental repair works	<ul style="list-style-type: none"> • Clearing and grubbing • Repair of damaged manhole covers • Repair of Masonry wall • Cleaning of waterways, hydraulic structures, drainage pipes, and box culverts,
2. Pavement repair works	<ul style="list-style-type: none"> • Pavement overlay, for a limited area, consists of paving over the existing roadway to cover cracks, fill potholes and increase the strength of the roadway • Shallow patching works, for a limited section, includes removing the existing pavement (milling); generally, between 4 to 5 cm, and paving the area that was milled • Deep patching works, for a limited section, may be needed when the structural integrity of the road is compromised. Including excavation, base course (30 cm), prime coat, asphalt binder course, tack coat and asphalt wearing courses • Crack sealing • Milling & overlay for sunken but stable trench, width less than 1 m including tack coat • Removal and reinstatement of damaged trench width less than 1 m including excavation, base course (30cm), prime coat, asphalt binder course, tack coat and asphalt wearing courses
3. Concrete repair works	<ul style="list-style-type: none"> • Repair of box culverts, headwalls, concrete channel, concrete safety barrier, retaining walls, and cover channels
4. Installation of Traffic control devices	<ul style="list-style-type: none"> • Installation of thermoplastic reflectorized road paint lines including surface preparation and removal of existing paint lines (where needed) • Installation of thermoplastic reflectorized special road marking including speed limit marking, cats eye, pavement studs, bituminous speed humps; rumble strips; delineators and markers posts; temporary traffic signs, barricade with flashers etc.
5. Temporary Channelizing Devices	<ul style="list-style-type: none"> • Installation and reinstatement of concrete barrier, removable single face concrete safety barrier, or removable double face concrete safety barrier.

3.3 Equipment and Materials/Items

Typical equipment used for routine maintenance activities include shovel, grass cutter, wheel roller, crusher, grader, paver, compacting equipment (compactor/roller), milling machines, cleaning machines, lifting devices etc. A typical tabular format, which shows the raw materials and items needed for the routine maintenance activities, is presented in

Table E in Annex 1.

3.4 Staffing and Site Facilities

Routine maintenance activities are typically of small scale (i.e., activities will occur on a small section of the road), but widely dispersed, and most of them require skilled and unskilled manpower. The number of required unskilled workers (laborers) needed to perform repair works on-site will depend on each maintenance activity and on the timing of works. In this context, and as an indicative number only, the number of workers is estimated to be 20 workers for normal days and can increase to reach up to 30 workers during the peak maintenance period (e.g., before the rainy season). Accordingly, the Contractor will be encouraged to hire laborers from the local community living in the project area (with a balanced distribution between Lebanese and Syrian laborers).

The Contractor's skilled labors include environmental, social, and OHS experts who will be responsible of the implementation of this ESMP in collaboration with project manager, site engineers, and site officers. They will also train non-skilled workers on how to follow the safeguards requirements.

The Project site will not include laborers camps, lodging on site, and repair garages. During the implementation phase, the Contractor will have to rent a flat located in the Project area to serve as a project office. The office will be fully used by the Contractor Engineers, technical skilled workers and the Supervising Consultant. The flat will be equipped with toilet, kitchen (including drinking water and appliances), lockers and other supplies needed for the daily administrative activities. If applicable, the on-site rest point will be decided by the Contractor at the time of works. Finally, the Contractor will have to service the on-site with a portable cabin toilet. The porta cabin will be mobile and its placement depends on the work zone (wastewater management in relation to the porta cabin are provided in Table 5-1).

4 Description of the Environment and Social Context

Existing conditions within the area of influence were recorded prior the project implementation. This data was then analyzed for impact prediction and assessment. Baseline data covers the status of the following receptors: air quality, water/soil quality, hydrogeological conditions, climate and meteorology, natural habitats, land-use/land-cover, and socio-economic conditions.

4.1 Physical Environment

4.1.1 Topography

Roads under consideration are located in Zahle Caza. Attitude approximately range between 875 m to 1700 m (refer to topography map in Annex 2).

The variation of surface elevation of representative roads is presented in the table below:

Table 4-1 Variation of surface elevation of representative roads in Zahle Caza

Road Alignment	Elevation (m)		
	Min	Max	Mean
Z0	906	1,119	1,392
Z1	935	962	985
Z2	875	922	1,064
Z6	1,007	1,372	1,707

4.1.2 Subsurface and Surface Conditions

4.1.2.1 Geological Outcrops

In order to obtain a better understanding of the geology in the area, a geospatial analysis (Figure A in Annex 2) was performed to indicate the percentages of geological outcrops encountered at the Caza level. The summary of the geological outcrops exposed in the study are listed and described in Table F in Annex 2. The outcropping lithological formations in and around the study area belong to multiple geological time periods namely, to the Jurassic, Cretaceous, and tertiary geological time periods.

Statistics for the % of geological outcrop formation along the representative roads are presented in Annex 2.

4.1.2.2 Hydrogeological Conditions

Geological units can be defined as aquifer or aquiclude in term of storing and transmitting water, and these types depend on the geological environment in which they occur. In summary, in terms of hydro-stratigraphy, the project covers several classes:

- Karstic limestone formation represented as 1,2, and 3 in Figure C and described in Table H (in Annex 2): these types of formations **are highly susceptible to contamination** in the event of mismanagement of generated wastes due to the shallow water table and easy subsurface water flow which enhances spread of contamination when it occurs.

- In-porous formation represented as 7 and 9 in Figure C. These types of formations typically limit subsurface water flow and therefore any contamination that manages to infiltrate to the subsurface is highly unlikely to spread.
- Areas generally without water table or a very local water table represented as 16, 17, 20 in Table H in Annex 2.

Similar to the geological analysis, a hydrogeological analysis was undertaken to determine the percentage distribution of hydrogeological classes at the Caza level. The analysis shows that only 31 % consists of karstic and high transmissivity formations with wide and rich water table. Statistics for each individual road are shown in Table I in Annex 2. Very limited segments of roads lie on permeable formations (except for Road Z6).

4.1.2.3 Surface Water

The primary river within the Zahle Caza region is the Litani River, which crosses Road Z2 at Zahle Maallaqa Aradi and follows the path of Road Z6, lying just 212 meters away from it (refer to Table J in Annex 2).

Springs and their distance in respect to assessed roads are presented in Table K in Annex 2.

4.1.3 Climate

The climate and meteorological parameters play a vital role in transport and dispersion of pollutants in the atmosphere. One of the most significant meteorological parameters that influence project activities is precipitation due to its ability to enhance the infiltration of accidental spills and contaminated construction wastewater within the area depending on site operation procedures. The total precipitation ranges between 480 mm (lowest point) and 800 mm at highest point whereas, the hottest month in the area is August (30.66 °C) and coldest month is January (-1.46 °C) (CHIRPS and MODIS satellites).

4.1.4 Ambient Air

Air quality is an essential component in assessing social wellbeing and health status of a community. Atmospheric air quality data was collected from the Sentinel 5P Tropomi Satellite which provides daily near real time data for various gases in the atmosphere. The mean tropospheric NO₂ column density was calculated using the Google earth engine code java script editor resulting in Figure D (in Annex 2) which revealed in the mean NO₂ values across the border of Lebanon between year 2018 up to end of year 2023. It is clear that the NO₂ pollution is concentrated above the Beirut area and decreases when moving east to reach its lowest value in the eastern Bekaa plain. The routine maintenance roads of Zahle Caza are overlain as white alignments over the below NO₂ map to have an idea of the ambient air quality in the surrounding area.

4.1.5 Land Use Land Cover

A Land Use and Land Cover (LULC) analysis was undertaken to determine the distribution of LULC over the whole Caza (% of LULC distribution throughout the Caza are presented Figure F in Annex 2). The assessment revealed that 35% of the Caza's LULC is comprised of field crops, 11 % of deciduous trees, and 17 % of grasslands (refer to the LULC map in Annex 2).

Further the analysis determined as well the % of LULC distribution along the representative road alignments with a fixed buffer of 50 m from roads centerlines (refer to Table N in Annex 2). For instance, statistics (% of LULC distribution) for each assessed road indicated that 43% of Road Z2, and 41 % of Road Z1 are bordered by field crops, whereas, 52% of Road Z0 is bordered by grasslands.

4.2 Biological Environment

Methodology

A rapid biological assessment was carried out to draw the ecological profile of the adjacent areas to Zahle primary roads. The assessment was based the Land Use and Land Cover (LULC) analysis. Results were then compiled with site visit observations. Potential flora species were also considered in this assessment and their ecological value was based on their local ecological importance (distribution of species and degree of endemism (Tohmé and Tohmé, 2014) and IUCN classification).

Project settlement

The biogeographic region ranges from the Eu-Mediterranean (which ranges between 500 and 1,000 m), this zone is damaged by urban expansion) to the Supra-Mediterranean zone (a zone that ranged between 1000 and 1500 m hat is normally characterized by a series of vegetation that are found on limestone substrata (e.g. the series of *Quercus calliprinos*) (Abi Saleh, 1996).

Results

The LULC assessment indicated that 43% of Road Z2, and 41 % of Road Z1 are bordered by field crops, whereas, 52% of Road Z0 is bordered by grasslands. Grasslands are important form of land use and contribute to a high degree to the struggle against erosion and to the regularizing of water regimes, to the purification of fertilizers and to biodiversity. However, based on field observations, as the case in Lebanon, encountered grasslands along the roads are degraded and need to be enhanced.

The remaining stretches of assessed roads predominantly pass through by human settlements, line of cultivated trees (Pseudo Acacia, eucalyptus, and Cypress trees), vineyards scrublands and open garrigue vegetation, fallow and bare lands, farmland and commercial and residential areas. In other words, ecosystems are degraded and these types of habitats do not provide a favorable environment for a large variety of plants and animals. There are no critical natural habitats encountered along assessed road alignments. Consequently, no listing of flora was provided.

4.3 Socio-Economic Condition

4.3.1 General Background

Zahle caza has a population of 177,400, constituting 3.7% of the national population (CAS, 2020). Females make up 50.3%, and males 49.7%, with nearly half aged 25–64 (CAS, 2020). Those under 18 account for 29%, 18–24-year-olds 12.2%, and 65+ make up 10.2% (CAS, 2020). CAS reports 82.5% of households are headed by men, compared to 81.5% nationally,

and 17.5% by women, in contrast to 18.5% in Lebanon (CAS, 2020). Unfortunately, there is no updated data available concerning impoverished households and individuals with disabilities in Zahle. However, it is evident that the economic crisis has disproportionately affected already vulnerable groups, including persons with disabilities and those aged 65 and above (ILO, 2021).

As of January 1, 2023, there are 318,713 Syrian refugees in Bekaa, with 136,694 in Zahle as of March 2023 (UNHCR). This influx strains local services, and while tensions between host and refugee communities have lessened, competition for jobs remains a concern (UNHCR, 2023). Syrian refugees in Zahle live in integrated structures, with around 30% in Informal Tented Settlements (IST) in areas like Qeb Elias and Majdel Anjar. There is no updated data on Syrian refugees in Zahle. At the national level, household size stabilizes at five individuals, with 18% headed by women and 6% by those above 59 (VASyR, 2019). The vulnerability of refugees has increased, with 55% living below the Survival Minimum Expenditure Basket of US\$87 per person per month in 2019 (VASyR, 2019).

Within this ESMP, evaluations of impacts on vulnerable groups (such as impoverished households, the elderly, and Syrian refugees) were integral. When residences or structures (including any Syrian tented settlements (if any)) are near designated roads, proactive notification to the municipality and local authorities is crucial, and the outlined measures in this ESMP must be implemented to prevent potential social consequences. The survey focused on immediate sensitive receptors (refer to section 4.3.2.).

Concerning the access to basic services, the vast majority of primary residences in Zahle reported having access to public transports (73%) and a pharmacy (72 %) within a 10- minute walk from home (CAS, 2020). Less than half of all dwellings lived within reach of a private clinic (44 %). Hospitals were the least common in the area (11%) (CAS, 2020). It is worth noting that compared to the national level, access to a public elementary school was 11 percentage points less (39 % in Zahle and 50 % in Lebanon). Schools and hospitals that were detected along assessed roads were presented in section 4.3.2.

As for education, according to CAS (2020), in Zahle, the Gross Enrolment Ratio (GER) at the elementary level was 94.4 % while it was 72.3 % at the secondary level. The Net Enrolment Rate (NER) at the elementary level was 82.8 % but decreased to 54.2 % at the secondary level (CAS, 2020). Interestingly, the GER and NER were at all levels lower in Zahle than the national level.

Regarding the socio-economic context, in summary, 29.8 per cent of the households in Zahle had a total income between 1,200 and 2,400 thousand LBP (CAS,2020). Among the 134,100 individuals aged 15 and above living in primary residences in Zahle during 2018-19, approximately 62,200 were part of the labor force, including 53,200 employed and 8,900 unemployed (CAS, 2020). The remaining 71,900 individuals were not in the labor force. The same CAS (2020) survey shows that the overall labor force participation rate in Zahle was 46.4%, lower than the national rate of 48.8%. The unemployment rate in Zahle (14.4 %) was higher than that of Lebanon (11.4%).

4.3.2 Sensitive Receptors

Sensitive receptors were collected during the field visits and previous surveys under REP. The data was analyzed using ArcGIS.

Environmental receptors

Environmental features/sensitive receptors include rivers, springs as well as ecologically significant ecosystems that need special care during project execution. Assessed roads involve a path that is already under anthropogenic influences. Roads predominantly pass through human settlements. Only the Litani River was detected as sensitive receptor, it crosses Road Z2 at Zahle Maallaqa Aradi and follows the path of Road Z6, lying just 212 meters away from it. The project should not further impact this river and the strict mitigation measures stipulated in this ESMP must be followed if works are to be implemented at these particular road segments.

Social receptors

Categories considered as social sensitive receptors during road maintenance are schools, places of worship, hospitals/medical centers, closest residential buildings/structures, agricultural lands/fields, and shops. The sensitive receptor map in Annex 2 summarizes the nearby sensitive receptors surrounding the main roads in Zahle Caza along with their respective distances from the nearest segment of the road.

In summary, nearly all assessed roads include segments that are in close proximity to residential buildings, shops, mosques and churches (e.g., Saint George Church is only 1 m away from Road Z0, Imam Ali Mosque is located 72 m away from Road Z2). For instance, Road Z1 is very urbanized and involve very close residential buildings and shops. All roads except the highway include sections that are in close proximity to agricultural lands (including polytunnels and deciduous fruit trees) and Mayas hospital is located 71 m away from Road Z0 (refer to sensitive receptors map Figure G in Annex 2). When road sections are at a distance of 30 m or less to or cross the surrounding sensitive receptors special care is needed in case they will be maintained.

The Contractor should inform the local community about work schedule and execute the works at a good timing in order not to affect citizen going to church or mosque, patients or students to anticipate and avoid obstruction of access. Further, coordination with owners of shops and nearby residents need to start before work execution to avoid disturbance and for safety issues as well. Moreover, water spraying is crucial during the execution of works near agricultural lands (field crops) to limit impacts on crop production.

5 Potential Impacts and Proposed Mitigation measures

In this Chapter, the project positive impacts and the identified REP's potential negative impacts are elaborated along with their correspondent mitigation measures. The impact assessment methodology is described in Annex 3.

5.1 Positive Impacts

Potential positive environmental impacts of the routine maintenance activities are associated with enhanced road conditions. For instance, improved drainage will 1) decrease blockages and improve surface storm water run-off, 2) improve traffic safety, and 3) control erosion,

which in turn reduces the risk of water stagnation which can damage road pavement and is associated with several waterborne diseases and contamination. Additionally, the project will improve the safety conditions of the roads through repair of pavements, safety barriers and retaining walls. Most importantly, the project will create short-term employment opportunities to local residents and Syrian refugees. Considerable additional jobs will also be created in the supply chain industries as well as the engineering and consultancy services.

5.2 Negative Impacts

Potential negative impacts on local environment, communities, and workers are presented in Table 5-1.

Impacts were assessed for the general routine maintenance activities under the project scope. The worst-case scenario impacts were considered for critical road segments (i.e. segment of roads that are in close proximity to rivers or critical natural habitats or that fall on karstic formation) where impacts are expected to be more significant and accordingly specific mitigation measures are provided.

As mentioned above, regarding the social impact assessment, impacts on socio economic conditions of vulnerable groups will be assessed as part of the impacts on the surrounding inhabited areas. Moreover, it is important to mention that maintenance works in Zahle will not require land acquisition, therefore, vulnerable groups will not be relocated.

Impacts that are expected to be localized and moderate include fugitive dust emission during maintenance work, increase in noise pollution derived from construction machinery, degradation of water quality, potential damages to existing utilities, and disturbance of local biodiversity. Potential social risks related to the project include nuisance; traffic disturbance; potential labor influx; potential social tensions; increase in GBV risks (mainly SEA and SH); inappropriate labor conditions; obstruction of temporary access routes to sensitive receptors and road users, damages of public utilities, and others. Further, adverse HS and OHS impacts that are associated with project activities (exposure to physical, chemical, biological hazards and traffic-related accidents) are expected to be of high significance in the absence of an effective Environment Health and Safety (EHS)/OHS management system and TMP or in case of safety gaps (e.g., incomplete risk assessment and lack of safety procedures, training, engineering and administrative controls, emergency preparedness and response plan).

5.3 Management Plans

All identified impacts must be controlled and mitigated as early as possible. Thus, the aim of the management plans is to ensure effective and fast action responses to achieving good environmental, social, and safety performances.

Measures to control exhaust emissions, dust and odor emissions, accidental spills of construction materials and damage to biodiversity are provided with specific/stricter measures for roads that crosses with rivers or are in close proximity to springs and thus involving riparian habitats. Further, to ensure that damage to biodiversity is avoided, the creation of a buffer zone and enforcing strict waste management plan are suggested for roads that are close certain partictain biotopes such as riparian habitats. Whereas, addressing potential GBV, SEA/SH concerns could be achieved by ensuring that CoC targeting GBV/SEA is signed and understood

by workers; training on GBV/SEA are regularly delivered, and REP GRM and the referral pathways are functioning. Further, the Contractor is recommended to ensure continuous engagement of stakeholders (namely concerned municipalities, identified PAPs/sensitive receptors) in order to avoid impacting/disturbing the local community (where roads are in close proximity to shops, residential buildings, churches and schools).

In addition to the environmental management plan (Table 5-1) and the social management plan (Table 5-2), a separate OHS management plan was provided in Table 5-3. Both the ESMP and the OHS management plan must be implemented to fulfill REP safeguard requirements. In other words, the Contractor is obliged to implement reasonable precautions to provide a safe environment for the work force and public. Measures to prevent and control occupational and community hazards are provided at this stage of the project.

However, an OHS plan, in line with CDR (2007), IFC, EHS/OHS, and OSHA guidelines for construction sites (including site-specific risk assessments), should be submitted by the Contractor before initiating works. The OHS manual plan should at least include the developed measures in Table 5-3 and a comprehensive Job Hazard Analysis (JHA). The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazard. Finally, measures in relation to traffic management and guidance in relation to the Traffic Management Plan (TMP) that should be prepared as well by the Contractor with special considerations for Highways (to be approved by consultant before commencement of work) are provided along with H&S control measures in Table 5-3.

Table 5-1 Environmental Management Plan

Parameter	Activities	Impacts	Significance of Impacts Before Mitigation	Mitigation Measures	Significance of Impacts After Mitigation	Responsibility
Water and soil Quality	<p>Works with Potential to Cause Impacts in case of <u>mismanagement of generated waste, improper handling of construction materials, and uncontrolled spills and littering:</u></p> <p>Pavement repair works</p> <ul style="list-style-type: none"> Excavations and milling can produce substantial amounts of dust and scattered pavement materials. Pavement repair works will result in the generation of solid and hazardous wastes; mainly old asphalt layers, crushed sub-base aggregates, solvent and oil products etc. Accidental spills of bituminous materials with construction runoff and storm water might result in water and soil quality deterioration. <p>Drainage Maintenance</p> <ul style="list-style-type: none"> Improper disposal of waste of removed obstructions, debris and waste; from cleaning hydraulic structures Improper disposal of excess waste during replacement of drainage appliances <p>Installation/removing of road markings and paintings</p> <ul style="list-style-type: none"> Improper storage and disposal of chemical compounds (e.g., paint). Spillage of chemical paint substances <p>Installation of concrete barriers and concrete repair works</p> <ul style="list-style-type: none"> Spills from on-site concrete pouring 	<ul style="list-style-type: none"> Pollution of surface water where road cross rivers. Pollution of underground aquifers specially that mainly all studied road alignments fall on karst limestone aquifers. Increased water turbidity due to the generated dust that can either enter water courses when it is mixed and directed by rain or it can be deposited naturally. Pollution of water resources and soil quality due to improper management of toxic substances (e.g., asphalt layer), inadequate disposal of solid waste, debris... Pollution of water and soil quality due to accidental spills of bituminous materials, chemicals/paint and leachate of concrete pouring. Pollution of water and soil quality due to improper management of the generated domestic solid waste and wastewater from the porta cabin. Deterioration of water and soil quality due to contaminated stormwater runoff with bituminous materials, fuel/oil. <p>These impacts will adversely affect the rivers/watercourses (i.e. namely the Litani river that intersects with Road Z2)</p>	Medium	<p>Dust Control</p> <ul style="list-style-type: none"> During excavation, water should be sprinkled to hamper fugitive dust emissions that could pollute surrounding water quality. <p>Construction Solid Waste and Wastewater Management</p> <ul style="list-style-type: none"> Excavated soil should be stored and transported offsite to the nearest licensed dumpsite “due to possible heavy metal contamination. <u>During pavement repair works</u> <ul style="list-style-type: none"> Cleared subgrade or reclaimed asphalt must not be disposed into the road adjacent ecosystems and rivers. Compacted, unsuitable/degraded materials shall be disposed in a licensed landfill and suitable materials should be sent to facilities to be reused in construction. Cleared materials and debris (soil, stones and sticks) should not be neither stored nor disposed into the nearby streams and rivers. Cleared materials should be properly collected away from drainage waterways <u>When cleaning hydraulic structures:</u> store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain. All obstruction materials cleared debris, silt and vegetation must be disposed of to a safe place. <p>Management of Accidental Leakages/Spills</p> <ul style="list-style-type: none"> Accidental leachate during concrete pouring should be immediately cleaned, collected in an impermeable bag and disposed along the municipal solid waste collection route. Have a spill response plan in place and spill kits on site. All workers should be trained on its implementation. Accidental spills of fuel or oil or hazardous materials should be stopped with an available obstacle. Spill should be cleaned with an absorbent pad or saw dust. Contaminated absorbent and/or soil should be collected in an impermeable bag to be deposited along the existing municipal waste collection route, in the absence of a national licensed landfill for hazardous waste. <p>Proper Handling of Construction Materials and Hazardous Waste</p> <ul style="list-style-type: none"> Proper handling of fresh asphalt, slurry, paints, and other construction materials. Provide secondary containment when storing hazardous substances in bulk quantities. All refueling operations shall take place off-site, vehicles should be fueled up before arriving to the road section. Ensure Material Safety Data Sheet (MSDS) of all hazardous materials (chemicals, sealants, patching materials) are present onsite. Raw materials should be stored away from watercourses. <p>Additionally, when the maintenance works are conducted in close proximity to roads that are in close proximity to critical features i.e. rivers, streams..) the following should be implemented:</p> <ul style="list-style-type: none"> Clearing and grubbing should be practiced at least 30 m away from the nearest stream or river. Avoid of use of hazardous materials (e.g. solvents, chemicals, paints...etc.) Mix hazardous materials at a minimum of 40 meters away from any near watercourse or sensitive habitats. Limit the application of surface treatments to the road surface and avoid over spraying near water courses and at watercourse crossings. Maintain suitable buffers between, material storage and watercourses and sensitive habitats. Placement of geotextile silt traps as appropriate, especially in areas close to water bodies (when roads are in close proximity to springs and rivers) During installation of concrete barriers and concrete repair works, on-site concrete pouring 	Low	Project Contractor

Parameter	Activities	Impacts	Significance of Impacts Before Mitigation	Mitigation Measures	Significance of Impacts After Mitigation	Responsibility
				<p>must be done in a way to avoid leaching in nearby streams and water bodies. Concrete works should be performed at least 40 meters away from nearby streams or sensitive habitats.</p> <p>Control of Stormwater Runoff</p> <ul style="list-style-type: none"> In case of temporary storage of excavated materials, accidental contamination or spills of the removed soil should be avoided to limit contamination of storm water runoff and in turn the surrounding streams. Any stockpiled construction material should be covered with an impermeable layer to avoid contamination of stormwater runoff. <p>Domestic Solid Waste and Wastewater Management</p> <ul style="list-style-type: none"> Domestic-like waste shall be removed daily from the routine maintenance sites. The generated waste onsite should be properly segregated at source into recyclables and organic waste in appropriately labelled waste bins. The Contractor should link the porta cabin toilet to the existing wastewater network. In case of linking the porta cabin toilet to a polyethylene storage tank, the following should be done: <ul style="list-style-type: none"> A specialized contractor and licensed by the relevant authority (e.g. municipality) should be selected to periodically collect the wastewater from the polyethylene tank. The tank should be inspected regularly to check for any leakages and to ensure that the generated wastewater is properly collected before it's full. <p>Timing of Works</p> <ul style="list-style-type: none"> Clean drain structures and repair slopes and road shoulders prior to the wet season for easier control of deleterious materials and runoff. If intervention in rainy season is needed, special care is required to allow water away from the road and avoid erosion. If the schedule requires working in the rain, the work area shall be isolated and appropriate erosion plan must be installed to prevent the release of sediment-laden water and other deleterious substances into watercourses and sensitive habitats particularly for surface maintenance activities requiring the application of patching and sealing component, tar, asphalt, and dust control materials 		
Soil erosion	<ul style="list-style-type: none"> Earth works Cleaning and grubbing Repair works resulting in disturbed areas which aren't properly re-vegetated. 	<ul style="list-style-type: none"> Excavation of soil may result in disturbance of soil structure and thus may cause an increase in soil erosion and release of sediments. This will permanently change the structure of the soil and surface geology. Cleaning and grubbing grass and weeds may result-in erosion of the slopes and removal of vegetation. 	Medium	<ul style="list-style-type: none"> After repairing shoulders, it is important that the side slope is immediately covered with grass turfing. When trimming of grass and weeds from roadway it is important to ensure that the grass is not grubbed but only trimmed to avoid erosion of the slopes. 	Low	Project Contractor
Air quality	<ul style="list-style-type: none"> Excavation and milling works Movement of raw materials transporting vehicles on unpaved surfaces Unloading of raw materials Open storage of raw materials Disturbances to material stockpiles by local winds and material handling, which is of great significance depending on the road location. 	<ul style="list-style-type: none"> Exhaust emissions from vehicles transporting workers to/from site (i.e., buses, mini-vans, cars). Exhaust emissions from power generators. Exhaust and dust emissions from excavators, paving vehicles (graders, sweepers, dump trucks, asphalt pavers, compactors/rollers, steel wheel rollers, bitumen tanks with spreaders). Dust emissions from disturbances to material stockpiles by local 	High	<p>Control of Exhaust Emissions</p> <ul style="list-style-type: none"> Ensure the maintenance of all construction equipment and vehicles regularly, at least once a month. Machinery and equipment should be equipped with air pollution control equipment that should be monitored regularly to ensure its effective operation. Power generators should be equipped air pollution control equipment. Avoid idling time of machinery. <p>Control of Dust Emissions</p> <ul style="list-style-type: none"> During excavation and dust generating activities, water should be sprinkled to hamper fugitive dust emissions. In specific, water should be sprayed on exposed surfaces during dry periods near sensitive receptor namely agricultural lands surrounding the roads (refer to LULC map in Annex 2). 	Low	Project Contractor

Parameter	Activities	Impacts	Significance of Impacts Before Mitigation	Mitigation Measures	Significance of Impacts After Mitigation	Responsibility
	<ul style="list-style-type: none"> Wind blow during transportation of materials by vehicles and specifically when transporting on unpaved roads 	winds, material handling and traffic using unpaved roads. The generated fugitive dust will highly affect the nearby agricultural lands.		<ul style="list-style-type: none"> Ensure that trucks hauling raw materials are properly covered. Ensure that stockpiles of raw materials are always covered Ensure that all trucks carrying removed materials/waste from construction sites are covered. <p>Additionally, when the maintenance works are conducted in close proximity to critical segments (e.g. near river, natural habitat), the following should be implemented:</p> <ul style="list-style-type: none"> Loading and off-loading of raw materials should be performed away from sensitive ecosystems and/or nearby rivers. Stockpiles of raw materials should be placed at least 50 m away from sensitive habitats. 		
Odor	<ul style="list-style-type: none"> Pavement repair works Installation of road marking and painting 	<ul style="list-style-type: none"> Odors from asphalt fumes and paint can cause unpleasant smells to the surrounding. Odor emissions might be generated from mismanagement of solid waste and wastewater and disrupt the local environment. 	High	<ul style="list-style-type: none"> Transport trucks, specifically trucks transporting asphalt, are to be tightly covered at all hauling times to reduce as much as possible release of unpleasant odors. When maintenance activities will be performed in close proximity to sensitive receptors (refer to sensitive receptor map in Annex 2), the community should be informed beforehand regarding the expected odor emissions. Ensure daily collection of solid waste from the site and adequate management of the generated wastewater. 	Low	Project Contractor
Noise	<ul style="list-style-type: none"> Elevated noise levels will mainly result from excavation, pavement and milling, and concrete placement, etc. Noise and vibration might be caused by the operation of earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and workers. 	<ul style="list-style-type: none"> Heavy and noisy machinery such as, excavators, bob cat, steel roller, compressors, pick- up, dump trucks that generate unpleasant noise levels and disrupt nearby settlements and natural habitats. 	High	<ul style="list-style-type: none"> Regular maintenance of the machinery, equipment and vehicle should be performed to prevent excessive noise. Appropriate work schedule should be applied to avoid nuisance to the surrounding receptors. Vehicles and equipment that meet national standards for noise and vibration should be used. Avoid noise generating activities near roads surrounded by sensitive receptors (mainly road segments that are surrounded by forests) 	Low	Project Contractor
Biodiversity	<ul style="list-style-type: none"> Routine maintenance debris, excavated materials and other used construction materials if discharged directly into the adjacent rivers and valleys. Wastewater discharge into the roadside woodlots and riparian habitats can severely affect the local fauna and flora and eventually lead to population destruction. Contamination of terrestrial habitat due to accidental spill The generation of emissions and disturbances such as noise, dust, and pollutants in adjacent areas' soil and vegetation. Clearing and grubbing (i.e., removal within the limits of working area all vegetation, surface debris and scattered stones and rocks etc.) could include accidental removal of sensitive and protected species. 	<ul style="list-style-type: none"> Temporary disturbance of nearby ecosystems Direct destruction of population Habitat Alteration Road kills (i.e., mortality due to vehicular collisions). Contamination of terrestrial habitat due to accidental spills Fauna injuries due to collision with machine 	Medium	<p>General Mitigation Measures</p> <ul style="list-style-type: none"> During drainage maintenance, culverts should be surveyed for the presence of nesting communities Culverts where wildlife have been determined to be absent do not require buffers or exclusion practices Prior to grubbing or excavation, the contractor should inspect the working zones for areas of endangered plant or animal species, any findings shall be reported immediately Whenever any vegetation is scheduled to remain in-place, selective clearing techniques shall be employed. All vegetation listed to remain should be marked Contractor's personnel should not damage remaining shrubs, trees or their root systems during selective clearing A waste management plan must be taken to avoid contaminating adjacent natural habitats and direct destruction of wildlife <p>Strict Measures Near Critical Habitats:</p> <ul style="list-style-type: none"> In case works will take place near sensitive receptors (i.e., when roads cross or are in close proximity to rivers and streams) provide a filter strip between the road and the river/stream. Prevent spillage of construction materials and do not discharge unused or removed materials during maintenance activities into adjacent natural habitats Restricting the use of noisy machines and/or adopting noise-reducing means (silencers) for construction machines, especially near sensitive areas 	Low	Project contractor

Parameter	Activities	Impacts	Significance of Impacts Before Mitigation	Mitigation Measures	Significance of Impacts After Mitigation	Responsibility
	<ul style="list-style-type: none"> Fauna injuries due to collision with machine and vehicles due to increase in traffic movement 					
Resources Consumption	<ul style="list-style-type: none"> Water will be used for domestic purposes, for construction activities (curing of concrete, moisturizing temporary stockpiles...etc.) and for cleaning and dust suppression. Energy will be consumed for the operation of vehicles and equipment. 	<ul style="list-style-type: none"> During the routine maintenance works, overconsumption of water and energy will lead to exploitation of natural resources. 	Medium	<p>Control of Freshwater Demand</p> <ul style="list-style-type: none"> Dry clean-up methods should replace wet cleaning methods whenever practical (sweeping, dust collection vacuum, wiping...etc.). Appropriate plastic sheeting or waterproof paper should be used to cover the concrete after water curing to preserve moisture and reduce the evaporation that leads to decrease water quantities used. Signs near water-using appliances should be installed to encourage water conservation. <p>Control of Energy Demand</p> <ul style="list-style-type: none"> Turning off non-used equipment should be done. Machinery and generators shall be regularly maintained and operated in an efficient manner. Vehicles should not be allowed to remain idle for long periods. 	Low	Project Contractor

Table 5-2 Social Management Plan

Parameter	Activities	Impacts	Significance of Impacts before mitigation measures	Mitigation measures	Significance of Impacts After Mitigation	Responsibility
Social Risks	All project activities	<p>Socio-Economic Conditions Community</p> <ul style="list-style-type: none"> Potential Labor influx Labor-induced SH and SEA Traffic disturbance and obstruction of access routes to sensitive receptors Disturbance of sensitive receptors Disturbance of public utilities and interference with private properties/lands 	High	<p>Potential Labor influx and labor induced SEA/SH</p> <ul style="list-style-type: none"> Providing workers with the necessary training and awareness raising session on issues regarding SEA/SH, GBV prior to signing the CoC. Ensuring that workers sign the Code of Conduct (CoC) (refer to Annex 4) that targets GBV risks, specifically SEA induced by labor influx, and penalizes the perpetrators of SEA/SH. Ensuring that REP established GRM is well disseminated to affected communities (before commencement of works) through municipalities public boards, project sign boards, and mobile GRM signs. Ensuring that REP GRM (including the QR code along active roads) is properly functioning to record complaints from the surrounding communities. This will ensure the management of complaints and the implementation of corrective actions. Ensuring that training on GBV/SEA are regularly delivered, and REP GRM and the referral pathways are functioning. REP GRM specific procedures for SEA/SH, including confidential reporting with safe and ethical documenting of SEA/SH cases must be communicated to all workers. The Contractor should employ a social/environmental specialist to supervise the GBV issues related to SEA/SH such as supervise signing of CoCs, verify adequate operation of the GRM for SEA/SH etc. <p>Obstruction of access routes to sensitive receptors</p> <ul style="list-style-type: none"> Adequate and timely communication with the concerned municipalities and dissemination of project-related work schedule with the surrounding community. Routine maintenance works should not be performed during peak traffic hours (e.g., works can take place when students are already at school and in a way not to disturb people where roads are in close proximity to schools, churches, mosques, and other sensitive receptors as shown in the sensitive receptor map in Annex2). The temporary traffic control can involve lane width reduction, lane closures depending on the type and duration of routine maintenance activities to be performed. Detours and diversions should be designed and provided as needed to ensure a continuous traffic movement. Traffic control measures will be provided in the project TMP. Provision of safe passages and crossings for pedestrians namely for roads that involve schools, hospitals, cultural sites, and churches (refer to sensitive receptor map in Annex 2) and for farmers when road segment are in close proximity to agricultural lands (refer to LULC map). <p>Disturbance of sensitive receptors (noise and dust)</p>	Low	Project Contractor

Parameter	Activities	Impacts	Significance of Impacts before mitigation measures	Mitigation measures	Significance of Impacts After Mitigation	Responsibility
				<ul style="list-style-type: none"> Noise levels and air emissions should be maintained within the national permissible limits and the contractor should be limited to working hours as defined with local municipalities. Activities should be planned in consultation with the local community so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. Nighttime activities, if any, should be performed using low-noise technologies. When performing noise generating activities, the Contractor should inform sensitive receptors such as nearby residences, schools, hospitals, and churches, cultural sites that if they lie in close proximity to the assessed roads. During excavation and dust generating activities, water should be sprinkled to hamper fugitive dust emissions. In specific, water should be sprayed on exposed surfaces during dry periods near schools, churches, cultural sites and agricultural lands surrounding the roads. Strict supervision must be applied when roads are in close proximity to the detected sensitive receptors i.e. ensuring that the Contractor will apply the above provided strict measures and that ongoing communication with affected people is being conducted. <p>Disturbance of public utilities and private properties</p> <ul style="list-style-type: none"> Pushing excavated materials onto adjacent lands and damaging public utilities or private properties must be avoided through delineation of work areas. When trimming trees, broken or cut limbs are not to fall on or damage overhead wires. Avoid damaging any possible existing infrastructure and try to obtain plans prior to commencement of any maintenance works in coordination with the relevant municipalities. Procedures for rapid notification in the case of disruption of any existing utility Immediate assistance with re-instatement, and close follow-up with concerned authorities 		
	All Project activities and the recruitment process	<p>Labor Conditions</p> <ul style="list-style-type: none"> Inadequate labor conditions Workers tension (Syrian/Lebanese ratio) Child labor Under-participation of women 	Medium	<p>Child Labor</p> <ul style="list-style-type: none"> The project should have measures in contracts to ensure that those below the working age are not hired and ensure that labor law of Lebanon is followed. Labor registry and age verification must be maintained during the whole project through an age verification mechanism to be implemented by the Contractor with documentation and records to be checked by the supervising engineer (including the continuous ID control). Penalty provisions should be available for hiring child labor. During the employment procedure, the contractor or subcontractor should abide by the Lebanese Law No.0 dated 1946. <p>Inadequate Labor Conditions</p> <ul style="list-style-type: none"> Safety and protection of workers should be ensured within the contracts provided by the contractor. Appropriate rules and regulations should be implemented in order to ensure the protection of laborers. Contractors should be forced to abide by the specified Lebanese law determining the minimum wage and minimum working age for children. Contractor must comply with Decision 29/1 dated 2018 which restricts significant number of jobs to Lebanese only and allows Syrians to occupy jobs that are not restricted to Lebanese. Continuous monitoring is required to maintain adequate labor conditions. Ensure that all workers (locals and foreign, skilled and unskilled) shall be compensated and are contracted equally as per the scale of market price rates, have equal contractual benefits and working conditions, and have access to internal GRM <p>Social tensions and conflict over job-sharing and dissatisfaction with allocation of project-generated jobs.</p> <ul style="list-style-type: none"> Clear criteria for job selection and allocation should be adopted accounting for the ratio of Syrian and Lebanese community workers in Zahle Caza and types of positions available. It is important to avoid competition between Syrian workforce willing to accept lower wages and skilled Lebanese labor. The Contractor should ensure a fair allocation of job opportunities, and most importantly non-discrimination and fair treatment should be ensured among workers (such as equal contractual wages/benefits and working conditions). Clear communication with all affected workers and good implementation of REP GRM are essential to mitigate the potential risk of social tensions or dissatisfaction among Syrian and Lebanese workers. <p>Under-participation or underemployment or discrimination of women</p> <ul style="list-style-type: none"> Setting minimum percentage of women at the employment phase. 	Low	Project Contractor

Parameter	Activities	Impacts	Significance of Impacts before mitigation measures	Mitigation measures	Significance of Impacts After Mitigation	Responsibility
				<ul style="list-style-type: none"> The project should ensure that gender equality is attained when it comes to recruitment, salary levels and others. Promoting the employment of females in appropriate jobs such as managerial or administrative positions. 		
Physical Cultural Resources	<ul style="list-style-type: none"> Excavation, milling and grubbing. 	<ul style="list-style-type: none"> During excavation (shallow and deep) and other geotechnical works, there is a potential to unexpectedly find and impact archaeological materials in an area not previously known for its archaeological interest. 	Medium	Prior to grubbing or excavation, the contractor should inspect the working zones for areas of archaeological remains. Chance-find procedure: <ul style="list-style-type: none"> All maintenance activities in place of the discovery must cease immediately once discovery of an archaeological artefact or complex is discovered. The site must be fenced (protected) and authorities (Ministry of Culture / Directorate General of Antiquities (MoC/DGA)) must be informed within 24 hours following the national procedures (law 166/LR of 1933 that regulates antiquities and law 37 of 2008 on Cultural properties The area should be secured in order to prevent any destruction or disappearance of the archaeological complexes. Work should not be commenced without the DGAs' written decision on how to handle the findings and recommence the work. 	Low	Project Contractor

Table 5-3 H&S Management Plan (in accordance with IFC EHS/OHS guidelines) – see more details in Annex 7

Health and Safety Hazards	Activities	Impact	Significance of Impacts before mitigation measures	Mitigation Measures	Significance of Impacts after mitigation measures	Responsibility
Community Health and Safety	<ul style="list-style-type: none"> All activities within the project scope 	<ul style="list-style-type: none"> General site hazards Disease Occurrence Traffic accidents 	High	Communication of risk with local community <ul style="list-style-type: none"> Placing of warning signs to warn the passing citizens about the potential hazards. Signage should be in accordance with international standards (e.g., OSHA 29 CFR 1910.145) and be well known to, and easily understood by the general public as appropriate. Restricting access to working sites, through directorial controls and dangerous spots in the working sites such as pits, trenches, etc. must be clearly marked and fenced. Disease prevention <ul style="list-style-type: none"> When repairing rain cuts and minor slips, if material was borrowed along the sides of the embankment, it is important to ensure that it does not become a pond of stagnant water where mosquitos can breed, particularly when it is situated nearby human settlements Developing a TMP <ul style="list-style-type: none"> A TMP must be prepared by the Contractor and approved by the Consultant and PIU before commencement of work to ensure traffic safety (refer to traffic safety section of this table) The TMP should address the partial closure requirements to limit interference to the traveling public and minimize project-related traffic delay and accidents by applying effective traffic mitigation plans and timely diffusion of information to the community and motorists concerning construction operations. These plans must cover alternative routes when needed and must focus on preventing, minimizing and managing traffic incidents. The TMP shall be approved by the Consultant prior the execution of work. A special TMP for highways must be prepared as well and approved by the Consultant, where it is advised to favor non-peak hours. In case of accidents In case of accidents, the CDR needs to be made aware of the incident within 24 hours of its occurrence, and the Bank within 48 hours 	Low	Project Contractor
Occupational Health and Safety	<ul style="list-style-type: none"> All activities within the project scope 	<ul style="list-style-type: none"> Job Hazards Workplace/Site Hazards Injuries Physical hazards (covering all planned routine maintenance activities) <ul style="list-style-type: none"> Noise Lifting, slipping, electrical, equipment and working at height hazards 	High	Hazard Identification and Risk Assessment <ul style="list-style-type: none"> A JHA must be conducted before commencement of work. The results of the analysis should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards. Permit to Work (PTW) should be used for Higher Risk activities. Workplace <ul style="list-style-type: none"> Clean eating area, potable water supply, lavatories and showers, first aid kits, lighting, fire detectors and fire-fighting equipment must be provided by the Contractor Zahle site office. Equipment should be adequate for the dimension of the office and the maximum number of people present. Fire and emergency alarm systems must be installed. 	Low	Project Contractor

Health and Safety Hazards	Activities	Impact	Significance of Impacts before mitigation measures	Mitigation Measures	Significance of Impacts after mitigation measures	Responsibility
		<ul style="list-style-type: none"> ○ <u>Vibration and excavation hazards</u> ○ <u>Vehicle driving & site traffic hazard</u> ○ Environmental hazards ○ <u>Culvert-specific hazards</u> <ul style="list-style-type: none"> • Confined space • Hazardous atmosphere • Culvert collapse • Water: High flow rates can create dangerous footing conditions • Animals, particularly snakes, in the culvert can be dangerous, especially if trapped • Entrapment: Deep mud can entrap personnel walking through it ○ <u>Working with precast concrete elements -specific hazards</u> <ul style="list-style-type: none"> • Incorrect loading and unloading methods: High-risk activity (serious injuries) • Uncontrolled collapse of elements • Incorrect lifting and/or unsafe lifting equipment • Poorly secured loads • Inappropriate or unstable work areas for cranes • Chemical hazards <ul style="list-style-type: none"> ○ Exposure to toxic, corrosive, sensitizing or oxidative substances. ○ Exposure to asphalt fumes is linked to breathing problems, and skin irritation (Norseth et al, 1991). • Biological hazards <ul style="list-style-type: none"> ○ Covid-19 spread/ labor-intensive project 		<ul style="list-style-type: none"> • A person must be appointed to be responsible for the fire protection. • Workstations must be equipped with first-aid stations, rest areas, and eye-wash stations • Fire extinguishers must be available in foremen cars. <p>First Aid and Injuries</p> <ul style="list-style-type: none"> • The Contractor should ensure that qualified first-aid can be provided at all times. • First aid kits must be available at project site office and at foremen cars. • One laborer onsite should be appointed to respond to emergency cases. • All workers onsite should know where the first aid facilities are located and how to adequately use first aid kits. • A complete list of nearby hospitals, medical centers and emergency contact numbers should be provided to workers at project site offices and to foremen. • In case of any severe incidents/accident, immediate reporting to CDR within 24 hours of their occurrence, and the bank with 48 hours must be done <p>Special care must be taken:</p> <ul style="list-style-type: none"> • If manual methods for removing brush, and other vegetation are labor-intensive and require close supervision to ensure good production and worker safety. • In order to avoid serious physical injury or equipment damage when debris being cut by a machine shatters and flies in unpredictable directions. <p>Communication of Hazard</p> <p><i>Area signage and labelling of equipment</i></p> <ul style="list-style-type: none"> • Hazardous areas (e.g., storage and excavation areas), installations, materials, and emergency exit, etc. must be marked appropriately. • All containers that may contain substances that are hazardous must be labeled as to the contents and hazard (i.e., based on MSDS), or suitably color coded. Copies of the hazard coding system must be posted outside the storage area where they are likely to come to the attention of safety personnel. • All energized electrical devices and lines should be marked with warning signs. • Machines with moving parts must be turned off, all electrical devices must be marked with warning signs. • Warning signs (danger/caution signs, general safety information signs, emergency and direction signs) must be installed at sites, offices, parking/storage areas as needed. <p><i>Site security</i></p> <ul style="list-style-type: none"> • Communication of risks to workers must be implemented. • Signage should be easily understood by workers. • Good house-keeping practices (e.g., placing loose construction materials in established areas and properly managing generated wastes) <p>Training</p> <ul style="list-style-type: none"> • Ensure that all workers are given proper site-specific instructions on OHS prior to commencing work. The OHS training should consist of hazard awareness and control measures. • Provide specialized trainings for supervisors of High-Risk activities to enhance personal safety (e.g., for people working at height, supervisor must be assigned and trained on risk assessment, inspection of scaffolds according to CFR 29 OSHA Part 1926 standards (SCF) and for basic fall arrest and basic rescue). • Trainings on PTW must be conducted to all workers participating in the job. • First Aid Training must be delivered to workers by a certified trainer from Red Cross to help them learn to be more conscious of safety on site and how to deal with accidents occurrence in a proper way. <p>Physical hazards</p> <p>Noise</p> <ul style="list-style-type: none"> • Workers should not be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. • Limiting the duration of noise exposure (e.g., for every 3 dB (A) increase in sound levels, the allowed exposure period should be reduced by 50 percent). reference 		

Health and Safety Hazards	Activities	Impact	Significance of Impacts before mitigation measures	Mitigation Measures	Significance of Impacts after mitigation measures	Responsibility
				<ul style="list-style-type: none"> • Periodic medical hearing checks should be performed on workers who are exposed to high noise levels. <p>Working at Height</p> <ul style="list-style-type: none"> • Working at height: Scaffolds inspection according to the OSHA standards • Fall prevention and protection measures should be implemented, such as the installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area • Train supervisors and workers for basic fall rescue <p>Safe tree branches removal</p> <ul style="list-style-type: none"> • Ensure all ladders or scaffolding used in tree branch removal are securely fixed and one worker is holding the ladder while another worker is climbing up and cutting the branches. • When using the rope to remove branches from tree, ensure that the length of the rope is longer than the height of the tree. <p>Electrical, lifting, slipping, and equipment hazards</p> <ul style="list-style-type: none"> • Checking all electrical cords, cables and hand power tools for frayed and exposed cords and following manufacture recommendations for maximum permitted operational voltage. • Protecting power cords and extensions from physical damages like getting wet from rain. • Train all workers on proper safe lifting technique (namely for lifting concrete elements). • Assess thoroughly the work area in order to identify areas at high risk for slip, trip, and fall injuries and control it; conduct regular inspections on general cleanliness, spill response, and the effectiveness of cleanings; • Turning off or disconnecting machinery with exposed moving parts. <p>Working with precast concrete – specific hazards (OSHA standards)</p> <ul style="list-style-type: none"> • The lifting hardware must be capable of supporting at least 5 times the maximum intended load • No employee shall be permitted under precast concrete elements being lifted • Use of tag lines to eliminate potentially hazardous situation <p>Exposure to vibration</p> <ul style="list-style-type: none"> • Installation of vibration dampening pads or devices. • Limiting the duration of exposure. Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers. <p>Excavation hazards (IFC OHS guidelines):</p> <ul style="list-style-type: none"> • Controlling site-specific features which may contribute to excavation slope instability (e.g., use of excavation dewatering, side-walls support, and slope gradient adjustments that minimize the risk of collapse and entrapment). • Providing safe means of access and egress from excavations, such as graded slopes, or ladders. <p>Vehicle driving and site traffic hazards (IFC OHS guidelines):</p> <ul style="list-style-type: none"> • Training and licensing vehicle operators in the safe operation of specific vehicles • Ensuring drivers undergo medical surveillance (regular request of medical checkup reports including drug test for truck and heavy machinery drivers). • Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns. • Implementation of traffic control procedures (e.g., application of traffic control devices and assigned traffic control people). • Traffic control procedures must be communicated to workers prior to starting work and used for toolbox safety meetings. <p>Environmental Hazards</p> <ul style="list-style-type: none"> • Care should be taken when cleaning culverts because snakes can be present. 		

Health and Safety Hazards	Activities	Impact	Significance of Impacts before mitigation measures	Mitigation Measures	Significance of Impacts after mitigation measures	Responsibility
				<ul style="list-style-type: none"> • Workers when undertaking routine maintenance activities (e.g., clearing and grubbing) can be exposed to bite and stings. <p>Culvert-specific hazards</p> <ul style="list-style-type: none"> • Permit-required confined space entry procedures (as specified in OSHA CFR 1910.146) should be followed for culverts. These procedures include: <ul style="list-style-type: none"> ○ Workers shall be trained in confined space entry procedures. ○ Entry hazards shall be evaluated and workers shall be informed of these hazards. ○ Before and during culvert entry, the atmosphere should be tested for oxygen content and flammable gases. ○ At least one assistant should be available outside the permit space into which entry is approved for the duration of entry operations. ○ Forced ventilation should be supplied if needed. <p>Chemical hazard</p> <ul style="list-style-type: none"> • All workers should be responsible for understanding the MSDS for any chemical that they may be exposed at the construction site (toxic, corrosive, sensitizing or oxidative substances). • All workers should handle hazardous materials properly, clean up any spills that occur. • All workers must wear proper PPE at all times. <p>Hazard associated with working with Asphalt</p> <ul style="list-style-type: none"> • The application temperature of heated asphalt must be kept as low as possible. • Worker exposure to asphalt fumes and asphalt-based paint aerosols must be minimized. • Recommended PPE when working with asphalt are respiratory protection/ chemical goggles, loose clothing with closed collars and buttoned cuffs, thermally insulated gloves with gauntlets that extend up the arm, safety shoes at least 150 mm high and laced. • Long handled sprayers with flexible hoses should be used when emulsified asphalts are applied by hand for tack coats. <p>Hazardous materials plan</p> <ul style="list-style-type: none"> • The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaking (e.g., banded-container). Secondary containment system must be free of cracks and able to contain the spill. • Any leaking containers must be removed immediately from the site and appropriate remediation measures must be undertaken on resulting contaminated areas. • Chemicals should be managed, used and disposed, and precautionary measures taken as required MSDS. • Workers who may be in contact with such products must be trained on their handling and toxicity. • Hazardous material containers must be kept in designated storage areas. <p>Biological Hazards</p> <p>Covid-19 measures</p> <ul style="list-style-type: none"> • Specific posters, signs and kits in relation to Covid-19 must be available at offices and working zones. • All workers should keep proper spacing of at least 1.5 m. • All workers should wash their hands often and clean them with an alcohol-based hand sanitizer that contains 60 to 95% alcohol • All workers should wear a facemask at all times. • All workers should cover their mouth and nose with a tissue when they cough or sneeze. • All workers should avoid sharing personal items. <p>PPE</p> <ul style="list-style-type: none"> • Selection of PPE should be based on the hazard and risk ranking. • Correct use of PPE should be part of the OHS training program for employees. • Ensure that workers wear PPEs all the time during working hours. 		

Health and Safety Hazards	Activities	Impact	Significance of Impacts before mitigation measures	Mitigation Measures	Significance of Impacts after mitigation measures	Responsibility
				<ul style="list-style-type: none"> Specific PPE should be used when handling corrosive or poisonous substances and working with asphalt (NIOSH, 2003) including thermally-insulated gloves to keep asphalt from burning or irritating the skin; steel-toed safety shoes; a face shield with the safety glasses. Ensure proper maintenance of PPE, including replacement when damaged. 		
Traffic Safety: Community and Workers (in accordance with CDR/WB guidelines on TMP)	<ul style="list-style-type: none"> All activities that will affect traffic movement Transportation of raw materials 	<ul style="list-style-type: none"> Increase in movement of heavy vehicles for the transport of construction materials and equipment may increase the risk of traffic-related accidents and injuries to workers and local communities. 	High	<p>Community</p> <ul style="list-style-type: none"> Signs, barriers and traffic diversions signs (vertical signalization and signs at the beginning of work zone) should be placed prior the working zone to inform the public that routine maintenance activities are taking place. Protection screens should be mounted on the concrete barriers delineating the work zone boundaries to avoid the drivers' distraction with the routine maintenance activities, to reduce the dust and noise resulting from these activities and prevent anyone from entering the work site. Advanced warning and regulatory signs should be installed prior and along the work zone. The signs should be placed at decision-making points on routes approaching the construction site and detour to inform motorists about alternate routes to avoid the constructions works. Advisory speed limit signs should be placed in advance or the reduced speed zone to inform the drivers about any driving speed changes. Installation of signs to ensure access to nearby facilities. Pedestrian safety must be ensured namely children if the school is in the vicinity. Traffic should be allowed only in the lane not being sealed. Car must go in a direction opposite of the seal coat operation. This prevents cars being turned on freshly placed seal coat. Some emulsions may require up to 24 hours of traffic control or until the first sweeping occurs. Temporary traffic control schemes must be removed after completion of the construction activities that can mislead the drivers. <p>Workers</p> <ul style="list-style-type: none"> Regular traffic safety training sessions must be delivered to workers. Safe movement and working environment for workers must be provided (e.g. temporary traffic barriers should delimitate the work zones to protect the workers from any errant vehicle). The concrete barriers should be flared to the clear zone outer edge to avoid any vehicle head-on collision with the upstream barrier. Entrance and exit gates should be provided to allow the access of workers, trucks and other construction equipment. 	Low	Project Contractor
Road users and Nearby communities	<ul style="list-style-type: none"> All routine maintenance activities on highway 	<ul style="list-style-type: none"> Routine Maintenance on highway (e.g. Road Z0) 	High	<ul style="list-style-type: none"> The traffic management plan shall be implemented, as first stage before starting works. During the execution of maintenance works, the traffic shall be diverted to the edge lanes or to service lanes in a safe manner, ensuring the continuity of traffic circulation with an acceptable flow <ul style="list-style-type: none"> If activities will occur during daytime, the implementation of traffic management plan will divert the traffic to the edge lanes or to a service lane since traffic flow is low. If activities will occur during night time, although traffic volume is low at night, the TMP will include measures to alert road users of any detours or diversions in a clear visible manner. 	Low	Project Contractor

6 Monitoring Plans

Monitoring aims to ensure that all project activities undertaken are environmentally and socially sound, while considering the mitigation measures provided in this ESMP. It does so by defining a clear set of measurable indicators in an attempt to properly evaluate the project's performance and compliance with WB safeguards. These indicators can then be used to assist in the early detection of non-compliances. This allows the involved parties to take corrective measures and limit any unsatisfactory performance if such a case arises. It also allows them to accurately communicate the performance and compliance of the project with REP proponents.

6.1 Institutional Setup

During the routine maintenance work, the Contractor would be the primary actor; ensuring compliance of works with the different items specified in the management plans. Accordingly, the Contractor will be supervised by several entities appointed by CDR (executor of REP on behalf of MoWPT) through weekly and/or monthly reports (sent by the Contractor) and site visits, ensuring and enforcing mitigation measures. In order to achieve proper management and monitoring, a clear, functional institutional structure was defined

More specifically, the project will undergo monitoring by the CDR Project Implementation Unit (PIU) exclusively dedicated to the REP. This unit comprises specialists in social, environmental, and health and safety (H&S) aspects. Oversight of the Contractor will be directly handled by the assigned Supervising Consultant, who will, in turn, report to the PIU. This setup ensures the effective implementation of the ESMP, with the Supervising Consultant responsible for overseeing the Contractor team and ensuring project compliance. The PIU, reporting to the World Bank (WB), adds an additional layer of oversight.

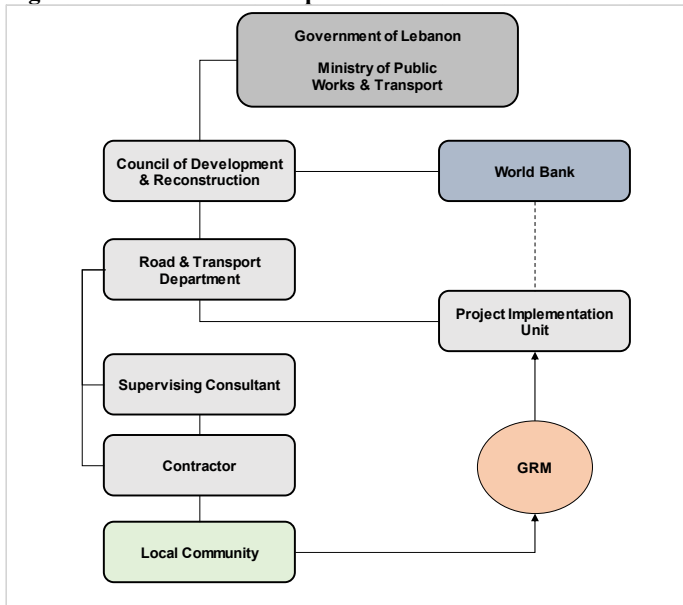
Finally, the main concerned municipalities will be involved in managing and communicating citizen's potential complaints to the CDR (PIU)

Figure 6-1).

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Finally, the main concerned municipalities will be involved in managing and communicating citizen's potential complaints to the CDR (PIU)

Figure 6-1 Institutional setup



6.2 Capacity Building

In order to ensure safeguard procedures, instruments and monitoring needs of REP are well understood by the Contractor staff, CDR (i.e. Supervising Consultant) will ensure that skilled and unskilled workers receive trainings covering environmental; social (including SEA, CAE, GBV, GRM, CoC), and OHS/First aid issues/requirements before initiation of works. These trainings aim to familiarize the Contractor’s staff on REP safeguards management and monitoring requirements as specified in this ESMP. Further, refreshers and specialized training sessions must be conducted at all times during the implementation of the project.

In practice, before commencement of work, the Contractor must develop a tailored training / capacity-building plan covering OHS, social and environmental issues that aligns with the planned specific maintenance works and road location. Accordingly, the plan, agenda and training materials need to be submitted to the Supervisor engineer for review approval.

6.3 Monitoring Plans Implementation

Contractors’ experts and officers and the Supervising Consultant’s safeguard expert will monitor the developed key indicators to ensure the implementation of this ESMP. Compliance monitoring involves visual observation/inspection, interviews with employees and external stakeholders, measurements and inspection of equipment, document review, and assessment of activities and parameters (Table 6-1).

This will allow detecting, reporting, and correcting the non-compliances. More specifically, the Supervisor Consultant must ensure that (1) Contractor staff are receiving safeguard trainings and signing CoC, (2) Contractor is filling out (a) workers’ registration and muster roll sheets; (b) complaints, and (c) environmental & OHS forms (e.g., incident forms, waste log, traffic inspection checklists, training records, equipment inspection checklists etc.) which shall be reported in the monthly progress report (3) Contractor is not hiring underage labors (age verification mechanism-regular inspection of workers IDs).

The Supervising Consultant must also inform CDR/WB on any severe accident on-site. Finally, ministries (e.g., MoE, MoA, MoC/DGA etc.) would also be expected to follow up, if deemed necessary, on the proper implementation and abidance by the relevant laws and regulations.

Table 6-1 Environmental, Social, and H&S Monitoring Plan

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
Environmental Monitoring Plan								
Air Emissions/GHG/Dust	PM2.5-10, SO _x , NO _x , O ₃ , CO, Total Suspended Particles (TSP)	Measurement (upon complains) Visual (weekly)	<ul style="list-style-type: none"> Construction vehicles exhaust Working sites for dust 	<ul style="list-style-type: none"> Single point sampling (at one quarter the diameter across the stack/source) Visual opacity Smoke inspection 	Decision 16/1 dated 2022 Particulate Matter (PM _{<10}) 50 mg/Nm ³ Sulfur dioxide (SO ₂) 10 mg/Nm ³ Nitrogen dioxide (NO ₂) 2,000 mg/Nm ³	Supervising Consultant	CDR (PIU)	(1,500 per test)
Noise	Noise Levels (Lmin, Lmax, and Leq)	Continuous during the execution of noisy operation (measurements to be conducted upon complains)	<ul style="list-style-type: none"> At the working site, especially near loud machinery and excavation sites Near sensitive receptors 	<ul style="list-style-type: none"> One sample per location (near sensitive receptors) 	Decision 52/1 dated 1996 and international standards when more stringent (refer to section 2.3)	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
WW Generation	Domestic-like wastewater	Monthly	<ul style="list-style-type: none"> Polyethylene storage tank (in case porta cabin toilet is not linked to WW network) 	<ul style="list-style-type: none"> Visual inspection ensuring no leaks from tank 	Lebanese and International standards (refer to section 2.3)	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Accidental Releases	Number of spills/leaks (of lubricants, oil, fuel, or other chemicals)	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> Around the Routine maintenance site, especially near equipment, material, and storage tanks 	<ul style="list-style-type: none"> Visual inspection 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Solid Waste storage, transport, and disposal	Collection and transport of the generated waste to the designated site.	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> Solid Waste Collection Point Storage areas Transport trucks 	<ul style="list-style-type: none"> Visual inspection Review of solid waste log 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Biodiversity Monitoring								
Biological Resources	Ecological audit for particular biotopes	When maintenance activities will occur near critical natural habitats	<ul style="list-style-type: none"> Riparian habitats near rivers 	<ul style="list-style-type: none"> Samples and photos per location and GPS point 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Social Monitoring Plan								
SEA/SH	<ul style="list-style-type: none"> CoC signed by new workers Delivery of induction training (including GBV) 	Before commencement of works or every time a new worker is recruited	<ul style="list-style-type: none"> At site office 	<ul style="list-style-type: none"> Signed CoC Number of workers trained Training attendance sheet Interview with workers Review of received GBV-related grievance 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
	<ul style="list-style-type: none"> GBV-related internal grievances 	Upon grievance occurrence	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Received complaints and GRM records 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Social Tensions and Conflicts over Job-Sharing	<ul style="list-style-type: none"> Number of related grievances Percentage of workers (based on gender, nationality) 	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Received complaints and records Check workers 'sheets 	N.A.	Supervising Consultant	CDR (PIU)	-
Obstructing Access to Amenities	<ul style="list-style-type: none"> Type, location, and duration of amenity to which access was obstructed 	Before and during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Visual inspection Complaint records 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Working conditions	<ul style="list-style-type: none"> Labor's wages and working hours GRM in place Grievances recorded 	Monthly	<ul style="list-style-type: none"> Laborers' contracts 	<ul style="list-style-type: none"> Review workers' complaints records Interview with workers Labor law verification 	Lebanese Labor Law dated 1946	Supervising Consultant	CDR (PIU)	-

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
Child labor	<ul style="list-style-type: none"> Labor's age 	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Labor registry Government-issued IDs and Badges (age verification) 	Lebanese Labor Law dated 1946	Supervising Consultant	CDR (PIU)	-
Underemployment of Women	<ul style="list-style-type: none"> Percentage of female employees in workforce 	Monthly	<ul style="list-style-type: none"> At site office 	<ul style="list-style-type: none"> Labor registry 	N.A.	Supervising Consultant	CDR (PIU)	-
Other Grievances	<ul style="list-style-type: none"> Internal and external grievance reports 	Upon grievance occurrence	<ul style="list-style-type: none"> At each routine maintenance site 	<ul style="list-style-type: none"> Complaints records 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Safety monitoring Plan								
OHS	<ul style="list-style-type: none"> Regular OHS- training- OHS – verifying training logs (covering all OHS matters) Total number of work injuries Recorded incidents including near misses Availability of safety barriers along the concerned road segment Availability of OHS procedures onsite (JHA, work permits...etc.) Presence of qualified OHS officer and foremen onsite Ensure use of PPE Availability of fire extinguishers onsite Good housekeeping onsite OHS-related internal grievances recorded Covid-19 precaution measures in place Traffic violations and accidents recorded (number of accidents) 	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Attendance sheet Employee records OHS incident form 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
		Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site office 	<ul style="list-style-type: none"> Review of OHS records (inspection reports, follow-up reports, incidents, and training records) Review of covid-19 checklist (reported cases) Inspection of driving license, drivers' medical checkup reports, and drug tests Review of traffic inspection checklists 	WBG OHS guidelines for construction sites CDR OHS guidelines OHS national laws/decrees Lebanese Traffic Law 243 dated 2012 (licenses requirements) MoPH guidelines/measures in relation covid-19	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Traffic Hazards	<ul style="list-style-type: none"> Safe traffic flow on roads under maintenance in accordance with TMP Availability of adequate safety and warning signs and restricted access measures Availability of Flagmen Availability of appropriate safety barriers Availability of TMP onsite, where (fully implemented) Availability of qualified Traffic Safety officer onsite, 	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Visual inspection 	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
	<ul style="list-style-type: none"> Availability of logs and records of traffic incidents...etc. 							
Other Impacts – Monitoring								
Damage to existing infrastructure	<ul style="list-style-type: none"> Type, size, and number of damaged infrastructure entities 	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> Visual inspection 	N.A.	Supervising Consultant	CDR (PIU)	-
Risk on cultural resources	<ul style="list-style-type: none"> Possible archaeological features found during the works Adequate implementation of the archeological chance find procedure. 	Upon discovery	<ul style="list-style-type: none"> At routine maintenance site 	<ul style="list-style-type: none"> ID and photographic records of all archaeological features found during the works 	Lebanese Antiquity Law No. 166	Supervising Consultant	DGA	-

6.4 Documentation and Reporting

Monitoring yields lots of data regarding project performance. As a result, proper documentation is necessary for two reasons: first to prepare and send performance reports to the concerned parties and second to analyze the acquired data and implement changes when necessary. In this context, monitoring reports will take place as described below.

- Contractor's experts submit compliance reports to the Supervising Consultant on a monthly basis including completed workers' sheets, GRM log, and environmental and OHS forms - these forms should encompass a wide range of information, including but not limited to: Environmental, Social, and OHS indicators that have been monitored since the last monitoring visit; details about the condition of the workstations; Information about the prevailing weather conditions during the reporting period; Photographic documentation to visually support and illustrate the reported information. This is to provide a comprehensive view of the project's compliance with environmental, social, and OHS standards, as well as the conditions at the work site.
- The Supervision Consultant experts review and approve contractor reports and submit them to PIU on a monthly basis.
- PIU submits environmental/social progress as part of their quarterly project progress reports to the WB on a quarterly basis.

All incidents must be recorded and reports in the regular monthly progress reports. Whereas, in case of severe incidents (e.g. fatality on site) immediate reporting within 24 hours to CDR and within 48 hours to the WB must be done.

7 Consultation, Disclosure and GRM

7.1 Public Consultation

PAPs, mainly municipalities, in addition to local residents represented by local NGOs, and International NGOs were consulted on the project's environmental and social aspects (list of attendees is attached in Annex 8).

The public participation meeting was held at Zahle Municipality building on Monday August 21, 2023. Invitations were sent by the consultant on behalf of CDR to concerned municipalities and NGOs through official letters. A sample of the invitation letter is attached in Annex 8. Invitations were sent to the concerned parties at least one week in advance from the meeting date. The number of attendees was 11 of which only two were woman.

Invited local NGOs and organizations include Yasa, Abaad, Kafa, and Lost. Caritas was invited as well. As for international NGOs, ACTED, ANERA, DRC and UNHCR were invited. Only Caritas and UNHCR attended the meeting.

During the meeting, attendees were informed about the project objectives, project design, the identified natural, economic, and social resources of importance in the area, the project's possible risks, and the planned mitigation measures. They were informed as well that a multi-channelled GRM was established for REP project in Zahle Caza to register and address grievances and complaints from all project stakeholders. REP GRM was disseminated, and it was explained that for each worksite, a QR code will be added on the project sign board (which

includes the project GRM and the online feedback form before the commencement of work). This will ensure addressing/responding to grievances and reporting to stakeholders as indicated in the ESMP (all complaints will be individually followed up).

The discussion primarily focused on the road selection process for routine maintenance activities. Accordingly, the Consultant explained in details the selection process and the collaboration between the Ministry of Public Works and Transportation (MoPWT) and CDR to select the roads for routine maintenance works— MoPWT provides a list of candidate roads to CDR, who will then assess their eligibility for routine maintenance activities, with the Consultant Engineer undertaking the eligibility assessment.

Municipalities expressed their intention to submit letters requesting the inclusion of specific roads in the project's scope to the MoPWT. Accordingly, they were assured that the Consultant engineer will assess the potential for including the requested roads.

Consequently, the Head of the Zahle municipality proposed the addition of Dahr el Baidar road to the project's scope due to the necessity for lighting and road marking improvements. Attendees also highlighted the significance and heavy usage of the Majdel Anjar road. Additionally, recommendations were made for maintenance efforts on the road connecting Zahle to Fakour, as well as the road section from Mrayjat to the Mdayrij bridge.

In a side conversation with UNHCR representatives, discussion focused on the employment mechanisms within REP. Additionally, the consultant elucidated the details of job allocation, as well as the safeguards and legal provisions designed to ensure employee protection throughout the duration of their contract engagement. The consultant provided an elaboration on the ESMP measures discussed in the presentation. These measures pertain to labor conditions, contractual clauses essential for worker protection, the CoC addressing GBV concerns and the planned training sessions for workers and awareness raising sessions on issues regarding SEA, GBV prior to signing the CoC. In addition to project GRM (GRM for workers) and operational referral pathways that will remain active throughout all project stages.

Finally, attendees were informed that all relevant municipalities will be informed beforehand, prior to the commencement of works, about the project (i.e. once roads are determined). Additionally, a public notice will be posted at each relevant municipality, including the GRM procedure, to ensure transparent implementation of the Project's activities.

7.2 Grievance Redress Mechanism (GRM)

A multi-channeled GRM was established for REP project in Zahle Caza to register and address grievances and complaints from all project stakeholders. Anonymous grievances will be addressed in both GRMs for communities and workers. The maximum anticipated time needed to close a GRM case is 45 days.

7.2.1 GRM for Surrounding Communities

The REP GRM has been established and is already accessible to communities to send their concerns and complaints. Citizens will be informed about the GRM mechanism before commencement of work through municipalities (i.e. through public announcement letters that will be posted at the public board of concerned municipalities including the number of

Contractor's site engineer to be contacted and also through project sign boards). REP GRM levels are as follows and the schematic illustration is shown in Annex 5:

- Level 1: If any person has any complaint or concern regarding the project implementation, he/she can lodge an oral or written grievance to the site engineer. In case an oral complaint is made, it should be written by the Contractor Social expert. The issue must be resolved within a maximum duration of one week.
- Level 2: If the person is not satisfied with the action of the Contractor, he/ she can send the complaint to the PIU social specialist through Phone: 01980096 ext:317, Email: GRM.REP@cdr.gov.lb or official letter registered at the CDR. The issue shall be resolved within a maximum of two weeks.
- Level 3: If the person is not satisfied with the decision of the social specialist of PIU, he or she can bring the complaint to the attention of the PIU Director's Office through phone call (01980096 ext:159). Once the PIU Director receives the complaint, it needs to be resolved within a maximum of two weeks. Citizen can also register an official letter at the CDR (Address: Tallet al Serail - Riad el Solh, Beirut – Lebanon).

All complaints will be individually followed up on and documented accordingly in a GRM log. The designated person at each level should report to the PIU on the number and subject of new complaints received, and the status of the already existing complaints, if any (i.e. the Contractor social expert will report to the Supervising Consultant expert who will report monthly to the PIU (CDR) who will, in turn, submit the consultants' monthly reports to the WB). The Complaints Register form or GRM log (refer to Annex 5) includes details/ nature of the complaint, the complainant's name and their contact details, date, corrective actions taken in response to the complaint.

Finally, an online form has been designed using the IMPACT platform to allow citizens to share their feedback (<https://cdr.impact.gov.lb/worldbankmobile/home/main?lang=en>). The link was shared with concerned municipalities and NGOs during the public participation meeting. It was also clarified that for each worksite in Zahle a link to the form will be shared with the local communities via location-based SMS, email and social media. At each worksite, a QR code will also be added on the project sign board (which already includes the project GRM) to automatically direct participants to the online form.

7.2.2 GRM for Workers

Similar to the GRM for surrounding communities, a GRM for internal employees, namely the labors onsite are also necessary. It aims to allow labors to report any wrongdoings in their favor or important concerns they might have. Workers must be informed about this GRM before commencement of works through induction training (refer to section 6.2). This internal GRM is similar in nature to the one previously discussed (in terms of accessibility, reporting means, etc...). The only main difference is the contact people for each level. In this context, the first level involves reporting to the health and safety officer and the social expert and has a duration of one week. The second level involves reporting to the PIU Director and should be resolved within one weeks. It also follows the Complaints Register form (refer to Annex 6).

8 Conclusion

Assessments showed that the project risks are localized, moderate, and can be mitigated if the Contractor succeeded to implement this ESMP in an adequate manner, which documents the project's risks management strategy. In order to achieve that, CDR (i.e. the Supervising Consultant) plays a major role in assisting and supervising him during project implementation.

Most importantly, this ESMP guides the Contractor on critical road segments (e.g. segments of roads that are critical in terms of factors such as transmissivity, proximity to rivers, sensitive receptors, and critical natural habitats) that need special care if they are to be maintained.

Noting that local communities were engaged at this phase of the project. However, engaging stakeholders including local and regional (when needed) communities is a continuous process that needs to be effectively adopted by the Contractor.

Finally, if the Contractor succeeded in complying with standards and in ensuring a safe operation of activities, the project is expected to enhance the safety conditions of the concerned roads and most importantly create short-term employment opportunities to local residents and Syrian refugees.

9 References

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10 Annex 1: Figures and Tables Related to Chapters 2 and Chapter 3

Table A National Applicable Legal Framework

Relevant Sector	Legislation	Date	Brief Description	Relevance to The Project
Environment	MoE Decision 52/1	29/06/1996	Environment quality standards and criteria for air, water and soil pollution. Revised standards for water, air and soil pollution (partly updated in Decision 8/1 dated 30/1/2001).	Decision 52/1 was referenced in the study to specify the National Standards for Environmental Quality and the Environmental Limit Values for Air and Water. The described decision (Annex 12 in decision 52/1) was used for monitoring air emissions.
	Decision 8/1	30/01/2001	Amendment to part of MoE Decision 52/1 dated 29/6/1996. National Standards for Environmental Quality (NSEQ) that covered air and liquid emissions for all sectors.	This decision will be used to monitor air and water quality during implementation of project activities.
	Law 444	29/07/2002	Environment Protection Law: Fundamental principles and public rules (7 parts, 68 articles), Organization of environmental protection, Environmental information system and participation in the management and protection of the environment, Environmental Impact Assessment, Protection of environmental media, Responsibilities and fines. Other regulations (miscellaneous, institutional).	It is essential for the proposed project as the protection of the environment is a must throughout all of the steps of the project.
	Law 77	13/04/2018	Water Resources Law	Penalizes unauthorized discharges or disposal of any kind of waste in water resources
	Law 78	13/04/2018	Law for the protection of air quality	The requirements of the law shall be adhered to for the management of air emissions from the project
	Law 80	10/10/2018	Integrated Solid Waste Management which sets integrated solid waste management principles and provides guidelines for the management of waste.	Solid waste generated during the project should be managed in accordance with Law 80, which includes limiting quantities generated, when possible, as well as properly disposing of any generated waste.
	Decree 5605	11/09/2019	Decree 5605 focuses on the importance of source sorting, reducing and reusing, the sorting method according depending on the type in order to protect the environment and reduce the damages.	The generated domestic solid waste are to be properly sorted as per decree 5605
	Decision 16/1	2022	Updated ELVs for air quality stated in Decision 8/1 and stated additional parameters for various industries.	Exhaust emissions from mobile onsite generators and heavy machinery should abide by the standards set in this decision

Health and safety	Law 64	12/8/1988	Protection against hazardous wastes that could harm air, water, biodiversity, soil, and people.	Precautionary measures should be taken to limit any potential damage from generated hazardous wastes (if any)
	Decree 11802	30/01/2004	Occupational health and safety decree	The occupation health and safety conditions during maintenance works should comply with this decree.
Labor Laws	Labor Law	23/09/1946	Labor Law that sets basic labor rights in Lebanon including minimum working age, working and resting hours etc....	It protects employees from any sort of violations dictated in this law.
	Law 335	2/8/2001	This law is the ratification of ILO convention No. 182: The agreement required the ratifying country to take immediate and effective measures to prohibit the worst forms of labor and eliminate it and specify the types of work that harm the health, safety or ethical behavior of children and their location.	Does not allow the employment of children and protects them from engaging in any work activities that could harm their health and safety.
	Law 400	5/6/2002	This law is the ratification of ILO convention No. 138: This agreement aims to develop a general instrument on the subject of minimum age for employment to gradually replace the instruments applied in specific economic sectors, aiming to completely eliminate child labor	Minimum age of employment on tasks and works that pose risks or hazards to health and safety
	Decree 8987	29/09/2012	Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals	Adhere to the requirements of this decree with regards to employment for this project.
	Decree 3791	30/06/2016	Sets minimum wage for employees and workers	Adhere to the requirements of this decree with regards to wages of employees on this project.
Traffic	Law 243	22/10/2012	Aims at the elimination of any kind of traffic violations such as: exceeding the speed limit, driving without a license or driving under any substance alternating the normal mental and physical state.	All transportation vehicles utilized during project implementation should abide by the general rules specified in Law 243.
General	Decree law 166	7/11/1933	Antiquity law (166/LR) regulates antiquities and Directorate General of Antiquities (DGA) has the authority to halt any development that is damaging archeological deposits.	Defines chance find procedures that should be followed in case antiquities were identified in the project site
	Decree 340	01/03/1943	The text of Article 522 of the Lebanese Penal Code, applies to cases of assault of women, by force, violence, and manipulations which are acts that affect a woman's dignity, physical health, psychological state, and moral integrity.	This law was mentioned as the project may hold risks on women during maintenance work.

Law 118	30/06/1977	Municipalities Law. It stipulates the role of the Municipalities and Municipalities councils.	Defines the roles of municipalities in the provision of environmental services such as solid waste management, wastewater management, etc.
Law 58	29/05/1991	Law of properties and expropriation	Despite that no expropriation activities will be done; this law is added because OP 4.12 was triggered by the project.
Law 53	14/09/2017	Abolishment of article 522 of the penal code that exempts a rapist from punishments if he marries a victim	This law was mentioned as the project may hold risks on women during maintenance works (influx of workers (men) to the concerned area).
Law 28	16/02/2017	Right to access information.	This law should be followed throughout the implementation of the project.
Decree 6940	24/09/2020	Determining the minutes of application of Law No. 28 date.	This decree should be followed throughout the implementation of the project.
Law 205	30/12/2020	Criminalizing sexual harassment and habilitating its victims.	This law should be implemented, in case of sexual harassment.

legislative body is represented by the Lebanese Parliament that approves and issues Laws. Lebanon's executive body is represented by the Council of Ministers (COM) and is headed by the Presidency of the Council of Ministers. The COM enacts regulations in the form of Decisions (denoted COM Decision Number) and Decrees. Decisions are issued by a specific minister and are limited to the affairs of the ministry that promulgated it. Ministerial Decisions are subject specific

Table B Institutional framework

Institution	Roles and Responsibilities
MoPWT	MoPWT is responsible for the management of public roads, and for developing a sustainable strategy for the transportation sector within the urban and rural areas. <ul style="list-style-type: none"> MoPWT will work closely with CDR during project implementation to ensure that important decisions on road (selection priorities, road designs, equipment specifications, and road asset management) are well coordinated.
CDR	CDR is a public institution established through Decree No. 5 dated 31st January 1977. CDR's main responsibilities is to: <ul style="list-style-type: none"> Coordinate with relevant government agencies and with the relevant government agencies, particularly MoPWT, regarding roads priorities, technical aspects, and project's requirements. Monitor the project. In particular, every six months CDR must submit to the Bank project progress reports summarizing all project aspects and progress achieved in project implementation.
Municipalities	<ul style="list-style-type: none"> Municipalities in Zahle Caza are responsible for their municipal area. According to Decree 118/1977, municipalities are responsible for supervising projects' implementation in their municipal territories. In this context they were consulted for this project.
Ministry of Environment (MoE)	<ul style="list-style-type: none"> MoE is responsible for planning and monitoring of environmental issues. MoE is in charge of protecting the environment in general, setting regulations and standards, and advising on implementing projects and programs in a sustainable manner. Accordingly, this ESMP must comply with the Lebanese environmental standards and regulations issued by MoE.
Ministry of Agriculture (MoA)	<ul style="list-style-type: none"> MoA is responsible for monitoring all activities related to forestry and agriculture. It regulates the introduction of new species in agriculture and livestock, protects, supervises and manages natural resources and provide technical assistance whenever necessary. The REP will not involve the construction of new roads or widening of existing ones (i.e., no tree cutting will occur). However, in the context of maintenance works, if the contractor had to cut native trees for traffic safety issues, the MoA must be consulted. Tree cutting permits are provided by MoA.
Ministry of Energy and Water (MoEW)	<ul style="list-style-type: none"> Monitoring the quality and determination of surface and groundwater. Design, study, and implement major water infrastructure installations. Protecting water resources from waste and pollution by taking the necessary measures to prevent pollution.
Traffic Department at the Internal Security Forces	<ul style="list-style-type: none"> Ensuring public safety Maintaining regular traffic control
Ministry of Labour (MoL)	<ul style="list-style-type: none"> MoL is responsible for all labour and employment issues. Labour inspection is the responsibility of the Department of Labour Inspection, Prevention and Safety (DLIPS) under the Labour Relations Authority of the MoL. DLIPS supervises the implementation of all laws, regulations, decrees and rules pertaining to the terms and conditions of employment, and the protection of workers in the workplace, including the provisions of international labour Conventions ratified. Labour inspectors ensure the supervision of compliance with regulations regarding conditions of employment and protection of workers including occupational safety and health. The works contracts must comply with the national law on labour and the ILO obligations, which have been ratified by Lebanon

Table C Labor Conventions

ILO Convention	Name	Entry into force	Ratification Date	Description	Relevance to Project
ILO no. 29	Convention Concerning Forced or Compulsory Labor	01/05/1932	25/06/1977	Its object and purpose are to suppress the use of forced labor in all its forms irrespective of the nature of the work or the sector of activity in which it may be performed. With some exceptions such as military service.	This project should abide by this convention to protect employees from being forced into any type of work activity that they do not want to engage in.
ILO no. 105	Abolition of Forced Labor Convention	17/01/1959	25/06/1977	Aims at the elimination of forced labor and cancels certain forms of forced labor still allowed under the Forced Labor Convention of 1930	This project should comply with the guidelines of this convention in order to protect employees from being forced into any type of work activity without their will.
ILO no. 111	Discrimination (Employment and Occupation) Convention	15/06/1960	25/06/1977	Enable legislation which prohibits all discrimination and exclusion on any basis including of race/color, sex, religion, political opinion, national or social origin in employment.	This project should abide by this convention to ensure a healthy environment between the employees and between the employer and employees in the work place by enforcing equality and respect between them.
ILO no. 122	Employment Policy Convention	09/07/1965	25/06/1977	Aim at ensuring that there is freedom of choice of employment and the fullest possible opportunity for each worker to qualify for, and to use his skills and endowments in, a job for which he is well suited, irrespective of race, color, sex, religion, political opinion, national extraction or social origin.	This project should comply with the guidelines of this convention to ensure that employees are given the right opportunities, based on their qualifications, irrespective of their origin, affiliations.
ILO no. 138	Minimum Age Convention for Admission to Employment and Work	19/06/1976	25/06/1977	It stipulates that States should progressively raise the minimum age to a level consistent with the fullest	This project should abide by this convention in order to abolish the employment of children below the

				physical and mental development of young people. It establishes 15 as the minimum age for work in general and 18 as the minimum age for hazardous work.	specified minimum age.
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Table D International treaties and conventions in relation to REP

Date	Convention/Agreement	Status	Relevance to Project
1992	United Nations Framework Convention on Climate Change.	Covered by Law No. 359 dated 11th August 1994.	This project must control activities that release green-house gases such as emissions from machineries used (most of which rely on fuel).
1992	Rio de Janeiro Convention on Biological Diversity.	Covered by Law No. 360 dated 11th August 1994.	This project should abide by this convention to avoid or control activities that may pose a threat on biodiversity at all levels, since improvement of roads sometimes leads, directly or indirectly, to the loss and degradation of natural habitats and biodiversity.

Table E Raw material and items needed for routine maintenance work

Item	Description	Unit
B	Incidental Repair Works	
B1	Clearing and Grubbing	m ²
B2	Repair and adjustment of manholes (replace damaged ones)	Nr
B3	Cleaning of waterways hydraulic structures, drainage pipes and box culverts	m ³
B4	Galvanized Steel Guardrail	lm
B5	Repairing Mortared Masonry wall	m ²
C	Pavement Repair Works	
C1	Shallow Patching works	m ²
C2	Deep Patching works	m ²
C3	Crack sealing	lm
C4	Trench Shallow Patching	lm
C5	Trench Deep Patching	lm
D	Concrete Repair Works	
D1	Cast-in-situ Reinforced concrete, Class 250/20 (B25) for repair of box culverts, headwalls and wing walls, concrete channels and retaining walls (all types and shapes)	m ³
D2	Plain concrete for patching for deteriorated concrete in culverts, channels, walls and safety barriers	m ²
D3	Cast-in-situ Reinforced concrete, Class 250/20 (B25) for channel's cover	lm
E	Traffic Control Devices and Safety Barriers	
E1	Road Paint Lines width	m ²
E2	Special Road Marking	m ²
E3	Cats eye	Nr
E4	Bituminous speed humps	m ²
E5	Rumble strips	lm
E6	Delineators J4	Nr
E7	Small Signs	m ³
E8	Concrete Single Face New Jersey Barrier free standing. Concrete class 360/20	lm

11 Annex 2: Figures and Tables Related to Chapter 4

Figure A Topography map for Zahle Caza

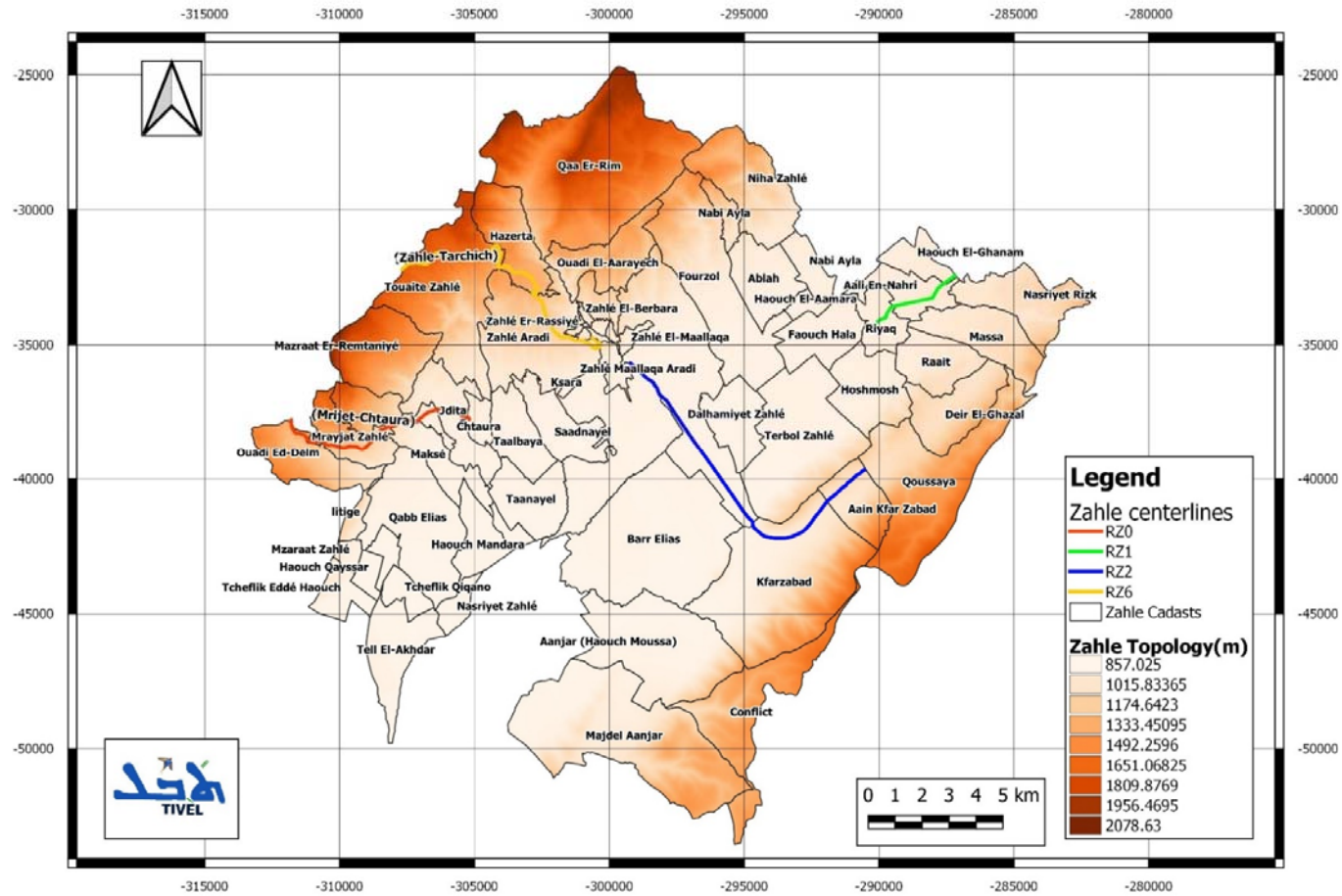


Figure B Geology map of Zahle Caza showing exposed outcrops and % of exposure of each class

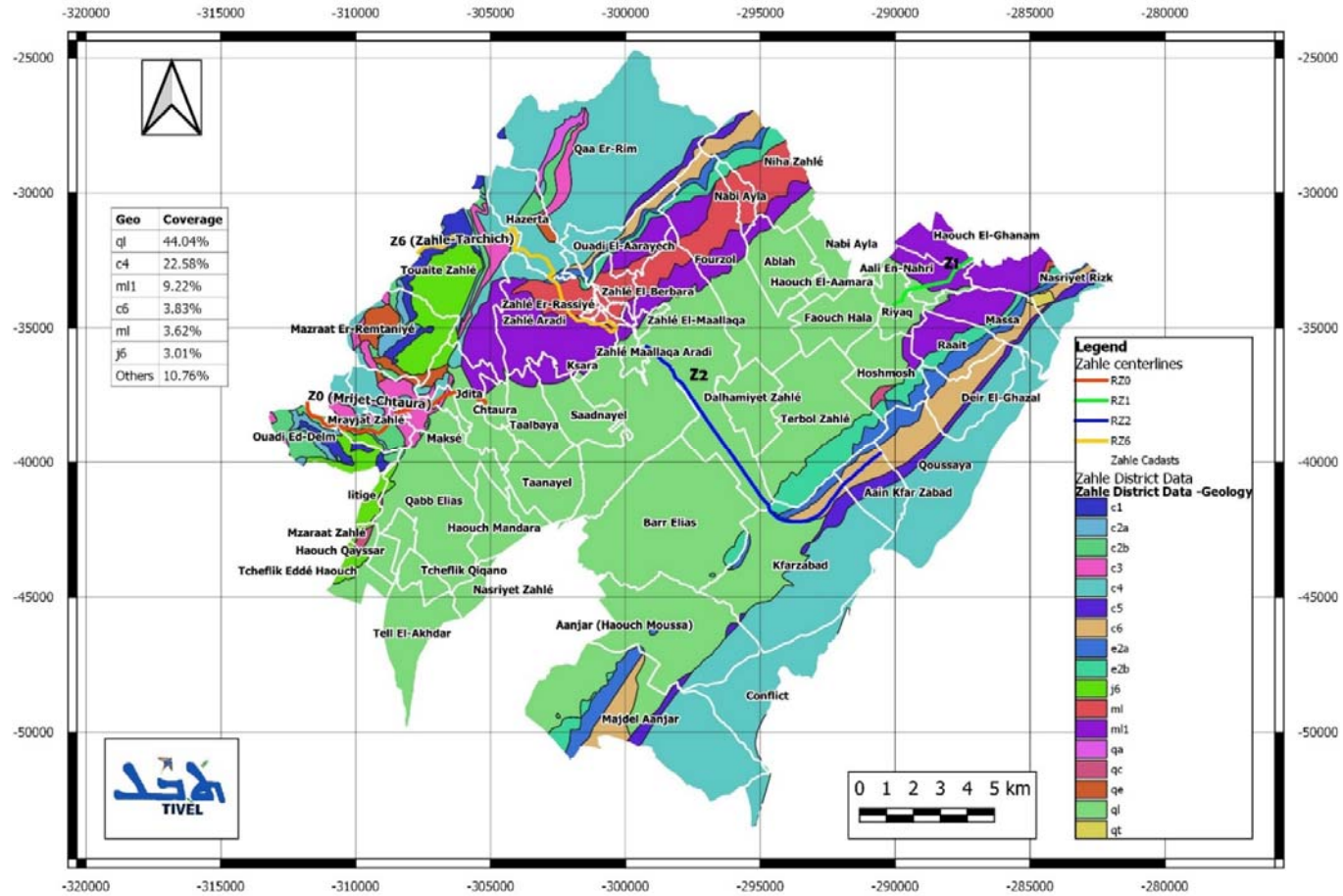


Table F Summary of main geological outcrops exposed at Zahle Caza (Dubertret, 1945)

Geology	Name	Description
C ₄	Sannine Limestone, of Cenemonain age	(C ₄); this unit is divided into three subunits: C _{4a} : Dolomitic Limestone, within this formation, geodes of different sizes filled or voided can be recorded. Thickness of this unit is about 300 meters. C _{4b} : Bluish marl and shale containing crystals of quartz, chert nodules and bands form. Thickness of this unit is about 100 meters. C _{4c} : Limestone and dolomitic limestone white to brown in color. Limestone is highly karstified. Thickness of this unit is about 300 meters.
C ₆	Chekka	White chalks, marly chalks with phosphate Upper unit with Paleocene not well defined
J ₆	Bikfaya Limestone, Portlandian epoch	Finely crystalline, massive, cliffy Limestone that includes trace to abundant brown chert nodules. This formation is chemically deposited with smooth fresh fracture. The thickness of this unit is ranging from 60 to 65 m and Type section is Bikfaya.
Q	Quaternary formation	Quaternary formation belonging to the Quaternary age. This formation can reach a thickness of 100 m and typically consists of sandy beaches, detrital LS, conglomerates, volcanic coastal or alluvial deposits
ml	Miocene	Red marly LS continental conglomerates, sequences of thick fractured LS

Table G Geological classes coverage (%) per each representative roads in Zahle Caza

RZ1	Coverage
ml1	59%
ql	41%
RZ2	Coverage
ql	67%
c6	31%
e2b	2%
RZ0	Coverage
c2b	31%
c3	26%
c2a	17%
ql	16%
c4	6%
ml1	4%
RZ6	Coverage
c4	36%
c1	19%
ml1	18%
ml	15%
c3	4%
c2a	4%
e2a	3%
c2b	1%

Figure C Hydrogeology map of Zahle Caza (showing water potential of the subsurface)- Refer to table I for description of hydrogeology classes

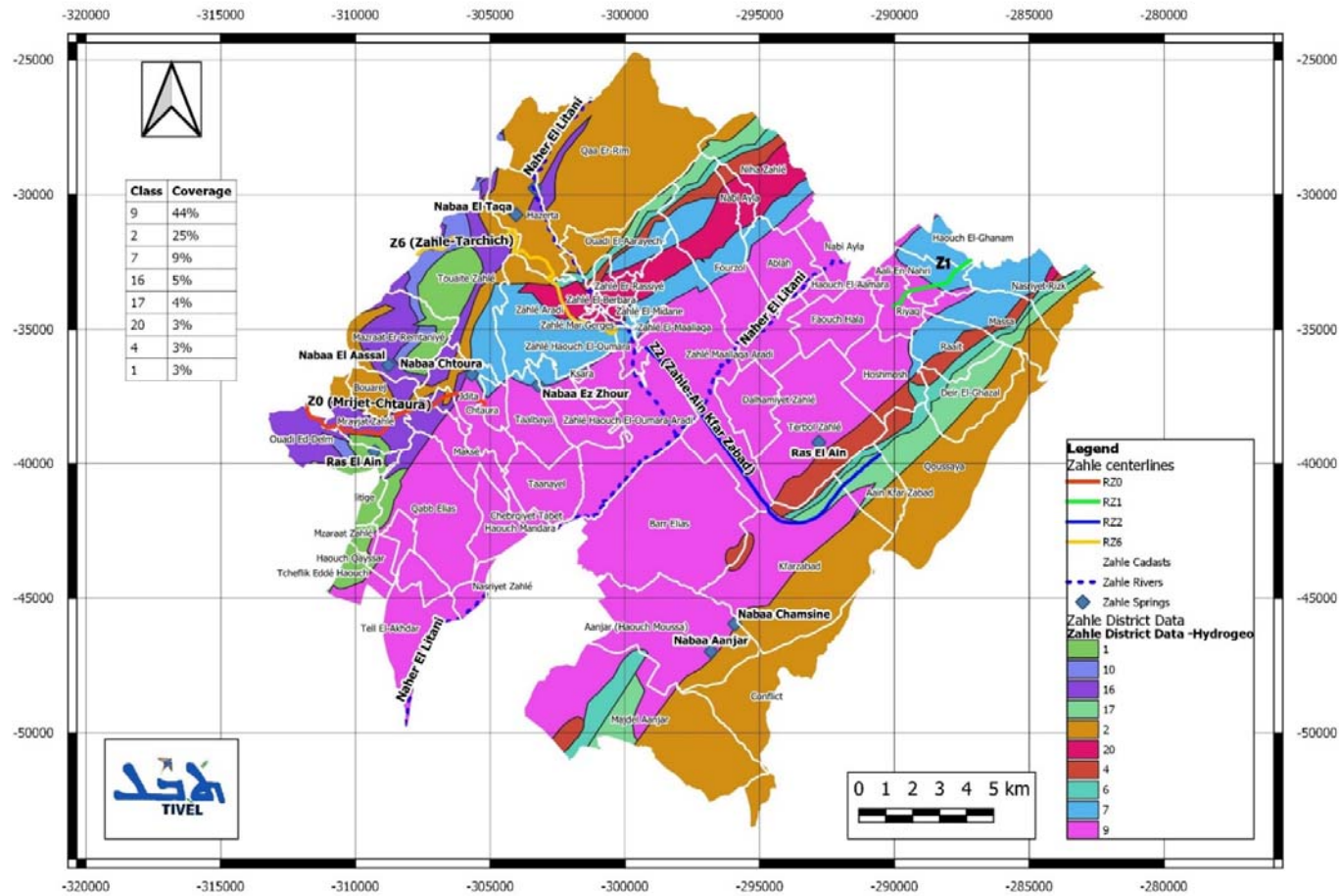


Table H Summary of hydrogeological classes exposed for all Zahle roads (legend of hydrogeological map)

Geology Class	UNDERGROUND SHEETS OF WATER		LITHOLOGIE	AGE	FLOWS OF the SOURCES I/sec.	PROBABLE INSTANTANEOUS FLOWS OF THE WORKS I/sec.	Transmissivity m ² /sec
			FACIES				
1	IN KARSTIC FORMATIONS Wide and rich watertable		Massive limestones and dolomitic limestones with intercal. marls Thickness: >1000 m.	JURASSIQUE Bathonien-Portlandien	<100 100-1000 >1000	>100	10 ⁻² ≤ T ≤ 1 Generally high
2			Limestone regularly bedding Thickness: 800 à 1000 m.	CRETACE Cénomanién-Turonien	<100 100-1000 >1000	>100	10 ⁻² ≤ T ≤ 1 Generally high
4			Reef limestones Thickness: 100 to 800 m.	NUMMULITIQUE Eocène	100-1000	<100	10 ⁻⁴ ≤ T ≤ 10 ⁻² Often High
7	IN POROUS FORMATIONS	Water Table extended	Coarse conglomerate torrential - marly conglomerates Thickness: 500 to 600 m.	NEOGENE Miocène et Pliocène (faciès continental)	<100 OR DISCHARGES DIFFUSE DISPERSEE	<30	<10 ⁻³ Poor or changing
9			Silt and "terra rossa" Thickness: 600 m.	QUATERNAIRE	DIFFUSE DISCHARGE	<10	Poor with weak very changing
16	AREAS GENERALLY WITHOUT WATER TABLE OR A VERY LOCAL WATER TABLE		Alternations of clay-sandy, limestone beds and marl Thickness: 300 to 400 m.	CRETACE Aptien_Albien	<5 (Sources intermittentes)	<5	Weak with very weak
17			Marl and marl-limestone thickness: 100 to 200 m.	CRETACE Sénonien et base de l'Eocène	-	Very weak	Very weak
20			Marnes et marno-calcaires Epaisseur: ~ 900 m.	NEOGENE Faciès continental	-	very weak	Weak with very weak

Table I Hydrogeological classes coverage (%) per each representative road in Zahle Caza

Road Z0 (Mrayjet –Chtaura)	
Hydrogeology class	Coverage (%)
16	81%
9	14%
2	5%
Road Z6 (Zahle-Tarchich)	
Hydrogeology class	Coverage (%)
2	38%
7	19%
10	15%
20	13%
16	13%
6	2%
Road Z1 (Rayak- Ali Nahri)	
Hydrogeology class	Coverage (%)
9	52%
7	48%
Road Z2 (Zahle- Ain Kfar Zabad)	
Hydrogeology class	Coverage (%)
9	72%
17	28%

Table J Rivers in respect to assessed road

Road	Z0 (Mrijet-Chtaura)	Z1 (Rayak-Ali Nahri)	Z2 (Zahle-Ain Kfar Zabad)	Z6 (Zahle-Tarchich)
Distance from Naher El Litani (Litani River)	1733 m	8196 m	Intersect in Zahle Maalaqa Aradi	212 m

Table K Springs in respect to assessed roads

Spring	Road	Distance (m)
Nabaa Chtoura	Z0 (Mrijet-Chtaura)	757
Nabaa El Taqa	Z6 (Zahle-Tarchich)	594
Ras El Ain	Z0 (Mrijet-Chtaura)	637

Figure D Distribution of air pollutant Nitrogen Dioxide (NO₂) in the troposphere above the Lebanese border average from year 2018 up to August 2023 (data retained from Sentinel-5 precursor/TROPOMI Level 2 Product

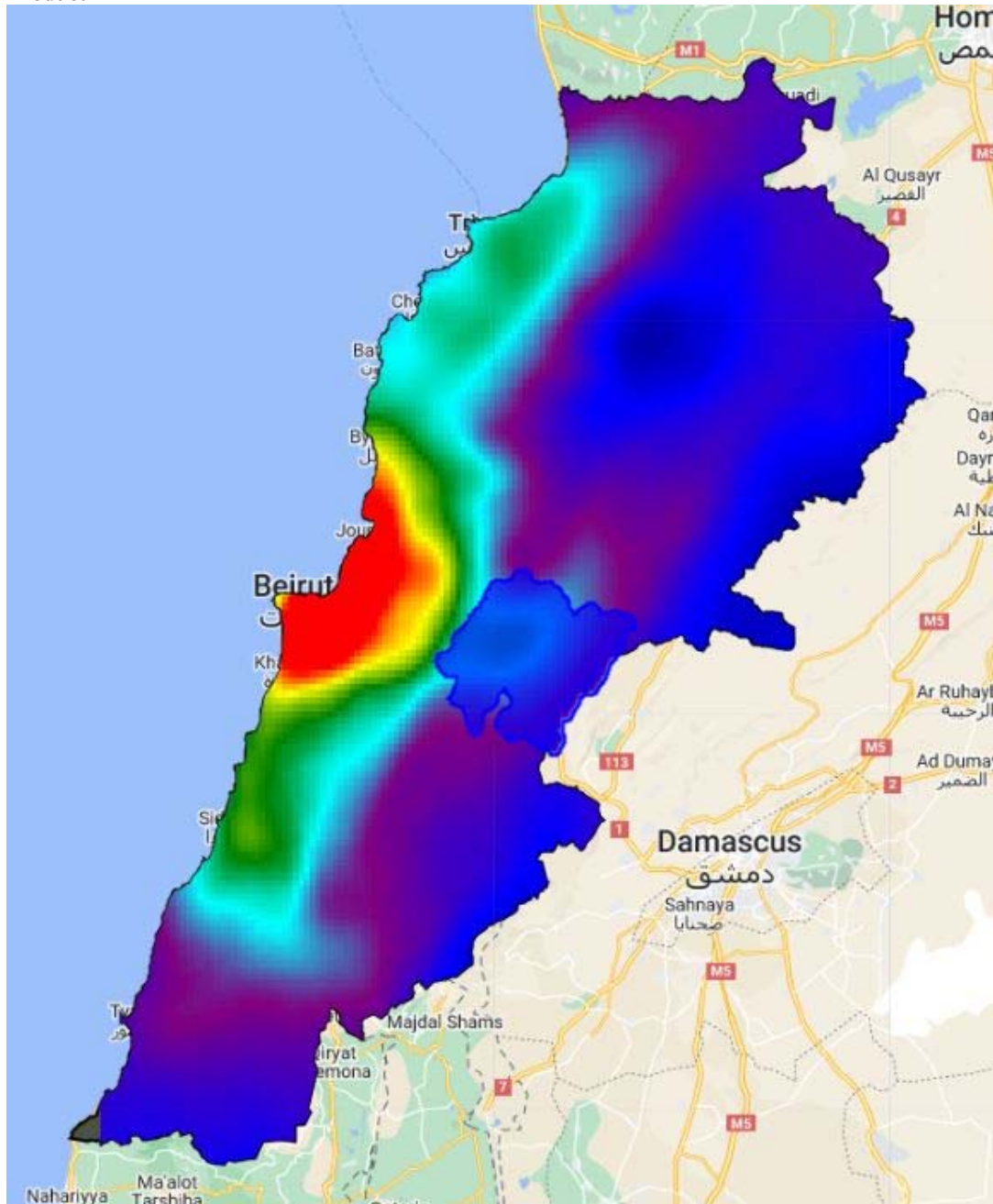
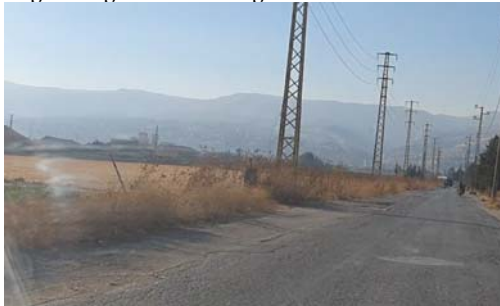


Table L LULC analysis for Zahle Caza

LULC analysis	Field observations
Grasslands	Grasslands used for agriculture and forage (croplands) Degraded grasslands
Outcrops bare rock and bare soil	Bare rocks in garrigue fallow lands
Low density oak forests	Oak stands dominated by Kermes oak
Shrubland	Open garrigue vegetation Stony scrubland
Field crops in small fields/terraces, deciduous fruit trees, vineyards, olive groves	Crops of wheat and vegetables Olive groves (<i>Olea europaea</i>) and fruit trees
Low density Cypress forest	Lines of cultivate cypress trees
Medium and low density urban fabric Extraction sites	Rural settlements and urbanized areas Extraction sites

Figure E Examples of encountered habitats/ LULC along assessed roads

Degraded grasslands along RZ2



Cultivated trees and grasslands along RZ2



Degraded ecosystem along Road Z0 (Highway)



Garrigue ecosystem along Road Z0 (highway)



Olive groves & agricultural lands bordering RZ1



Line of cultivated *Pinus pinea* and agricultural lands along RZ1



Figure F LULC of Zahle Caza

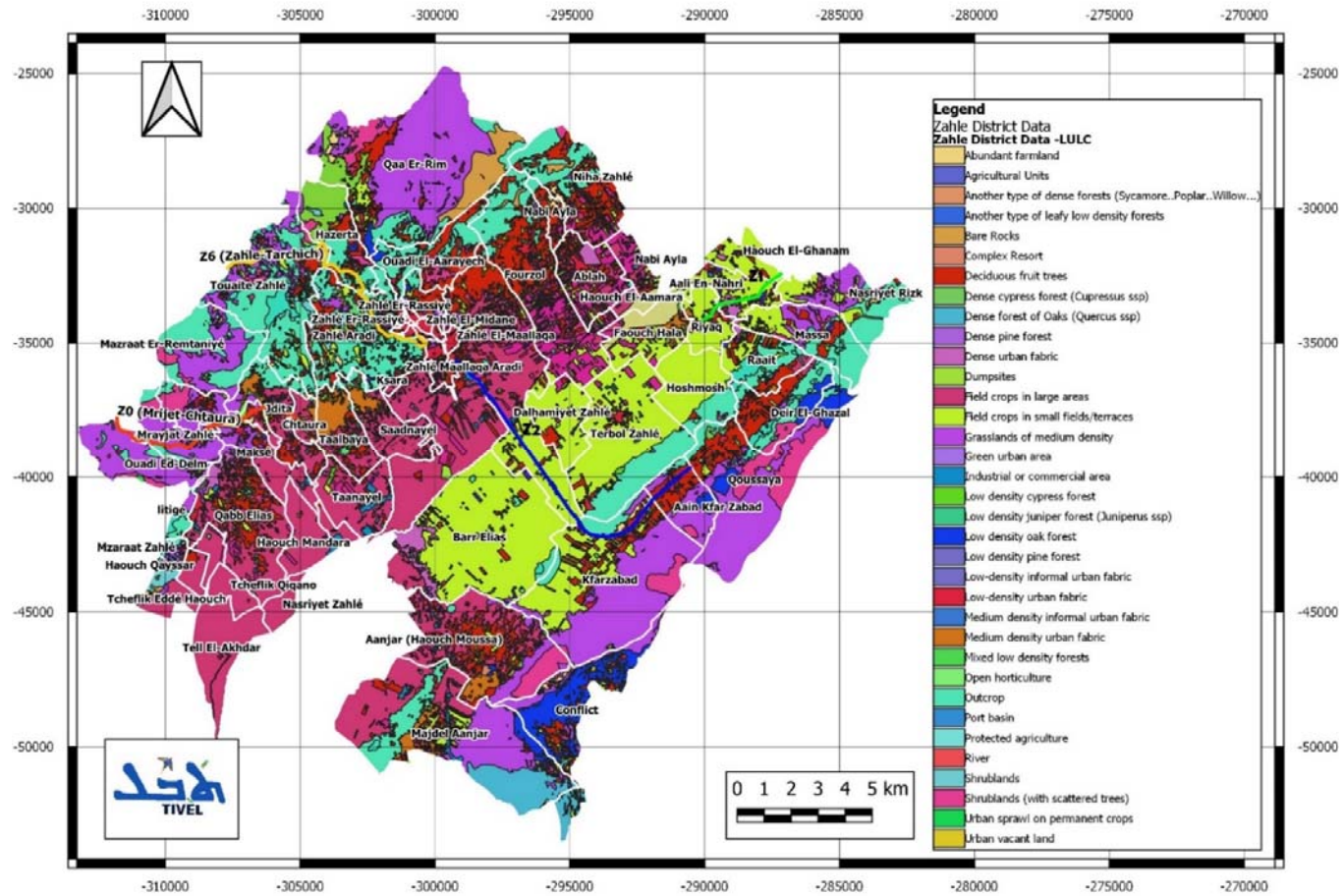


Table M Distribution of LULC at the Caza level

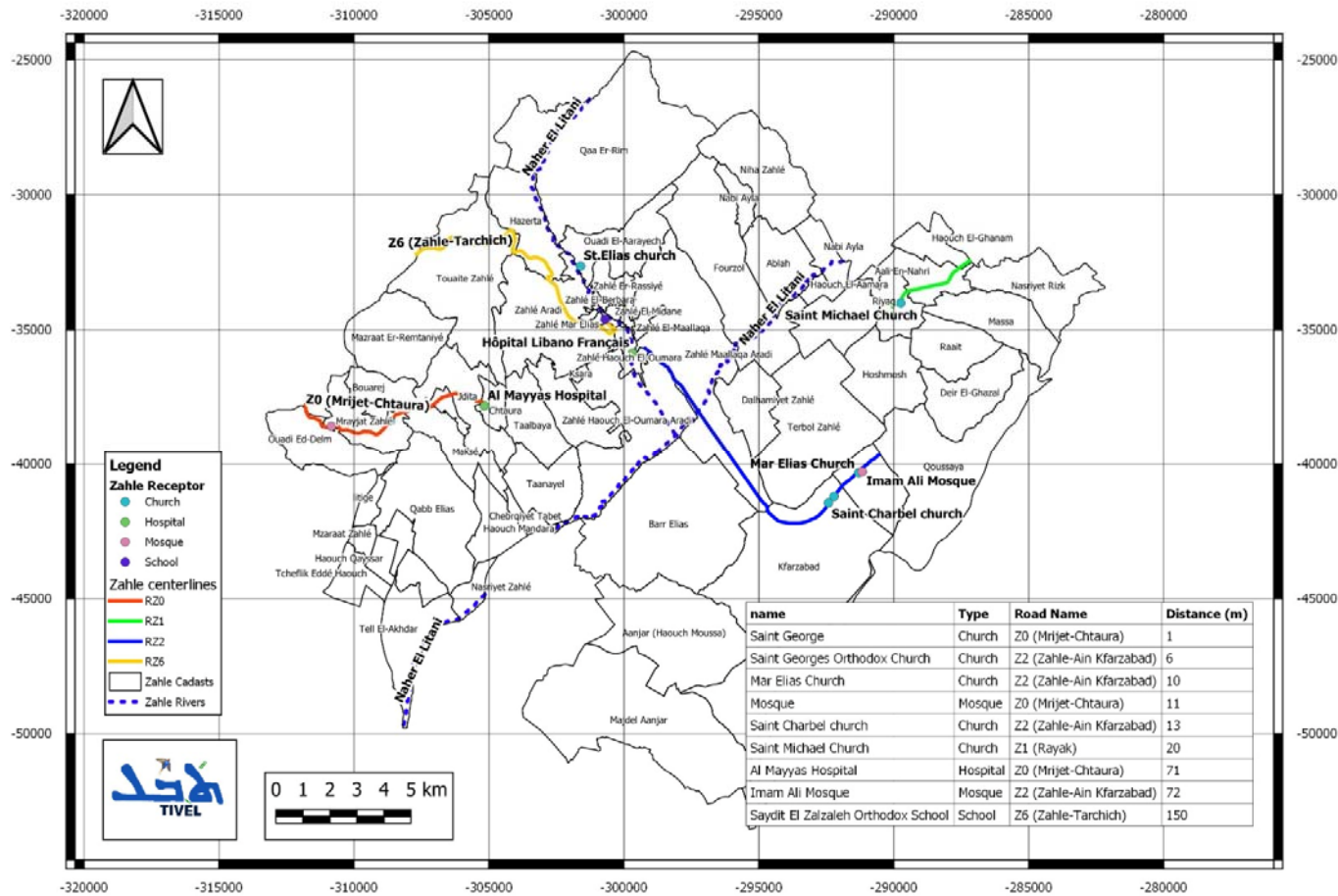
LULC Zahle District	Coverage (%)
Field crops in large areas	18%
Field crops in small fields/terraces	17%
Grasslands of medium density	17%
Outcrop	14%
Deciduous fruit trees	11%
Vineyards	3%
Shrublands (with scattered trees)	3%
Low-density urban fabric	3%
Low density oak forest	2%
Medium density urban fabric	2%
Dense forest of Oaks (Quercus ssp)	1%
Material Extraction Sites	1%
Bare soil	1%
Bare Rocks	1%
Urban sprawl on field crops	1%
Abundant farmland	1%
Dense urban fabric	1%
Industrial or commercial area	2%

Table N Distribution of LULC over the length of Zahle roads with a 50 m fixed buffer from the road centerline (% of LULC distribution per road)

Road Z6 (Zahle-Tarchich)	% of LULC
Outcrop	51%
Deciduous fruit trees	16%
Grasslands of medium density	11%
Low-density urban fabric	6%
Dense pine forest	3%
Material Extraction Sites	3%
Olives	2%
Bare soil	2%
Field crops in small fields/terraces	2%
Shrublands	1%
Vineyards	1%
Urban sprawl on permanent crops	1%

Road Z0 (Mrayjet –Chtaura)	% of LULC
Grasslands of medium density	52%
Medium density urban fabric	21%
Low-density urban fabric	16%
Low density cypress forest	5%
Field crops in small fields/terraces	2%
Deciduous fruit trees	1%
Abundant farmland	1%
Field crops in large areas	1%
Outcrop	1%
Road Z1 (Rayak- Ali Nahri)	% of LULC
Field crops in small fields/terraces	45%
Low-density urban fabric	18%
Dense urban fabric	18%
Deciduous fruit trees	10%
Urban sprawl on field crops	7%
Low density cypress forest	1%
Road Z2 (Zahle- Ain Kfar Zabad)	% of LULC
Field crops in small fields/terraces	29%
Low-density urban fabric	18%
Deciduous fruit trees	14%
Field crops in large areas	14%
Abundant farmland	6%
Industrial or commercial area	6%
Urban sprawl on field crops	5%
Outcrop	3%
Olives	1%
Urban sprawl on permanent crops	1%
Agricultural Units	1%
Grasslands of medium density	1%

Figure G Main sensitive receptors along assessed roads



**Figure H Example of sensitive receptors along Zahle roads
Deciduous fruit trees along Road Z2**



Agricultural lands along Road Z1



Agricultural lands and polytunnels along Road Z2



Saint Georges church in Mrayjet along Road Z0 and shops very close to the road



12 Annex 3: Impact Assessment Methodology

The assessment followed the Lebanese MoE grading methodology stated in Decision No 261/1, dated 2015. The impact grading methodology is explained in this section.

This approach was adopted in order to address the several sources of impacts from the project's activities. The stages of the evaluation process are the following:

- Identification of project-related activities (sources) and environmental aspects.
- Identification of potential impacts to the environment (physical, biological, human, cultural).
- Evaluation and assessment of the related unmitigated impact significance.

Impacts are first classified as shown in the table below:

Table O Classification of impacts

Matrix	Classification	Criteria
N (Nature)	P (Positive)	The proposed activity offers benefits for the overall project
	N (Negative)	Impacts having minimal to major negative influence
	D (Direct)	Impact arising directly from the project activities
	I (Indirect)	Impacts arising from activities not directly related to the project development
M (Magnitude)	L (Low)	High potential to mitigate negative impacts on the physical, biological or human environment to the level of insignificant effects. Disturbance of degraded areas with little conservation value. Minor changes in species occurrence or variety. Simple mitigation measures may be needed to minimize impacts
	M (Moderate)	Medium range (beyond site boundary but restricted to local area). Medium-term (reversible over time, duration of operational phase). Potential to mitigate negative impacts on physical, biological or human environment. However, the implementation of mitigation measures may still not prevent some negative effects. Destruction/Disturbance of areas with potential conservation value. Complete changes in species occurrence or variety. Mitigation measures will help minimize impacts
	H (High)	Disturbance to areas of high conservation value. Destruction of rare or endangered species. Mitigation is required. Largely irreversible impacts on the physical, biological or human environment. Has a massive impact on the surrounding livelihood. Potentially irreparable damage to a site of social and/or cultural importance
E (Extent)	L (Local)	Limited to the project area Locally occurring impact within the locality of the proposed project
	G (Global)	Extend beyond the local area National impact affecting resources on a national scale
T (Timing)	S (Short-term)	Activities and their related impacts are characterized by a short duration of effect
	M (Medium-term)	Activities and their related impacts are characterized by a medium duration of effect

Matrix	Classification	Criteria
	L (Long-term)	Activities and their related impacts are characterized by a long duration of effect
D (Duration)	C (Construction)	Impacts arise during the construction phase of the proposed project
	O (Operation)	Impacts arise during the operational phase of the project
R (Reversibility)	R (Reversible)	Impacts may be reversible, or able to be rehabilitated upon the decommissioning of the proposed project
	I (Irreversible)	Impacts may not be reversible, or able to be rehabilitated upon the decommissioning of the proposed project
L (Likelihood of occurrence)	L (Low)	The classified impact is unlikely to occur under normal operating conditions
	M (Medium)	The classified impact may possibly occur
	H (High)	The classified impact is unlikely to occur under normal operating conditions
S (Significance)	L (Low)	Results in no substantial adverse change to existing environmental conditions
	M (Medium)	Substantial adverse change to existing environmental conditions Can be mitigated to less-than-significant levels by implementation of proposed potentially feasible mitigation measures or by the selection of an environmentally superior project alternative
	H (High)	Substantial adverse change to existing environmental conditions Cannot be fully mitigated by implementation of all feasible mitigation measures

The environmental significance matrix adopted is based on the well-known “weighted scoring” or “weighing and scoring” method used as a tool in various decision analysis applications. In this method, the following steps takes place:

Attributes relevant to the project are chosen

Weights or numerical values are assigned to each attribute depending on its importance (values should be based on objective data or expert opinion to exclude subjectivity during the process).

Scores are allocated to each option to reflect its status with respect to each attribute

The final result is a single weighted score for each option, which is used to quantify its overall performance/significance. As such, the adopted matrix is designed to allow subjective conclusions to be numerically recorded or quantified, therefore providing at the same time an impact evaluation and quantitative record to revert to in the future:

Table P Significance Impact Matrix

		Magnitude x Extent x Duration								
Likelihood x Frequency	1	2	3	4	5	6	7	8	9	
	2	4	6	8	10	12	14	16	18	
	3	6	9	12	15	18	21	24	27	
	4	8	12	16	20	24	28	32	36	
	5	10	15	20	25	30	35	40	45	
	6	12	18	24	30	36	42	48	54	

Yellow: Negligible / **Green:** Low significance / **Blue:** Medium significance / **Red:** High significance

13 Annex 4: Code of Conduct

Individual CoC in Arabic

مدونة سلوك - Code of Conduct

مشروع الطرقات والعمالة - Roads & Employment Project
الممول من قبل البنك الدولي (القرض رقم ٨٧٠٥ - لبنان)، بإدارة وتنفيذ مجلس الإنماء والإعمار لصالح وزارة الأشغال العمومية والنقل

تعتبر مدونة السلوك هذه وثيقة ضرورية لحماية جميع العاملين في مشروع الطرقات والعمالة من جميع مظاهر العنف القائم على أسس اجتماعية، التمييز، سوء المعاملة، التحرش والاعتداء والاستغلال الجنسي وأي سلوك اجتماعي آخر يخل بحقوق الإنسان، المجتمع المحلي والآداب العامة، بما في ذلك المعايير التالية:

• الالتزام بمعاملة النساء والرجال والشباب باحترام بغض النظر عن انتمائهم الديني، العرقي، الطائفي، اللغوي، التوجه السياسي، الاعاقة، الجنسية، الجندرة، الخ. • احترام موقع العمل وادوات العمل المشتركة: نظافة المكان، عدم التعدي على الممتلكات العامة المجاورة للأعمال، الخ.	١- التزام الاحترام والآداب العامة
• العنف القائم على النوع الاجتماعي: أي فعل مؤذ يرتكب ضد إرادة الشخص. وهو مبنئ على الفروق بين الذكور والإناث التي يُعزى وجودها لأسباب اجتماعية. • العنف الجنسي: الاغتصاب، الاعتداء الجنسي، التحرش الجنسي، الخ. • العنف الجسدي: الضرب، الصفع، الضرب المتكرر أو باستعمال أداة، الخ. • العنف العاطفي: الاستغلال النفسي، والابتزاز، الخ. • العنف الاقتصادي: الحرمان من الموارد، الحصول على أدوات العمل، عدم الالتزام بالأجر المتفق عليه، الخ.	٢- عدم استعمال العنف بشتى اشكاله
• الالتزام بالتصدي لأي شكل من أشكال التحرش أو التمييز أو التخويف أو الاستغلال أو الاعتداء الجنسي بما في ذلك التعليقات المهينة المتعلقة بالميل الجنسي، القذف باللقاب أو عبارات ذات دلالات جنسية، التحديق بطريقة ذات إيحاء جنسي، اللمس غير مرغوب فيه، القيام بحركات جنسية غير لائقة، تبادل الحكايات أو النكات الجنسية، توجيه رسائل ذات إيحاء جنسي بأي شكل من الأشكال، محاولة الاعتداء الجنسي أو ارتكابه، بما في ذلك الاغتصاب.	٣- التحرش والاعتداء والاستغلال الجنسي

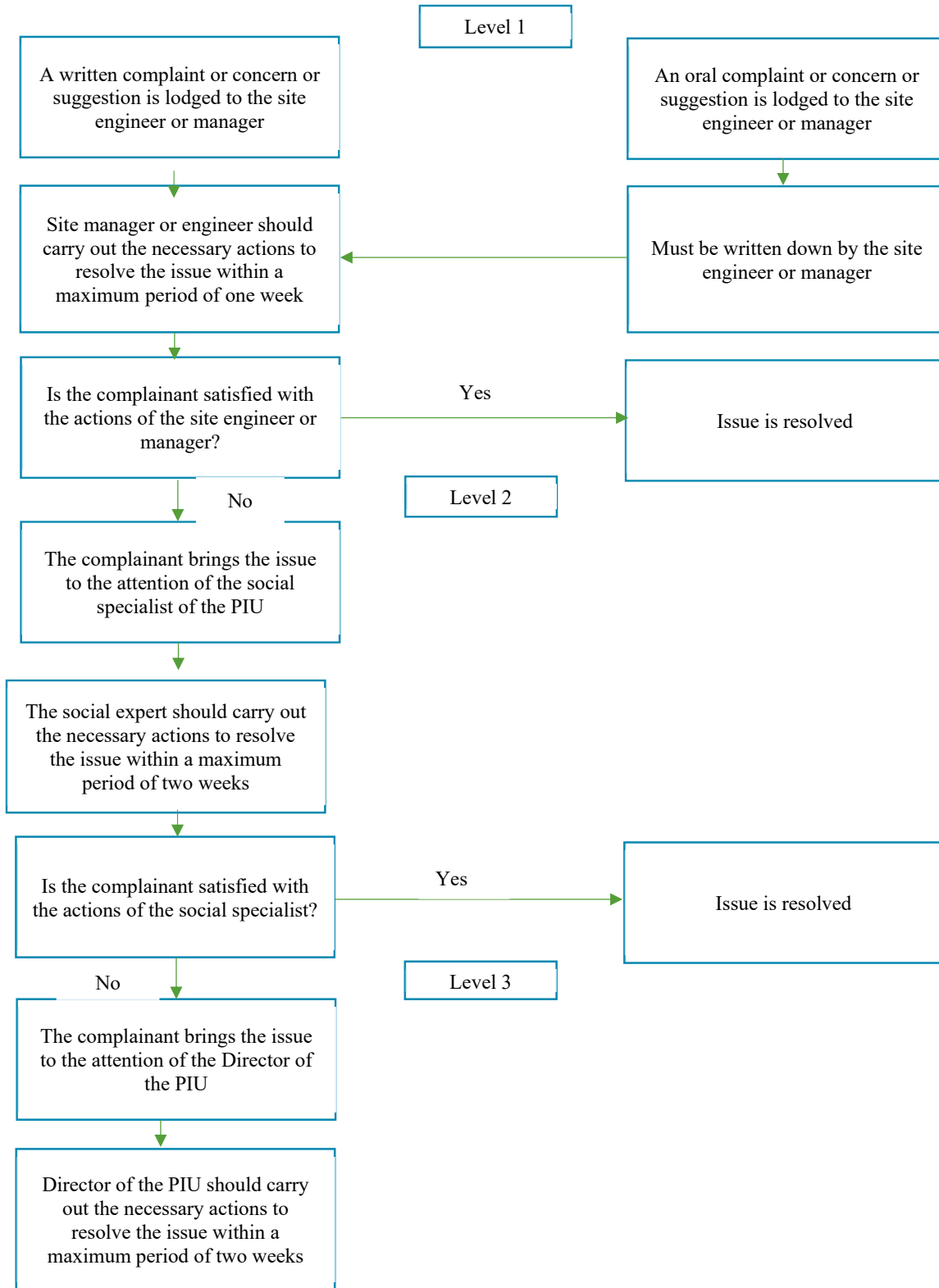
أنا الموقع أدناه، أقر بأنني قرأت وتلني علني وفهمت وتلقيت الشرح والتدريب والمعلومات الكافية عن مدونة السلوك التابعة لمشروع الطرقات والعمالة. وأوافق على الامتثال للمعايير الواردة فيها وأعرف أن أي إجراء يتعارض مع مدونة السلوك هذه قد يؤدي إلى اتخاذ إجراء تأديبي وقد يؤثر على استمرارية عملي ضمن مشروع الطرقات والعمالة.

أسم وامضاء المشرف على الاعمال (من قبل الاستشاري)	أسم وامضاء مسؤول الموقع (من قبل المتعهد)	أسم وامضاء العامل
التاريخ:	التاريخ:	التاريخ:

العامل يجيد القراءة، وقد دون اسمه وامضاءه

العامل لا يجيد القراءة، وقد تليت عليه مدونة السلوك وتم الامضاء نيابة عنه من قبل الأخصائي الاجتماعي

14 Annex 5: Schematic illustration of the GRM



16 Annex 7: Plans and Procedures during Maintenance Activities

Pollution Prevention Plan

The Contractor shall prepare and abide by a Pollution Prevention Plan to ensure that pollution to air, water or land is prevented or, where this is not possible, reduced and mitigated as far as practicable during the construction phase. The Pollution Prevention Plan will be developed for managing:

- liquid effluents
- air emissions
- noise and vibration
- fuel, oil, and chemical storage and handling
- hazardous, non-hazardous, and household waste handling, storage and final disposal
- vehicle and equipment selection and maintenance

Effluent Management Provisions

- No effluent shall be discharged under any condition neither into water courses or bodies including surface water bodies nor to ground surface or infiltrated into subsoils
- Install mobile porta-cabins and connect the generated wastewater from workers to the existing sewage network or to polyethylene tank
- Empty the tank in the sewer network or into nearby operational wastewater treatment plants either by municipality-owned or contracted wastewater tankers

Rainwater run-off Management Provisions

- Install temporary structures to prevent runoff from reaching nearby water bodies
- Remove base coarse and sand from active maintenance sites to prevent the transfer of suspended solids in rainwater
- All platforms where generators or hydrocarbon storage tanks are installed have an impervious layer
- Restrict excavation activities during periods of intense rainfall

Atmospheric Emissions and Dust Management Provisions

- Exercise care to minimize emissions of dust from its activities, including traffic, at work sites, in residential areas and on access roads.
- Stop dust generating activities during windy weather especially in residential areas
- Where it is deemed that dust is impacting or may have an impact on human, plant or animal receptors or where dust may cause sedimentation of watercourses/water bodies or unacceptable levels of soil loss, water shall be applied to the area creating the dust
- Control vehicle speeds to reduce traffic-induced dust dispersion and resuspension by setting and enforcing speed limits
- Post speed limit signs in sensitive areas
- Ensuring trucks hauling sand, dirt or other loose materials are covered (sheeting trucks)
- Cover dusty stockpiles
- Suspending topsoil stripping and replacement during strong winds
- Using a dust collection system for bulk materials unloading
- Ensure proper handling and storage of materials thus minimizing the areas of stockpiled materials
- When storage, transport and handling of bulk materials is made in the open air and exposed to the wind, necessary dust abatement measures shall be implemented
- Regular maintenance of construction machinery, equipment and vehicles

Spill Prevention and Management

- Spill clean-up procedure to reduce the risks of accidental leakages
- Carry out all re-fuelling in designated areas with impervious surfaces and guarantee no fuel spills

- A spill collection tank must be installed under generators and specific equipment
- All chemicals shall be stored in dedicated areas on a paved or sealed floor and in tightly closed containers and be protected from adverse weather conditions
- Used oil or chemical must be stored in an appropriate area until it is collected and disposed in licensed sites
- Use of secondary containment basins for long term storage of lubricants and fuels
- Ensure that the plan is present at the construction site and that oil spill response kits are available
- Ensure proper housekeeping conditions are maintained at the oil/chemical storage areas
- Train all workers to implement this plan in case of accidental spillage

Waste Management Plan

This plan shall be developed and implemented by the Contractor to manage the generated waste effectively. The plan shall include the following components:

- Establish and maintain a waste register which is at the disposal of the Engineer. This register will record all waste management operations: production, collection, transport and disposal. Waste shall be categorized according to the following definitions:
- Non-hazardous solid waste generated at maintenance sites and offices includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office and kitchen wastes.
- Hazardous solid waste includes contaminated soils, oily rags, used oil filters, used oil, as well as spill cleanup materials from oil and fuel spills
- Waste shall be collected from each maintenance sites and from offices at the same rate that it is produced
- All the waste materials generated at work sites and offices shall be segregated into domestic (organic/ paper and cardboard/ metals, glass and plastics) and hazardous waste and disposed into the color-coded containers (one for the disposal of organic waste, one for paper and cardboard and one for aluminium, glass and plastics)
- The domestic waste containers shall be emptied 2 to 3 times per week by the municipality to maintain maintenance sites sanitation
- Segregated recyclables shall be sent to recycling facilities in the area where possible
- Reuse of excavation materials generated during cutting and filling activities whenever possible and disposal of remaining material in controlled disposal site to be identified by the contractor in coordination with the relevant municipality
- Approval letters shall be obtained from the concerned municipalities for domestic and construction waste disposal
- Reuse or recycle the generated waste whenever possible
- Train workers on waste reduction procedures
- Provide workers with nearby sanitation facilities and inform them about their location
- The work zone shall be cleaned on a daily basis. Construction leftovers that are external to the working zone shall be removed regularly. Site housekeeping must be maintained

Hazardous Materials Management Plan

A Hazardous Materials Management Plan will be developed for hazardous materials that pose a potential risk to human health or the environment and include cleaning chemicals, solvents and fuels. The plan shall include the following:

- Fuel and hazardous chemicals/materials shall be stored in designated areas, except for quantities generated or required for the daily construction activities.
- All fuel and hazardous chemical storage facilities shall be located on flat or gently sloping ground and shall be contained within a bund designed to contain at least 110% of the total capacity of the storage containers plus 10% of the aggregate tank volume within the containment area or as otherwise specified by regulatory requirements. The bund walls and floor shall be constructed of

concrete or other suitably impermeable material. The filling connection must be within the bund. No drain valves or other connections through the bund walls shall be permitted. Tanks shall be fitted with a gauge to allow the fill level to be monitored during refilling and preferably with a high-level alarm.

- Hydrocarbons, lubricants, paints, solvents and batteries are transported in drums to suitable waste management facilities, if available

Emergency Preparedness and Response Plan

An Emergency Preparedness and Response Plan (EPRP) will be developed so that the Contractor is prepared to respond to accidental and emergency situations in a manner that prevents and mitigates harm to people and the environment. The EPRP needs to be discussed and disclosed to service providers and local affected communities prior to construction. The EPRP shall cover the following emergency situations as a minimum/;

- Medical emergency
- Fire or explosion;
- Hazardous Material Spill or Release;
The EPRP will identify
- Accidents and emergency situations and the communities and individuals that may potentially be impacted
- Response procedures, provision of equipment and resources, designation of responsibilities, communication systems and channels and periodic response training
The Project will need to ensure that the Contractor shall
- Maintain fit-for-purpose Emergency Response Capability, which shall be clearly documented
- Make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name, address and telephone number of the Doctor and the nearest hospital shall be prominently displayed in the Contractor's office.
- Ensure that all personnel are informed and aware of how to react in an emergency situation, and responsibilities are defined. Information and awareness training shall be documented, and available on all Project Areas
- Organize and document emergency simulation exercises within 3 months of the physical start of the works, and subsequently once every 12 months

Traffic Management Plan

A Traffic Management Plan (TMP) will need to be developed by the main contractor. The TMP shall be a starting point for further discussion between the main contractor, local authorities and road agencies. The plan will include preventative measures to manage the risks from potential increases in traffic from construction activities including transportation of material and workers to and from the maintenance activity sites. In addition, it will include measures to protect workers and manage the risks from civilian traffic within close proximity to maintenance activities especially within residential areas. The TMP will be refined and updated as access routes are confirmed and the timing and type of abnormal loads become known. The TMP shall include the following:

- Proposed program of works;
- Details of key stakeholders;
- Details regarding the proposed method of construction;
- Proposed Temporary Traffic Control/ Management Plans (TTCP/ TMP);
- Various traffic diversion plan layouts for various type of activities;
- Diversion signs;
- Regulatory signs;
- Informative signs;
- Analysis of impacted roads;
- Risk Assessment;
- Proposed working hours; and

- Protection of Work Zones and road users including pedestrians;

The TMP shall be approved by the Consultant prior the execution of work.

A special TMP shall be prepared regarding works on Highways. Noting that Works on Highways shall be minimized during Peak- Hours and maximized during off-peak hours, 7 days a week.

Public Health and Safety Plan

An effective Public Health and Safety Plan for construction shall include at least the following components:

- Secure the site and restrict access to it
- Prohibit unattended/unauthorized public access
- No children are allowed to be present on the work site, reminding workers and community members of this in all related communications
- Install barriers with warning lights at night around excavations, material dumps or other obstructions at the maintenance sites
- Install warning signs for drilling and maintenance at the external part of the site and at a distance of 100 meters
- Inform residents and place proper safety and diversion signs at sensitive areas within the project area (i.e. near schools, shops hospitals and agriculture areas)
- Install pedestrian and vehicular passages near residential areas
- Accidental oil spillage shall be well controlled
- Make sure at least three sets of first aid kits are present on the construction site.
- Access to hospitals should not be impeded at any time
- Properly manage trucks and heavy machinery entering and exiting the construction site.
- Training of heavy machinery drivers about road safety
- Equip Project drivers with telephones for contacting the emergency services to enact the EPRP if necessary in case of emergency.
- Keep stakeholders informed of maintenance schedule and abide by assigned timing
- Manage the grievance mechanism through which community members can make complaints about project activities
- The community health and safety plan shall cross reference with other relevant management plans such as the TMP and EPRP. Local health care and emergency services shall be consulted in the development of the plan.

Occupational Health and Safety (OHS) Plan

In addition, the Contractor shall ensure the workers' health and safety against possible accidents and injuries from the various maintenance activities. The plan shall include the following:

- Hazard Identification and assessment including (Physical injuries from: Traffic accidents, Falling from moving vehicles, Loss of stability and overturning of equipment, Falling from height, Hit by construction materials, Slips, trips and falls, Electrical incidents, Burns from hot works, Health problems due to: Fumes and dust, Noise and vibration, Excessive manual handling, Disease outbreaks, Asphyxiation in confined spaces and Fire)
- OHS protection measures for the identified hazards
- OHS protection measures for Unexploded Explosive Ordnance
- Prevention and precaution measures for COVID-19
- Identify the mandatory personal protective equipment (PPE) to be used including hard hats, safety boots, reflective vest as well as specific PPEs
- Identify and manage dangerous substances planned to be used on the project area
- Work Permit System for Confined Space Entry, Hot Works, Excavation, Lifting, Working at Height, Handling of Hazardous Materials, and Electrical works

- Safe Work Method Statements
- Hazard communication
- Emergency and Evacuation procedures
- Accident and incident reporting and investigation

The Contractor shall implement mitigation measures as per the Occupational Health and Safety Plan. Measures include but not limited to:

- Personnel and visitors to maintenance activity areas shall be equipped with a safety helmet, safety shoes and a reflective jacket as a minimum.
- Adequate quantities of PPE shall be available on the project areas and stored properly
- Personnel shall be trained on how to use and care for PPE
- Conduct training and awareness meetings including correct use of PPE, health and safety procedures, and handling hazardous material containers and related wastes
- Ensure refreshing training session on occupational health and safety measures is conducted on a monthly basis
- Ensure that supervision, directly in charge of construction activities, fully brief and discuss with Personnel HS Tool Box Talks at the start of each work day and prior to commencing new activities. These talks shall be conducted in a language understood by the workforce. A checklist shall be utilised for this purpose. At a minimum it shall include the following: Nature of the job, associated hazards, safe working methods to be adopted and requirements of the Permit to Work
- Ensure a minimum of first-aid provisions on any work site, including: suitably stocked first-aid kits; a person, respectively an adequate number of staff appointed and trained to take charge of first-aid arrangements and ensure that staff and workers are informed about first-aid arrangements
- Equip the project area with a communication system exclusively for the purposes of communication with the first aid services. Information on how to communicate with the first aid services shall be clearly indicated near the communications equipment
- Collaborate with local health authorities and make arrangement with an appropriate number of local doctors, and/or nurses, hospitals and ambulance services to ensure that medical staff, first aid facilities, and ambulance service are available within the project area
- Measures as per national guidelines published by WHO and Ministry of Public Health regarding COVID-19 prevention and quarantine procedures
- Workplace inspections

Chance Finds Procedure

The chance find procedure is a project-specific procedure that identify actions necessary if previously unknown heritage resources, particularly archaeological resources, are unexpectedly encountered during project construction phase. A Chance Find Procedure will set out how chance finds associated with the project will be managed and will include the following requirements:

- Notify relevant authorities (Directorate of General of Antiquities) of found objects or sites
- Fence the area of finds or sites to avoid further disturbance
- Conduct an assessment of found objects or sites by cultural heritage experts in order to identify and implement actions consistent with the requirements of ESS8 and national legislation
- Train project personnel and project workers on chance find procedures

17 Annex 8: Public Consultation

Consulted NGOs

Municipalities and NGOs were consulted at this phase of the project.

Consulted NGOs were targeted according to their position in Lebanon. They consist of two levels as follows:

- a) Local NGOs: they are specific to each Caza. Their mission is to address different concerns and issues among the local society including social, economic, gender equality, environment, poverty, women empowerment, etc. The name of the invited NGOs and their field of activity are presented in the table below. Those local NGOs may play a role of advocates to reduce projects' social and environmental risks.
- b) International NGOs: they are covering the whole country and their consultation will be applied to all the ESMPs of the REP. They provide relief and developmental aid to many developing countries. They support the society in responding to crises and helps people whose lives and livelihoods are shattered by conflict and disaster to survive, recover and gain control of their future. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrian in Lebanon by providing aid and responding to their critical situation.

This ESMP consulted International NGOs (Anera, Acted, and DRC) to inform them about the Project, disseminate it, ask them to circulate its impacts and activities among Syrian and tell them that they can inquire about additional information and/or submit a complaint (if any) by contacting the Grievance Redress Mechanism (GRM) Unit on 01980096 ext:317 or send an Email to rep.grm@cdr.gov.lb or register by hand an official letter at the CDR.

Syrian individuals in Zahle Caza were contacted through the International NGOs to seek their feedback about the Project. Accordingly, this ESMP did not receive any concern about the Project.

Also UNHCR were informed about the project in Zahle meeting. They are relevant stakeholders in Zahle Caza.

Table R Consulted Local NGOs and their Activities

Organization	Activities
ABAAD	ABAAD is a non-profit, non-politically affiliated, non-religious civil association that aims to achieve gender equality as an essential condition to sustainable social and economic development in the MENA region. ABAAD seeks to promote women's equality and participation through policy development, legal reform, gender mainstreaming, engaging men, eliminating discrimination, and advancing and empowering women to participate effectively and fully in their communities. ABAAD also seeks to support and collaborate with civil society organizations that are involved in gender equality programs and advocacy campaigns.
Kafa	KAFA (enough) Violence & Exploitation is a feminist, secular, Lebanese, non-profit, non-governmental civil society organization seeking to create a society that is free of social, economic and legal patriarchal structures that discriminate against women. KAFA has been aiming to eliminate all forms of gender-based violence and exploitation since its establishment in 2005.
YASA	YASA a Non-Governmental Organization that seeks through its efforts to create a greater level of safety awareness and commitment from all people in order to reduce the global burden of unintentional injuries. It supports strategies to improve international cooperation for safety promotion and injury prevention. The organization launched from Lebanon in 2002 the Middle East Campaign for Accident Prevention (MECAP) which was successful in building effective partnerships with many public and private agencies in the region, especially with media and educational institutions.

Lost	Lebanese NGO that works with people, particularly women and youth to create a more developed and equitable society through reducing poverty, eliminating exclusion, and fostering a culture of peace.
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Table S Consulted International NGOs and their Activities

NGO Name	Intervention Sector(s)
ANERA Lebanon	<ul style="list-style-type: none"> • Children & Youth • Development • Education • Relief Services • Water sanitation and hygiene
ACTED	<ul style="list-style-type: none"> • Development • Infrastructure & Services Rehabilitation • Labor & Livelihoods • Shelter • Water sanitation and hygiene
Danish Refugee Council (DRC)	<ul style="list-style-type: none"> • Direct Assistance • Protection • Shelter • Community Empowerment and Livelihoods
UNHCR	<ul style="list-style-type: none"> • Respond to emergencies • Protect human rights • Actions to protect refugees, forcibly displaced communities and stateless people

Photos: Zahle Caza- Public participation meeting
Public Participation meeting (August 21 2023)





Invitation letter:

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Zgharta, Lebanon
Registry No. 3017068



الموضوع: دعوة لحضور إجتماع مشاركة عامة حول مشروع "الطرق والعمالة"

تحية طيبة وبعد،

بما أن مجلس الإنماء والإعمار يقوم بتمويل من البنك الدولي بتنفيذ مشروع "الطرق والعمالة" لتأهيل وصيانة طرق في جميع المحافظات اللبنانية، باستثناء محافظة بيروت؛

ولما كانت شركة دار الهندسة نزيه طالب وشركاه قد تكلفت من قبل مجلس الإنماء والإعمار للقيام بالدراسات الهندسية والبيئية المتعلقة بالمشروع والتي بدورها كلفت شركة TIVÈL للإستشارات البيئية بإعداد خطة إدارة بيئية وإجتماعية للمشروع المذكور؛

وحيث أنه من الضروري عقد اجتماعات تشاورية مع الجهات المعنية والعامة بشؤون البيئة والأمور الإجتماعية ذات الصلة بمشاريع الطرق والإستماع إلى آرائهم؛

وبما أن المشروع يهدف للقيام بأعمال صيانة دورية لطرق دولية ورئيسية وثانوية في قضاء زحلة؛

لذلك،


ندعوكم لحضور إجتماع مشاركة للعامة في تمام الساعة الحادية عشر صباحاً من يوم الإثنين الواقع في ٢١ آب في مبنى بلدية زحلة؛ ونتمنى على المواطنين الكرام، إبداء الملاحظات الخطية، في حال وجودها، حول المشروع المذكور، وإرسالها إلى شركة دار الهندسة نزيه طالب وشركاه بواسطة البريد الإلكتروني التالي [.elie.imad@daralhandasha.com](mailto:elie.imad@daralhandasha.com)

وتفضلوا بقبول فائق الاحترام

مديرة شركة TIVÈL
نسرين غزال معوض



Attendance sheet:


REP Project – Routine Maintenance
Zahle Caza
ESMP-Public Participation
 قائمة حضور

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PowerPoint Presentation:

نقاط حوار الجلسة

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12. نمسة مشاركة المواطنين
13. أسئلة ومناقشة عامة

1. مقدمة

تتمتع شبكة الطرق في لبنان بنطاق وتغطية كافيين بشكل عام لكن نسبة كبيرة من تلك الطرق في حالة سيئة وهو الأمر الذي يؤدي إلى إعاقة التنمية المحلية والاقتصادية

مشروع الطرق والعمالة

- بلغ مجلس الإنماء والإعمار مشروع الطرق والعمالة في لبنان وذلك بالتنسيق مع وزارة الأشغال العامة والنقل عبر تمويل من البنك الدولي
- يشمل المشروع أعمال صيانة عدة طرق في بلدات من كافة الأقطاب البلدية
- يهدف المشروع إلى تحسين شبكات النقل البري على امتداد أجزاء من عدة مخدات من الطرق المصلفة في لبنان، و إلى تحفيز الاقتصاد من خلال خلق فرص العمل.

3. الجهات المعنية بالمشروع

الجهة	الصفة
البنك الدولي	ممول المشروع
مجلس الإنماء والإعمار	إدارة وتنفيذ
دار الهندسة نزيه طالب وشركاه	استشاري هندسي
TIVEL	استشاري بيئي

2. أهداف اللقاء

تحقيق الشفافية عبر إعلام الرأي العام بالمشروع لإبداء ملاحظاتهم وذلك وفقاً لسياسة ضمانات البنك الدولي (سياسة تشغيلية رقم 4.01)

عرض لأهم الآثار البيئية والاجتماعية والتدابير التخفيفية المرتبطة بتنفيذ المشروع

مناقشة خطة الإدارة البيئية والاجتماعية للمشروع التي تهدف لحماية الصحة البشرية، السلامة العامة والموارد البيئية

4. مراحل إعداد خطة الإدارة البيئية والاجتماعية

- تحديد الأطر السياسية والأطر القانونية للمشروع
- دراسة مكونات المشروع
- دراسة البيئة المحيطة
- تقييم الآثار المحتملة للمشروع
- مشاركة العامة
- تحديد الإجراءات التخفيفية لهذه الآثار وسبل مراقبتها

5. وصف المشروع

أن المشروع يهدف للقيام:
- بأعمال صيانة لطرق دولية ووطنية وثانوية في قضاء زحلة



5. وصف المشروع

- حواجز السلامة
- مجاري المياه
- الجسور والعبارات الصندوقية (Culvert box)
- اللوحات الإرشادية والخطوط السرورية والعلامات
- طبقات الرصف الإسفلتية (مستويات الأضرار ومدى انتشارها)



ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

1. الصيانه العاديه

- تنظيف الطريق .
- تعبئة التشققات وإصلاح العيوب البسيطة الموجودة على سطح الطريق.
- إصلاح الأكتاف والميول الجانبية للطريق.
- تنظيف منشآت تصريف مياه الأمطار والقيام بالإصلاحات البسيطة اللازمة للمنشآت الخرسانية.
- فحص وصيانة وإصلاح حواجز السلامة.
- إصلاح أو استبدال إشارات الطرق ودهان الطريق.
- الإهتمام بنظافة وتشكيل حدود حرم الطريق.

ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

2. الصيانه الوقائيه والتي تعمل على إطالة العمر الافتراضي للطريق وتتم به الاعمال التاليه

- تغطية سطح الطريق بطبقات جديدة.
- استبدال الطبقات الأسفلتيه سواء بإعادة رصفها أو بازالتها تماماً وإعادة إنشائها تبعاً لحالة الرصف.
- إعادة إنشاء بعض أجزاء الطريق التي إنهارت طبقة القاعدة تحتها.
- تركيب عبارات إضافية للصرف.
- إصلاح العبارات الصندوقية (Culvert box) لإزالة الأضرار الناتجة عن السيول.

6. دراسة المحيط البيئي (الوضع الحالي)



7. الآثار البيئية والاجتماعية الإيجابية للمشروع

مشاريع الطرق:

- تقلل أو تمنع الغبار، وتحسن التصريف، وتقلل العبثات المرورية
- تحسن مستويات السلامة على الطرقات وتحد من الحوادث المرورية
- تحفز الاقتصاد من خلال خلق فرص العمل
- وظائف قصيرة للأشغال المدنية
- ويساعد المشروع بالنفع أيضاً على الصناعات المحلية التي تساند قطاع الإنشاءات (المعاجر والنقل والإسمنت) والاقتصادات المحلية بفضل تحسن شبكات الطرق وزيادة الطلب على السلع والخدمات المحلية.

8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

التدابير التخفيفية	الآثار المحتملة على البيئة
<ul style="list-style-type: none"> • استخدام الآلات ذات الانبعاثات منخفضة • توجيه مصادر الانبعاثات بعيداً عن المساكن المحيطة • رش الطرق بانتظام بالمياه لمكافحة الغبار • تغطية مركبات نقل المواد الأولية والمخلفات من وإلى موقع المشروع • تحديد سرعة الشاحنات والمركبات 	تلوث الهواء
<ul style="list-style-type: none"> • استخدام حواجز لمنع وصول الترسبات الرملية الى قنوات المياه • تغطية مواد البناء 	تلوث المياه

8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

التدابير التخفيفية	الآثار المحتملة على البيئة
<ul style="list-style-type: none"> • التأكد من صيانة المركبات والمعدات ومن عدم وجود أي تسرب للوقود • توفير أطقم في الموقع لمعالجة أي انسكاب عرضي على الفور • تعيين مسؤولين عن الممارسات الجيدة في الموقع بما في ذلك العلاج السريع لأي انسكاب عرضي • تدريب الموظفين على إدارة النفايات • إزالة المخلفات السلبية من الموقع خلال 24 ساعة، والتخلص منها في مكبات قانونية محددة. 	تلوث التربة
	إنشاء المخلفات الصلبة

8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

التدابير التخفيفية	الآثار المحتملة على المجتمع
<ul style="list-style-type: none"> • التخطيط والتشغيل السليمين للتحديات المرورية • إعادة تأهيل الطريق بشكل تدريجي • وضع علامات سير وأنظمة إضاءة في الأماكن الحساسة لضمان سلامة النقل • Traffic Management Plan 	تغير في حركة السير
<ul style="list-style-type: none"> • تطوير خطة لتأكيد من التزام المقاولين بالمبادئ التوجيهية للصحة والسلامة المهنية (OHS) • توفير المعدات المناسبة للحماية الشخصية • توفير التدريب على الصحة والسلامة المهنية للعمال • Hazard Communication 	خطر على الصحة والسلامة المهنية العامة (في حال حصول أي حادث)

8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

التدابير التخفيفية	الآثار المحتملة على المجتمع
<ul style="list-style-type: none"> • تسريع العمل من خلال الوضع والالتزام بأهداف ومقاييم واضحة لتقييم الأداء ومتابعة سير العمل • إعادة تأهيل الطريق بشكل تدريجي 	تأثر الحركة التجارية للمؤسسات والمحال القائمة على جانبي الطريق
<ul style="list-style-type: none"> • Awareness/Training, CoC, Sanctions • آلية مراجعة الشكاوى GRM 	Labor induced Sexual Exploitation and Abuse الاستغلال الجنسي والاعتداء الجنسي
<ul style="list-style-type: none"> • حصر الأعمال في ساعة محددة ومصروح عنها سابقاً • الحد من استخدام الأجهزة والمعدات التي تسبب الضوضاء خصوصاً بالقرب من المنشآت الحساسة 	الضوضاء

9. خطة الإدارة البيئية والاجتماعية

هدف الخطة الإدارة البيئية والاجتماعية: مراقبة المشروع والتأكد من مطابقته مع جميع المعايير البيئية والاجتماعية.
بعد دراسة الآثار المحتملة للمشروع، تقوم الدراسة باقتراح اساليب تخفيفية لهذه الآثار وسبل لمراقبتها.

خطة الإدارة البيئية والاجتماعية تتضمن:

- مراقبة نوعية المياه
- مراقبة نوعية التربة
- مراقبة نوعية الهواء
- مراقبة نوعية التنوع البيولوجي
- مراقبة عملية التوظيف + Work conditions
- مراقبة الصحة والسلامة العامة
- خطة طوارئ في حال حدوث اي حادث مفاجئ.

10. آلية مراجعة الشكاوى GRM

يمكن للأشخاص المعنيين الاستفسار عن معلومات اضافية أو/و تقديم أية شكاوى (في حال وجودها) بالتواصل مع وحدة آلية مراجعة الشكاوى من الاثنين حتى الجمعة بين 9:00 صباحاً و15:00 بعد الظهر، عبر:

1. الهاتف: 01980096 مقسم 317
2. البريد الإلكتروني: GRM.REP@cdr.gov.lb
3. تسجيل كتاب رسمي لدى مجلس الإنماء والإعمار
(العنوان: تلة السراي - رياض الصلح، بيروت - لبنان)

11. منصة مشاركة المواطن

انشاء تنفيذ المشروع



يمكنك إيداء رأيك حول تنفيذ المشروع في منطقتك من خلال تعبئة النموذج الموجود عبر الرابط
<https://cdrimpact.gov.lb/worldbankmobile/home/main?lang=ar>
سيكون رأيك مجهول المصدر

12. أسئلة ومناقشة عامة

يمكنكم إيداء رأيكم
عبر التواصل مع شركة TIVÈL
هاتف: +961 76 788 843
أو إيداء الملاحظات الخطية، في حال وجودها، وإرسالها إلى شركة
دار الهندسة نزيه طالب وشركاه بواسطة البريد الإلكتروني التالي
elie.imad@daralhandasha.com