



**REPUBLIC OF LEBANON**  
**COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION**

**Consultancy Services For**  
**Roads Routine Maintenance**  
**And Rehabilitation of Remaining Roads**  
**For Lot2 (Aley & Baabda Cazas)**

**CDR Contract No. 20833**

**Final Tender Documents**  
**For**  
**Roads Routine Maintenance**

**Environmental and Social Management Plan**  
**(ESMP)**

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**DAR AL HANDASAH NAZIH TALEB & PARTNERS**  
**دار الهندسة نزيه طالب وشركاه**

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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
ESMP	Environmental and Social Management Plan
FHH	Female Headed Households
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
LULC	Land Use Land Cover
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
MoIM	Ministry of Interior and Municipalities
MoL	Ministry of Labour
MoPH	Ministry of Public Health
MoPWT	Ministry of Public Works and Transportation
MoSA	Ministry of Social Affairs
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
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 project funded by the World Bank (WB) that aims 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.

The first component of 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 that will result in environmental and social impacts, an Environmental and Social Management Plan (ESMP) shall be prepared under the requirements of OP4.01, that classifies the project as Category B to reduce the footprint of REP’s operations in Aley. 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 Aley Caza (lot 2), 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 second ESMP was developed for Aley Caza covering this time 22 candidate primary road for routine maintenance activities. Routine maintenance activities are typically small in scale compared to rehabilitation activities, but widely dispersed.

Similarly, to the ESMP prepared in 2020 that examined the environmental and social baseline conditions of each road to be rehabilitated under the REP, assessed all site-specific environmental and social aspects and put in place environmental and social management and monitoring plans to ensure the appropriate implementation of all safeguard requirements , this ESMP will assess the potential impacts of routine maintenance activities on the local environment and community of Aley Caza and consult relevant stakeholders 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 Environmental and Social Framework (ESF).**

### Project Description

The project consists of routine maintenance activities for a period of two years in Lot 2- Aley Caza namely for primary roads (including International roads/ Highways). More particularly, 22 primary roads with a total length of 127 km are candidate for routine maintenance activities. These activities include incidental repair works, pavement repair works, concrete repair works, and installation of traffic control and safety devices. The purpose of this task consists of maintaining the existing level of service for the concerned roads.

## **Legal Framework**

This ESMP was conducted in accordance with WB environmental and social standards and the Lebanese laws and regulations namely Law No. 444 (2002) for Environmental Protection. More specifically, routine maintenance activities will be done under OP 4.01 Environmental Assessment. Despite that the project triggered, OP 4.12 Involuntary Resettlement, routine maintenance activities in Aley will not involve involuntary resettlement or land acquisition. In other words, there will be no displaced persons (local or Syrian refugees) by project activities.

## **Consultation**

This ESMP was publicly consulted with the main stakeholders 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 Aley Caza at Aley Municipality's Cultural Center on Monday December 13, 2021. A total of 15 people attended of which four were women. During the meeting attendees (citizens, municipalities, and relevant local and national NGOs) 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 mainly worried and concerned about the monitoring process of routine maintenance works. In this context, the consultant and CDR representative explained the monitoring process for this project and highlighted the role of municipalities and local communities in monitoring the Contractor. Further, CDR explained that REP Grievance Redress Mechanism (GRM) was established to ensure the management of any project-related complaints. Accordingly, REP GRM (multi-channel levels) that is already accessible to all relevant stakeholders to send their project-related suggestions, concerns and complaints was disseminated. It was explained that complaints can be sent by email, phone, or in person to CDR (phone: 01980096 ext:317, Email: GRM.REP@cdr.gov.lb, or official letter registered at the CDR (address: Tallet al Serail - Riad el Solh, Beirut – Lebanon). Moreover, attendees were informed that a specific GRM QR will be placed along each active road in Aley and at concerned municipalities before the commencement of maintenance works. They were also informed about the code will be added to direct the citizens to the designed IMPACT platform that will allow them to share their feedback. This will ensure addressing/responding to grievances and reporting to stakeholders as indicated in the ESMP (all complaints will be individually followed up).

**It is worth mentioning here that all relevant municipalities will be informed upfront before the commencement of works about the Project since public consultation was conducted back in December 2021. In addition, a public notice will be posted at each relevant municipality including the GRM procedure. This will disseminate the Project and ensure that its activities are implemented in a transparent manner.**

## **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 studied roads was investigated for outcropping formations, subsurface stratigraphy, hydrogeology (groundwater and sea water intrusions) and hydrology (surface

water). The geospatial analysis that was performed to indicate the percentages distribution of hydrogeological classes along each road alignment showed that nearly all roads lie on a karstic formation characterized by its high transmissivity and can be easily exposed to contamination. Moreover, in terms of surface water, it was detected that Wadi Ghadir is crossed by AP12 and AP 20 and Damour river is crossed by AP2 and AP4.

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 of the adjacent areas to the concerned roads and assess natural habitats that are at added risk from the proposed project. The majority of roads are bordered by agricultural terraces, open garrigue vegetation, scrubland and degraded grasslands, cultivated trees and urbanized/industrial areas. These types of habitats do not provide a favorable environment for a large variety of plants and animals. However, some roads partly involve particular biotopes. These biotopes include riparian habitats when roads intersect with Damour river, pine forests and Mediterranean oak maquis or forests. Accordingly, roads that involve riparian habitats, which are excellent refuge for birds, reptiles and amphibians, and roads that are surrounded by dense pine forests and oak maquis, which are of high biodiversity value, are considered of certain ecological criticality.

Lastly, a socio-economic survey was conducted in the project area to map the demographic, social and economic baseline conditions at the level of Aley Caza. Further, sensitive receptors were detected including agricultural lands, which constitute a significant portion of lands adjacent to the roads under study, and could be affected in case of mismanagement (e.g., dust accumulation on nearby agricultural terraces).

### *Critical roads –Multi-criteria weighted analysis*

In order to determine the combined influence of hydrological, ecological, and social issues, a multi-criteria weighted analysis was performed to distinguish critical from non-critical roads. This distinction is important since mitigation measures for sensitive roads should be stricter. The assessment showed that **roads of high criticality are AP2, AP4, and AP10.**

### **Impacts Evaluation**

Given that at this stage, the specific activities planned for each of the 22 assessed roads are not yet available, impacts were assessed for all activities under the scope of work and the worst-case scenario impacts were considered for identified critical roads.

Environmental impacts are expected to be localized and moderate. Impacts 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. In addition to the expected temporary disturbance of the natural ecosystems (dust emission, noise pollution and potential soil and water contamination), direct destruction of vegetation and population might occur if waste materials (e.g., excavated materials, debris, paints etc.) were discharged directly into the roadside riparian habitats and woodlots.

Potential social risks related to the project include labor influx (in case the contractor doesn't recruit labor from the surrounding community) and potential risk of labor induced SH towards female workers and SEA towards women in the surrounding community (due to the close

proximity of human settlements to the roads to be maintained); potential risk of child labor; poor labor conditions, dissatisfaction with job allocation; risk of under-participation or underemployment of women; nuisance and traffic disturbance; and temporary obstruction of access routes to sensitive receptors and disturbance (e.g., obstruction of access to agricultural lands, dust accumulation on nearby vegetation and agricultural terraces). Finally, risk of traffic-related accidents and injuries to workers and local communities is expected to be significant if precautions and control measures were not implemented.

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 and improve surface storm water run-off, improve traffic safety, and 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 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 Aley 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 roads to be implemented in order to avoid soil and water contamination. Regarding biodiversity, provided recommendations to guide the project Contractor in reducing the negative impacts on natural habitats and biodiversity are related to activities, schedules, and waste management. Contractors must be careful so that the direct impacts (direct destruction) on rich ecosystems and associated fauna would be minimal. In other words, waste should not be dumped into the adjacent natural habitats (e.g. woodlots and rivers) and maintenance activities should be avoided nearby forests and critical 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. Finally, REP GRM levels are provided including the procedure for handling complaints.

## **Conclusion**

Assessments showed that the project risks can be mitigated if the Contractor succeeded in implementing this ESMP, which documents the project's risks management strategy. In order to achieve that, CDR plays a major role in assisting and supervising him during implementation.

Most importantly, this ESMP guides the Contractor on critical roads that need special care if they are to be maintained. 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. The REP was approved by the WB Board of Executive Directors in February 2017 and ratified by the Lebanese Parliament in October 2018.

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;
- (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.

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 Aley Caza (Lot 2) under CDR contract No.20833, covers the envisaged routine maintenance works for classified primary roads in Aley.

It is important to note that REP Environmental and Social Management Framework (ESMF) 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. Furthermore, the project's Resettlement (RPF) cleared by the WB and disclosed in April 2018 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. Moreover, 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 the Aley-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 Aley Caza is available on CDR Website via the following [link https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Aley\\_Final-ESMP.pdf.aspx](https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Aley_Final-ESMP.pdf.aspx)).

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

## 1.1 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 (Hoekman 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 was prepared for development decision to go hand in hand with environmental and social protection.

## 1.2 Report Objectives

The main aim of this ESMP for Aley 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 Aley 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. Establish environmental and socio economic baseline
2. Set the legal institutional standards & Policies Frameworks
3. 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
4. Identify potential social, environmental, and H&S impacts caused by the project
5. Propose feasible and applicable mitigation measures
6. Guide on creating short term jobs for communities within a gender workforce equality environment
7. Identify the responsible authorities and assign roles for different organizations in the efficient implementation of this ESMP
8. Implement a robust CRM that is multi channeled and fully functional and that is clearly communicated to all PAPs

## 1.3 Methodology

This ESMP 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.

### **1.3.1 Collection of Environmental and Social Baseline information**

Baseline data were collected from field surveys, previously conducted assessments in Aley Caza under REP, generated GIS maps and side meetings.

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 Aley community. A geospatial analysis was performed to indicate the percentages distribution of geological outcrops and hydrogeological classes along each road alignment. A Land Use Land Cover (LULC) analysis was conducted to better understand the percentage distribution of LULC along each road alignment in Aley Caza. Results were then compiled with site visit observations. Finally, regarding the social assessment, socio-economic information about Aley Caza was obtained from several national sources and studies, as well as from the Ministry of Social Affairs (MoSA) and informal meetings with municipalities. Finally, a list of sensitive receptors was generated to better determine the PAPs.

### **1.3.2 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 Aley Municipality Cultural Center.

### **1.3.3 Methodology for Impact Assessment**

Specific activities that will be performed for each road separately have not yet been determined. Thus, impacts were assessed for the general routine maintenance activities under the project scope. Also 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 each target road, a multi-criteria weighted analysis was performed to distinguish critical roads from non-critical. This distinction is important since critical roads, that are expected to be significantly impacted, require stricter mitigation measures. The parameters or criteria that were considered in the analysis are described in Chapter 4, section 1.16.

## **Existing Policies, Legal and Administrative Framework**

### 1.4 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 1.6). 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; Law 946 : The Lebanese Code of Labor 35 2001 ; Pursuant to the international organization of the Convention 182 ; Law 00 2002 ; Ratification of the Convention of 138 Decree 987 2012 ; Law 05 2020 ; Law 8 2017 ; Decree 6 940 2020 ; Decree 8 987 2012 ; Prohibition of employment of minors under the age of 18 ; and Decree 3 791 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 and occupational legislations is provided in Table A in Annex 1.

### 1.5 Institutional Framework

The project is implemented by the CDR in coordination with the MPWT. The other main national institutions that are in relation to REP include (1) municipalities in Aley 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).

### 1.6 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 the WB are presented in Table 0-1

**Table 0-1 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

<b>Total suspended solids mg/l</b>	50
<b>Total coliform bacteria (Most Probable Number/100 ml)</b>	400

### Air Emissions Targets

According to Decision 16/1 dated 2022, the maximum allowable limits for generators with capacity  $\geq 200$  kW (or  $\geq 60$  kVA) are shown in the below table. It is important to note that application of Decision 16/1 will be as of February 2023.

**Table 0-2 Reciprocating engine generator with capacity  $\geq 200$  kW (or  $\geq 60$  kVA)**

Monitoring Parameter	Maximum Allowable Limits (mg/Nm <sup>3</sup> )	Fuel type	Measurement Frequency
Dust	50	-	Continuous • Mandatory if capacity $\geq 10$ MW • Optional if capacity $< 10$ MW
CO	100	-	
NO <sub>2</sub>	2,000	-	
SO <sub>2</sub>	10	Diesel	
	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 0-3 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 0-4 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 0-5 Lebanese noise guidelines for different zones (MoE 52/1, 1996)**

Area classification	Maximum accepted noise level dB(A)		
	Day <sup>1</sup>	Evening <sup>2</sup>	Night <sup>3</sup>
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

<sup>(1)</sup> 7 a.m. to 6 p.m.

<sup>(2)</sup> 6 p.m. to 10 p.m.

<sup>(3)</sup> 10 p.m. to 7 a.m.

## 1.7 World Bank Policies and Guidelines

### 1.7.1 Safeguard Policies

In addition to the Lebanese legislation, two safeguard policies apply to Lebanon Road and Employment Project (1) OP 4.01 Environmental Assessment and OP 4.12 and (2) Involuntary Resettlement. The ESMP for Aley Caza should comply with the safeguard policy of the World Bank, 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 roads 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. In the context of Aley 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” there will be no displaced persons by the project activities (this includes local and Syrian refugees).

#### 1.7.1 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 Aley Caza (refer to section 7.1). Finally, this ESMP will be disclosed on CDR’s and concerned municipalities’ website.

## Description of the Proposed Project

### 1.8 Project Scope and Location

The project consists of routine maintenance activities for a period of two years in Lot 2- Aley Caza namely for primary roads (**including International roads ranging from one lane in each direction with low traffic volume to multiple lanes in each direction with high traffic density known as Highways.**). The purpose of this task consists of maintaining the existing level of service for the concerned roads.

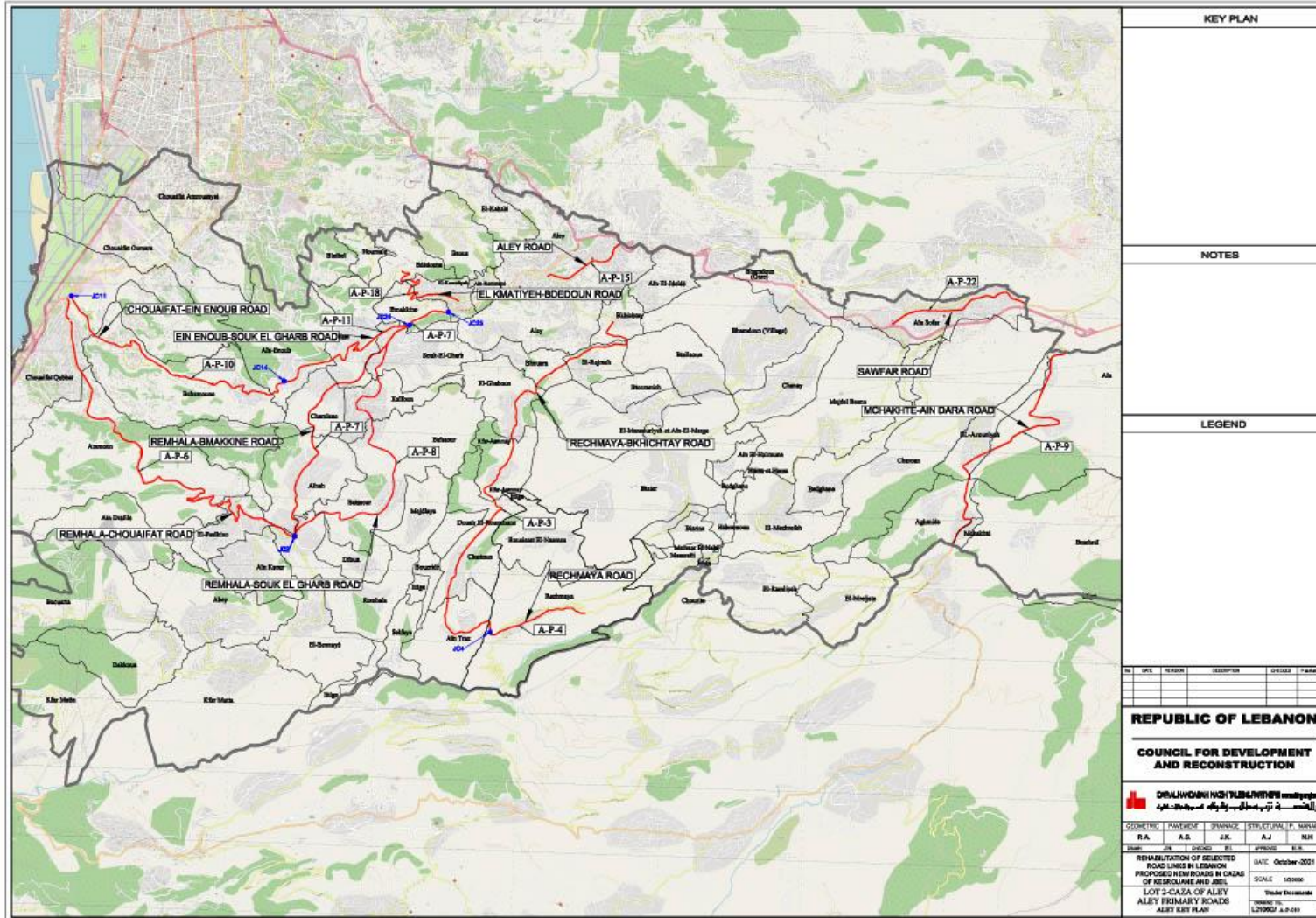
Candidate primary roads for routine maintenance activities within Aley Caza are presented in Table 0-1 and Figure 0-1. The total length of these roads is around 127.42 km.

**Table 0-1 Aley Caza primary roads**

Caza	Road Code	Name of Primary Roads in Caza Aley	Length (km)
Aley	A-P-1	Damour - Baouarta - Dakkoun - Kfar Matta - Abey - Ain Ksour - Qabr Chamoun	15.5
	A-P-2	Deir Couché - Jisr El Qadi - El Bennayé - Remhala - Dfoun - Qabr Chamoun	8.07

A-P-3	Rechmaya - Aïn Traz - Chartoun - Kfar Aamma - El Ghaboun - Bhouara - El Rejmeh - Btallaoun - Bkhichtay	11.24
A-P-4	Rechmaya - Maasraïti - Mazraet El Nahr - Jdael et Kfarhi - El Ramliyah - El Mreijate	11.71
A-P-5	El Mreijate - El Ramliyah - Kfarnice	3.91
A-P-6	Remhala – El-Fsaikine – Armoun – Chouaifat Qobbat	11.03
A-P-7	Bmakine - Souk El-Gharb - Aïtate - Chamlane - Aïnab – Remhala	7.33
A-P-8	Qabr Chamoun - Baïssour - Kaïfoun - Souk El Gharb	7.25
A-P-9	Aïn Zhalta - Mchakhté - Aghmide - EL Azouniyeh - Aïn Dara - Hammana	7.09
A-P-10	Chouaifat Qobbat - Bchamoune - Aïn Enoub	6.39
A-P-10-1	Bchamoune	1.17
A-P-11	Aïn Enoub - Aïtate - Souk El Gharb	3.91
A-P-12	Souk El Gharb - Bmakine - El Kamatiyeh	1.58
A-P-13	Souk El Gharb - Bmakine - Aley	4.78
A-P-14	Aley	2.13
A-P-15	Aley	2.06
A-P-16	Chouaifat Qobbat - Chouaifat Oumara - Aïn Enoub	5.53
A-P-17	Aïn Enoub - Bsaba Wadi Dlab	3.42
A-P-18	El Kamatiyeh - Bmakine - Bdédoune	2.35
A-P-19	Chouaifat Qobbat - Chouaifat Oumara - Chouaifat Amroussyat - Kfarchima	3.04
A-P-20	Chouaifat Oumara - Chouaifat Amroussyat	2.4
A-P-20-1	Chouaifat Amroussyat	0.74
A-P-21	Aley	1.52
A-P-22	Ain Sofar	3.27
<b>Total Length of Primary Road (km)</b>		<b>127.42</b>

Figure 0-1 Aley Caza primary roads



Source: Dar Al Handasah Nazih Taleb & Partners

## 1.9 Project Activities

The assessment of required maintenance activities is provided in a separate technical report prepared by the Engineer (Dar Al Handasah Nazih Taleb). It was based on site inspection and detailed field observation for 25% of the total primary roads which are considered as representative roads.

In this context, the envisaged general roadway repair works within Aley Caza were grouped into incidental repair works, pavement repair works, concrete repair works, and installation of channelizing devices and traffic control devices (Table 0-2). Specific activities for each of the 22 candidate roads are not yet assigned.

**Table 0-2 Envisaged routine maintenance activities for Aley**

Category	Maintenance Activity
1. Incidental repair works	<ul style="list-style-type: none"> <li>• Clearing and grubbing</li> <li>• Repair of damaged manhole covers</li> <li>• Repair of Masonry wall</li> <li>• Cleaning of waterways, hydraulic structures, drainage pipes, and box culverts,</li> <li>• Remove damaged galvanized steel guardrail and replace by new one</li> </ul>
2. Pavement repair works	<ul style="list-style-type: none"> <li>• 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</li> <li>• 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 (applying prime coat, one layer of asphalt binder course (5 cm), tack coat and one layer of asphalt wearing course of (5 cm)</li> <li>• 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 (one layer 5 cm), tack coat and asphalt wearing courses (one layer 5 cm)</li> <li>• Crack sealing</li> <li>• Milling &amp; overlay for sunken but stable trench, width less than 1 m including tack coat</li> <li>• Removal and reinstatement of damaged trench width less than 1 m including excavation, base course (30cm), prime coat, asphalt binder course (one layer 5 cm), tack coat and asphalt wearing courses (one layer 5 cm)</li> </ul>
3. Concrete repair works	<ul style="list-style-type: none"> <li>• Repair of box culverts, headwalls, concrete channel, concrete safety barrier, retaining walls, and cover channels</li> </ul>
4. Installation of Traffic control devices	<ul style="list-style-type: none"> <li>• Installation of thermoplastic reflectorized road paint lines including surface preparation and removal of existing paint lines (where needed)</li> <li>• 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.</li> </ul>
5. Temporary Channelizing Devices	<ul style="list-style-type: none"> <li>• Installation and reinstatement of concrete barrier, removable single face concrete safety barrier, or removable double face concrete safety barrier.</li> </ul>

## 1.10 Link with REP Rehabilitation Activities

The candidate primary roads for routine maintenance activities are different from the ones that are currently under rehabilitation. A general map showing the candidate primary roads (including International Roads/Highways) for routine maintenance activities in Aley along with the roads that are under rehabilitation within REP (roads that were studied in

2020([https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Aley\\_Final-ESMP.pdf.aspx](https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Aley_Final-ESMP.pdf.aspx).) is presented in Figure 0-2.

Given the same geographic scope of both ‘projects’ (rehabilitation and routine maintenance activities under REP), concurrent actions would generally tend to offer a higher potential for cumulative impacts. However, routine maintenance activities may not be conducted at the same time of the currently ongoing rehabilitation activities. Moreover, given the nature of maintenance activities as they are smaller in scale compared to rehabilitation works (that involve complete and full asphaltting of roads and deep excavations...) which makes REP projects’ combined effect less significant on Aley local environment and community.

If there may be overlap between the rehabilitation and routine maintenance activities periods, as with air quality and noise emissions due to the distance between the activities and the difference in nature and scale (i.e. localized impacts during maintenance works), cumulative impacts are not expected to be significant at sensitive receptors. However, cumulative deterioration in groundwater quality is expected when roads are in close proximity to the same river/spring and if the contractors did not follow the projects’ ESMPs.

### **1.11 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 D in Annex 1.

### **1.12 Staffing and Site Facilities**

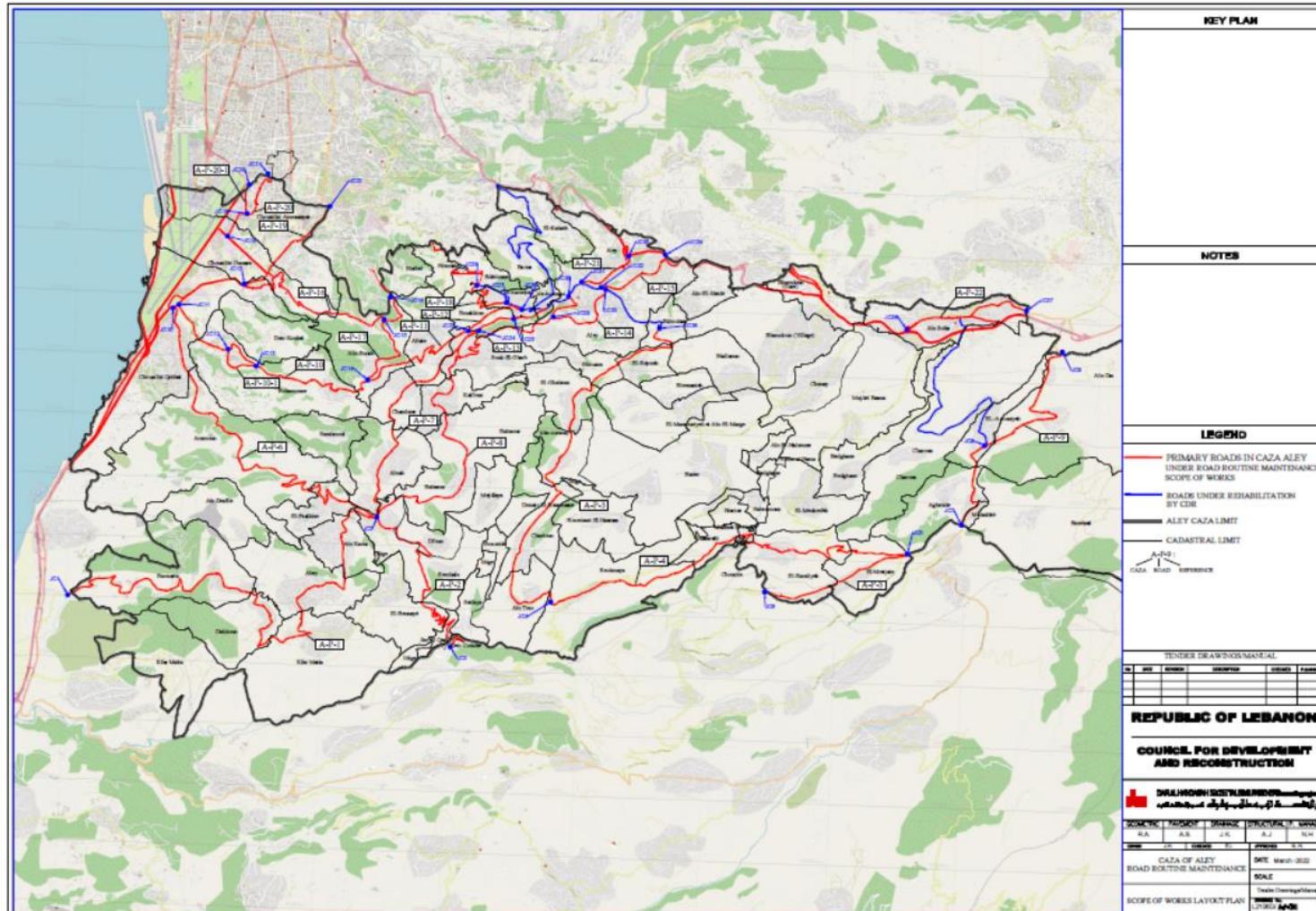
Routine maintenance activities are typically of small scale (i.e., activities will occur on a small section of the road), but widely dispersed, and most of them require skilled and unskilled manpower. The number of required unskilled workers (laborers) needed to perform repair works on-site depends on the type of maintenance activity, its scale, and on the timing of works. In this context, the number of workers is estimated to be 20 workers for normal days and can increase to 50 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.

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 project area to serve as a project office. The office will be used by the Contractor Engineers, technical skilled workers and Supervising Consultants and will be equipped with toilet, kitchen (including drinking water and appliances), lockers and other supplies needed for the daily administrative activities. 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 (management in relation to wastewater are provided in Table 0-1).

Figure 0-2 Candidate Primary road for routine maintenance activities and roads under rehabilitation in Aley Caza



Source: Dar Al Handasah Nazih Taleb & Partners

## **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.

### **1.13 Physical Environment**

#### **1.13.1 Topography**

Roads under consideration are located in Aley Caza. Primary roads start off at the coast and ascend east into the mountains. Attitude approximately range between 12m (road AP 20 near the airport in Choueifat Oumara village) to 1,350m (road AP9 in Ain Dara village and AP22 in Ain Sawfar village) –Table F in Annex 2.

### 1.13.2 Subsurface and Surface Conditions

#### (1) Geological Outcrops:

The geology of the studied area was investigated for outcropping formations, subsurface stratigraphy, structure (faults, folds, seismic, etc.), hydrogeology (groundwater and sea water intrusions) and hydrology (surface water).

The summary of the geological outcrops exposed in the study are listed and described in Table G in Annex 2. Additionally, in order to obtain a better understanding of the geology in the area, a geospatial analysis (Table H in Annex 2) was performed to indicate the percentages of geological outcrops encountered in each unique road alignment. For example, road AP20 and 20-1 sit entirely (100%) over a quaternary (Q) formation.

#### (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. The detailed Hydrogeological conditions in the area are presented in Table E in Annex 2. In summary, in terms of hydro-stratigraphy, the project covers several classes:

**Table J Percentage distribution of the hydrogeological classes over the length of each road in Aley Caza**

Road Name	1: Jurassic Aquifer	2: Cretaceous Aquifer	7: Neogene Semi Aquifer	10: Cretaceous Low - Semi Aquifer	12: Quaternary Low - Semi Aquifer	16: Cretaceous Non- Aquifer	17: Cretaceous Non- Aquifer
A-P-1		56%	0%	3%		40%	
A-P-2	2%	1%		7%		90%	
A-P-3		0%		7%		93%	
A-P-4		1%		7%		92%	
A-P-5		0%		7%		93%	
A-P-6		57%			3%	40%	
A-P-7		1%				99%	
A-P-8		1%				99%	
A-P-9		0%		7%		93%	
A-P-10		57%			3%	40%	
A-P-10-1		100%				0%	
A-P-11						100%	
A-P-12						100%	
A-P-13						99%	
A-P-14						99%	
A-P-15						100%	
A-P-16		57%			3%	40%	
A-P-17						100%	
A-P-18						100%	
A-P-19		94%			6%		
A-P-20			6%		94%		

A-P-20-1					100%		
A-P-21						100%	
A-P-22						100%	

- Klastic formations represented as **and** in figure and described in table (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
- Impervious formation represented as **10**, and **11**: 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
- Clay formations these types of formations are **not risky** in the sense that if a surface contamination occurs surface spread is limited due to the clay impermeable formation

Similar to the geological analysis, a hydrogeological analysis was done to determine the percentage distribution of hydrogeological classes along each road alignment (Table J in Annex 2). For example, road AP15 sits entirely (100%) over (**16: Cretaceous Non-Aquifer**) with weak transmissivity

### (3) Surface Water

The main rivers and springs in Aley Caza include: Wadi Ghadir and Damour River.

- Wadi Ghadir is crossed by **P2** and **0**
- Damour river is crossed by **P2** and **P4**

Other roads travel near some of the rivers, as summarized in Table K in Annex 2.

### 1.13.3 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 influences the direct environmental 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.

In order to have an idea about the meteorological parameter in all of the study area, three strategic locations were considered a) a low point, b) a middle point, and c) a high point in terms of surface elevation in order to encompass all the roads and have an average of the results. In the study area, the monthly precipitation data is summarized in Table L in Annex 2. The historical data shows that most of the rain occurs in the winter months between December and March. The total precipitation ranges between 762mm and 1,004mm. in relation to temperature, the hottest month in the area is August (31 °C) and coldest month is January (1 °C). Fluctuations in the temperature values are shown in Table L in Annex 2.

### 1.13.4 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 available near real time data for various gases in the atmosphere. The mean tropospheric NO<sub>2</sub> column density was calculated using the Google earth engine code java script editor resulting in Figure C (in Annex 2) which revealed in the mean NO<sub>2</sub> values across the border of Lebanon between year 2018 up to end of year 2021. It is clear that the NO<sub>2</sub> 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 Aley Caza are overlain as white alignments over the below NO<sub>2</sub> map to have an idea of the ambient air quality in the surrounding area.

## 1.14 Biological Environment

A rapid biological assessment was carried out to draw the ecological profile of the adjacent areas to Aley primary roads and assess key natural habitats that are at added risk from maintenance activities. A LULC analysis was conducted to understand the distribution of LULC over the length of each primary road with a 50m strategic constant buffer (refer to Table M in Annex 2). Results were then complied with site visit observations. Potential flora species were considered as well in this assessment. The ecological value of species was based on their local ecological importance (distribution of species and degree of endemism (Tohmé and Tohmé, 2014) and IUCN classification).

### 1.14.1 Study Area

The study area is ranging between 2 and 350 mIt covers the Eu-Mediterranean and Supra-Mediterranean zones (CORINE classification). The altitudinal range plays an important role in plant composition (Abi Saleh, 1996). Thermo-Mediterranean zone comprises Carob-lentiscus series and *Quercus calliprios* thermophilous series. Whereas, the Supra-Mediterranean zone is characterized by a series of vegetation that are found on limestone substrata (series of *Quercus calliprinos*, *Quercus infectoria*, *Ostrya carpinifolia* and *Fraxinus ornus*) and the *Pinus pinea* and *Pinus brutia* found on sandstone.

### 1.14.2 Results

Studied roads in Aley are mainly bordered by urban areas, rural settlements, olive groves (*Olea europaea*) agriculture terraces fruit orchards cultivated trees e.g umbrella pine, scrublands degraded grasslands, and open garrigue vegetation, discontinuous bushy associations of the Mediterranean calcareous plateaus dominated by Kermes Oak (*Quercus calliprinos*) and dwarf-shrubs and spiny burnet (*Sarcopoterium spinosus*). These types of habitats do not provide a favorable environment for a large variety of plants and animals refer to Table M in Annex 2. However some roads involve partly particular biotopes (refer to Table O in Annex 2). These biotopes include riparian habitats when roads intersect with Damour river; *Pinus pinea* forest accompanied with other tree species such as *Quercus calliprinos*, *Quercus infectoria*, and *Cercis siliquastrum*; and oak maquis.

In summary the assessment considered that ecologically critical roads are roads that involve riparian habitats that are excellent refuge for birds, reptiles and amphibians and roads that are surrounded by dense pine forests and oak maquis which are of high biodiversity value

Even though most of the riparian habitats are already impacted, the project should not affect further the concerned aquatic and riparian communities (remaining adapted species) and the surrounding vegetation and animal communities (birds of passage or resident amphibians and reptiles) that could be of ecological significance. Similarly, some of the recorded forests are impacted by human activities. Nevertheless, maquis or shrub-lands, remain critically rich ecosystems throughout the country. Due to their density and difficulty of access, they constitute a dynamic hideout for numerous reptiles, mammals, and birds.

## **1.15 Socio-Economic Condition**

### **1.15.1 General Background**

The population of Aley is 300,800, out of which 70% are Lebanese and 30% are non-Lebanese (CAS, ILO and EU, 2020). Aley has 74,900 households and the average household size is 4, whereas, the average household size in Lebanon is 3.8. In addition, 105,500 people from the population of Aley are aged between 0–14 and above 65 years (CAS, ILO and EU, 2020).

With regards to other Lebanese vulnerable groups, there is no updated information on Female Headed Households (FHH), elderlies or disabled in Aley. Data on FHH in Mount Lebanon is only available which indicates that 105,000 of the households are headed by a woman and 458,000 are headed by a man (CAS, ILO and EU, 2020). Further, in 2016, 48,392 of Aley's Lebanese population were deprived while 104,746 were above the poverty line (OCHA, 2016). In other words, 48,392 of the Lebanese in Aley were deprived from basic resources essential to meet their fundamental survival and protection needs.

The number of Syrian refugees in Aley is 68,332 (UNHCR, UNICEF and WFP, 2017) and the average households size of Syrians in Aley is 5 (UNHCR, UNICEF and WFP, 2018). 14.6% of the households are headed by a woman and 63.3% of the Syrian refugees in Aley are below the poverty line (UNHCR, UNICEF and WFP, 2018). Moreover, Syrian refugees are generally spread out through different areas of the community (there are no camps in the study area). 87.8% of the Syrian refugees in Aley live in residential buildings, 10.3% in farm or warehouses and 1.9% in non-permanent structures (prefabricated units) (UNHCR, UNICEF and WFP, 2018).

Regarding other vulnerable groups such as individuals with specific needs, 31.6%, 10.1%, 33.5%, 12.7% and 4.7% of the households have at least one person with chronic illness, serious medical condition, temporary illness, disability, needing support in daily activities respectively (UNHCR, UNICEF and WFP, 2018).

Regarding health care facilities, Aley district contains different facilities ranging from public and private hospitals, and private clinics. However, due to the uneven geographical distribution of hospitals in Lebanon, Aley caza mainly comprises small sized hospitals/medical facilities According to the Ministry of Public Health (MoPH, 2019), Aley contains 6 private hospitals, one public hospital, and 11 primary healthcare centers. For instance, El Azouniyeh Hospital is spotted at a distance of 200 m from road AP9. Finally, the average years of education in Aley is 11.3 and the enrollment rate is 39.5 (CAS). Aley has 36 public schools and 41 private schools (CAS, ILO and EU, 2020). Moreover, there are several colleges and universities in Aley

district, including: Kamatiyeh Pubic school and Sofar School (these schools are considerably distant from AP18 and AP22).

Similar to most of the Districts in Mount Lebanon, Aley’s economy relies mainly on the industrial and agricultural sectors. According to IDAL (2017), the Mount Lebanon Governorate contains the highest concentration of industrial firms in Lebanon, hosting 58% of the total number Lebanese industrial firms. The majority of these firms are agro-food companies (17.93%). The unemployment rate in Aley is 13%, whereas, unemployment rate in Lebanon is 11.4% (CAS, ILO and EU, 2020).

### 1.15.2 Sensitive Receptors

The LULC cover analysis showed Aley roads in a higher altitude are mainly surrounded by rural settlement, fruit orchards, and agricultural terraces (refer to Table N in Annex 2). When determining critical roads, this study prioritized agricultural areas. In other words, the social parameter was mainly linked to the presence of agricultural areas along the assessed roads because agricultural lands are more spread over the alignments, are subsequently more likely to get impacted, and are highly important for the neighboring communities.

## 1.16 Determination of Critical Roads

### 1.16.1 Methodology

In order to calculate a net effect from the hydrogeological, ecological, and social parameters, a multi-criteria weighted analysis was performed in order to distinguish critical roads from non-critical ones. This distinction is important since mitigation measures for sensitive roads differ from non-sensitive roads. The parameters or criteria that were considered in the analysis are transmissivity, proximity to rivers, proximity to springs, sensitive LULC classes, and a social parameter.

**Table 0-1 Weights assigned for each criterion to determine criticality of each road based on expert opinions**

Criteria	Weight
Transmissivity	0.2
Proximity to river	0.15
Proximity to spring	0.15
LULC/Ecological	0.25
Social/proximity to agricultural lands	0.25

Specifically, each parameter consisted of the following (refer to Table P in Annex 2):

- **Transmissivity** distinguished between high of low based on the geological and hydrogeological classes C1, C2, and C3; which all the roads occupy entirely have a high transmissivity
- **Proximity to river** Road are either to cross a river by travel near a river (< 100 m), and they are very remote from any surface water body and therefore an A1 value is assigned
- **Proximity to spring** similar reasoning as proximity to river

- **LULC/Ecological:** This parameter was divided to either critical or not critical based on the LULC classes shown in Table 0-2, where roads are bordered or intersect with natural habitats of high ecological significance namely dense pine forests are assigned the highest score of 0.6 or 60%.

**Table 0-2 Weights assigned to determined ecological parameter**

LULC/Ecological	
Class	Weight
Dense forest of Oaks (Quercus ssp)	0.6
Outcrop (rocky habitats)	0.3
Low density oak forest	0.1

**Social:** This parameter was linked directly to the different types of agricultural areas that might be affected by the works and are of importance to the local community in Aley. This parameter was prioritized knowing that agricultural lands are expected to get impacted by maintenance activities. Similarly, it is divided to either critical or not critical based on the classes shown in Table 0-3, where roads passing near deciduous fruit trees areas are assigned the highest score of 0.4 or 40%.

**Table 0-3 Weights assigned to determined social parameter**

Social	
Class	Weight
Deciduous fruit trees	0.4
Field crops in large areas	0.15
Field crops in small fields/terraces	0.15
Olives	0.2
Protected agriculture	0.1

### 1.16.1 Results

The results of the analysis are shown in Table 0-5 and the criticality score is either defined as low, medium, or high based on the legend shown in Table 0-4. **Roads of high criticality are AP2, AP4, and AP10.**

**Table 0-4 Criticality score and legend**

Sensitivity Value	Criticality
$\leq 0.3$	Low
$> 0.3$ and $\leq 0.5$	Medium
$< 0.5$ and $\leq 0.85$	High

**Table 0-5 Roads of High Criticality (results of the weighted analysis)**

Road Name	Sensitivity Value	Criticality
A-P-1	0.45	Medium
A-P-2	0.5	High
A-P-3	0.35	Medium
A-P-4	0.5	High
A-P-5	0.2	Low

A-P-6	0.35	Medium
A-P-7	0.35	Medium
A-P-8	0.1	Low
A-P-9	0.325	Medium
A-P-10	0.7	High
A-P-10-1	0.45	Medium
A-P-11	0.35	Medium
A-P-12	0.35	Medium
A-P-13	0.1	Low
A-P-14	0.1	Low
A-P-15	0.1	Low
A-P-16	0.2	Low
A-P-17	0.35	Medium
A-P-18	0.35	Medium
A-P-19	0.35	Medium
A-P-20	0.25	Low
A-P-20-1	0.1	Low
A-P-21	0.1	Low
A-P-22	0.1	Low

## Potential Impacts and Proposed Mitigation measures

In this Chapter, the identified REP's potential positive and negative environmental, social, and H&S impacts are elaborated along with their correspondent mitigation measures.

### 1.17 Positive Impacts

Potential positive environmental impacts of the routine maintenance activities are associated with enhanced road conditions (if activities were managed properly). 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.

### 1.18 Negative Impacts

As mentioned earlier, specific activities that will be performed for each road separately have not yet been determined. Thus, impacts were assessed for the general routine maintenance activities under the project scope. The worst-case scenario impacts were considered for critical roads where impacts are expected to be more significant (Table 0-5) and accordingly specific mitigation measures were provided roads.

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, as in the case Aley, displaced Syrians are not living in specific camps, and thus are considered as part of the local communities. Moreover, it is important to mention that maintenance works in Aley will not require land acquisition, therefore, vulnerable groups in Aley Caza will not be relocated.

### 1.19 Management Plans

All identified impacts must be controlled and mitigated as early as possible. The aim of the ESMP is to ensure effective and fast action responses to achieving good environmental and social performances.

Measures to control exhaust emissions, dust and odor emissions, and accidental spills of construction materials and subsequent impairment of ecosystems are provided with specific/stricter measures for critical roads. 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 the local community.

In addition to the environmental management plan (Table 0-1) and the social management plan (Table 0-2), a separate OHS management plan was provided (Table 0-3). 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 protect the workers and the 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, Environmental Health and Safety (EHS)/OHS and OSHA guidelines for construction sites including site-specific risk assessments, should be submitted by the Contractor. The OHS manual plan should at least include the developed measures in Table 0-3 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 are provided along with H&S control measures in Table 0-3. Contractor must provide a safe environment for the work force and public.

**Table 0-1 Environmental Management Plan**

Parameter	Activities	Impacts	Mitigation Measures
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><b>Pavement repair works</b></p> <ul style="list-style-type: none"> <li>Excavations and milling can produce substantial amounts of dust and scattered pavement materials.</li> <li>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.</li> <li>Accidental spills of bituminous materials with construction runoff and storm water might result in water and soil quality deterioration.</li> </ul> <p><b>Drainage Maintenance</b></p> <ul style="list-style-type: none"> <li>Improper disposal of waste of removed obstructions, debris and waste; from cleaning hydraulic structures</li> <li>Improper disposal of excess waste during replacement of drainage appliances</li> </ul> <p><b>Installation/removing of road markings and paintings</b></p> <ul style="list-style-type: none"> <li>Improper storage and disposal of chemical compounds (e.g., paint).</li> <li>Spillage of chemical paint substances</li> </ul> <p><b>Installation of concrete barriers and concrete repair works</b></p> <ul style="list-style-type: none"> <li>Spills from on-site concrete pouring</li> </ul>	<ul style="list-style-type: none"> <li>Pollution of surface water where road cross rivers.</li> <li>Pollution of underground aquifers specially that mainly all studied road alignments fall on karst limestone aquifers.</li> <li>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.</li> <li>Pollution of water resources and soil quality due to improper management of toxic substances (e.g., asphalt layer), inadequate disposal of solid waste, debris . .</li> <li>Pollution of water and soil quality due to accidental spills of bituminous materials, chemicals/paint and leachate of concrete pouring</li> <li>Pollution of water and soil quality due to improper management of the generated domestic solid waste and wastewater from the portacabin.</li> <li>Deterioration of water and soil quality due to contaminated storm water runoff with bituminous materials, fuel/oil.</li> </ul> <p>These impacts will adversely affect the following rivers/watercourses that are crossed by the identified <b>critical roads</b> (refer to Table 0-5):</p> <ul style="list-style-type: none"> <li>Wadi Ghadir is crossed by AP12 and AP20</li> <li>Damur river is crossed by AP2 and AP4</li> </ul> <p>As for the groundwater resources, <b>road identified with high transmissivity</b> (refer to Table P) and can be easily exposed to contamination.</p>	<p><b>Dust Control</b></p> <ul style="list-style-type: none"> <li>During excavation, water should be sprinkled to hamper fugitive dust emissions that could pollute surrounding water quality.</li> </ul> <p><b>Construction Solid Waste and Wastewater Management</b></p> <ul style="list-style-type: none"> <li>Excavated materials should be stored and transported offsite to the nearest licensed dumpsite due to possible heavy metal contamination.</li> <li><u>During pavement repair works</u> <ul style="list-style-type: none"> <li>Cleared subgrade or reclaimed asphalt must not be disposed into the road adjacent ecosystems and rivers.</li> <li>Compacted, unsuitable/degraded materials shall be disposed in a licensed landfill and suitable materials should be sent to facilities to be reused in construction.</li> </ul> </li> <li>Cleared materials and debris (soil, stones and sticks) should not be disposed into the nearby streams and rivers. Cleared materials should be properly collected away from drainage waterways and disposed by the Municipality of Aley.</li> <li><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.</li> </ul> <p><b>Management of Accidental Leakages/Spills</b></p> <ul style="list-style-type: none"> <li>Accidental leachate during concrete pouring should be immediately cleaned, collected in an impermeable bag and disposed along the municipal solid waste collection route.</li> <li>Have a spill response plan in place and spill kits on site. All workers should be trained on its implementation.</li> <li>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.</li> </ul> <p><b>Proper Handling of Construction Materials and Hazardous Waste</b></p> <ul style="list-style-type: none"> <li>Proper handling of fresh asphalt, slurry, paints, and other construction materials.</li> <li>Provide secondary containment when storing hazardous substances in bulk quantities.</li> <li>All refueling operations shall take place off-site, vehicles should be fueled up before arriving to the road section.</li> <li>Ensure Material Safety Data Sheet (MSDS) of all hazardous materials (chemicals, sealants, patching materials) are present onsite.</li> <li>Raw materials should be stored away from watercourses.</li> </ul> <p><b>Additionally, when the maintenance works are conducted in close proximity to critical roads (refer to Table 0-5) the following should be implemented:</b></p> <ul style="list-style-type: none"> <li>Cleaning and grubbing should be practiced at least 30m away from the nearest stream or river.</li> <li>Mix hazardous materials at a minimum of 40 meters away from any watercourse or sensitive habitats.</li> </ul>

			<ul style="list-style-type: none"> <li>• Limit the application of surface treatments to the road surface and avoid over spraying near water courses and at water course crossings.</li> <li>• Maintain suitable buffers between, material storage and water courses and sensitive habitats.</li> <li>• Placement of geotextile silt traps as appropriate, especially in areas close to water bodies (when roads are in close proximity to Damour river and Wadi Ghadir).</li> <li>• During installation of concrete barriers and concrete repair works, on-site concrete pouring 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.</li> </ul> <p><b><u>Control of Stormwater Runoff</u></b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Any stockpiled construction material should be covered with an impermeable layer to avoid contamination of storm water runoff.</li> </ul> <p><b><u>Domestic Solid Waste and Wastewater Management</u></b></p> <ul style="list-style-type: none"> <li>• Domestic-like waste shall be removed daily from the routine maintenance sites.</li> <li>• The generated waste onsite should be properly segregated at source into recyclables and organic waste in appropriately labelled waste bins.</li> <li>• In case of linking the porta cabin toilet to a polyethylene storage tank, the following should be done:             <ul style="list-style-type: none"> <li>○ A specialized contractor should be selected to periodically collect the wastewater from the polyethylene tank.</li> <li>○ 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.</li> </ul> </li> </ul> <p><b><u>Timing of Works</u></b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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 water courses and sensitive habitats particularly for surface maintenance activities requiring the application of patching and sealing component, tar, asphalt, and dust control materials</li> </ul>
<p><b>Soil erosion</b></p>	<ul style="list-style-type: none"> <li>• Earth works</li> <li>• Cleaning and grubbing</li> <li>• Repair works resulting in disturbed areas which aren't properly re-vegetated.</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Cleaning and grubbing grass and weeds may result in erosion of the slopes and removal of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>• After repairing shoulders, it is important that the side slope is immediately covered with grass turfing.</li> <li>• 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.</li> </ul>
<p><b>Air quality</b></p>	<ul style="list-style-type: none"> <li>• Excavation and milling works</li> <li>• Movement of raw materials transporting vehicles on unpaved surfaces</li> <li>• Unloading of raw materials</li> <li>• Open storage of raw materials</li> </ul>	<ul style="list-style-type: none"> <li>• Exhaust emissions from vehicles transporting workers to/from site (i.e., buses, mini-vans, cars).</li> <li>• Exhaust emissions from power generators.</li> </ul>	<p><b><u>Control of Exhaust Emissions</u></b></p> <ul style="list-style-type: none"> <li>• Ensure the maintenance of all construction equipment and vehicles regularly, at least once a month.</li> </ul>

	<ul style="list-style-type: none"> <li>Disturbances to material stockpiles by local winds and material handling, which is of great significance depending on the road location.</li> <li>Wind blow during transportation of materials by vehicles and specifically when transporting on unpaved roads</li> </ul>	<ul style="list-style-type: none"> <li>Exhaust and dust emissions from excavators, paving vehicles (graders, sweepers, dump trucks, asphalt pavers, compactors/rollers, steel wheel rollers, bitumen tanks with spreaders).</li> <li>Dust emissions from disturbances to material stockpiles by local winds, material handling and traffic using unpaved roads. The generated fugitive dust will highly affect the nearby agricultural lands, shown in Table N in Annex 2.</li> </ul>	<ul style="list-style-type: none"> <li>Machinery and equipment should be equipped with air pollution control equipment that should be monitored regularly to ensure its effective operation.</li> <li>Power generators should be equipped air pollution control equipment.</li> <li>Avoid idling time of machinery.</li> </ul> <p><b>Control of Dust Emissions</b></p> <ul style="list-style-type: none"> <li>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 and agricultural lands surrounding the critical roads (refer to Table O-5 and Table N in Annex 2).</li> <li>Ensure that trucks hauling raw materials are properly covered.</li> <li>Ensure that stockpiles of raw materials are always covered</li> <li>Ensure that all trucks carrying removed materials/waste from construction sites are covered.</li> </ul> <p><b>Additionally</b>, when the maintenance works are conducted in close proximity to critical roads (refer to Table O-5), the following should be implemented:</p> <ul style="list-style-type: none"> <li>Loading and off-loading of raw materials should be performed away from sensitive ecosystems and/or nearby rivers.</li> <li>Stockpiles of raw materials should be placed at least 50m away from sensitive habitats.</li> </ul>
<b>Odor</b>	<ul style="list-style-type: none"> <li>Pavement repair works</li> <li>Installation of road marking and painting</li> </ul>	<ul style="list-style-type: none"> <li>Odors from asphalt fumes and paint can cause unpleasant smells to the surrounding.</li> <li>Odor emissions might be generated from mismanagement of solid waste and wastewater and disrupt the local environment.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>When maintenance activities will be performed in close proximity to sensitive receptors (i.e. agricultural lands), identified affected people should be informed beforehand regarding the expected odor emissions.</li> <li>Ensure daily collection of solid waste from the site and adequate management of the generated wastewater.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>Elevated noise levels will mainly result from excavation, pavement and milling, and concrete placement, etc.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Heavy and noisy machinery such as, excavators, bobcat, steel roller, compressors, pick-up, dump trucks that generate unpleasant noise levels and disrupt nearby settlements and natural habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Regular maintenance of the machinery, equipment and vehicle should be performed to prevent excessive noise.</li> <li>Appropriate work schedule should be applied to avoid nuisance to the surrounding receptors.</li> <li>Vehicles and equipment that meet national standards for noise and vibration should be used.</li> <li>Avoid noise generating activities near roads surrounded by sensitive receptors (mainly road segments that are surrounded by pine forests that are of high biodiversity value (refer to Table O in Annex 2).</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>Routine maintenance debris, excavated materials and other used construction materials if discharged directly into the adjacent rivers and valleys.</li> <li>Wastewater discharge into the roadside woodlots and riparian habitats can severely affect the local fauna and flora and eventually lead to population destruction.</li> <li>Contamination of terrestrial habitat due to accidental spill</li> <li>The generation of emissions and disturbances such as noise, dust, and pollutants in adjacent areas' soil and vegetation.</li> <li>Clearing and grubbing (i.e., removal within the limits of working area all vegetation, surface debris and scattered stones and rocks etc.) could include</li> </ul>	<ul style="list-style-type: none"> <li>Temporary disturbance of nearby ecosystems</li> <li>Direct destruction of population</li> <li>Habitat Alteration</li> <li>Road kills (i.e., mortality due to vehicular collisions).</li> <li>Contamination of terrestrial habitat due to accidental spills</li> <li>Fauna injuries due to collision with machine</li> </ul>	<p><b>General Mitigation Measures</b></p> <ul style="list-style-type: none"> <li>During drainage maintenance, culverts should be surveyed for the presence of nesting communities</li> <li>Culverts where wildlife have been determined to be absent do not require buffers or exclusion practices</li> <li>Prior to grubbing or excavation, the contractor should inspect the working zones for areas of endangered plant or animal species (mainly areas that are considered of high ecological criticality- indicated in this ESMP in Table O-5). Any findings shall be reported immediately</li> <li>Whenever any vegetation is scheduled to remain in-place, selective clearing techniques shall be employed. All vegetation listed to remain should be marked</li> <li>Contractor's personnel should not damage remaining shrubs, trees or their root systems during selective clearing</li> <li>A waste management plan must be taken to avoid contaminating adjacent natural habitats and direct destruction of wildlife</li> </ul>

	<p>accidental removal of sensitive and protected species.</p> <ul style="list-style-type: none"> <li>Fauna injuries due to collision with machine and vehicles due to increase in traffic movement</li> </ul>		<p><b>Strict Measures Near Critical Habitats:</b></p> <ul style="list-style-type: none"> <li>In case works will take place in riparian habitats (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 (e.g., Damour River and Wadi Ghadir).</li> <li>Prevent spillage of construction materials and do not discharge unused or removed materials during maintenance activities into adjacent natural habitats (refer to critical natural habitats in Table O in Annex 2).</li> <li>Restricting the use of noisy machines and/or adopting noise-reducing means (silencers) for construction machines, especially near sensitive areas (namely if works took place along critical roads refer to ecologically critical roads in Table O in Annex 2).</li> <li>Washing of vehicles and machinery should be done offsite and away from particular biotopes (dense pine forests and riparian ecosystems);</li> </ul>
<p><b>Resources Consumption</b></p>	<ul style="list-style-type: none"> <li>Water will be used for domestic purposes, for construction activities (curing of concrete, moisturizing temporary stockpiles . etc.) and for cleaning and dust suppression.</li> <li>Energy will be consumed for the operation of vehicles and equipment.</li> </ul>	<ul style="list-style-type: none"> <li>During the routine maintenance works, overconsumption of water and energy will lead to exploitation of natural resources.</li> </ul>	<p><b>Control of Freshwater Demand</b></p> <ul style="list-style-type: none"> <li>Dry clean up methods should replace wet cleaning methods whenever practical (sweeping, dust collection vacuum, wiping . etc.).</li> <li>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.</li> <li>Signs near water-using appliances should be installed to encourage water conservation.</li> </ul> <p><b>Control of Energy Demand</b></p> <ul style="list-style-type: none"> <li>Tuning off non-used equipment should be done.</li> <li>Machinery and generators shall be regularly maintained and operated in an efficient manner.</li> <li>Vehicles should not be allowed to remain idle for long periods.</li> </ul>
<p><b>Physical Cultural Resources</b></p>	<ul style="list-style-type: none"> <li>Excavation, milling and grubbing.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<p>Prior to grubbing or excavation, the contractor should inspect the working zones for areas of archaeological remains.</p> <p>Chance-find procedure:</p> <p>In the case of chance finding the following procedures should be applied:</p> <ul style="list-style-type: none"> <li>All construction activities in place of the discovery must cease immediately once discovery of an archaeological artefact or complex is discovered.</li> <li>The site must be fenced (protected) and authorities (Ministry of Culture/ Directorate General of Antiquities (M/C/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</li> <li>The area should be secured in order to prevent any destruction or disappearance of the archaeological complexes.</li> <li>Work should not be commenced without the DGAs' written decision on how to handle the findings and recommence the work.</li> </ul>

**Table 0-2 Social Management Plan**

Parameter	Impacts	Mitigation measures
<p><b>Social Risks</b></p>	<p><b>Socio-Economic Conditions Community</b></p> <ul style="list-style-type: none"> <li>• Labor influx and Labor-induced SH and SEA</li> <li>• Traffic disturbance and obstruction of access routes to sensitive receptors</li> <li>• Disturbance of sensitive receptors</li> <li>• Disturbance of public utilities and interference with private properties/lands</li> </ul>	<p><b>Labor influx and labor induced SEA</b></p> <ul style="list-style-type: none"> <li>• Providing workers with the necessary training and awareness raising session on issues regarding SEA, GBV prior to signing the CoC.</li> <li>• Ensuring that workers sign the Code of Conduct (CoC) (refer to Annex 3) that targets GBV risks, specifically SEA induced by labor influx, and penalizes the perpetrators of SEA.</li> <li>• Verifying that REP GRM for communities is adequately implemented.</li> <li>• Ensuring that REP established GRM is well disseminated to concerned communities (before commencement of works) through municipalities public boards and project sign boards.</li> <li>• Ensuring that REP GRM (including the QR code along active roads) is properly functioning to record complaints from the surrounding communities.</li> </ul> <p><b>Obstruction of access routes to sensitive receptors</b></p> <ul style="list-style-type: none"> <li>• Adequate and timely communication with the concerned municipalities and dissemination of project-related work schedule with the surrounding community.</li> <li>• Routine maintenance works should not be performed during peak traffic hours (e.g., works can take place when students are already at school).</li> <li>• 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.</li> <li>• Provision of safe passages and crossings for pedestrians namely for roads that involve schools and for farmers when road segment are in close proximity to agricultural lands (refer to Table N in Annex 2) – this was one of the main concerns of attendees at the public participation for Aley Caza (refer to section 1.24).</li> <li>• Strict supervision must be applied when roads are in close proximity to the detected sensitive receptors.</li> </ul> <p><b>Disturbance of sensitive receptors (noise and dust)</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• Nighttime activities, if any, should be performed using low-noise technologies.</li> <li>• When performing noise generating activities, the Contractor should inform sensitive receptors such as schools, hospitals, and churches that if they lie in close proximity to the assessed roads.</li> <li>• 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 and agricultural lands surrounding the critical roads (refer to Table 0-5 and Table N).</li> </ul> <p><b>Disturbance of public utilities and private properties</b></p> <ul style="list-style-type: none"> <li>• Pushing excavated materials onto adjacent lands and damaging public utilities or private properties must be avoided through delineation of work areas.</li> <li>• When trimming trees, broken or cut limbs are not to fall on or damage overhead wires.</li> </ul>
	<p><b>Socio-Economic Conditions of Labor</b></p> <ul style="list-style-type: none"> <li>• Inadequate labor conditions</li> <li>• Workers tension (Syrian/Lebanese ratio)</li> <li>• Child labor</li> <li>• Under-participation of women</li> </ul>	<p><b>Labor Induced SH</b></p> <ul style="list-style-type: none"> <li>• Laborers should be provided with training sessions and awareness campaigns on SH</li> <li>• CoC should be enforced to project laborers (in a language understood by all workers).</li> <li>• The Contractor should ensure that CoC requirements and sanctions to be applied, if breached, are well understood by signatories, prior to signing the CoC.</li> <li>• The Contractor should ensure that a proper GRM is established to address any kind of violations to the signed CoC.</li> <li>• 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.</li> <li>• 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.</li> </ul> <p><b>Child Labor</b></p> <ul style="list-style-type: none"> <li>• The project should closely monitor the risk of child labor and 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.</li> <li>• Labor registry and age verification must be maintained during the whole project through an age verification mechanism to be implemented by the Contractor and checked by the supervising engineer (continuous ID control).</li> <li>• Penalty provisions should be available for hiring child labor.</li> </ul>

		<ul style="list-style-type: none"> <li>During the employment procedure, the contractor or subcontractor should abide by the Lebanese Law No.0 dated 1946.</li> </ul> <p><b>Inadequate Labor Conditions</b></p> <ul style="list-style-type: none"> <li>Safety and protection of workers should be ensured within the contracts provided by the contractor.</li> <li>Appropriate rules and regulations should be implemented in order to ensure the protection of laborers.</li> <li>Contractors should be forced to abide by the specified Lebanese law determining the minimum wage and minimum working age for children.</li> <li>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.</li> <li>Continuous monitoring is required to maintain adequate labor conditions.</li> </ul> <p><b>Social tensions and conflict over job-sharing and dissatisfaction with allocation of project-generated jobs.</b></p> <ul style="list-style-type: none"> <li>Clear criteria for job selection and allocation should be adopted accounting for the ratio of Syrian and Lebanese community workers in Aley Caza and types of positions available.</li> <li>It is important to avoid competition between Syrian workforce willing to accept lower wages and skilled Lebanese labor.</li> <li>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).</li> <li>Clear communication with all affected workers and implanting REP GRM are essential to mitigate the potential risk of social tensions or dissatisfaction among Syrian and Lebanese workers.</li> </ul> <p><b>Under-participation or underemployment or discrimination of women</b></p> <ul style="list-style-type: none"> <li>Setting minimum percentage of women at the employment phase.</li> <li>The project should ensure that gender equality is attained when it comes to recruitment, salary levels and others.</li> <li>Promoting the employment of females in appropriate jobs such as managerial or administrative positions.</li> </ul>
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**Table 03 H&S Management Plan (in accordance with IFC EHS OHS guidelines) – see more details in Annex 6**

Health and Safety Hazards	Activity	Impact	Mitigation Measures
Community Health and Safety	All Routine Maintenance activities	<ul style="list-style-type: none"> <li>General site hazards</li> <li>Disease Occurrence</li> <li>Traffic accidents</li> </ul>	<p><b>Communication of risk with local community</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p><b>Disease prevention</b></p> <ul style="list-style-type: none"> <li>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</li> </ul> <p><b>Developing a TMP</b></p> <ul style="list-style-type: none"> <li>A TMP must be developed before commencement of work to ensure traffic safety (refer to traffic safety section of this table)</li> <li>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.</li> </ul>
Occupational Health and Safety		<ul style="list-style-type: none"> <li><b>Job Hazards</b></li> <li><b>Workplace/Site Hazards</b></li> <li><b>Injuries</b></li> <li><b>Physical hazards</b> (covering all planned routine maintenance activities)                             <ul style="list-style-type: none"> <li>Noise</li> <li>Lifting, slipping, electrical, equipment and working at height hazards</li> <li><u>Vibration and excavation hazards</u></li> <li><u>Vehicle driving &amp; site traffic hazard</u></li> <li>Environmental hazards</li> <li>Culvert-specific hazards                                     <ul style="list-style-type: none"> <li>Confined space</li> <li>Hazardous atmosphere</li> <li>Culvert collapse</li> </ul> </li> </ul> </li> </ul>	<p><b>Hazard Identification and Risk Assessment</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Permit to Work (PTW) should be used for Higher Risk activities.</li> </ul> <p><b>Workplace</b></p> <ul style="list-style-type: none"> <li>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 in Aley site office.</li> <li>Equipment should be adequate for the dimension of the office and the maximum number of people present.</li> <li>Fire and emergency alarm systems must be installed.</li> <li>A person must be appointed to be responsible for the fire protection.</li> <li>Workstations must be equipped with first-aid stations, rest areas, and eye-wash stations</li> <li>Fire extinguishers must be available in foremen cars.</li> </ul> <p><b>First Aid and Injuries</b></p> <ul style="list-style-type: none"> <li>The Contractor should ensure that qualified first-aid can be provided at all times.</li> <li>First aid kits must be available at project site office and at foremen cars.</li> <li>One laborer onsite should be appointed to respond to emergency cases.</li> </ul>

		<ul style="list-style-type: none"> <li>• <b>Water:</b> High flow rates can create dangerous footing conditions</li> <li>• <b>Animals, particularly snakes, in the culvert can be dangerous, especially if trapped</b></li> <li>• <b>Entrapment:</b> Deep mud can entrap personnel walking through it</li> <li>○ <b>Working with precast concrete elements -specific hazards</b> <ul style="list-style-type: none"> <li>• <b>Incorrect loading and unloading methods:</b> High-risk activity (serious injuries)</li> <li>• <b>Uncontrolled collapse of elements</b></li> <li>• <b>Incorrect lifting and/or unsafe lifting equipment</b></li> <li>• <b>Poorly secured loads</b></li> <li>• <b>Inappropriate or unstable work areas for cranes</b></li> </ul> </li> <li>• <b>Chemical hazards</b> <ul style="list-style-type: none"> <li>○ Exposure to toxic, corrosive, sensitizing or oxidative substances.</li> <li>○ Exposure to asphalt fumes is linked to breathing problems, and skin irritation (Norseth et al, 1991).</li> </ul> </li> <li>• <b>Biological hazards</b> <ul style="list-style-type: none"> <li>○ Covid-19 spread/ labor-intensive project</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• All workers onsite should know where the first aid facilities are located and how to adequately use first aid kits.</li> <li>• A complete list of nearby hospitals, medical centers and emergency contact numbers should be provided to workers at project site offices and to foremen.</li> </ul> <p>Special care must be taken:</p> <ul style="list-style-type: none"> <li>• If manual methods for removing brush, and other vegetation are labor-intensive and require close supervision to ensure good production and worker safety.</li> <li>• In order to avoid serious physical injury or equipment damage when debris being cut by a machine shatters and flies in unpredictable directions.</li> </ul> <p><b>Communication of Hazard</b></p> <p><i>Area signage and labelling of equipment</i></p> <ul style="list-style-type: none"> <li>• Hazardous areas (e.g., storage and excavation areas), installations, materials, and emergency exit, etc. must be marked appropriately.</li> <li>• 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.</li> <li>• All energized electrical devices and lines should be marked with warning signs.</li> <li>• Machines with moving parts must be turned off, all electrical devices must be marked with warning signs.</li> <li>• Warning signs (danger/caution signs, general safety information signs, emergency and direction signs) must be installed at sites, offices, parking/storage areas as needed.</li> </ul> <p><i>Site security</i></p> <ul style="list-style-type: none"> <li>• Communication of risks to workers must be implemented.</li> <li>• Signage should be easily understood by workers.</li> <li>• Good house-keeping practices (e.g., placing loose construction materials in established areas and properly managing generated wastes)</li> </ul> <p><b>Training</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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).</li> <li>• Trainings on PTW must be conducted to all workers participating in the job.</li> <li>• 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.</li> </ul> <p><b>Physical hazards</b></p> <p>Noise</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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</li> <li>• Periodic medical hearing checks should be performed on workers who are exposed to high noise levels.</li> </ul> <p>Working at Height</p> <ul style="list-style-type: none"> <li>• Working at height: Scaffolds inspection according to the OSHA standards</li> <li>• 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</li> <li>• Train supervisors and workers for basic fall rescue</li> </ul> <p>Safe tree branches removal</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• When using the rope to remove branches from tree, ensure that the length of the rope is longer than the height of the tree.</li> </ul> <p>Electrical, lifting, slipping, and equipment hazards</p> <ul style="list-style-type: none"> <li>• Checking all electrical cords, cables and hand power tools for frayed and exposed cords and following manufacture recommendations for maximum permitted operational voltage.</li> </ul>
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<p>Traffic Safety:                  Community and Workers (in accordance with CDR/WB guidelines on TMP)</p>		<ul style="list-style-type: none"> <li>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.</li> </ul>	<p><b>Community</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>Advisory speed limit signs should be placed in advance or the reduced speed zone to inform the drivers about any driving speed changes.</li> <li>Installation of signs to ensure access to nearby facilities.</li> <li>Pedestrian safety must be ensured, namely children if the school is in the vicinity.</li> <li>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.</li> <li>Temporary traffic control schemes must be removed after completion of the construction activities that can mislead the drivers.</li> </ul> <p><b>Workers</b></p> <ul style="list-style-type: none"> <li>Regular traffic safety training sessions must be delivered to workers.</li> <li>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.</li> <li>Entrance and exit gates should be provided to allow the access of workers, trucks and other construction equipment.</li> </ul>

## 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, also known as Key Performance Indicators (KPIs), 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.

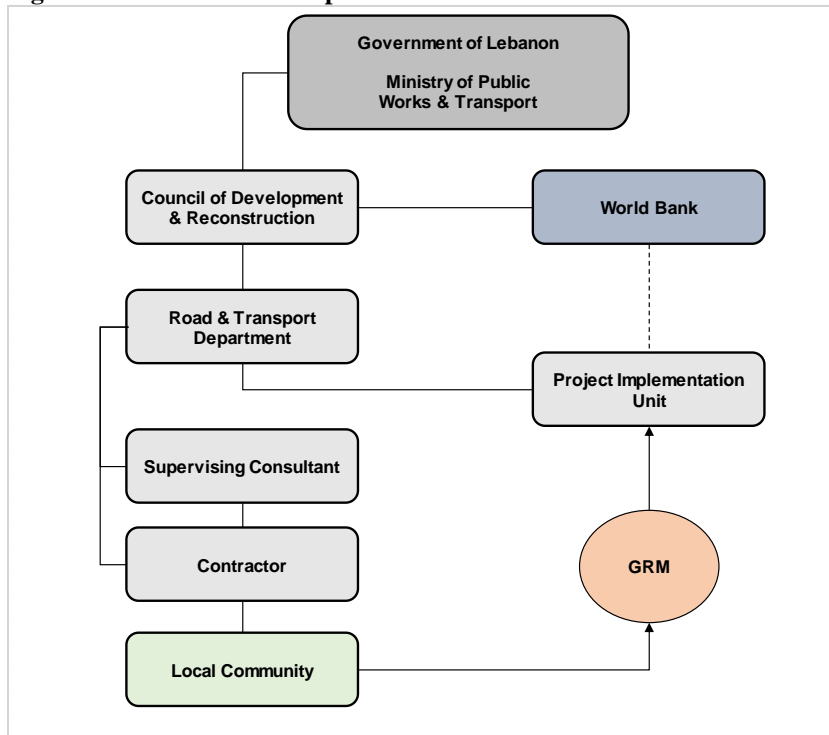
### 1.20 Institutional Setup

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 (refer to Figure 0-1).

The project will be monitored by CDR Project Implementation Unit (PIU) dedicated to REP, which includes social and environmental specialists and the Supervising Consultant who will directly monitor the Contractor. In this context, planning, implementation and supervision of environmental safeguards will thus take place at different stages (a) PIU, (b) Supervising Consultant, and (c) Contractor.

PIU will be responsible for providing the overall plan direction and validation of management plans and monitoring of compliance and progress reporting to the WB. The responsibility of implementation and management of environmental and social safeguards by the PIU will be coupled with the assignment of Supervising Consultant (focal point(s) for REP safeguards) who will be in charge of ensuring sound application of the ESMP. Accordingly, the Supervising Consultant will have to appoint qualified experts to directly supervise and guide the Contractor team and ensure project compliance. Finally, the ~~main concerned municipalities will be~~ involved in ~~managing and communicating citizen's potential complaints to the~~ (PIU).

**Figure 0-1 Institutional setup**



## 1.21 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.

## 1.22 Monitoring Plans Implementation

Contractors' experts and officers and the Supervising Consultant's safeguard expert (s) will monitor the developed key indicators to ensure the implementation of this ESMP during the execution of works. Compliance monitoring involves observation, review, and assessment of activities and parameters (Table 0-1). This will allow Contractor and Supervising Consultant experts to detect and correct 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 etc.) which shall be reported in the monthly progress report (3) Contractor is not hiring underage labors (age verification mechanism, regular inspection of 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 0-1 Environmental, Social, and H&S Monitoring Plans (Routine maintenance for Aley Caza)**

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
<b>Environmental Monitoring</b>								
Air Emissions/GHG/Dust	PM2.5-10, SO <sub>2</sub> , NO <sub>x</sub> , O <sub>3</sub> , CO, Total Suspended Particles (TSP)	If needed	<ul style="list-style-type: none"> <li>Construction vehicles exhaust</li> <li>Working sites for dust</li> </ul>	<ul style="list-style-type: none"> <li>Single point sampling (at one quarter the diameter across the stack/source)</li> <li>Visual opacity</li> <li>Smoke inspection</li> </ul>	Decision 16/1 dated 2022 Particulate Matter (PM-10) 500 µg/m <sup>3</sup> Sulfur dioxide (SO <sub>2</sub> ) 10120 µg/m <sup>3</sup> Nitrogen dioxide (NO <sub>2</sub> ) 2,000 150 µg/m <sup>3</sup>	Supervising Consultant	CDR (PIU)	(1,500 per test)
Noise	Noise Levels (Lmin, Lmax, and Leq)	During the execution of noisy operation	<ul style="list-style-type: none"> <li>At the working site, especially near loud machinery and excavation sites</li> </ul>	<ul style="list-style-type: none"> <li>One sample per location (near sensitive receptors)</li> </ul>	Decision 52/1 dated 1996	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
WW Generation	Domestic-like wastewater	Monthly	<ul style="list-style-type: none"> <li>Polyethylene storage tank (in case porta cabin toilet is not linked to WW network)</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	Prohibit leaks from tank Prohibit overfilling of tank	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"> <li>Around the Routine maintenance site, especially near equipment, material, and storage tanks</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Construction 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"> <li>Solid Waste Collection Point</li> <li>Storage areas</li> <li>Transport trucks</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Solid Waste log</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
<b>Biodiversity</b>								
Biological Resources	Ecological audit for particular biotopes	When maintenance activities will occur near critical natural habitat	<ul style="list-style-type: none"> <li>Riparian habitats near water channels and streams</li> <li>Forests adjacent to the roads</li> </ul>	<ul style="list-style-type: none"> <li>Samples and photos per location and GPS point</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
<b>Social &amp; Safety Monitoring Plans</b>								
GBV	<ul style="list-style-type: none"> <li>CoC signed by new workers</li> <li>Delivery of induction training (including GBV)</li> </ul>	Before commencement of works or every time a new worker is recruited	<ul style="list-style-type: none"> <li>At site office</li> </ul>	<ul style="list-style-type: none"> <li>Signed CoC</li> <li>Training attendance sheet</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
	<ul style="list-style-type: none"> <li>GBV-related internal grievances</li> </ul>	Upon grievance occurrence	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Received complaints and GRM records</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Social Tensions and Conflicts over Job-Sharing	<ul style="list-style-type: none"> <li>Number of related grievances</li> <li>Percentage of workers (based on gender, nationality)</li> </ul>	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Received complaints and records</li> </ul>	NA	Supervising Consultant	CDR (PIU)	-
Obstructing Access to Amenities	<ul style="list-style-type: none"> <li>Type, location, and duration of a amenity to which access was obstructed</li> </ul>	Before and during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Complaint records</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Working conditions	<ul style="list-style-type: none"> <li>Labor's wages</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>Laborers' contracts</li> </ul>	<ul style="list-style-type: none"> <li>Workers' complaints records</li> <li>Labor law verification</li> </ul>	Lebanese Labor Law dated 1946	Supervising Consultant	CDR (PIU)	-
Child labor	<ul style="list-style-type: none"> <li>Labor's age</li> </ul>	Continuously-during the execution	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Labor registry</li> <li>Government-issued IDs and Badges (age verification)</li> </ul>	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)
		of maintenance activities						
Underemployment of Women	<ul style="list-style-type: none"> <li>Percentage of female employees in workforce</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>At site office</li> </ul>	<ul style="list-style-type: none"> <li>Labor registry</li> </ul>	NA	Supervising Consultant	CDR (PIU)	-
Other Grievances	<ul style="list-style-type: none"> <li>Internal and external grievance reports</li> </ul>	Upon grievance occurrence	<ul style="list-style-type: none"> <li>At each routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Complaints records</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
OHS	<ul style="list-style-type: none"> <li>Regular OHS training</li> <li>Total number of work injuries</li> <li>OHS-related internal grievance</li> </ul>	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Attendance sheet</li> <li>Employee records</li> <li>OHS incident form</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
	<ul style="list-style-type: none"> <li>Ensure use of PPE</li> <li>Covid-19 precaution measures</li> <li>Traffic violations</li> <li>Vehicle driving and Site Traffic Hazards</li> </ul>	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site office</li> </ul>	<ul style="list-style-type: none"> <li>Continuous visual inspection</li> <li>Number of positive COVID-19 cases</li> <li>Driving license inspection</li> <li>Drivers medical checkup reports</li> <li>Dug test for truck drivers</li> <li>Number of received traffic safety training</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Traffic Hazards	<ul style="list-style-type: none"> <li>Safe traffic flow on roads under maintenance in accordance with TMP                             <ul style="list-style-type: none"> <li>Availability of adequate safety and warning signs.</li> <li>Availability of Flagmen</li> </ul> </li> </ul>	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	NA	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
<b>Other Impacts</b>								
Damage to existing infrastructure	<ul style="list-style-type: none"> <li>Type, size, and number of damaged infrastructure entities</li> </ul>	Continuously-during the execution of maintenance activities	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	NA	Supervising Consultant	CDR (PIU)	-
Cultural	<ul style="list-style-type: none"> <li>Possible archaeological features found during the works</li> <li>Adequate implementation of the archeological chance find procedure.</li> </ul>	Upon discovery	<ul style="list-style-type: none"> <li>At routine maintenance site</li> </ul>	<ul style="list-style-type: none"> <li>ID and photographic records of all archaeological features found during the works</li> </ul>	NA	Supervising Consultant	DGA	-

### 1.23 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 environmental supervision consultants on a monthly basis including completed workers' sheets, GRM log and environmental and HSE forms.
- The environmental supervision consultants review and approve contractor reports and submit them to the WB on a monthly basis.
- PU submits environmental social progress as part of their quarterly project progress reports to the WB on a quarterly basis.

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.

## Consultation, Disclosure and GRM

### 1.24 Public Consultation

PAPs, mainly municipalities and local authorities Makhatir (مخاتير), in addition to local residents represented by local NGOs such as Al Resalah Association were consulted on the project's environmental and social aspects (list of attendees and list of invited NGOs is attached in Annex 7). The meeting covered REP planned (1) routine maintenance activities for primary roads in Aley Caza (the subject of this ESMP) and (2) rehabilitation activities for the two remaining roads in Aley (Aley R1d: Bdadoun-Houmal and Aley R1a Chroun-Ain Souafar).

The public participation meeting was held at Aley Municipality's Cultural Center on Monday December 13, 2021. Invitations were sent electronically and they were posted prior time of the consultation at Aley Kaemakamiye billboards. The number of attendees was 15 of which 4 were women, whom represent concerned municipalities and local community.

**It is worth mentioning here that all relevant municipalities will be informed upfront before the commencement of works about the Project since public consultation was conducted back in December 2021. In addition, a public notice will be posted at each relevant municipality including the GRM procedure. This will disseminate the Project and ensure that its activities are implemented in a transparent manner.**

During the meeting, attendees were informed about the project objectives, the identified natural, economic, and social resources of importance in the area, the project's possible environmental and social risks, the planned mitigation measures and the established GRM for Aley communities.

Municipalities and local authorities were concerned about the (1) monitoring process during project implementation, and (2) effectiveness of routine maintenance activities in the absence

of appropriate infrastructure in the region. Moreover, they asked if non classified primary roads can be included in the routine maintenance scope of work. Accordingly, the consultant explained that given the limited remaining fund for Aley Caza, only routine maintenance activities for primary roads can be considered under phase 2 of REP. Further the consultant explained the important role of municipalities in assisting CDR in monitoring the Contractor to ensure safe operation of activities.

Female attendees were asked separately about their concerns. They were particularly worried about the supervision process. According to them, women must be in the supervision board, as they would best monitor the execution of the ESMP. In this context, CDR ensured to consider employing women during project implementation. Moreover, they believe secondary roads are in greater need for maintenance activities. Finally, they expressed their wish to cancel the routine maintenance activities and select a short road segment in the region for full rehabilitation work.

## 1.25 Grievance Redress Mechanism (GRM)

A multi-channeled GRM was established for REP project 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.

### 1.25.1 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 4:

- 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's 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](mailto: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 (e-mail ([elieh@cdr.gov.lb](mailto:elieh@cdr.gov.lb)) or 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. For each worksite in Aley, 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.

### 1.25.2 **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 1.21). 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 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 5).

## **Conclusion**

Assessments showed that the project risks are localized, short term, and moderate, and can be mitigated if the Contractor succeeded to implement this ESMP, 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 roads that need special care if they are to be maintained. Noting that local communities were engaged and their concerns were integrated in the management strategy. However, engaging stakeholders including local 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, 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.

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## 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
<b>Environment</b>	Decree 2761	19/12/1933	Guidelines related to Wastewater Management and Disposal	Wastewater generated by the project activities should be managed and disposed of according to this decree. This decree provides guidelines related to wastewater management and disposal to avoid pollution caused by the discharge of liquid waste illegally into water streams and valleys.
	Decree 8735	23/08/1974	All generated maintenance solid wastes are to be properly collected, handled and disposed	Solid wastes generated by project activities should be managed according to guidelines set in this decree.
	Law 558	24/07/1996	Law for the protection of forests	The requirements of the law shall be adhered to for the protection of forests.
	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.
	MOE Decision no.29	1998	Classification of Damour River as a natural site	When primary roads intersect with Damour river special care is needed.
	MoE 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	It is essential for the proposed project as the protection of the environment is a must throughout all of the steps of the project.

			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).	
	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
	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.
<b>Health and safety</b>	Decree 11802	30/01/2004	Occupational health and safety decree	The occupation health and safety conditions during the execution of routine maintenance works should comply with this decree.
<b>Labor Laws</b>	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	Does not allow the employment of children and protects them from engaging in any work

			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.	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.
	MOL Decision 29/1	2018	Restricts significant number of jobs to Lebanese only and allows Syrians to occupy jobs that are not restricted to Lebanese, these are mainly covering the construction sector.	Adhere to the requirements of this decree with regards to employment for this project
<b>Traffic</b>	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.
<b>Cultural and Municipal</b>	Decree law 166	7/11/1933	Antiquity law	Defines chance find procedures that should be followed in case antiquities were identified in the project site

	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 37	16/10/2008	Cultural Property focuses on determining the categories of the cultural properties and classifying them in order to protect them as national treasures.	Defines the procedures to be followed to categorize cultural properties.
<b>General</b>	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 work execution.
	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 habitating its victims.	This law should be implemented, in case of sexual harassment.

Lebanon's 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
<b>MoPWT</b>	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"> <li>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.</li> </ul>
<b>CDR</b>	The Council for Development and Reconstruction 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"> <li>Coordinate with relevant government agencies and with the relevant government agencies, particularly MoPWT, regarding roads priorities, technical aspects, and project's requirements.</li> <li>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.</li> </ul>
<b>Municipalities</b>	<ul style="list-style-type: none"> <li>Municipalities in Aley 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.</li> </ul>
<b>Ministry of Environment (MoE)</b>	<ul style="list-style-type: none"> <li>MoE is responsible for planning and monitoring of environmental issues.</li> <li>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.</li> </ul>
<b>Ministry of Agriculture (MoA)</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
<b>Ministry of Energy and Water (MoEW)</b>	<ul style="list-style-type: none"> <li>Monitoring the quality and determination of surface and groundwater.</li> <li>Design, study, and implement major water infrastructure installations.</li> <li>Protecting water resources from waste and pollution by taking the necessary measures to prevent pollution.</li> </ul>
<b>Traffic Department at the Internal Security Forces</b>	<ul style="list-style-type: none"> <li>Ensuring public safety</li> <li>Maintaining regular traffic control.</li> </ul>
<b>Ministry of Labour (MoL)</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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. This ESMP must be in accordance with labor laws, regulations and conventions.</li> </ul>

**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 C Labor Conventions**

ILO Convention	Name	Entry into force	Ratification Date	Description	Relevance to Project
<b>ILO no. 29</b>	<b>Convention Concerning Forced or Compulsory Labor</b>	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.
<b>ILO no. 105</b>	<b>Abolition of Forced Labor Convention</b>	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.
<b>ILO no. 111</b>	<b>Discrimination (Employment and Occupation) Convention</b>	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.
<b>ILO no. 122</b>	<b>Employment Policy Convention</b>	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,	This project should comply with the guidelines of this convention to ensure that employees are

				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.	given the right opportunities, based on their qualifications, irrespective of their origin, affiliations.
<b>ILO no. 138</b>	<b>Minimum Age Convention for Admission to Employment and Work</b>	19/06/1976	25/06/1977	It stipulates that States should progressively raise the minimum age to a level consistent with the fullest 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.	This project should abide by this convention in order to abolish the employment of children below the specified minimum age.

**Table D Raw material and items needed for routine maintenance work**

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

## Annex 2: Figures and Tables Related to Chapter 4

**Table E Hydrogeological conditions in the area**

Aquifers	Aquifers in the area are Sannine Limestone (C4), Mdeirej Limestone, and Lower Aptian (C2a2). The limestone formation forms a main part to the study area and is the most important karstic system in the study area characterized by a significant amount of groundwater flowing in channels, faults and fractures. These fractures include solution joints, solution pits, lapiaz, grooves and sinkholes. Cavities in the rocks are often filled with calcite and cave deposits.
Aquicludes	Aquicludes formations along the area are the Hammana Formation, Albian (C <sub>3</sub> ) and Quaternary (Q) formation. These deposits constitute an aquiclude due to the presence of marls and marlstones with low hydraulic conductivity. However, low to medium discharge springs are present in this formation.
Semi-Aquifers	Semi-Aquifers in the area are the Chouf Sandstone (C1), Abey Formation, Lower Aptian (C2a1) and Hammana Formation, Upper Aptian (C2b), and Bikfaya Limestone, Portlandian (J6) epoch which is composed of sand, with very high permeability, and clay, with low permeability are present within these deposits. In relation to permeability and porosity, there are no important fractures or joints within these formations that is why they are classified as a semi-aquifer.

**Table F Variation of surface elevation of Aley roads**

Road Alignment	Elevation (m)		
	Min	Max	Mean
A-P-1	150	750	503
A-P-2	300	750	533
A-P-3	600	800	700
A-P-4	550	1,000	733
A-P-5	950	1,050	1,010
A-P-6	50	750	428
A-P-7	700	750	725
A-P-8	750	850	790
A-P-9	1,050	1,350	1,221
A-P-10	50	500	288
A-P-10-1	200	250	217
A-P-11	500	750	625
A-P-12	650	750	700
A-P-13	800	850	817
A-P-14	800	900	850
A-P-15	850	900	875
A-P-16	100	350	256
A-P-17	350	500	425

A-P-18	500	650	575
A-P-19	50	100	75
A-P-20	12	22	16
A-P-20-1	16	20	18
A-P-21	800	850	825
A-P-22	1,250	1,350	1,300
<b>Stats</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>
	<b>12</b>	<b>1,350</b>	<b>604</b>

**Table G Summary of geological outcrops exposed along Aley primary roads**

<b>Geology</b>	<b>Name</b>	<b>Description</b>
<b>C1</b>	Chouf Sandstone (Grés de Base), Neocomian-Barremian	Varicolored, cross bedded Sandstone with inter-beds of shale; contains heavy minerals; color depends upon percentage of hematite and presence of volcanic giving purplish color; Sand is sometimes white; contains coal seams and traces of brittle amber. This formation can reach 300 meter in thickness.
<b>C2a</b>	C2a1: Abey Formation, Lower Aptian	Clastic: mixture of clay, sand and calcareous material in varying proportions forming clay, sandy clay, marl, marly limestone etc. The calcareous material may be slightly to moderately indurated. Where marl prevails, its fresh color is bluish, weathering to creamish brown. This formation can reach 125 meter in thickness.
	C2a2: Mdeirej Limestone, Lower Aptian	Karstic, massive marine depositional environment Limestone forming a prominent cliff, which often used as a marker bed. Transition with the Abey Formation consists of three layers of green clay intercalating limestone. This formation is outcropping to the East of the site and it can reach 45 meter in thickness.
<b>C2b</b>	Hammana Formation, Upper Aptian	Marl intercalated with marly Limestone with thick layers of Sand on top; layers of ferro-oolitic limestone sometimes overlies the sand. This formation can reach 20 meter in thickness
<b>C3</b>	Hammana Formation, Albian	Green Marl (containing glauconite) intercalated with thick layers of marly Limestone forming cliffs 3 - 4 m in height; may contain some thin sand layers in the lower part of the formation. This formation can reach 150 meter in thickness.
<b>C4</b>	Sannine Limestone, of Cenomanian age	(C4); this unit is divided into three subunits: <b>C4a:</b> Dolomitic Limestone, within this formation, geodes of different sizes filled or voided can be recorded. Thickness of this unit is about 300 meters. <b>C4b:</b> Bluish marl and shale containing crystals of quartz, chert nodules and bands form. Thickness of this unit is about 100 meters. <b>C4c:</b> Limestone and dolomitic limestone white to brown in color. Limestone is highly karstified. Thickness of this unit is about 300 meters.
<b>C6</b>	Chekka Marl, Maastrichtian / Paleocene	Cretaceous and lower Tertiary sediments indistinguishable lithologically; stiff bluish plastic Marl with glauconite, interbedded with chalky marly Limestone and nodules of black chert. This formation has a thickness varies from 400 m to 150 m.
<b>J6</b>	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.
<b>J7</b>	Salima Limestone, Portlandian epoch	Composed of Chocolate brown Shale and bluish Marl, in many parts it's intercalated with thick oolitic Limestone bed. The marl weathers to a ceramic, ochre color and Crinoids fossil can be recorded in this formation. Thickness varies from zero-few meters to 150 m. Type section is Salima.
<b>M2a</b>	Miocene	Loose marine greenish marl, that weathers to grey marl. In some parts this formation is inter-bedded with marly limestone. Thickness of this outcropping is around 150 m and it is rich in foraminifera fossils.
<b>Q</b>	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

Source: Dubertret, (1945)

**Table H Percentage distribution of the geological outcrops over the length of each road in Aley Caza**

Road Name	C1	C2a	C2b	C3	C4	C6	J6	J7	M2a	Q
A-P-1	2%	1%	3%	6%	82%	3%				2%
A-P-10		20%	1%	1%	44%					34%
A-P-10-1					100%					0%
A-P-11		52%	8%	31%	7%					0%
A-P-12			20%	74%						5%
A-P-13			75%	21%	5%					0%
A-P-14			64%	32%	4%					0%
A-P-15			82%	18%						0%
A-P-16		20%	1%	1%	44%					34%
A-P-17	8%	79%	13%							0%
A-P-18		57%	9%	34%						0%
A-P-19					55%				1%	45%
A-P-2	9%	9%	6%	2%	27%		42%	5%		0%
A-P-20										100%
A-P-20-1										100%
A-P-21			82%	18%						0%
A-P-22		2%	68%	14%						15%
A-P-3	2%	4%	76%	19%						0%
A-P-4	59%	13%	4%	5%	20%					0%
A-P-5	44%	9%	24%	22%	0%					0%
A-P-6			1%	2%	56%					41%
A-P-7			28%	50%	22%					0%
A-P-8			16%	62%	22%					0%
A-P-9	18%	2%	57%				23%			0%

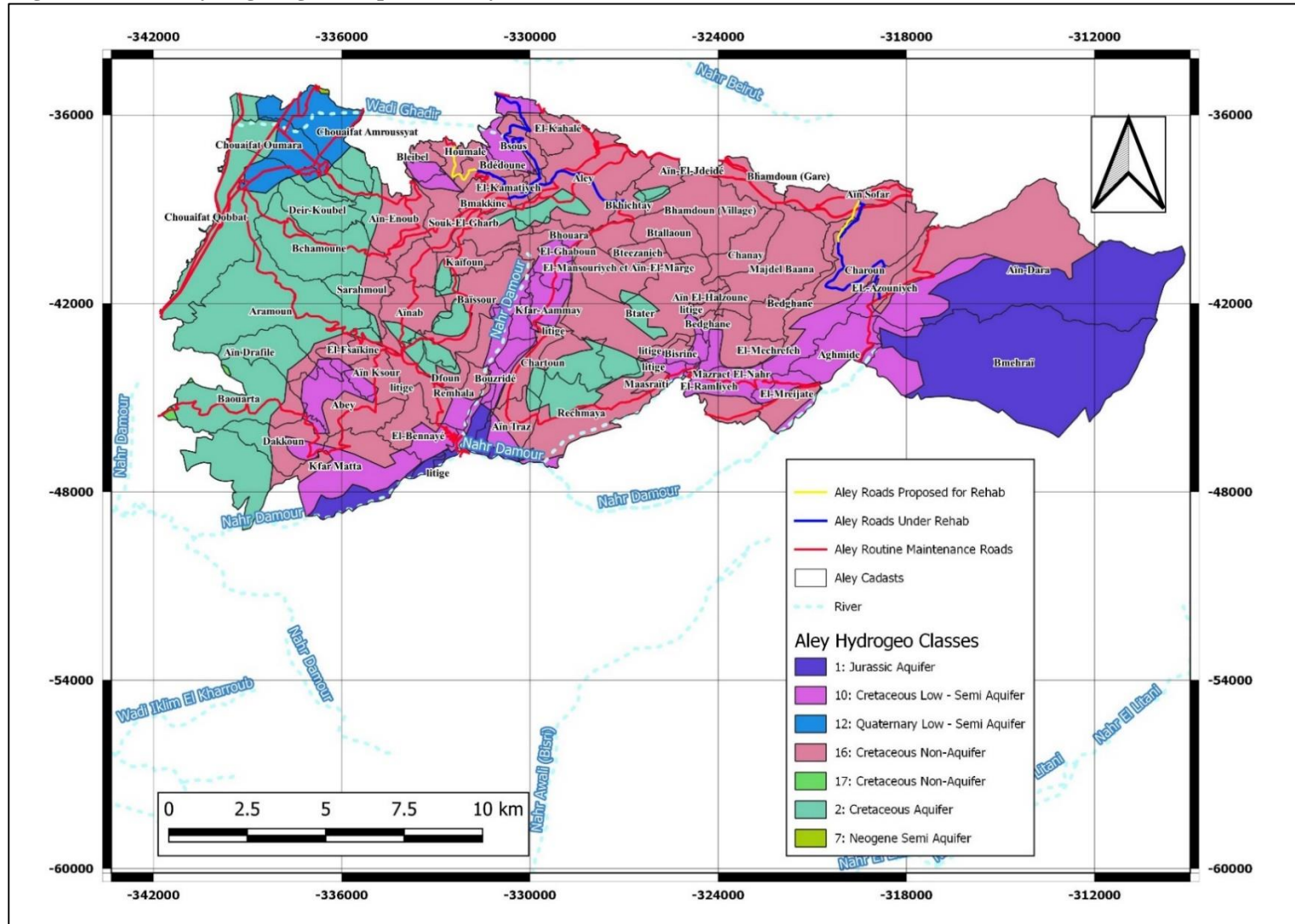
**Table I Summary of hydrogeological classes exposed for all Aley roads**

Geology Class	Groundwater Sheets		Lithology	Age	Flows of the Sources L/sec.	Probable Instantaneous Flows of the Works L/sec.	Transmissivity m <sup>2</sup> /sec
1	<b>In Karstic Formation</b> Wide and rich water table		Massive limestone and dolomitic limestone with interval. marls Thickness: >1000 m.	JURASSIQUE Bathonien-Portlandien	<100 100-1000 >1000	>100	10 <sup>-2</sup> ≤ T ≤ 1 Generally high
2			Limestone regularly bedding Thickness: 800 à 1000 m.	CRETACE Cénomaniens-Turonien	<100 100-1000 >1000	>100	10 <sup>-2</sup> ≤ T ≤ 1 Generally high
7	<b>In Porous Formations</b>	<b>Water Table Extended</b>	Coarse conglomerate torrential - marly conglomerates Thickness: 500 to 600 m.	NEOGENE Miocène et Pliocène (faciès continental)	<100 OR DISCHARGES DIFFUSE DISPERSEE	<30	<10 <sup>-3</sup> Poor or changing
10		<b>Local Or Discontinuous Water Table</b>	Sandstone Thickness : 150 à 250 m.	CRETACE Grès de base	<10	<10	10 <sup>-5</sup> ≤ T ≤ 10 <sup>-4</sup> Poor with weak
16	<b>Areas Generally Without Water Table Or A Very Local Water Table</b>		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

**Table J Percentage distribution of the hydrogeological classes over the length of each road in Aley Caza**

Road Name	1: Jurassic Aquifer	2: Cretaceous Aquifer	7: Neogene Semi Aquifer	10: Cretaceous Low - Semi Aquifer	12: Quaternary Low - Semi Aquifer	16: Cretaceous Non-Aquifer	17: Cretaceous Non-Aquifer
A-P-1		56%	0%	3%		40%	
A-P-2	2%	1%		7%		90%	
A-P-3		0%		7%		93%	
A-P-4		1%		7%		92%	
A-P-5		0%		7%		93%	
A-P-6		57%			3%	40%	
A-P-7		1%				99%	
A-P-8		1%				99%	
A-P-9		0%		7%		93%	
A-P-10		57%			3%	40%	
A-P-10-1		100%				0%	
A-P-11						100%	
A-P-12						100%	
A-P-13						99%	
A-P-14						99%	
A-P-15						100%	
A-P-16		57%			3%	40%	
A-P-17						100%	
A-P-18						100%	
A-P-19		94%			6%		
A-P-20			6%		94%		
A-P-20-1					100%		
A-P-21						100%	
A-P-22						100%	

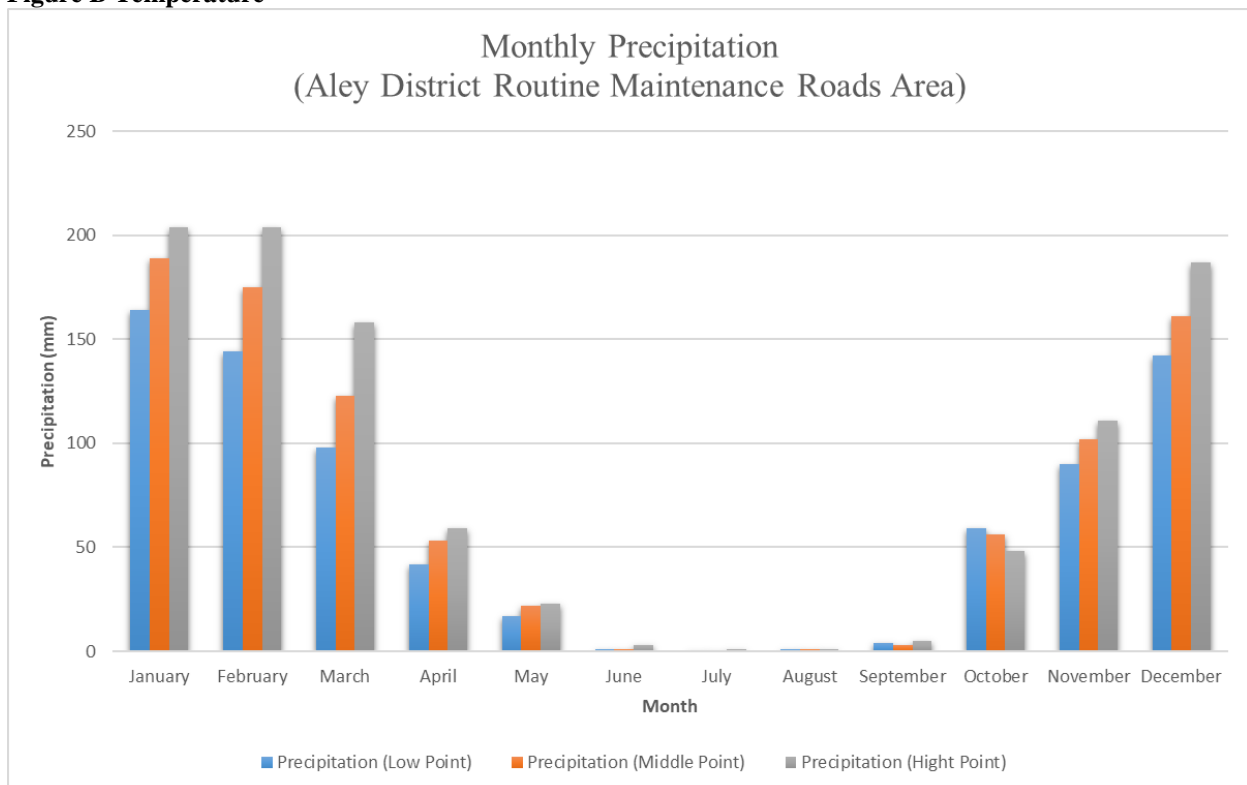
Figure A General hydrogeological map of the Aley cadastral limits and Caza



**Table K Existing surface water with respect to assessed roads (rivers and springs)**

Road Name	River conditions	Spring conditions
A-P-1	-	-
A-P-2	Crosses Damour river in Selfaya	-
A-P-3	-	-
A-P-4	Crosses Damour river in Mazraat El Naher	-
A-P-5	-	-
A-P-6	-	-
A-P-7	-	-
A-P-8	-	-
A-P-9	Close to Damour River <80m	Safa spring <200m
A-P-10	-	-
A-P-10-1	-	-
A-P-11	-	-
A-P-12	-	-
A-P-13	-	-
A-P-14	-	-
A-P-15	-	-
A-P-16	-	-
A-P-17	-	-
A-P-18	-	-
A-P-19	Crosses Wadi Ghadir in Choueifet Amrousiyet	-
A-P-20	Crosses Wadi Ghadir in Choueifet Oumara	-
A-P-20-1	-	-
A-P-21	-	-
A-P-22	-	-

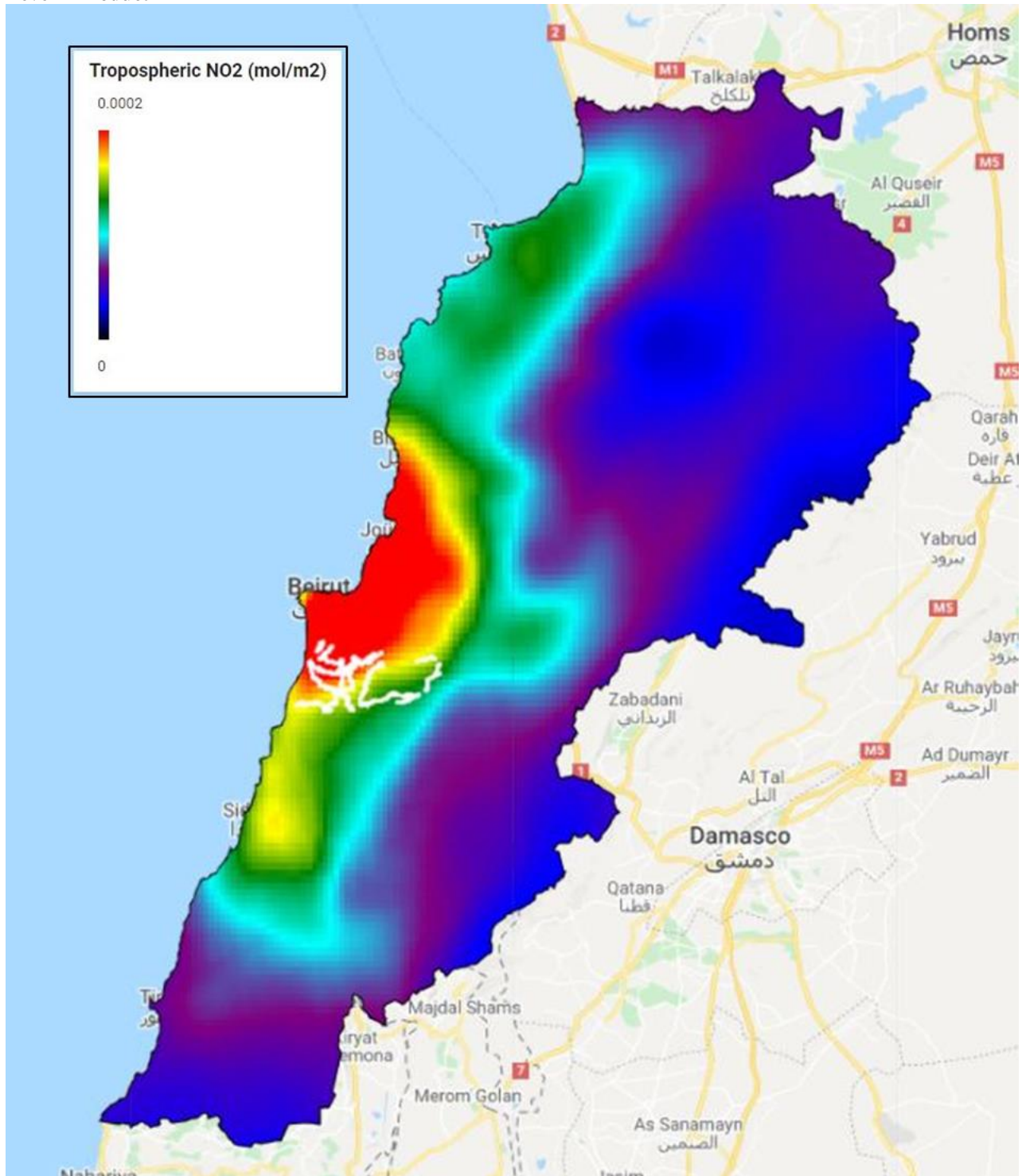
**Figure B Temperature**



**Table L Summary of land surface temperature variation and precipitation at the project area (period extending between 2000-2018) extracted and analyzed from MODIS satellite 1km spatial resolution**

Month	Precipitation (mm)			Min Temp (°C)			Mean Temp (°C)			Max Temp (°C)		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
<b>1</b>	164	189	204	10	8	1	13	11	4	16	12	9
<b>2</b>	144	175	204	10	8	2	14	11	5	16	13	9
<b>3</b>	98	123	158	11	9	3	15	13	8	19	15	13
<b>4</b>	42	53	59	14	12	7	18	16	12	22	20	18
<b>5</b>	17	22	23	17	15	10	22	20	17	26	24	22
<b>6</b>	1	1	3	20	18	13	25	23	19	28	27	26
<b>7</b>	0	0	1	22	20	15	27	25	21	30	29	28
<b>8</b>	1	1	1	23	21	15	27	25	21	31	30	29
<b>9</b>	4	3	5	22	19	13	26	23	19	30	28	27
<b>10</b>	59	56	48	19	17	10	23	21	16	27	25	23
<b>11</b>	90	102	111	16	13	7	19	17	11	22	19	16
<b>12</b>	142	161	187	12	10	3	15	13	7	18	15	12
stats	<b>Total</b>			<b>min</b>			<b>Average</b>			<b>max</b>		
	762	886	1,004	10	8	1	20	18	13	31	30	29

**Figure C Distribution of air pollutant Nitrogen Dioxide (NO<sub>2</sub>) in the troposphere above the Lebanese border average from year 2018 up to January 2022 (data retained from Sentinel-5 precursor/TROPOMI Level 2 Product**



**Table M Main natural habitats encountered along the assessed roads in Aley Caza**

LULC analysis	Field observations
Dense pine forest and low density pine forest	<ul style="list-style-type: none"> <li>• Pine forests and woodlots on sandstone</li> <li>• Clear pines intermixed with oak trees</li> <li>• Clusters of Calabrian pine (<i>Pinus brutia</i>) trees and prickly Juniper (<i>Juniperus oxycedrus</i>) in the understory were recorded.</li> <li>• Lower herbaceous species encountered are <i>Cyclamen persicum</i>, <i>Inula visoca</i>, <i>Lupinus digitatus</i>, <i>Romulea ramiflora</i>, and <i>Anemone coronaria</i>. The lower strata include mostly degraded woodlands and scrublands and is covered by <i>Cistus creticus</i> and <i>Sarcopoterium spinomsum</i>.</li> <li>• <i>Pinus pinea</i> “forest” (clear pines) that is accompanied with other tree species such as <i>Quercus calliprinos</i>, <i>Quercus infectoria</i>, and <i>Cercis siliquastrum</i> was recorded</li> <li>• Pine forests and woodlots on sandstone</li> </ul>
Dense forest of Oak Mixed low-density forest	<ul style="list-style-type: none"> <li>• Oak forests</li> <li>• woodlands dominated by <i>Quercus infectoria</i></li> </ul>
Grassland of medium density	<ul style="list-style-type: none"> <li>• Meadows near water channels</li> <li>• Grasslands used for agriculture and forage (croplands)</li> </ul>
Shrubland with scattered trees and scrubland	<ul style="list-style-type: none"> <li>• Open garrigue vegetation</li> <li>• Scrublands and degraded grasslands</li> </ul>
Field crops in small fields Deciduous fruit trees	<ul style="list-style-type: none"> <li>• Agriculture terraces Orchards</li> <li>• Cultivated trees namely umbrella pine trees Agricultural polytunnels</li> </ul>
Low and Medium density urban fabric	<ul style="list-style-type: none"> <li>• Rural settlements and urbanized areas</li> </ul>

**Figure D AP22 Degraded ecosystem (AP22)**



**Figure E AP Clear pine forest (AP9)**



**Figure F Riparian habitat (AP7)**



**Figure G Oak maquis (AP6)**



**Figure H Mixed forest patch along (AP10)**



**Figure I Pine forest (AP4)**



**Table N Percentage distribution of the LULC classes over the length of each road in Aley Caza**

Road Name	AP-1	AP-2	AP-3	AP-4	AP-5	AP-6	AP-7	AP-8	AP-9	AP-10	AP-10-1	AP-11	AP-12	AP-13	AP-14	AP-15	AP-16	AP-17	AP-18	AP-19	AP-20	AP-20-1	AP-21	AP-22
Abundant farmland			16%																					
Aiport																					23%	73%		
Deciduous fruit trees	6%	7%	11%	10%									4%						1%					
Dense forest of Oaks (Quercus spp)	19%			11%																				
Dense informal urban fabric																				22%	4%	14%		
Dense pine forest	7%	16%				1%																		
Dense urban fabric	3%																31%			39%	68%			
Field crops in large areas	1%			2%	11%		2%	7%				3%	10%				4%			4%				
Field crops in small fields/terraces	3%		1%	1%	1%	3%	1%	2%		4%			3%						1%	9%	3%	8%		
Grasslands of medium density	10%	16%	24%	35%	23%	8%	8%	30%	90%			3%		20%	41%	67%	18%	11%	15%	22%				98%
Industrial or commercial area						3%				3%							8%				2%	5%		
Low density oak forest			6%	2%		3%	4%	3%		4%	2%	2%	1%	39%	1%				2%	69%				
Low density pine forest	12%	16%	2%	11%	30%	6%	9%	13%	4%		1%	34%	34%	8%			33%	24%						
Low density urban fabric	8%	11%	2%			6%	11%	7%		2%	3%	2%	19%						9%					
Medium density informal urban fabric						2%																		
Medium density urban fabric	2%	2%	14%			15%	20%	28%	1%	30%	25%	31%	19%	27%	42%	30%			26%					
Mixed dense forest			17%			38%	40%			36%	64%								16%					
Mixed low density forests				4%						8%				4%	7%									
Olives	6%		1%	2%		9%	2%	1%		11%		19%					1%	19%		1%				
Outcrop	9%							2%	1%															
River		11%		4%																				
Shublands	2%	6%		2%										1%	2%									
Shublands (with scattered trees)	9%	12%	3%	16%	32%	5%	2%	6%			4%	3%	8%		4%				3%					

**Table O Natural habitats encountered along AP2, AP4, and AP10**

Road	Distance from rivers	%LULC along the road (50 m buffer)	Elevation	Vegetation zone (Abi Saleh and Safi, 1996)	Characteristics of the Natural Habitat
A-P-2	<ul style="list-style-type: none"> <li>Crosses Damour river in Selfaya (Damour river is protected by MoE Decision 29/1998)</li> <li>Passes near forest patch &lt;100m in Remhala at 490m elevation</li> </ul>	16% Dense pine forest 16% low dense forests 16% grasslands	300-750	Thermo-Mediterranean	<ul style="list-style-type: none"> <li>Pine forests and woodlots on sandstone</li> <li>Clusters of Calabrian pine (<i>Pinus brutia</i>) trees and prickly Juniper (<i>Juniperus oxycedrus</i>) in the understory</li> <li>Lower herbaceous species encountered are <i>Cyclamen persicum</i>, <i>Inula visoca</i>, <i>Lupinus digitatus</i>, <i>Romulea ramiflora</i>, and <i>Anemone coronaria</i>. The lower strata include mostly degraded woodlands and scrublands and is covered by <i>Cistus creticus</i> and <i>Sarcopoterium spinosum</i>.</li> <li>Riparian trees when the road crosses the river: trembling poplar (<i>Populus tremula</i>)</li> </ul>
A-P-4	<ul style="list-style-type: none"> <li>Crosses Damour river in Mazraat El Naher</li> <li>Passes near forest patch &lt;100m in Maasraiti</li> </ul>	35% grasslands	550-1000	Supra-Mediterranean	<ul style="list-style-type: none"> <li>Grassland and meadows</li> <li>Riparian trees when the road intersects with river walnut tree (<i>Juglans regia</i>) and trembling poplar (<i>Populus tremula</i>)</li> <li>Roadside vegetation: common fig (<i>Ficus carica</i>), Oriental Alder (<i>Alnus orientalis</i>), Syrian maple (<i>Acer syriacum</i>), Edible fruited blackberry (<i>Rubus hedycarpus</i>)</li> <li>Dense patch of <i>Pinus pinea</i></li> </ul>
A-P-10	<ul style="list-style-type: none"> <li>Crosses forest patch in Bchamoun</li> </ul>	36% mixed dense forest	50-500	Thermo-Mediterranean	<ul style="list-style-type: none"> <li><i>Pinus pinea</i> forest that is accompanied with other tree species such as <i>Quercus calliprinos</i>, <i>Quercus infectoria</i>, and <i>Cercis siliquastrum</i></li> </ul>

**Table P Criteria considered in the weighted decision analysis for determination of the level of criticality of Aley roads**

Road Name	Transmissivity	River	Spring	LULC	Social
A-P-1	H	N.A.	N.A.	NC	C
A-P-2	W	Crosses	N.A.	C	NC
A-P-3	W	N.A.	N.A.	NC	C
A-P-4	W	Crosses	N.A.	NC	C
A-P-5	H	N.A.	N.A.	NC	NC
A-P-6	W	N.A.	N.A.	C	NC
A-P-7	W	N.A.	N.A.	C	NC
A-P-8	W	N.A.	N.A.	NC	NC
A-P-9	W	Near	Near	NC	NC
A-P-10	H	N.A.	N.A.	C	C
A-P-10-1	H	N.A.	N.A.	C	NC
A-P-11	W	N.A.	N.A.	NC	C
A-P-12	W	N.A.	N.A.	NC	C
A-P-13	W	N.A.	N.A.	NC	NC
A-P-14	W	N.A.	N.A.	NC	NC
A-P-15	W	N.A.	N.A.	NC	NC
A-P-16	H	N.A.	N.A.	NC	NC
A-P-17	W	N.A.	N.A.	NC	C
A-P-18	W	N.A.	N.A.	C	NC
A-P-19	H	Crosses	N.A.	NC	NC
A-P-20	W	Crosses	N.A.	NC	NC
A-P-20-1	W	N.A.	N.A.	NC	NC
A-P-21	W	N.A.	N.A.	NC	NC
A-P-22	W	N.A.	N.A.	NC	NC

**Note:**

*H: High and W: Weak*

*N.A.: Not applicable*

*Crosses: road crosses a river or spring*

*Near: Road is <100m from a river or spring*

*C: Critical*

*NC: Not Critical*

## Annex 3: Code of Conduct

### 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 العامة والنقل

تعتبر مدونة السلوك هذه وثيقة ضرورية لحماية جميع العاملين في مشروع الطرقات والعمالة من جميع مظاهر العنف القائم على أسس اجتماعية، التثمر، سوء المعاملة، التحرش والاعتداء والاستغلال الجنسي وأي سلوك اجتماعي آخر يخل بحقوق الانسان، 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 مؤذٍ يُرتكب ضد إرادة الشخص. وهو مبني 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 اشكال التحرش أو التمييز أو التخويف أو الاستغلال أو الاعتداء الجنسي بما في ذلك التعليقات المهينة المتعلقة بالميل الجنسي، القبح بالقاب 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

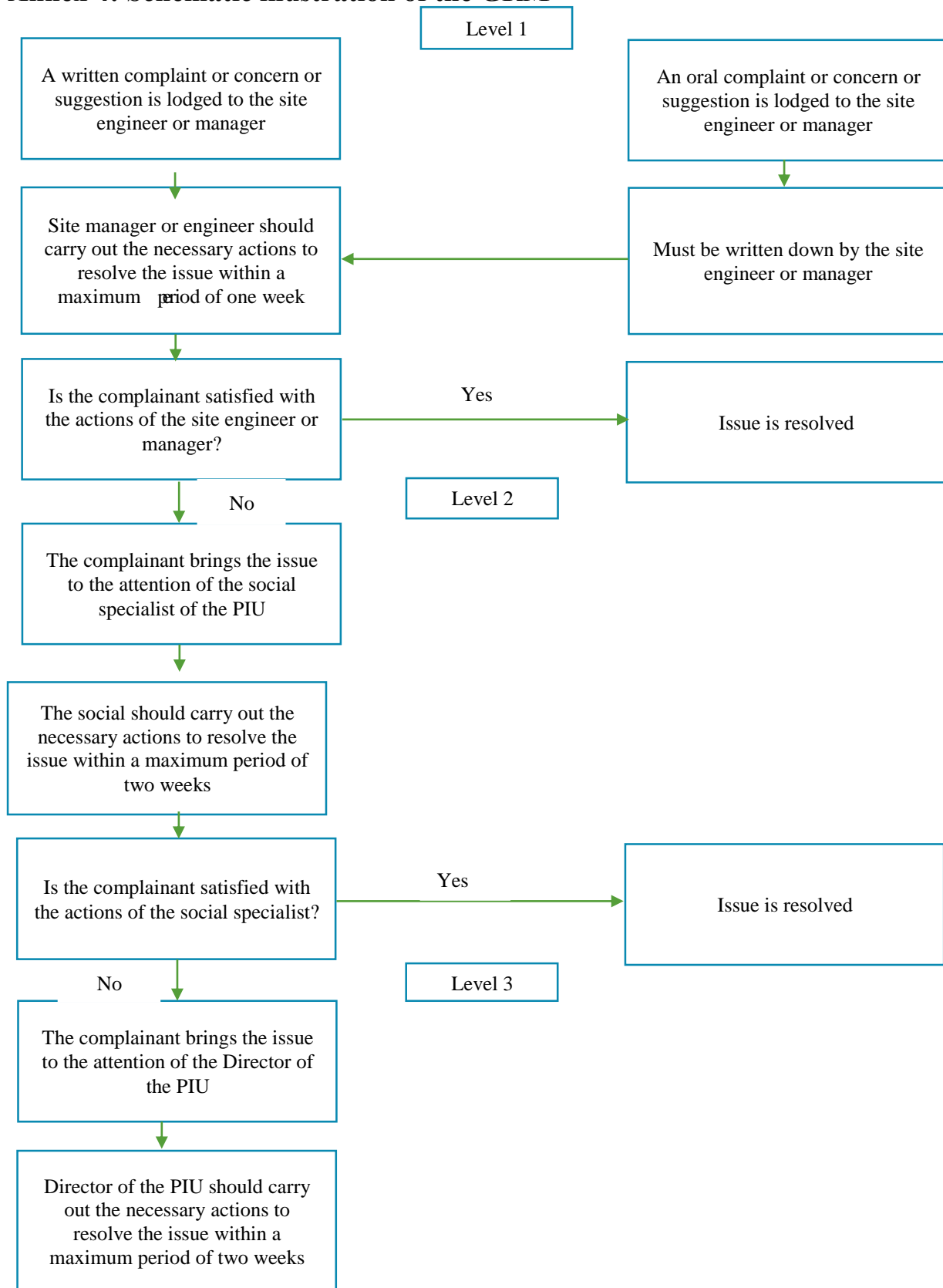
أنا الموقع أدناه، أقر بأنني قرأت وتلّيت وفهمت وتلقيت الشرح والتدريب والمعلومات الكافية عن مدونة السلوك التابعة لمشروع الطرقات والعمالة. وأوافق على الامتثال للمعايير الواردة فيها وأعرف أن أي إجراء يتعارض مع مدونة السلوك هذه قد يؤدي إلى اتخاذ إجراء تأديبي وقد يؤثر على استمرارية عملي ضمن مشروع الطرقات والعمالة.

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 تُلّيت عليه مدونة السلوك وتم الامضاء نيابةً عنه من قبل الأخصائي الاجتماعي

### Annex 4: Schematic illustration of the GRM





## **Annex 8: 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 minimising 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

## Annex 7: Public Consultation

### Invited NGOs

This ESMP has targeted NGOs according to their position in Lebanon. They consist of two levels as follows: (1) Local: specific for Aley Caza. Their mission is to address different concerns and issues among the local society including social, economic, gender equality, environment, poverty, women empowerment, etc. and (2) International: they cover the whole country. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrians in Lebanon by providing aid and responding to their critical situation.

More specifically, invitations were sent by the consultant on behalf of CDR to concerned municipalities and NGOs through official letters, emails and direct phone calls. The consultant shared information with local NGOs. Those local NGOs may play a role of advocates to reduce projects' social and environmental risks. Concerned local NGOs and their field of activity are as follows:

**Table R Contacted local NGOs**

Organization	Contacts	Activities
Druze Women Association	Kamalia Ballan 71463305	Empowering women Charity projects Development projects
The Al Resalah Association	Amal el Rayes 030658382	Social projects and work in Aley Caza

This ESMP consulted International NGOs 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 [GRM.REP@cdr.gov.lb](mailto:GRM.REP@cdr.gov.lb) or register by hand an official letter at the CDR.

In Aley Caza, the total number of registered Syrian is 59,920 or 26.8 % of its total population (UN OCHA, 2016). They were contacted through the International NGOs to seek their feedback about the Project. Accordingly, this ESMP did not receive any concern about the Project.

**Table S Contacted International NGOs**

NGO Name	Contacts	Intervention Sector(s)	Comments
ANERA Lebanon	Mrs. Dima Zayat Deputy Country Director T: 01382590 (ext: 105) M: 70051813 E: dzayat@aneralebanon.org	<ul style="list-style-type: none"> <li>• Children &amp; Youth</li> <li>• Development</li> <li>• Education</li> <li>• Relief Services</li> <li>• Water sanitation and hygiene</li> </ul>	Mrs. Zayat received the Project information sheet and explained that recently Anera operations in Lebanon have grown substantially to cope with the Syrian crisis. they have six offices throughout Lebanon. She welcomed the idea of the Project and will

			disseminate it across her organization.
ACTED	Mr. Jack French Deputy Country Director T: 01324331 M: 79160375 E: jack.french@acted.org	<ul style="list-style-type: none"> <li>• Development</li> <li>• Infrastructure &amp; Services Rehabilitation</li> <li>• Labor &amp; Livelihoods</li> <li>• Shelter</li> <li>• Water sanitation and hygiene</li> </ul>	Mr. French received the Project information sheet and explained that ACTED is working with Syrian in Beirut and northern districts of Mount Lebanon (Baabda, Metn, Keserwane and Jbeil), as well as in Akkar District. He welcomed the idea of the Project and will disseminate it across his organization.

Photos of public consultation meeting



Invitation letter:

TIVEL Consultancy  
Cell.: +961-76 788843  
1<sup>st</sup> floor-Ghaleb Center- Slayeb  
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 طرقات في جميع المحافظات اللبنانية، بإستثناء 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 TIVEL للإستشارات البيئية بإعداد خطة إدارة بيئية وإجتماعية للمشروع المذكور؛

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

وبما أن المشروع يهدف للقيام:

- بأعمال صيانة معظم الطرقات الرئيسية في قضاء عاليه؛
- إعادة تأهيل طريقتين ملحوظتين في هذا المشروع:
  - طريق بدادون - حومال
  - طريق شارون - عين صوفر

لذلك،

ندعوكم لحضور إجتماع مشاركة للعامة في تمام الساعة الحادية عشر صباحاً من يوم الاثنين الواقع في 13 كانون الأول في المركز الثقافي/بلدية عاليه؛ ونتمنى على المواطنين الكرام، إبداء الملاحظات الخطية، في حال وجودها، حول المشروع المذكور، وإرسالها إلى شركة دار الهندسة نزيه طالب وشركاه بواسطة الفاكس على الرقم التالي 01/863434 أو إيداعها في المركز الثقافي/بلدية عاليه.

وتفضلوا بقبول فائق الاحترام

مديرة شركة TIVEL





PowerPoint Presentation:

### نقاط حوار الجلسة

1. المقدمة
2. أهداف اللقاء
3. الجهات المعنية بالمشروع
4. وصف المشروع
5. دراسة المحيط البيئي (الوضع الحالي)
6. الآثار البيئية والاجتماعية الإيجابية للمشروع
7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع
8. خطة الإدارة البيئية والاجتماعية
9. أسئلة ومناقشة عامة



**مشروع الطرق والعمالة  
في لبنان**

**خطة الإدارة البيئية والاجتماعية**

**قضاء عاليه**

جلسة مشاركة العمامة



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### 1. مقدمة

يخّط مجلس الانماء والاعمار لتنفيذ مشروع الطرق والعمالة في لبنان عبر تمويل من البنك الدولي يشمل المشروع أعمال تأهيل وصيانة طرق في بلدات من كافة الأفضية اللبنانية

يهدف هذا المشروع إلى رفع مستوى شبكة الطرق الوطنية وقد جرى تحديد الأولويات في اختيار الطرق التي ستخضع للتأهيل وفق منهجية علمية جرى عرضها على مجلس الوزراء الذي وافق على المشروع وعلى المنهجية وعلى جدول الأولويات

### 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، خاصة في المناطق الريفية التي تعتبر فيها حالة شبكة الطرق أدنى مستوى من حالة الطرقات على المستوى الوطني ككل

## 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

## 3. الجهات المعنية بالمشروع

الصفة	الجهة
ممول المشروع	البنك الدولي
إدارة وتنفيذ	مجلس الانماء والاعمار
استشاري هندسي وشركاه	دار الهندسة نزيه طالب
استشاري بيئي	TIVÈL

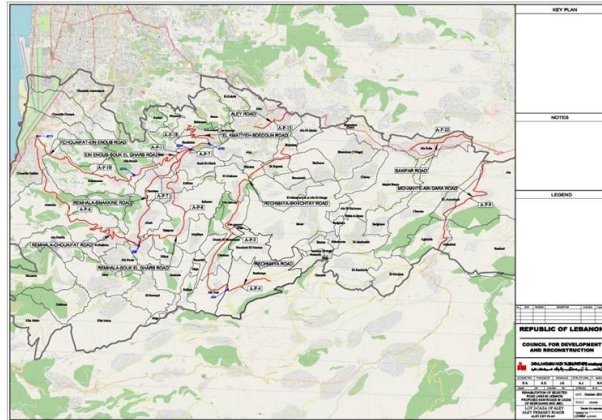
## 4. وصف المشروع

أن المشروع يهدف للقيام:

- بأعمال صيانة معظم الطرقات الرئيسية في قضاء عاليه؛
- إعادة تأهيل طريقتين ملحوظتين في هذا المشروع:
  - طريق بدادون – حومال
  - طريق شارون – عين صوفر

## 4. وصف المشروع (a)

أعمال صيانة معظم الطرقات الرئيسية في قضاء عاليه



#### 4. وصف المشروع (a)

تم فحص الطرق لتحديد ما تحتاج إليه من صيانة من خلال مسح شامل



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

#### 4. وصف المشروع (a)

Caza	Road Code	Name of Primary Roads in Caza Aley	Length (km)
	A-P-1	Damour - Baourta - Dakkoun - Kfar Matta - Abey - Ain Ksour - Qatr Chamoun	15.5
	A-P-2	Deir Couché - Jisr El Qadi - El Bennayé - Remhala - Dfoun - Qatr Chamoun	8.07
	A-P-3	Rechm aya - Ain Traz - Chartout - Kfar Aammay - El Ghabour - Bnoona - El Roumeih - Bralloum - Elhachray	11.24
	A-P-4	Rechm aya - Maasarati - Mazarat El Nahr - Jdeit et Kfarla - El Ramlivieh - El Mrejjate -	11.71
	A-P-5	El Mrejjate - El Ramlivieh - Kfarneice	3.91
	A-P-6	Remhala - El Fankine - Amoun - Chouafat Qobbat	11.03
	A-P-7	Bmakine - Souk El Gharb - Arate - Chamlane - Ainab - Remhala	7.33
	A-P-8	Qatr Chamoun - Baisour - Kafoun - Souk El Gharb	7.25
	A-P-9	Ain Zhalta - Mchakhté - Aghmide - El Azoumivieh - Ain Dara - Hammana	7.09
Aley	A-P-10	Chouafat Qobbat - Bchamoune - Ain Enoub	6.39
	A-P-10-1	Bchamoune	1.17
	A-P-11	Ain Enoub - Aitite - Souk El Gharb	3.91
	A-P-12	Souk El Gharb - Bmakine - El Kamatiyeh	1.58
	A-P-13	Souk El Gharb - Bmakine - Aley	4.78
	A-P-14	Aley	2.13
	A-P-15	Aley	2.06
	A-P-16	Chouafat Qobbat - Chouafat Oumara - Ain Enoub	5.53
	A-P-17	Ain Enoub - Baba Wadi Diab	3.42
	A-P-18	El Kamatiyeh - Bmakine - Bédoune	2.35
	A-P-19	Chouafat Qobbat - Chouafat Oumara - Chouafat Amroussyat - Kfarhima	3.04
	A-P-20	Chouafat Oumara - Chouafat Amroussyat	2.4
	A-P-20-1	Chouafat Amroussyat	0.74
	A-P-21	Aley	1.52
	A-P-22	Ain Sofar	3.27
		Total Length of Primary Road (Km)	127.42

#### ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

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

- تغطية سطح الطريق بطبقات جديدة.
- إستبدال الطبقات الأسفلتية سواء بإعادة رصفها أو بإزالتها 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

#### ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

1. الصيانه العاديه

الفحص الدوري المتواصل للطرق مع الحرص على تنفيذ المهام التاليه بصفة دائمه أو كلما دعت الحاجة إلى ذلك

- 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 إستبدال إشارات الطرق ودهان الطريق.
- الإهتمام بنظافة وتشكيل حدود حرم الطريق.

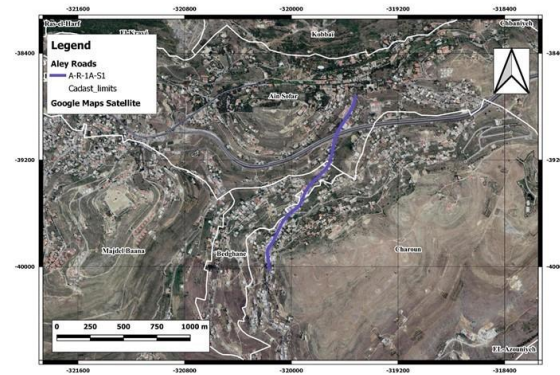
#### 4. وصف المشروع (b)

Road 1d: 2.7 km  
 بدادون - حومال



#### 4. وصف المشروع (b)

Road 1a : 1.5 km  
 شارون - عين صوفر



#### 5. دراسة المحيط البيئي (الوضع الحالي)



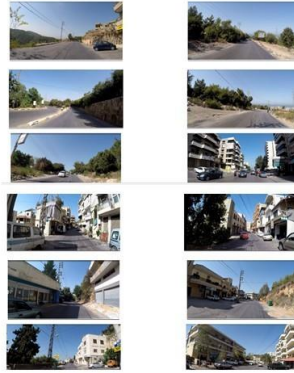
- نوعية الهواء
- جيولوجية المنطقة
- نوعية التربة والمياه السطحية والجوفية
- التنوع البيولوجي
- التلوث الضوضائي
- الوضع الاجتماعي والاقتصادي للمنطقة

#### ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

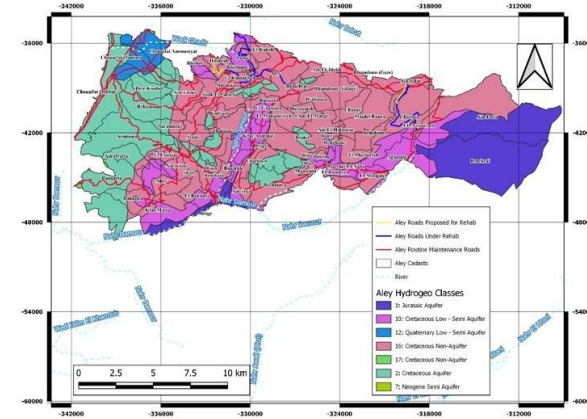


- استبدال أو تأهيل طبقات الإسفلت بحسب نتائج اختبار من أجل إعادة تأهيل
- إعادة تأهيل شبكة تجميع مياه الأمطار عند الحاجة
- وضع إشارات السير وتخطيط الطرقات
- بناء جدران دعم وحاجز السلامة عند الحاجة

## 5. دراسة المحيط البيئي (الوضع الحالي)



## 5. دراسة المحيط البيئي (الوضع الحالي)

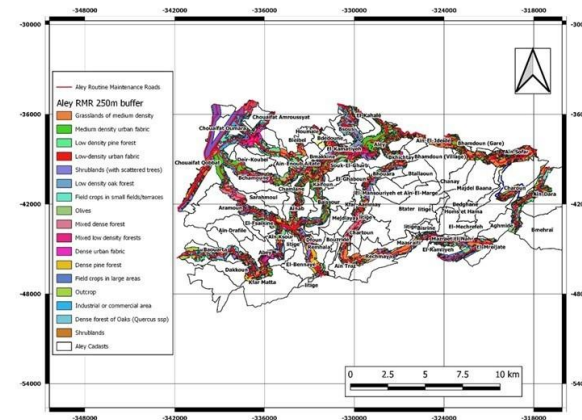


## 6. الآثار البيئية والاجتماعية الإيجابية للمشروع

مشاريع الطرق:

تقلل أو تمنع الغبار، وتحسن التصريف، وتقلل العقبات المرورية  
 تضمن سلامة الطرق وتحد من الحوادث المرورية  
 ترفع قيمة الأراضي وتزيد الخيارات للأنشطة التجارية على طول الطريق

## 5. دراسة المحيط البيئي (الوضع الحالي)



7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ		7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ	
<p><b>الآثار المحتملة على البيئة</b></p> <ul style="list-style-type: none"> <li>التأكد من صيانة المركبات والمعدات ومن عدم وجود أي تسرب للوقود</li> <li>توفير أطقم في الموقع لمعالجة أي انسكاب عرضي على الفور</li> <li>تعيين مسؤولين عن الممارسات الجيدة في الموقع بما في ذلك العلاج السريع لأي انسكاب عرضي</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>تلوث التربة</li> </ul>	<p><b>الآثار المحتملة على البيئة</b></p> <ul style="list-style-type: none"> <li>تلوث الهواء</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>إستخدام آلات ذات انبعاثات منخفضة</li> <li>توجيه مصادر الانبعاثات بعيداً عن المساكن المحيطة</li> <li>رش الطرق بانتظام بالمياه لمكافحة الغبار</li> <li>تغطية مركبات نقل المواد الأولية والمخلفات من وإلى موقع المشروع</li> <li>تحديد سرعة الشاحنات والمركبات</li> </ul>
<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>تدريب الموظفين على إدارة النفايات</li> <li>إزالة المخلفات الصلبة من الموقع خلال 24 ساعة، والتخلص منها في مكبات قانونية محددة.</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>إنشاء المخلفات الصلبة</li> </ul>	<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>تلوث المياه</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>استخدام حواجز لمنع وصول الترسبات الرملية الى قنوات المياه</li> <li>تغطية مواد البناء</li> <li>تطبيق ممارسات ترشيد المياه من قبل عمال البناء</li> </ul>

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ		7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ	
<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>تسريع العمل من خلال الوضع والالتزام بأهداف ومقاييس واضحة لتقييم الأداء ومتابعة سير العمل</li> <li>إعادة تأهيل الطريق بشكل تدريجي</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>تأثر الحركة التجارية للمؤسسات والمحال القائمة على جانبي الطريق</li> </ul>	<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>تغير في حركة السير</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>التخطيط والتشغيل السليمين للتحويلات المرورية</li> <li>إعادة تأهيل الطريق بشكل تدريجي</li> <li>وضع علامات سير وأنظمة إضاءة في الأماكن الحساسة لضمان سلامة النقل</li> </ul>
<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>حصر الأعمال في ساعة محددة ومصرح عنها سابقاً</li> <li>صيانة دورية للمعدات وتجنب تعطلها</li> <li>الحد من استخدام الأجهزة والمعدات التي تسبب الضوضاء خصوصاً بالقرب من المنشآت الحساسة (المدارس وأماكن الصلاة)</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>الضوضاء</li> </ul>	<p><b>الآثار المحتملة على المجتمع</b></p> <ul style="list-style-type: none"> <li>خطر على الصحة والسلامة المهنية والعامة (في حال حصول أي حادث)</li> </ul>	<p><b>التدابير التخفيفية</b></p> <ul style="list-style-type: none"> <li>تطوير خطة للتأكد من التزام المقاولين بالمبادئ التوجيهية للصحة والسلامة المهنية</li> <li>توفير المعدات المناسبة للحماية الشخصية</li> <li>توفير التدريب على الصحة والسلامة المهنية للعمال</li> </ul>

## 8. خطة الإدارة البيئية والاجتماعية

**هدف الخطة الادارة البيئية:** مراقبة المشروع والتأكد من مطابقته مع جميع المعايير البيئية والاجتماعية.

بعد دراسة الاثار المحتملة للمشروع ،تقوم الدراسة باقتراح اساليب تخفيفية لهذه الاثار وسبل لمراقبتها.

### خطة الادارة البيئية تتضمن:

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

## 9. أسئلة ومناقشة عامة

يمكنكم إبداء رأيكم  
عبر التواصل مع شركة TIVÈL  
هاتف: +961 76 788 843  
أو عبر التواصل مع وحدة مشروع الطرق والعمالة في مجلس الانماء  
والاعمار  
هاتف: +961 1 980 096  
بريد الالكتروني: rep.grm@cdr.gov.lb