ROADS &
EMPLOYMENT PROJECT

REPUBLIC OF LEBANON
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

DETAILED ENGINEERING DESIGN FOR THE
REHABILITATION OF SELECTED ROAD LINKS IN LEBANON

LOT 3B

BENT JBEIL - JEZZINE - SAIDA - SOUR

APPENDIX B3

ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP) FOR REHABILITATION OF THE SELECTED ROADS IN BENT JBEIL CAZA

September 2020

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Final Report

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACE	Associate Consulting Engineers
BOQs	Bill of Quantities
CBD	Convention on Biological Diversity
CDR	Council of Development and Reconstruction
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CO	Carbon Monoxide
COM	Council of Ministers
EA	Environmental Assessment
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ESMP	Environmental and Social Management Plans
FHH	Female Headed Household
GBV	Gender Based Violence
GRM	Grievance Redress Mechanism
IBA	Important Bird Area
IFC	International Finance Corporation
ILO	International Labor Organization
LARI	Lebanese Agriculture Research Institute
MOC	Ministry of Culture
MOE	Ministry of Environment
MOIM	Ministry of Interior and Municipalities
MOL	Ministry of Labor
MOPWT	Ministry of Public Works and Transportation
MOT	Ministry of Tourism
NAAQS	National Ambient Air Quality Standards
NGOs	Nongovernmental Organizations
NO	Nitrogen Monoxide
NOx	Nitrogen Oxides
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
REP	Road and Employment project
SEA	Sexual Abuse and Exploitation
SH	Sexual Harassment
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
VAC	Violence Against Children
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization

EXECUTIVE SUMMARY – NON-TECHNICAL SUMMARY

ES1. Introduction

The Council for Development and Reconstruction (CDR) acting as an executing agency on behalf of the Lebanese Council of Ministers (COM) awarded a contract to Associated Consulting Engineers (ACE), hereinafter the Consultant, to prepare the assessment, design and Environmental and Social Management Plans (ESMP) of Lot 3 under Roads and Employment Project (REP). This project is funded by the World Bank (WB).

The Project's main objectives are to enhance the transport connectivity along selected secondary and tertiary road sections in different cazas and to create short-term job opportunities for the Lebanese and Syrian communities. The project will include the rehabilitation of urban and rural stretches of roads from all Lebanese regions. The project covers classified roads in 25 cazas throughout Lebanon with an expected total length of 835 km and grouped in six (6) lots. The project will be implemented over a period of five years.

This document represents an ESMP of the REP in Bent Jbeil Caza and it was prepared according to the WB OP 4.01 (Environmental Assessment). It covers all components of the proposed project during the rehabilitation and operation phase, assesses of the likely environmental and social consequences of a project, and determines the necessary measures to mitigate the negative ones and increase the positive impact on the environment and natural resources throughout a mitigation plan. In addition, the work included the development of a monitoring plan to ensure compliance of the project with environmental and social conditions and regulations. Moreover, public hearing sessions of the project were conducted and included the participation of the public and concerned communities.

ES2. Existing Policies, Legal and Administrative Framework

The governmental public institutions involved in the different stages of implementation of the roads project as well as its different components are CDR, Ministry of Public Works and Transportation (MOPWT), Ministry of Environment (MOE), Ministry of Labor (MOL), Ministry of Interior and Municipalities (MOIM), Ministry of Agriculture (MoA) and the Ministry of Culture (MOC).

The Project is affected by a number of legislations and regulations covering various sectors including Labor, Environment, Health and Safety, Traffic and Antiquity. The most important legal documents are listed below:

- Labor Law/1946: The Lebanese Labor Code
- Law No. 335/2001: Pursuant to the International Labor Organization ILO Convention No 128
- Decree 8987/2012 Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals
- Decree 3791/2016 on Minimum Wage
- Law 444/2002 Framework Law for Environmental Protection
- Decree 8803/2002 and its amendments: Organization of quarries activity, rehabilitation and licensing procedures
- Decree 11802/2008 Occupational prevention, safety, and health in all enterprises subject to the Code of Labor
- Law 166/1933 amended by Law 37 of 2008: Antiquity Law

- Decree-Law 118/1977 on the Municipal Act
- Law243/2012: New Traffic Law
- Legislative Decree 340/1943: Penal Code

The World Bank Policies and Procedures: OP/BP 4.01on Environmental Assessment, classifies the proposed project under Category 'B' and OP/BP 4.12 on Involuntary Resettlement. However, the project will not include land acquisition or resettlement. In addition to the Public consultation and Disclosure Policy under OP/BP 4.01.

The World Bank Policy governs the public accessibility of information in the Bank's possession. The World Bank allows access to any information in its possession that is not on a list of exceptions.

In addition, some international conventions and treaties are relevant to the project and are as follows: The United Nations Framework Convention on Climate Change (UNFCC), Convention on Biological Diversity (CBD), and International Labor Organization (ILO) Conventions.

ES3. Description of the Proposed Project

The study area where the proposed roads are located is the Caza of Bent Jbeil of Nabatiyeh Governorate. The total number of the proposed roads to be rehabilitated under this project is 3 roads with a total length of 16.8 km. All of the roads are already existing and require rehabilitation of various components, including pavement, sidewalks, drainage, safety measures, and street lighting. The selection of the roads was determined by the Cabinet of Ministers in their Meeting Number 32 dated 27/06/2019. The land acquisition did not occur during the design of any road under study.

The proposed project consists of the rehabilitation of existing roads in the Caza of Bent Jbeil. The rehabilitation activities differ for each road depending on the pavement conditions and the road rating that was defined by the consultant.

Determining the condition of the asphalt is important to assign the proper pavement rehabilitation activities. The pavement rehabilitation activities consist of either pavement maintenance or overlay on existing pavement or complete removal of deteriorated pavement and constructing a new one.

The proposed project also consists of other activities beside the pavement rehabilitation works. These activities consist of:

- Construction or improvement of drainage systems
- Construction or improvement of retaining walls
- Installing concrete safety barriers
- Marking lanes and stoppage line
- Adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs
- Rehabilitating sidewalks
- Repairing street lighting
- Relocation of existing utilities as needed

During the execution of rehabilitation activities, roads will not be closed or shutdown. Works will be executed on the road right of way/passageway only and will not use or undermine

any existing adjacent facilities. Detours and diversions were not included in the design. Therefore, before the execution of rehabilitation works, the Contractor, based on the schedule of works and if needed, will secure the access and traffic movement via other alternative routes and means in coordination with the related Municipality. Accordingly, Aall detours will be on existing alternative roads (public domain properties) and there is no need to use or rent some land to create the detour.

The duration of the project is 18 months with a one-year liability period. It is assumed that an estimate total number of workers shall range between 150 and 250.

ES4. Baseline Environmental and Social Conditions

Topography, Geology and Hydrogeology

The Caza of Bent Jbeil is located in the Governorate of Nabatiyeh and it is about 122 km away from the capital of Beirut (localiban website, 2015). The villages of the project area lie between 594 meters to 786 meters above sea level (a.s.l). The main geological formation within the study belongs to the following: the Sannine Limestone of Cenomanian age unit (C4) and its subunits, the Maameltein Limestone formation (C4-5), the the Senonian and Base of Eocene formation (C6), the Eocene formation (E2) and the Pleistocene formation(Q). As for the water resources, a water course is located within the study area around the proposed road Kaounine-Aainata (L3-BJ-RD05). The hydrological map representing this water courses is represented in this report.

Climate and Meteorology

As per the available data, the average annual temperature and precipitation of the village Beit Yahoun was taken into consideration since the project site passes through the village. The average annual temperature in the area is 17.8 °C and the average annual precipitation is 826 mm. The historical climate data (1982-2012) of the village Beit Yahoun were represented in a climograph as well as data obtained (temperature, precipitation, wind speed and wind direction) from the nearest meteorological station, located in the village of Rmeich, of the Lebanese Agriculture Research Institute (LARI).

Air Quality and Noise

Ambient air quality of the project area was requested from MOE. Data was available from the UNDP project “Environmental Resources Monitoring in Lebanon 2011-2013”, which was conducted across the country including Bent Jbeil. This project was conducted in collaboration with the MoE, The emissions inventory of the Project divided the Lebanese territory into a grid of cells with 5km x 5km each. . Annual background average concentrations for criteria pollutants was obtained for each cell. In this project the area surrounding Bent Jbeil is divided into nine cells. For the concerning project the proposed roads pass through only six cells. The results of the above study have shown that the concentrations of NO_2 in all six cells comply with the national standards and the WHO Guidelines. As for the concentrations of PM_{10}, the obtained values were following the national standards and WHO Guidelines while $PM_{2.5}$ in all six cells were not in compliance with the WHO standards for air quality. Noise measurements that were conducted onsite showed that the average noise level at 2 sites (one residential and another calm area) were both above the national standards for noise limits in residential areas.

Land Use/Land Cover

In Bent Jbeil Caza, agricultural activities are seen in different villages as the Caza has arable lands. For several families, tobacco cultivation in Bent Jbeil serves as a breadwinner. It is considered one of the chief agricultural crops next to olives in the absence of alternative crops. Other agricultural crops include olives, apples and vegetables though they are less significant economically due to the weakness of the agricultural sector across the country. In addition, the sector has also been negatively affected by the Syrian crisis which has decreased the export of the agricultural products. (UNDP, 2016). In addition, Bent Jbeil is also home for 15.5 km^2 of mixed forests. The Caza has mainly Eucalyptus and pine trees along most roads. The table below represents the visual classification of land use based on google maps.

Municipality	Land Use
Bent Jbeil	Moderately populated with agriculture areas
Aainata	Moderately populated with agriculture areas
Tbnine	Presence of agriculture areas with some scattered houses
Beit Yahoun	Moderately populated with few agriculture areas
Kaounine	Presence of agriculture areas with some scattered houses
Yaroun	Densely populated with agriculture areas

Biological Environment and Ecologically Sensitive Areas

During the site visits in February 2020, many trees were identified along road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), road Kaounine-Aainata (L3-BJ-RD05) and road Bent Jbeil-Yaroun (L3-BJ-RD63) such as Pine trees, Olive trees, Eucalyptus trees and Melia. However, all the mentioned tree species that were identified along the three roads are located outside the road delimitations or are private to residential buildings and areas. There was no floral and tree species of an ecological importance along the roads of the project area.

Livestock production is not significant in the Caza of Bent Jbeil. During the site visits, grazing livestock and wild animals including mammals and birds were not identified.

Moreover, The Caza of Bent Jbeil hosts several natural reserves. The forest of Khorbat Selem that was listed as protected forest in Lebanon in 1992. Khorbet Selem is around 4.7 km away from the nearest road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), hence it is not at a proximity to the road sites.

Demographic Profile

The Caza of Bent Jbeil is part of Nabatiyeh Governorate which has around 330,000 inhabitants (including Syrian and Palestinian refugees). The average household size in the caza is 3.6 compared to the national overall average household size of 3.7 individuals. The governorate of Nabatiyeh possesses a poverty rate of 25% lower than the national average 27%. Moreover, the unemployment rate in Bent Jbeil Caza is estimated at 10.6%, less than the national average 11.4% and the number of deprived[1] Lebanese in Bent Jbeil Caza is

[1] Poor is referred to people who are living in bad conditions variously described as marginalised, vulnerable, excluded or deprived. People are in poverty when they are deprived of the basic life conditions such as income, diets, material goods, amenities, standards and services (UNDP, 2006)

41,079. Concerning vulnerable groups, such as Female Headed Households (FHH) and people with disabilities, unfortunately there is no available information. As for the elderly (seniors above the age of 65), they comprise 11.7% of the total population in the caza compared with the country's national average of 11%.According to the Syria Refugee Response per district of 2019, the total number of Syrian Refugees in Bent Jbeil Caza is 6,549. The total number of registered refugees in the project area is 1,962. The refugees are not expected to be affected by proposed projects. Moreover, Bent Jbeil Caza does not host any Palestinian or Syrian camps.

Economic Activities & Infrastructure

Bent Jbeil's agricultural sector has declined over the years the area still has agricultural areas and arable lands. Livestock breeding is not significantly present in the area. There are several craft and trade activities in Bent Jbeil, mainly in the shoe and construction industry.

Remittance from external migration remains one of the key sources of income for residents in the Caza of Bent Jbeil. This is closely followed in by income from agriculture, mainly from the government subsidized tobacco agriculture. Other agricultural crops include olives, apples and vegetables. Other income sources comprise of small industries (carpets, sweets, construction material) and small commercial institutions, restaurants, and cafes. During the site visits, different observations were recorded along the 3 project roads. For example, along road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), electricity shops, curtain shop, gas stations, clothes shops, aluminum and steel shops were seen along. During the site visit in February 2020, electricity lines and streetlights were observed all along the roads. The area also has water supply networks. Moreover, wastewater collection and treatment in municipalities of Bint Jbeil Caza is under preparation since 2016 and it is expected to end in 2022.

Education

In the Bent Jbeil village, there are 3 public schools, one vocational school and one branch for the Faculty of Sciences of the Lebanese University. The 3 public schools provide education for the elementary and intermediate levels. Additionally, there are 3 private schools and a nursery. As such, many students from the surroundings villages tend to attend the schools within the Bent Jbeil village. However, the schools in the Caza suffer from the lack of human resources and from the availability of new programs and curricula. Moreover, Bent Jbeil has a limited number of local institutions dealing with social matters in the village such as the UNDP Youth Gathering.

As per the Google Maps, the CIS College is at a distance of 0.03 km away from the proposed road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03). Moreover, during the site visits, the American University of Technology was seen in proximity (around 500 m) to the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03).

Health Services

The Caza of Bent Jbeil encompasses a hospital known as the Bent Jbeil Governmental Hospital which is around 0.4 km away from the road (L3-BJ-RD05). As for the Tbnine Governmental Hospital, it is around 0.9 kilometers from the nearest project road (L3-BJ-RD03).

Healthcare facilities were not observed at the proximity of the proposed roads during the site visits.

Cultural Heritage

The Caza of Bent Jbeil encompasses an important architectural heritage. However, none of these sites of archeological or cultural importance were detected by the team along the roads. The Caza hosts many churches and mosques. As per the Google maps, the Yaroun Church is 0.25 km away from the road (L3-BJ-RD03), while the Tbnine Church is around 0.75 km away from the road (L3-BJ-RD03). In addition, the closes mosque in Tbnine area to the road (L3-BJ-RD03) is around 0.6 km away. As for the Bent Jbeil Mosque, it is 0.27 km away from the road (L3-BJ-RD06). Yet, no churches or mosques were not observed during the site visits. Moreover, the Bent Jbeil village also hosts a football field, while Tbnine hosts a cultural center which is 0.46 m away from the road (L3-BJ-RD03). No cultural center was observed in proximity of the roads.

ES5. Summary of Potential Environmental and Social Impacts and Mitigation during Rehabilitation and Operation Phases

Summary of Impacts and Mitigation during Rehabilitation Phase

Potential Impact	Proposed Mitigation
Environmental Impacts	
Air pollution from emissions of machinery, trucks or open burning activities	Use properly maintained equipment Abide by a dust management plan Water the ground when extremely windy Mix material in an enclosed space Cover material when transporting
Dust pollution from rehabilitation and excavation activities	
Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators	Maintenance of vehicles and machinery Excavation and any other noisy activity only during working hours Prohibit solid waste disposal into undesignated sites
Disturbance of nearby areas and animal escape through noise and vibrations	
Contamination of surface water and pollution of ground water from improper disposal of wastewater from workers and of wash water coming from cleaning of machines and equipment	Install temporary structures to prevent runoff from reaching nearby water bodies Avoid working in rainy weather Connect the generated wastewater from workers to the sewage network or to polyethylene tank Discharge the pumped wastewater from the polyethylene tank into nearby operational wastewater treatment plants Prohibit the discharge of wastewater into nearby water bodies under any condition
Water pollution due to accidental spill of oils and chemicals from trucks and from transportation of chemicals and oils	Prepare and abide by a Spill Prevention & Management Plan Used oil from occasional maintenance of machinery or chemicals must be stored in an appropriate area until it's collected and disposed in a controlled disposal site Minimize soil exposure time Proper storage of raw material including chemicals and fuel and handling must be on a paved and sealed floor Regular maintenance of vehicles Minimize the use of chemicals Reuse of excavated material whenever possible Disposal of excavated material in controlled disposal site
Improper disposal of cut volume may cause contamination of water bodies in rainy weather	

Potential Impact	Proposed Mitigation
Contamination of soil and surface water bodies from the improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Proper disposal of construction waste in controlled disposal site to be identified by the contractor in coordination with the relevant municipality Proper waste management practices Reuse or recycle the generated waste whenever possible Reuse of excavated material whenever possible Disposal of excavated material in controlled disposal site to be identified by the contractor in coordination with the relevant municipality Train workers on waste reduction procedures
High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Maintenance of the generators and trucks Light in the site offices shut down during the night Construction workers must be trained and provided with awareness sheets on efficient energy use Machinery and equipment must be turned off when not in use
High consumption rates of water for construction related activities	Use water in the most efficient way and reduce wastage Regular site inspection to detect water leakages Whenever possible, use dry-cleaning instead wet cleaning Training and awareness should be raised to workers concerning water usage best practices and water conservation Proper disposal of construction waste
Reduction in overall ground and surface water quality due to improper disposal of construction waste	
Depletion of natural resources due to the unsustainable extraction of borrowing material (sand,, aggregates, …)	Ensure that the borrow material are extracted from legal sites Avoid agricultural lands to extract borrowing material
Socioeconomic Impacts	
Temporary potential Labor Influx	Priority hiring to qualified local community GRM for local communities
Economic Activities and its effect on the livelihood of the shop's owners, the visitors of the recreational site and other visited places	Install overpass structures from the road to the shops and the recreational site entrance Maintain a passing corridor within the alignment to grant access to nearby properties Ensure that access to nearby shops is not blocked by installing wooden boards where necessary Inform the shops' owners ahead of time about rehabilitation date Proper installation of sign boards in culturally appropriate languages and written in clear and understandable manner Timely completion of the rehabilitation phase Ensure access to external GRM
Social tensions in the event of potential labor influx due to discrimination from the local community against the foreign workers	Conduct awareness campaigns for the local community regarding the slight potential of foreign workers influx Inform the local community that worker will sign code of conduct before starting the work and coordinate with relevant municipalities GRM for local communities and all relevant stakeholders
Possible unequal wage benefits between local and foreign workers	Ensure that all workers (locals and foreign, skilled and unskilled) shall be compensated and are contracted equally as per the scale of market price rates, have equal contractual benefits and working conditions, and have access to internal GRM

Potential Impact	Proposed Mitigation
Possible recruitment of children who are under the legal age as workers on the site, especially in the case of the day laborers	Daily registrations of workers and verification of their age to prevent child labor Abide by the Labor Law Ensure the contractor is aware of the penalties that Labor Law imposes in the case of child labor Oblige the contractor to strictly abide by the Labor Law through the CDR tender documents that should include prohibition of child labor
Disruption of local community to access services due to construction activities and temporal road closures	Traffic shall be secured via alternative routes to reach relevant destinations in case the works imply the temporary closure of this road Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage GRM for local communities and all relevant stakeholders
Damage of existing infrastructure	Regular coordination with relevant municipalities Conducting of trial pits
Potential occurrence of gender-based violence, sexual abuse and exploitation incidents	Draft CoC and the guidelines for a GBV and VAC Action Plan Conduct training sessions for workers on Sexual Exploitation and Abuse and/or Sexual Harassment All workers should understand, and sign CoC written in their native language Respond to the reported incidents of sexual abuse exploitation as a matter of priority Regular trainings on gender-based aspects, internal and external GRM Availability of a GRM with multiple channels to initiate a GBV complaint, which ensures confidential reporting with safe and ethical documenting of GBV cases, including Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)
Slight increase in traffic due to the transport of construction materials or due to the material that may fall	Ensure traffic is not blocked during transportation Inform residents and place signs near the working areas Ensure communities have access to GRM Cover transported material Abide by traffic regulations Operate well maintained vehicles
Traffic congestion in the town due to temporal road closure	
Material falling from vehicles during transport may cause traffic accidents or congestion	
Community and Workers Health and Safety	
Increased traffic, accidents rates and risk on pedestrians	Apply Best Applicable Practices on Road Safety
Accident and injuries to workers and public because of rehabilitation activities	Workers to wear proper safety gear (PPE) Presence of first aid kits (at least three) on the construction site Inform residents and place signs near the working areas and sensitive areas within the project area (i.e. near schools, medical centers, hospitals and shops) Secure the site and restrict access to it Access to hospitals should not be impeded at no time Proper management of trucks and heavy machinery entering and exiting the construction site Develop a site-specific Public Health and Safety Plan and Occupational Health and Safety
Dust generation and noise may cause health related problems for workers and disturbance to residents	

Potential Impact	Proposed Mitigation
	Apply Best Applicable Practices on Road Safety

Summary of Impacts and Mitigation during Operation Phase

Potential Impact	Proposed Mitigation
Environmental Impacts	
Increased vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area causing public health risks and other impacts on the environment.	Ensure that the road is regularly maintained to ensure good surface conditions Frequent air quality monitoring must be done along the roads area to ensure that ambient air quality parameters are within the standards
Blockage of drainage systems and overflow of storm water transporting residues and pollutants to nearby water bodies and soils	Ensure that the drainage system is regularly maintained especially before the start of the rainy season and that solid waste is continually collected
Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Installation of signs near sensitive areas to prevent people from using the pressure horns
Depletion of natural resources (fuel) used for street lighting purposes	Install eco-friendly light fixtures for the streetlight infrastructure to reduce the consumption of non-renewable sources of energy
Disruption of animal's movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Install speed limit and animal crossing signs at areas were animals cross the roads
Community and Workers Health and Safety	
Increased traffic, accidents rates and risk on pedestrians	Apply Best Applicable Practices on Road Safety

ES6. Consultation, Disclosure and GRM

A public hearing was held at the union of Bent Jbeil Municipalities on Friday, 3 January 2020. The purpose of the hearing was to inform the stakeholders, including the municipality representatives, local residents, and the public , about the proposed project that will rehabilitate 3 roads in Marjayoun Caza and 3 roads in Bent Jbeil Caza and their accompanying infrastructural works and to take into account their concerns and feedback. Thirty seven people participated in the meeting including 10 women, two working in the Municipality of Al Taybe, two at the municipality of Aainata, two at the municipality of Al Aadayseh, two woman working in two NGOs in Tbnine, one working in a woman organization in Yaroun and another woman is a teacher in Aainata.

During the session, different concerns were raised by the attendees such as whether the design of the roads will be presented to the public before implementation. The consultant and CDR responded to this comment by saying that they will do another meeting with the municipalities to have a look on the design before the contractor starts working. Moreover, when participants also asked of the reason that a part of the road was excluded from the proposed rehabilitation project, the Consultant and CDR noted that this was due to budget issues. Another comment was raised concerning the issue of the road widening and if the project includes this work. The CDR and the consultant responded to this comment by saying that the project will not cover the widening of the road except for special safety conditions.

The consultant also ensured that land acquisition will not be considered in this project. Furthermore, all participants were noting that CDR and the Consultant must stress on the contractor to hire local workers. As for the impacts that might result from the rehabilitation of roads, the public does not see any major environmental, health and safety concerns. It was emphasized that clear communication and transparency is needed throughout the project implementation with widely disseminated GRM in place and awareness of GBV and mitigation measures.

Moreover, the women that participated in the women's session believed the project will contribute positively to improving women's participation in the economy by making transportation safer and more convenient. The women participants also said that there are well educated women in the Caza, as such these women can be involved in the project during rehabilitation. There must be clear coordination mechanism with the municipalities and other authorities during the rehabilitation phase to quickly address potential problems and to not duplicate the road rehabilitation works.

As for NGOs Consultation, this ESMP has targeted them according to their position in Lebanon. They consist of two levels as follows: (1) Local: they are specific to each Caza. Local NGOs were invited to the hearing, only Social, Humanitarian, Economical Intervention for Local Development (SHEILD) attended. Their mission is to address different concerns and issues among the local within the Caza including social, economic, gender equality, environment, poverty, women empowerment, etc. They believe this project can have a positive impact if the associated risks, during both construction and mitigation phases, are minimized and good practices are put in place. (2) International: They are covering the whole country and their consultation will be applied to all the ESMPs of the REP. These contacted international NGOs are ANERA, and ACTED. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrian in Lebanon by providing aid and responding to their critical situation.

In addition, a formal Grievance Redress Mechanism (GRM) is implemented during both the rehabilitation and operation phases. The purpose of the GRM is to ensure that all feedback and complaints received from stakeholders, customers, employees, contractor staff and the public in general are documented, considered and addressed in an acceptable and timely manner (45 days). All the attendees of the public hearing were informed about this mechanism. The link to the GRM webpage is as follows: http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm

ES.7 Conclusion

It was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated liquid waste and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of heavy rehabilitation activities especially where new pavement is proposed for the roads the traffic will be impacted by the planned measures that will be applied to ensure the alternative circulation. On the other hand, job opportunities will be created to the local community during the rehabilitation phase which is considered as a positive impact. However, these impacts are short in term and will diminish as soon as the project is completed. The assessed socioeconomic impacts during the operational phase were mostly positive in nature in terms of traffic and road safety and livelihood improvement within the project area. However, on the long term the proposed project will contribute to increasing

vehicular pollutant levels in the area as well as traffic related noise causing public health problems and other impacts on the environment. Nevertheless, the negative environmental impacts that might arise from the rehabilitation of the proposed roads in Bent Jbeil Caza can be minimized and even eliminated through proper management and mitigation practices that were proposed in the report.

ملخص تنفيذي - موجز غير تقني

1. مقدمة

كلّف مجلس الانماء والاعمار، الذي يعمل كجهة منفذة بإسم مجلس الوزراء اللبناني، للشركة الإستشاريّة العالمية الهندسية (ACE)، الاستشاري، عقدا لإعداد خطة إدارة بيئية واجتماعية لـ "Lot 3" في اطار مشروع الطرق والعمالة في لبنان الممولة من البنك الدولي.

يهدف هذا المشروع إلى تحسين قطاع الطرق من طرق ثانوية وفرعية في عدة بلدات من كافة الأقضية اللبنانية، وخلق فرص عمل قصيرة الأجل للمجتمعات اللبنانية والسورية. يتضمن المشروع إعادة تأهيل الطرقات الممتدة في المناطق المدنية والريفية في جميع المناطق اللبنانية. يغطي المشروع طرقات مصنفة في ٢٥ قضاء في جميع أنحاء لبنان حيث يبلغ طولها الإجمالي المتوقع ٨٣٥ كيلومترا، موزعة على ست مجموعات وسينفذ المشروع على مدى خمس سنوات.

يمثل هذا التقرير خطة الإدارة البيئية والإجتماعية لقضاء بنت جبيل، وقد أعدت الدراسة وفقا لسياسة ضمانات البنك الدولي (سياسة تشغيلية رقم ٤,٠١) (التقييم البيئي). هذا المستند يغطي ايضا جميع عناصر المشروع المقترح خلال مرحلة إعادة التأهيل والتشغيل، ويقيم الآثار البيئية والإجتماعية المحتملة من المشروع ، ويحدد التدابير اللازمة للتخفيف من الآثار السلبية وزيادة الأثر الإيجابي على البيئة والموارد الطبيعية من خلال خطة الإجراءات التخفيفية للآثار السلبية. وإضافة إلى ذلك، يتضمن التقرير وضع خطة تحديد وسائل الرصد والمراقبة لضمان إمتثال المشروع للأنظمة البيئية والإجتماعية. بالإضافة، عقدت جلسات المشاورة العامة وشملت مشاركة المعنيين والهتمين بالمشروع.

2. السياسات القائمة والإطار القانوني والإداري

المؤسسات الحكومية العامة المعنية بمختلف مراحل تنفيذ مشروع الطرق، فضلا عن مختلف مكوناتها المؤلفة من مجلس الإنماء والإعمار ووزارة النقل ووزارة الأشغال العامة ووزارة البيئة ووزارة العمل ووزارة الداخلية والبلديات ووزارة الزراعة ووزارة الثقافة.
يتأثر المشروع بعدد من التشريعات التي تغطي مختلف القطاعات بما في ذلك العمالة والبيئة والصحة والسلامة والسير والأثار. أهم هذه القوانين مدرجة أدناه:

- قانون العمل / ١٩٤٦: قانون العمل اللبناني
- القانون رقم ٢٠٠١/٣٣٥: عملاً باتفاقية منظمة العمل الدولية رقم ١٢٨
- المرسوم ٢٠١٢/٨٩٨٧ حظر تشغيل القاصرين تحت سن ١٨ سنة في العمل الذي قد يضر بصحتهم أو سلامتهم أو أخلاقهم
- المرسوم ٢٠١٦/٣٧٩١ بشأن الحد الأدنى للأجور
- القانون ٢٠٠٢/٤٤٤ القانون الإطاري لحماية البيئة
- المرسوم ٢٠٠٢/٨٨٠٣ وتعديلاته: تنظيم نشاط المحاجر وإجراءات التأهيل والترخيص
- المرسوم ٢٠٠٨/١١٨٠٢ الوقاية المهنية والسلامة والصحة في جميع الشركات الخاضعة لقانون العمل
- القانون ١٩٣٣/١٦٦ المعدل بالقانون ٣٧ لعام ٢٠٠٨: قانون الآثار
- المرسوم بقانون ١١٨ لسنة ١٩٧٧ بشأن قانون البلديات
- القانون ٢٠١٢/٢٤٣: قانون السير الجديد
- المرسوم التشريعي ١٩٤٣/٣٤٠: قانون العقوبات

سياسات و قوانين البنك الدولي: السياسة التنفيذية رقم ٤,٠١ بشأن التقييم البيئي، يصنف المشروع المقترح في إطار الفئة "B" و السياسة التنفيذية رقم ٤,١٢ بشأن إعادة التوطين الجبري (غير أن المشروع لن يشمل حيازة الأراضي أو إعادة التوطين) بالإضافة إلى سياسة أجتماعات الحلقه التشاوريه و عرض النتائج بموجب السياسة التنفيذية رقم٤,٠١.

تحكم سياسة البنك الدولي سهولة وصول الجمهور إلى المعلومات التي بحوزته. يسمح البنك الدولي بالوصول إلى أي معلومات في حوزته ليست مدرجة في قائمة الاستثناءات..

وبالإضافة إلى ذلك، لقد تم عرض في هذا المستند بعض الإتفاقيات والمعاهدات الدولية ذات صلة بالمشروع وهي كما يلي: إتفاقية الأمم المتحدة المتعلقة بإطار العمل بشأن تغير المناخ، واتفاقية التنوع البيولوجيواتفاقيات العمل الدولية

3. وصف المشروع المقترح

يقع المشروع المقترح في قضاء بنت جبيل محافظة النبطية. يبلغ مجموع الطرق المقترحة والتي سيتم إعادة تأهيلها في إطار هذا المشروع ٣ طرق يبلغ طولها الإجمالي ١٦,٨ كم. جميع الطرق موجودة سابقا وتتطلب إعادة تأهيل لمختلف مكوناتها بما في ذلك من الطبقات الإسفلتية والاساس، الأرصفة، عبارات لتصريف مياه الأمطار و شبكات إنارة. ولقد اختيرت الطرقات من خلال إجتماع مجلس الوزراء رقم ٣٢ بتاريخ ٢٠١٩/٦/٢٧. . لم يتم إستملاك أراضي أثناء تصميم أي طريق ضمن المشروع.

يتضمن المشروع المقترح إعادة تأهيل طرق موجودة سابقا في قضاء بنت جبيل. وتختلف أنشطة إعادة التأهيل بالنسبة لكل طريق حسب ظروف الطبقات الإسفلتية والاساس و تصنيف الطرق التي حددها الإستشاري.

بهدف تحديد أنشطة إعادة التأهيل المناسبة، من المهم دراسة حالة الطبقات الإسفلتية والاساس. وتتألف أنشطة إعادة تأهيل الطرق: صيانة أو غشاء الطبقات الإسفلتية القائم أو إزالة الطبقات الإسفلتية المتدهورة بالكامل واعادة انشاءها من جديد.

ويتضمن المشروع المقترح أيضا أنشطة أخرى إلى جانب أعمال إعادة التأهيل. وتتألف هذه الأنشطة من:

- تأمين/تأهيل أقنية، عبارات لتصريف مياه الأمطار
- تأمين/تأهيل جدران دعم إستنادية
- تأمين/تأهيل حواجز سلامة جانبية
- تخطيط الطرقات
- تأمين/تأهيل إشارات سير و إشارات تحذير
- تأهيل أرصفة
- تأهيل شبكات إنارة
- نقل المرافق الموجودة حسب الحاجة

أثناء تنفيذ أنشطة إعادة التأهيل، لن يتم إغلاق الطرق أو قطعها. فقبل تنفيذ أعمال إعادة التأهيل سيؤمن المقاول الوصول وحركة المرور عبر طرق ووسائل بديلة أخرى بالتنسيق مع البلدية ذات الصلة.

تمتد مدة المشروع على فترة ١٨ شهرًا بالإضافة إلى مدة عام واحد لفترة الصيانة. من المفترض أن يتراوح العدد التقديري الإجمالي للعمال بين ١٥٠ و٢٥٠.

4. الوضع البيئي والاجتماعي الحالي

التضاريس والجيولوجيا والهيدروجيولوجيا

يقع قضاء بنت جبيل في محافظة النبطية، حيث أن الطرق المقترحة تبعد حوالي ١٢٢ كيلومترا من العاصمة بيروت (موقع لوكاليبان، ٢٠١٥). وتقع الطرق في بنت جبيل ضمن الرتفاع يتراوح بين ٥٩٤ مترا و٧٨٦ مترا فوق مستوى سطح البحر (a.s.l). يتكوّن التكوين الجيولوجي الرئيسي داخل الدراسة التالي: Sannine Limestone of Cenomanian age unit (C4) and its subunits, Maameltain or Ghazir Limestone, of Turonian agre (C5), White marl and marl-limestones (C6), Eocene (E2) and the Pleistocene (Q) وفيما يتعلق بمصادر المياه، فإن مجرى مائي يقع داخل منطقة الدراسة حول الطريق المقترح "كونين– عيناتا"(L3-BJ-RD05) . ويحوي هذا التقريرعلى الخرائط الهيدرولوجية التي تبرز مواقع هذه المصادر المائية وأحواض المياه على طول الطرق المقترحة.

المناخ والأرصاد الجوية

لقد اخذت قرية بيت ياحون لتمثّل مناخ منطقة المشروع حيث يبلغ متوسط درجة الحرارة السنوية في المنطقة ١٧,٨ درجة مئوية، ويبلغ متوسط هطول الأمطار السنوي ٨٢٦ ملم. وقد تمّ وضع البيانات المناخية (١٩٨٢-٢٠١٢) لقرية بيت ياحون في رسم بياني مناخي، وكذلك البيانات (درجة الحرارة والهطول وسرعة الرياح واتجاه الرياح) التي تم الحصول عليها من أقرب محطة أرصاد جوية في قرية رميش التابعة لمصلحة الأبحاث العلمية الزراعية (LARI).

جودة الهواء والضوضاء

لقد اخذت البيانات المتعلقة بجودة الهواء المحيطة بمنطقة المشروع من وزارة البيئة من خلال مشروع برنامج الأمم المتحدة الإنمائي ٢٠١١-٢٠١٣. تم تنفيذ هذا المشروع بالتعاون مع وزارة البيئة حيث تم تقسيم المناطق إلى عدة خلايا (٥ كم × ٥ كم لكل منهما) في العديد من المناطق اللبنانية وضمنها بنت جبيل. تم الحصول على متوسط تركيزات الخلفية السنوية للملوثات لكل خلية. في هذا المشروع تنقسم المنطقة المحيطة بنت جبيل إلى تسع خلايا. بالنسبة لمنطقة المشروع المعنية ، تمر الطرق المقترحة، بست خلايا فقط. وقد أظهرت النتائج في منطقة المشروع أن تركيزات ثاني أكسيد النيتروجين (NO2) في جميع الخلايا متوافق مع المعايير الوطنية و معايير منظمة الصحة العالمية. اما فيما يتعلق بتركيزات PM_{10}، أظهرت القيم التي تم الحصول عليها انها متوافقة مع معايير منظمة الصحة العالمية الخاصة بنوعية الهواء لكن لم يكن الحال نفسه لقيم $PM_{٢,٥}$ حيث أن لم تكن كل الخلايا ضمن المعايير. أما بالنسبة لمستوى الضوضاء في المنطقة فقد قام الفريق بقياس مستويات الضوضاء في موقعين (أحدهما سكني والآخر هادئ). وقد تبين أن متوسط مستوى الضوضاء في الموقعين تخطّى المعاييرالوطنية لمستوى الضوضاء في المناطق السكنية.

غطاء الأرض

نظرًا لخصوبة أراضيها، توجد أنشطة زراعية فى مختلف القرى في قضاء بنت جبيل. تعتبر زراعة التبغ في بنت جبيل معيلا لها ومن أكبر المحاصيل الزراعية بجانب الزيتون في غياب المحاصيل البديلة. كما تم تحديد أنواع مختلفة من المحاصيل الزراعية الأخرى مثل الزيتون والتفاح والخضروات وهي أقل أهمية من الناحية الاقتصادية بسبب ضعف القطاع الزراعي على الصعيد الوطني، وتتأثر سلبا بالقيود المفروضة على التصدير بسبب الأزمة السورية (برنامج الأمم المتحدة الإنمائي، ٢٠١٦). وبالإضافة إلى ذلك، تضم مدينة بنت جبيل أيضا مساحة ١٥,٥ كيلومتر مربع من الغابات المختلطة (FAO, 2016b). يذكر بوجود أشجار االكينا والصنوبرعلى طول معظم الطرق. يمثل الجدول التالي التصنيف البصري لاستخدام الأراضي استنادا إلى خرائط جوجل.

البلدية	غطاء الأرض
بنت جبيل	ذات كثافة سكانية متوسطة- وجود مناطق زراعية
عيناتا	ذات كثافة سكانية متوسطة- وجود مناطق زراعية
تبنين	وجود مناطق زراعية –مع بعض المنازل المتناثرة
بيت ياحون	ذات كثافة سكانية متوسطة- وجود مناطق زراعية قليلة
كونين	وجود مناطق زراعية –مع بعض المنازل المتناثرة
يارون	ذات كثافة سكانية مرتفعة- وجود مناطق زراعية

البيئة البيولوجية والمناطق الحساسة إيكولوجيا

تم رصد الكثير من الأشجار خلال زيارة الموقع في شباط ٢٠٢٠ على طول طريق بنت جبيل - عيناتا - بيت ياحون - تبنين(L3-BJ-RD03) ، وطريق كونين – عيناتا,(L3-BJ-RD05) وطريق بنت جبيل - يارون (L3-BJ-RD63)مثل أشجار الصنوبر، أشجار الزيتون، أشجار الكينا، والزنزلخت. الا أن جميع أنواع الأشجار المذكورة التي تم تحديدها على طول الطرق الثلاثة تقع خارج حدود الطرق أو هي أشجار خاصة بالمباني والمناطق السكنية. ولا توجد أنواع من الأشجار والشجيرات ذات أهمية إيكولوجية على طول طرق منطقة المشروع.

إنتاج المواشي غير مهم في بنت جبيل. وخلال زيارة الموقع، لم يتم رصد أي حيوانات برية بما فيها الثدييات والطيور. كما لم يلاحظ رعي الماشية على طول طرق المشروع.

كما يضم قضاء بنت جبيل العديد من الغابات المحمية والمحميات الطبيعية، إلا أنها ليست على مقربة من الطرق المقترحة ولم يلاحظ أي منها خلال زيارة الموقع.

الديموغرافيا

يبلغ مجموع السكان المسجلين في محافظة النبطية، بمن فيهم اللاجئون السوريون والفلسطينيون ٣٣٠ ألف نسمة (IDAN,2018),ويبلغ متوسط حجم الأسرة ٣,٦ مقارنة بالمتوسط الإجمالي الوطني لحجم الأسرة البالغ ٣,٧ فردا (CAS, 2018-2019) كما تبلغ نسبة الفقر في محافظة النبطية ٢٥ في المائة أقل من المتوسط الوطني ٢٧ في المائة2018 (IDAL) ويقدر معدل البطالة في بنت جبيل ب ١٠,٦ في المائة، أي أقل من المتوسط الوطني ١١,٤ في المائة (CAS, 2019) وعدد اللبنانيين المحرومين في بنت جبيل ب ٤١،٠٧٩ (OCHA, 2016).اما فيما يتعلق بالفئات الضعيفة ،مثل الأسر التي ترأسها امرأة والأشخاص ذوي الحاجات الخاصة، فلا يوجد معلومات متاحة. أما كبار السن (كبار السن فوق ٦٥ سنة) فهم يشكلون ١١,٧٪ من إجمالي السكان في القضاء مقارنة بالمتوسط الوطني البالغ ١١٪.. وبحسب المفوضية السامية لشؤون اللاجئين، (UNHCR, 2019) يبلغ عدد اللاجئين السوريين في بنت جبيل ٦,٥٤٩ لاجئو يبلغ العدد الإجمالي للاجئين المسجلين فقط في منطقة المشروع 1,962. لا يتوقع أن يتأثر اللاجئون بالمشروع المقترحة. اضف على ذلك فان قضاء بنت جبيل لا يستضيف أي مخيمات فلسطينية أو سورية.

الأنشطة الإقتصادية و البنية التحتية

لقد تراجع القطاع الزراعي في منطقة بنت جبيل على مر السنين، الا انه لا يزال هناك بعض المناطق الزراعية وأراض صالحة للزراعة. كما أن تربية الماشية ليست موجودة بشكل كبير في المنطقة. كما وهناك العديد من النشاطات الحرفية والتجارية في بنت جبيل، وخاصة صناعة الأحذية ومواد البناء.

ولا تزال التحويلات الخارجية من المهاجرين من مصادر الدخل الرئيسية للسكان في بنت جبيل ومن بعدها دخل الزراعة بالأخص زراعة التبغ التي تدعمها الحكومة. وتشمل المحاصيل الزراعية الأخرى الزيتون والتفاح والخضروات. وتشمل مصادر الدخل الأخرى الصناعات الصغيرة (السجاد والحلويات ومواد البناء) والمؤسسات التجارية الصغيرة والمطاعم والمقاهي (برنامج الأمم المتحدة الإنمائي، ٢٠١٦) (UNDP, 2016)). وخلال زيارة الموقع، سجلت ملاحظات مختلفة على طرق المشروع الثلاثة. على سبيل المثال، على طول طريق بنت جبيل - عيناتا - بيت ياحون - تبنين-L3-BJ) RD03)تم رصد على طول الطريق محال الكهرباء ومحل بيع الستائر ومحطات الوقود ومحال الملابس ومحال الألومنيوم.و لقد شوهد خلال زيارة الموقع خطوط الكهرباء وإنارة الشوارع على طول الطرق. يوجد في المنطقة أيضا شبكات تزويد المياه. علاوة على ذلك ،فان شبكات جمع ومعالجة مياه الصرف الصحي في بلديات قضاء بنت جبيل هي قيد الإعداد منذ ٢٠١٦ ومن المتوقع أن تنتهي الاعمال في ٢٠٢٢

قطاع التعليم

هناك ٣ مدارس رسمية ومدرسة مهنية وفرع لكلية العلوم في الجامعة اللبنانية في بنت جبيل. توفرالمدارس الحكومية الثلاث التعليم للمرحلتين الابتدائية والمتوسطة. وبالإضافة إلى ذلك، هناك ٣ مدارس خاصة ودار حضانة (Civil Society Center, n.d.). وهكذا، تمتلك القرية مقصدا تعليميا للطلاب من القرى المحيطة بها. وبالإضافة إلى ذلك، تعاني المدارس الحالية من افتقار في القدرات وعدم توفر البرامج والمناهج الجديدة، ولا سيما في مجال المعلوماتية والتكنولوجيا والفنون (CDR,2015). هناك عدد محدود من المؤسسات المحلية التي تعنى بالشؤون الاجتماعية في القرية، مثل تجمع الشباب التابع لبرنامج الأمم المتحدة الإنمائي (Civil Society Center, n.d.).

ووفقا لخرائط جوجل، تقع كلية CISعلى بعد ٠,٠٣ كيلومتر من الطريق المقترح - بنت جبيل - عيناتا - بيت ياحون - تبنين .(L3-BJ-RD03) و خلال زيارة الموقع تم تحديد الجامعة الأمريكية للتكنولوجية بالقرب من طريق بنت جبيل - عيناتا - بيت ياحون - تبنين(L3-BJ-RD03) (حوالي ٥٠٠ م)

قطاع الرعاية الصحية

يضم قضاء بنت جبيل مستشفى يعرف بمستشفى بنت جبيل الحكومي الذي يبعد ٠,٤ كلم عن طريق (L3-BJ-RD05). اما مستشفى تبنين الحكومي فيقع على بعد ٠,٩ كيلومتر من أقرب طريق للمشروع (L3-BJ-RD03).

و خلال الزياة الميدانية، كانت هناك علامة في قرية كونين إلى جانب الطريق كونين – عيناتا (L3-BJ-RD05) تفيد بوجود مبنى الى الشمال يقدّم الخدمات الصحية. ومع ذلك، لم يلاحظ أي مكان قريب من المستشفيات أو مراكز الرعاية الصحية أو الصيدليات بالقرب من الطرق خلال زيارة الموقع.

لم يلحظ أي مرفق للرعاية الصحية على مقربة من الطرق المقترحة خلال زيارة الموقع.

التراث الثقافي

يتضمن قضاء بنت جبيل تراث معماري وطبيعي مهم. غير أن الفريق لم يكتشف أيا من هذه المواقع ذات الأهمية الأثرية أو الثقافية على طول الطرق. والقضاء يضمّ أيضا العديد من الكنائس والمساجد. ووفقا لخرائط جوجل، تبعد كنيسة يارون ٠,٢٥ كيلومترا عن الطريق(L3-BJ-RD03) ، بينما تبعد كنيسة تبنين ٠,٧٥ كيلومترا عن الطريق .(L3-BJ-RD03) وبالإضافة إلى ذلك، فإن المسجد في منطقة تبنين الأقرب إلى الطريق (L3-BJ-RD03) يبعد حوالي ٠,٦ كيلومتر. أما مسجد بنت جبيل، فهو على بعد ٠,٢٧ كيلومتر من الطريق (L3-BJ-RD06). ومع ذلك، لم يتم رصد أي كنائس أو مساجد خلال زيارات الموقع. إضافة إلى ذلك، يوجود ملعب كرة قدم في بنت جبيل، في حين يوجد في مدينة تبنين مركزا ثقافيا على بعد ٠,٤٦ متر من الطريق (L3-BJ-RD03) . ولم يلاحظ أي مركز ثقافي بالقرب من الطرق.

5. موجز الآثار البيئية والاجتماعية المحتملة والتدابير التخفيفية خلال مرحلتي التأهيل والتشغيل

ملخص للآثار البيئية والاجتماعية والاقتصادية المحتملة والتدابير التخفيفية خلال مرحلة التأهيل:

الآثار	التدابير التخفيفية
البيئية	
تلوث الهواء الناجم عن انبعاثات الآلات أو الشاحنات أو أنشطة الاحتراق المفتوح	استخدام معدات خاضعة لصيانة بشكل صحيح الالتزام بخطة إدارة الغبار ري الأرض عندما تكون الرياح شديدة مزج المواد في أمكان مغلقة تغطية المواد عند النقل
تلوث الغبار الناجم عن أنشطة إعادة التأهيل والحفر	
تلوث الضوضاء الناجم عن نقل أو المواد الخام وحركة الشاحنات والحفر وتشغيل المركبات الثقيلة مثل الحفارات	صيانة المركبات والآلات حصر الحفر وأي نشاط ضوضائي خلال ساعات العمل فقط حظر التخلص من النفايات الصلبة في مواقع غير مخصصة
انزعاج الحيوانات والسكان في المنطقة المجاورة من الضوضاء والارتجاجات	
تلوث المياه السطحية من جراء التخلص غير السليم من مياه الصرف الصحي من العمال والمياه القادمة من تنظيف الآلات والمعدات	تركيب هياكل مؤقتة لمنع الجريان السطحي للمياه من الوصول إلى المياه السطحية القريبة تجنب العمل في الطقس الممطر شبك مياه الصرف الناتجة عن العمال بشبكة الصرف الصحي أو بخزان البولي إيثيلين تصريف مياه الصرف الصحي المضخ من خزان البولي إيثيلين إلى محطات معالجة مياه الصرف الصحي القريبة منع تصريف مياه الصرف الصحي الى المياه السطحية القريبة تحت أي ظرف
تلوث المياه بسبب انسكاب الزيوت والمواد الكيميائية عن طريق الخطأ من الآلات والشاحنات ونقل المواد الكيميائية والزيوت	الاستعداد والالتزام بخطة منع الانسكاب وإدارته

الآثار	التدابير التخفيفية
التخلص غير السليم من كميات الحفر يسبب تلوث المياه في الطقس الممطر	تخزين الزيوت المستعملة والناتجة عن صيانة الآلات أو المواد الكيميائية في منطقة مناسبة حتى يتم جمعها والتخلص منها في موقع خاضع للرقابة تقليل وقت التعرض للتربة يجب تخزين المواد الخام بما في ذلك المواد الكيميائية والوقود على أرضية معبدة ومغلقة الصيانة الدورية للمركبات التقليل من استخدام المواد الكيميائية إعادة استخدام المواد المحفورة كلما أمكن ذلك التخلص من المواد المحفورة في المكبات الخاضعة للرقابة
تلوث التربة والمياه السطحية بسبب التخلص غير السليم من النفايات الصلبة الصادرة عن العمال والمواد المستعملة، ومخلفات البناء الناجمة عن أعمال الحفر	التخلص السليم من مخلفات البناء في المكبات الخاضعة للرقابة وتحديدها من قبل المقاول بالتنسيق مع البلدية المعنية إدارة النفايات بالممارسات المناسبة إعادة استخدام أوإعادة تدوير النفايات الناتجة كلما أمكن ذلك إعادة استخدام المواد المحفورة كلما أمكن ذلك التخلص من المواد المحفورة في المكبات الخاضعة للرقابة وتحديدها من قبل المقاول بالتنسيق مع البلدية المعنية تدريب العمال على إجراءات تخفيف النفايات
إرتفاع معدلات إستهلاك الكهرباء مما يسهم في زيادة إستهلاك الوقود واستنفاده	صيانة المولدات والشاحنات اطفاء الأضواء في مكاتب الموقع أثناء الليل تدريب عمال البناء وتزويدهم بأوراق التوعية حول الاستخدام الفعال للطاقة إيقاف تشغيل الآلات والمعدات عند عدم استخدامها
إرتفاع معدلات إستهلاك المياه في الأنشطة المتصلة باعادة التأهيل	استخدام المياه بأكثرالطرق كفاءة والتقليل من هدرها فحص الموقع بانتظام للكشف عن أي تسرب للمياه
انخفاض في نوعية المياه الجوفية والسطحية الإجمالية بسبب التخلص غير السليم من نفايات البناء	استخدم التنظيف الجاف بدلاً من التنظيف الرطب كلما أمكن ينبغي رفع مستوى التدريب والتوعية للعاملين بشأن أفضل الممارسات لاستخدام المياه والحفاظ عليها التخلص السليم من مخلفات البناء
إستخراج مواد الخام واستنفاد الموارد الطبيعية (الرمل، البحص، ...)	تأكد من استخراج مواد الخام من المواقع القانونية تجنب الأراضي الزراعية لاستخراج مواد الخام
اقتصادي و اجتماعي	
احتمال تدفق اليد العاملة	إعطاء أولوية التوظيف الى المجتمع المحلي المؤهل آلية مراجعة الشكاوى (GRM) للمجتمعات المحلية
الأنشطة الاقتصادية وأثرها على معيشة أصحاب المحلات	تركيب هياكل مؤقتة من الطريق إلى المحلات التجارية تأكد من عدم حظر الوصول إلى المتاجر الصغيرة من خلال تركيب ألواح خشبية كما تستلزم الحاجة إبلاغ أصحاب المحلات مسبقًا عن موعد إعادة التأهيل والتنسيق مع البلديات ذات الصلة الاحتفظ بممر ضمن حدود الطريق لمنح الوصول إلى المحلات التجارية القريبة تركيب لوحات الإشارات بشكل صحيح الانتهاء من مرحلة إعادة التأهيل في الوقت المناسب
التوترات الاجتماعية في حالة تدفق العمال للتمييز من المجتمع المحلي ضد العمال الأجانب	تنظيم حملات توعوية للمجتمع المحلي بشأن احتمال تدفق العمال الأجانب أبلاغ المجتمع المحلي أن العامل سيوقع على على شروط قواعد السلوك قبل ذكر العمل آلية مراجعة الشكاوى (GRM) للمجتمعات المحلية وجميع أصحاب المصلحة المعنيين
توترات إجتماعية نتيجة تصور أن العمال الأجانب يحصلون على نسبة كبيرة من الوظائف التي خلقها المشروع	التأكد أن جميع العمال (السكان المحليين والأجانب ، ذوي المهارات أولا) متعاقد معهم على قدم المساواة وفقًا لجدول أسعار السوق، ولديهم مزايا تعاقدية وظروف عمل متساوية، وإمكانية التأكد من الوصول إلى آلية مراجعة الشكاوى (GRM)

الآثار	التدابير التخفيفية
احتمال عمالة الأطفال ما دون السن القانونية في مواقع التأهيل خاصة العاملين في النهار	التسجيلات اليومية للعمال والتحقق من سنهم لمنع عمل الأطفال الالتزام بقانون العمل التأكد من أن المقاول على علم بالعقوبات التي يفرضها قانون العمل في حال عمل الأطفال إلزام المقاول بالتقيد الصارم بقانون العمل من خلال وثائق المناقصة التابعة لمجلس الإنماء والإعمار التي يجب أن تتضمن حظرعمل الأطفال
تعزر وصول المجتمع المحلي إلى الخدمات بسبب أنشطة اعادة التأهيل وإغلاق الطرق مؤقتا	تأمين حركة المرورعبر طرق بديلة للوصول إلى الوجهات ذات الصلة في حال استدعت أعمال التأهيل لإغلاق مؤقت لهذا الطريق إبلاغ المجتمع المحلي عن موقع الطرق المقفلة أو التحويلات من خلال الإعلانات العامة ولافتات التحويل المناسبة آلية مراجعة الشكاوى (GRM) للمجتمعات المحلية وجميع أصحاب المصلحة المعنيين
ضرر على البنية التحتية القائمة	التنسيق المنتظم مع البلديات المعنية إجراء حفر تجريبية
احتمال وقوع حوادث عنف قائم على النوع الاجتماعي واعتداء واستغلال جنسي بسبب تدفق اليد العاملة	مسودة مدونات السلوك والمبادئ التوجيهية لخطة عمل للعنف القائم على النوع الاجتماعي (GBV) والعنف ضد الأطفال (VAC) عقد دورات تدريبية للعاملين حول الاستغلال والاعتداء الجنسي و / أو التحرش الجنسي على جميع العمال التوقيع على مدونات قواعد السلوك المكتوبة بلغتهم الأم الرد على حوادث الاستغلال الجنسي المبلغ عنها واعطائها الأولوية تدريبات منتظمة على الجوانب القائمة على نوع الجنس وآلية مراجعة الشكاوى (GRM) داخلية وخارجية تأكد من توفرآلية مراجعة الشكاوى (GRM) مع قنوات متعددة لبدء شكوى تتعلق بالعنف المبني على النوع الاجتماعي(GBV) ، والتي تضمن إعداد تقارير سرية مع توثيق آمن وأخلاقي لحالات العنف المبني على النوع الاجتماعي ، بما في ذلك الاستغلال والاعتداء الجنسيين (SEA) والتحرش الجنسي (SH)
إزدحام المرور في المناطق المعنية بسبب نقل مواد البناء والمواد التي قد تسقط أو بسبب الإغلاق المؤقت للطرق	التأكد من عدم حظر حركة المرور أثناء النقل إعلام السكان ووضع لافتات بالقرب من مناطق العمل ضمان وصول المجتمعات إلى آلية مراجعة الشكاوى (GRM) تغطية المواد المنقولة الالتزام بقواعد المرور تشغيل المركبات التي تتم صيانتها جيدًا
إزدحام المرور في المناطق المعنية بسبب الإغلاق المؤقت للطرق	
حوادث مرور أو إزدحام نتيجة سقوط مواد من المركبات أثناء النقل	
الأنشطة الاقتصادية وتأثيرها على حياة أصحاب المحال التجارية والزائرين والمواقع الترفيهية	تركيب هياكل مؤقتة من الطريق إلى المحلات التجارية ومدخل المواقع الترفيهية تركيب لوحات الإشارات بشكل صحيح و باللغات المناسبة الواضحة والمفهومة للمجتمع الانتهاء من مرحلة إعادة التأهيل في الوقت المناسب التأكد من الوصول إلى آلية مراجعة الشكاوى (GRM)
الصحة والسلامة المهنية والمجتمعية	
زيادة حركة المرور ومعدلات الحوادث والمخاطر على المشاة	تطبيق أفضل الممارسات المطبقة على السلامة على الطرق
الحوادث والإصابات التي تلحق بالعمال بسبب أنشطة التأهيل (المخاطر الصحية التنفسية بشكل رئيسي)	على العمال ارتداء معدات الحماية الشخصية (PPE) المناسبة وجود عدّة الإسعافات الأولية (ثلاثة على الأقل) في موقع البناء إعلام السكان ووضع لافتات بالقرب من مناطق العمل والمناطق الحساسة ضمن طرق المشروع (بالقرب من المدارس، المراكز الصحيّة، المستشفيات والمحلات التجارية) ضمانة عدم الوصول الى موقع المشروع لا ينبغي إعاقة الوصول إلى المستشفيات في أي وقت من الأوقات الإدارة السليمة للشاحنات والآليات الثقيلة التي تدخل وتخرج من موقع البناء
توليد الغبار والضوضاء قد يسبب في مشاكل صحية للعمال وللمقيمين القريبين	

الآثار	التدابير التخفيفية
	وضع خطة للصحة العامة والسلامة الخاصة بالموقع والصحة والسلامة المهنية تطبيق أفضل الممارسات المطبقة على السلامة على الطرق

ملخص للآثار البيئية والاجتماعية والاقتصادية المحتملة والتدابير التخفيفية خلال مرحلة التشغيل:

الآثار	التدابير التخفيفية
البيئي	
زيادة مستويات تلوث الهواء في المنطقة مما يسبب مخاطر صحية عامة وآثار أخرى على البيئة	تأكد من صيانة الطريق بانتظام لضمان ظروف سطح جيدة إجراء مراقبة متكررة لجودة الهواء على طول منطقة الطرق للتأكد من أن جودة الهواء المحيط تقع ضمن المعايير
انسداد شبكات الصرف وتدفق مياه الأمطار الناقلة للملوثات إلى المسطحات المائية والتربة المجاورة	التأكد من أن صيانة نظام الصرف بانتظام خاصة قبل بداية موسم الأمطار وأن النفايات الصلبة تجمع باستمرار
تلوث الضوضاء الناجم عن حركة المركبات وارتجاجاتها واستخدام الأبواق التي تزعج السكان في المناطق السكنية القريبة والحياة البرية	تركيب لافتات بالقرب من المناطق الحساسة لمنع الناس من استخدام أبواق السيارات
استنفاد الموارد الطبيعية (الوقود) المستخدمة لإضاءة الشوارع	تركيب إضاءة صديقة للبيئة لإضاءة الشوارع لتقليل استهلاك مصادر الطاقة غير المتجددة
تعطيل حركة الحيوانات مما يؤدي إلى الموت المباشر أو تجنبها بسبب زيادة حركة مرور المركبات في المنطقة	وضع علامات تحديد السرعة وعلامات عبور الحيوانات في المناطق حيث تعبر الطرق
الصحة والسلامة المهنية والمجتمعية	
زيادة حركة المرور ومعدلات الحوادث والمخاطر على المشاة	تطبيق أفضل الممارسات المطبقة على السلامة على الطرق

6. مشاورة وإبلاغ العامة وعرض النتائج

عقدت جلسة مشاركة عامة في اتحاد بلديات بنت جبيل يوم الجمعة، ٣ كانون الثاني/يناير ٢٠٢٠. وكان الغرض من هذه الجلسة اهو إبلاغ أصحاب المصلحة (بما في ذلك ممثلين البلدية، السكان المحليين وهيئات القطاع العام والخاص داخل منطقة المشروع في منطقة المشروع)، بالمشروع المقترح لإعادة تأهيل ٣ طرق في قضاء مرجعيون و٣ طرق في قضاء بنت جبيل وما يصاحبها من أعمال اخرى، ومراعاة ملاحظاتهم. وشارك في الاجتماع ٣٧ شخصا، منهم ١٠ سيدات، اثنتان تعملان في بلدية الطيبة، واثنتان في بلدية عيناتا، واثنتان في بلدية العديسة، وامرأتان تعملان في منظمتين غير حكوميتين في تبنين، وواحدة تعمل في منظمة نسائية في يارون وامرأة أخرى هي معلمة في عيناتا. خلال الجلسة، أثار الحضور مخاوف مختلفة مثل ما إذا كان سيتم عرض تصميم الطرق للجمهور قبل التنفيذ. ورد الخبير الاستشاري ومجلس الإنماء والإعمار على هذا التعليق بقولهم أنهم سيعقدون اجتماعاً آخر مع البلديات لإلقاء نظرة على التصميم قبل أن يبدأ المقاول في العمل. علاوة على ذلك ، عندما سأل المشاركون أيضًا عن سبب استبعاد جزء من الطريق من مشروع إعادة التأهيل المقترح ، أشار المستشار ومجلس الإنماء والإعمار إلى أن ذلك يرجع إلى مشاكل في الميزانية. وأثير تعليق آخر بشأن مسألة توسيع الطريق وما إذا كان المشروع يتضمن هذا العمل. رد مجلس الإنماء والإعمار والاستشاري على هذا التعليق بقوله أن المشروع لن يغطي توسيع الطريق باستثناء ظروف السلامة الخاصة. كما أكد المستشار أنه لن يتم النظر في حيازة الأراضي في هذا المشروع. علاوة على ذلك ، أشار جميع المشاركين إلى أنه يجب على مجلس الإنماء والإعمار والاستشاري التأكيد على المقاول لتوظيف عمال محليين. أما بالنسبة للتأثيرات التي قد تنجم عن إعادة تأهيل الطرق ، فإن الجمهور لا يرى أي مخاوف بيئية وصحية وسلامة. وتم التأكيد على أن التواصل الواضح والشفافية مطلوبان طوال فترة تنفيذ المشروع من خلال نشر آلية إعادة إعمار غزة ونشرها على نطاق واسع والتوعية بالعنف المبني على النوع الاجتماعي وتدابير التخفيف

واعتقدت النساء اللواتي شاركن في جلسة مشاركة المرأة أن المشروع سيساهم بشكل إيجابي في تحسين مشاركة المرأة في الاقتصاد من خلال جعل النقل أكثر أمانًا وملاءما، وذكرت المشاركات أيضاً أن هناك نساء متعلمات جيداً في القضاء، حيث يمكن لهؤلاء النساء المشاركة في المشروع أثناء إعادة التأهيل. و اشارو ايضا الى أهمية وجود آلية تنسيق واضحة مع البلديات والسلطات الأخرى خلال مرحلة إعادة التأهيل لمعالجة المشاكل المحتملة سريعا وعدم تكرار أعمال إعادة تأهيل الطرق.

تمت المشاورات مع المنظمات غير الحكومية في هذه الخطة الإدارية البيئية والاجتماعية وفقًا لموقعها في لبنان وتمثل هذه المنظمات مستويين (١) المحلية: وهي مخصصة لكل قضاءز و لقد دعيت المنظمات غير الحكومية المحلية إلى جلسة الاستماع، وحضرها فقط (SHEILD). وتتمثل مهمتهم في معالجة مختلف القضايا في المجتمع المحلي، بما في ذلك المسائل الاجتماعية والاقتصادية والمساواة بين الجنسين والبيئة وتمكين المرأة. و يعتقدون أن هذا المشروع يمكن أن يكون له تأثير إيجابي إذا تم تقليل المخاطر المصاحبة ، خلال كل من مرحلتي البناء والتخفيف ، ووضع الممارسات الجيدة موضع التنفيذو(٢) الدولية: وهي تغطي كل البلد وستطبق المشاورة معها على جميع الدراسات البيئية لمشاريع الطرق والعمالة في لبنان. يجدر الذكر الى انه عندما اندلعت الأزمة في سوريا في مطلع عام ٢٠١١، إستجابت العديد من المنظمات الدولية غير الحكومية للأزمة الإنسانية وعملت بشكل مباشر مع السوريين في لبنان من خلال تقديم المساعدات والاستجابة لأوضاعهم الحرجة.

وبالإضافة إلى ذلك، نُفذّت آلية مراجعة الشكاوى (GRM) خلال مرحلتي اعادة التأهيل والتشغيل. والغرض من هذا هو ضمان توثيق جميع الملاحظات والشكاوى الواردة من المعنيين والزبائن والمقاول والموظفين وللعامة، والنظر فيها ومعالجتها بطريقة مقبولة وفي الوقت المناسب (٤٥ يوم). بالاضافة، لقد تمّ إبلاغ جميع الحاضرين خلال جلسة المشاركة العامة بهذه الآلية. تم إبلاغ جميع الحاضرين في جلسة المشاركة العامة بهذه الآلية. الرابط إلى صفحة GRM :http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm

7. الخلاصة

معظم الآثار السلبية للمشروع يتوقع أن تحدث خلال مرحلة إعادة التأهيل. هذه الآثار تتعلق بإزعاج السكان القريبين من أنشطة إعادة التأهيل إلى جانب بعض الآثار على البيئة المحيطة، مثل تدهورنوعية التربة و المياه إذا لم تتم إدارة النفايات السائلة والنفايات الصلبة بشكل سليم. اضافة إلى ذلك فهناك أثر سلبي على نوعية الهواء نتيجة أعمال اعادة التأهيل خاصة عند إزالة الطبقات الإسفلتية المتدهور بالكامل و اعادة انشاءها من جديد. كما ستتأثر حركة المرور بالإجراءات المخطط لها والتي سيتم تطبيقها لضمان البديل لحركة المرور. ومن ناحية أخرى سيتم توفير فرص العمل للمجتمع المحلى خلال مرحلة اعادة التأهيل التى تعتبر اثرا ايجابيا. و لكن تعتبر هذه الآثار قصيرة الأمد وستتقلص بمجرد انهاء المشروع. اما الآثار الاجتماعية والإقتصادية التي تم تقييمها خلال مرحلة التشغيل فهي إيجابية في معظمها من حيث تحسين حركة المرور والسلامة العامة على الطرقات وتحسين الاحوال الاقتصادية في منطقة المشروع. لكن المشروع المقترح سيسهم على المدى الطويل في زيادة مستويات ملوثات االهواء في المنطقة فضلا عن الضوضاء المتصلة بحركة المرور التي تسبب مشاكل صحية عامة وآثارا أخرى على البيئة. ومع ذلك، يمكن التقليل من الآثار البيئية السلبية التي قد تنشأ عن اعادة تأهيل الطرق المقترحة في قضاء بنت جبيل بل وازالتها من خلال ممارسات خطة ادارة البيئة و المجتمع و الاجراءات الاحترازية المقترحة في التقرير.

1. INTRODUCTION

1.1 Project Background

The Council for Development and Reconstruction (CDR) acting as an executing agency on behalf of the Lebanese Council of Ministers (COM) awarded a contract to Associated Consulting Engineers (ACE), hereinafter the Consultant, to prepare the assessment, design and Environmental and Social Management Plans (ESMP) of Lot 4 under Roads and Employment Project (REP) – *See more about the Project in Section 3.*

The Roads and Employment Project is funded by the World Bank (WB). Its objectives are (1) to improve transport connectivity along select paved road sections and (2) to create short term jobs for Lebanese and Syrians. The project covers classified roads[2] in 25 Cazas[3] throughout Lebanon with an expected total length of 835 km and grouped in six (6) lots. The project will be implemented over a period of five years.

This report represents the ESMP of the REP in Bent Jbeil Caza that is part of Lot 3.

1.2 Project Rationale

Lebanon has a total of around 8,000 km of roads along with a highway network linking the country with Syria (WFP, 2016). Despite this large road network coverage, a significant percentage of these roads is in poor condition. This situation hinders local and economic development mainly in rural and lagging regions, where the condition of the main network is worse than the national average. Moreover, this state has been aggravated by the influx of Syrian refugees which has significantly increased traffic and the utilization of the road network (CDR, 2018). As such, the proposed project aims to improve the efficiency of road sector expenditures through the prioritization of road works and the improvement of road asset management techniques (CDR, 2018).

The Project's main objectives are to enhance the transport connectivity along selected secondary and tertiary road sections in different cazas and to create short-term job opportunities for the Lebanese and Syrian communities. The project will include the rehabilitation of urban and rural stretches of roads from all Lebanese regions.

The specific objectives of the project are as follows:

- Providing road reconstruction/rehabilitation and road safety activities such as pavement structure, retaining walls, drainage systems, edge safety barriers, repairing street lighting, marking and traffic signing;
- Creating job opportunities for the local community by engaging them in several rehabilitation activities;
- Promoting gender workforce equality to the extent possible through encouragement of employment of both genders within the project.

[2]Classified roads are based on the official Ministry of Public Works road classification which classifies the roads in Lebanon as primary, secondary or tertiary.

[3]Lebanon is divided administratively into three levels: Governorates (محافظات), cazas or districts (أقضية), and municipalities (بلديات). There are eight governorates, 26 districts, and 1,029 municipalities in the country (as of the 2016 municipal elections).

1.3 Report Objectives

Pursuant to the World Bank OP 4.01 (Environmental Assessment), this ESMP report seeks to satisfy the following objectives:

- Describe all components of the proposed project;
- Identify relevant environmental and social national, international and WB policies and regulations;
- Conduct public consultation to identify public concerns regarding the project and to feed into project design to the extent possible;
- Describe baseline environmental and socio-economic conditions within the study area;
- Identify the significant positive and negative environmental and social impacts associated with the implementation of the proposed project;
- Propose mitigation / enhancement measures for the identified impact whenever possible;
- Facilitate informed decision making, including setting the environmental terms and conditions for implementing the proposed project;
- Develop a plan to monitor the identified impacts and their associated mitigation measures;
- Develop an institutional setup along with capacity building requirements.
- Develop a Grievance Redress Mechanism (GRM).

1.4 Methodology

This ESMP of the REP in Bent Jbeil Caza that is part of Lot 3 was prepared to cover all components of the proposed project during the rehabilitation and operation phases, to assess the likely environmental and social consequences of a project, and to determine the necessary measures to mitigate the negative ones and increase the positive impact on the environment. As such, the task was initiated by conducting site visits and a literature review in order to determine the current environmental and social conditions (such as hydro-geological and groundwater quality, air meteorological data, biological and socio-economic conditions, and cultural heritage sites), along with relevant local and WB legislations, guidelines, and standards. The review also included the identification and assessment of the suggested alternatives to the project.

In addition, the environmental team communicated closely with the technical team in order to obtain the necessary information on both the status of each road, as well as the proposed rehabilitation activities, thus describing the proposed project in a thorough manner. In terms of the assessment, negative and positive impacts were identified and mitigation measures were proposed to address the negative ones. As such, an ESMP was developed and included a monitoring plan, which is needed to ensure compliance of the project with environmental and social conditions and regulations.

Furthermore, the scope of work also included the development of an institutional setup to ensure that the project implementers have sufficient technical and human resources available to effectively undertake the environmental management and monitoring tasks. As for the participation of the public and concerned communities, this was done through conducting a public hearing in a central location and invited all stakeholders and local community to participate.

2. EXISTING, LEGAL, ADMINISTRATIVE AND POLICIES FRAMEWORK

2.1 National Environmental and Social Legal Framework

The rehabilitation of roads involves a variety of activities that need to abide by national legislations that are enforced by various government institutions. Table 2-1 describes a legal framework governing the REP for Lot 3 in Bent Jbeil Caza, taking into consideration that no land acquisition or expropriation will be required during its implementation.

Table 2-1: National Legal Framework related to Project

Year	Law[4] / Decree[5] / Decision[6]	Title	Relevant Provisions
Labor			
1946	Labor Law	The Lebanese Labor Code	The Labor Law covers the industrial accident prevention and compensation. It regulates the minimum wage, the minimum age of employment based on their ages and the workplaces, resting periods and vacations for adolescent workers. It also sets the working hours, and the penal code regulation of strikes and lock out in essential employments
2001	Law No. 335	Pursuant to International Labor Organization (ILO) Convention No 128	This ratified convention addresses the minimum age of employment
2002	Law No. 400	Pursuant to the ILO Convention No 138	Elimination of the worst form of child labor
2012	Decree 8987	Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals	This Decree restrict the employment of minors under the age of 18 in activities and works that can be harmful to their health, morals and that can limit their education
2016	Decree 3791	Minimum Wage	Raises the minimum daily wage to 20$/day
Environment			
1933	Decree 2761	The prohibition of wastewater discharge into water streams	States the characteristics of channels and reservoirs where wastewater is discharged. In addition to the prohibition of its discharged into natural environment
1974	Decree 8735	Conservation of Public Hygiene	Solid waste management including collection and disposal is under the control of the municipality. It restricts dumping of wastes in public or private

[4]Lebanon's legislative body is represented by the Lebanese Parliament that approves and issues Laws.
[5]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.
[6]Decisions are issued by a specific minister and are limited to the affairs of the ministry that promulgated it. Ministerial Decisions are subject specific.

Year	Law[4] / Decree[5] / Decision[6]	Title	Relevant Provisions
			lands adjacent to roads and residential districts
1992	MOA Decision 21	Establishment of Khorbet Selem as a protected forest	The Project area is located nearby the nature reserve at a distance of is around 4.7 km away from the nearest road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03)
1996	Law 558	Protection of forests	Classifies protected forests and defines the prohibited activities and works into the mentioned forests. It also contains offences and penalties.
1996	MOE Decision 52/1	Requirements to protect air, water, and soil pollution	Allowable noise level according to type of areas and the permissible duration of exposure
2001	MOE Decision 8/1	Revised standards for air emissions, liquid effluents and wastewater treatment plants	The decision sets limits for discharge of wastewater into water bodies
2002	Law 444	Framework Law for Environmental Protection	Protect the national environment against all forms of degradation, air and water and soil pollution, and the promotion of sustainable use of natural resources and conservation of biodiversity
2002	Decree 8803 and its amendments	Organizes the activity of quarries and crushers, licensing procedures, as well as the operation, management and rehabilitation of quarries.	Ensures the provision of construction material and the disposal of construction waste comply with the decree
2011	Law 198	Establishment of Kafra Nature Reserve	The Project area is located nearby the nature reserve at a distance of 6 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03)
2011	Law 199	Establishment of Ramyeh Nature Reserve	The Project area is located nearby the nature reserve at a distance of 11.2 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and 10 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06)
2011	Law 200	Establishment of Debl Nature Reserve	The Project area is located nearby the nature reserve at a distance of 5.8 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and 5.4 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06)
2011	Law 201	Establishment of Beit Leef Nature Reserve	The Project area is located nearby the nature reserve at a distance of 9 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and

Year	Law[4] / Decree[5] / Decision[6]	Title	Relevant Provisions
			8.8 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06)
2018	Law 77	Water Law	Tackles protection of water resources from pollution and management and monitoring of public wastewater treatment facilities
2018	Law 78	Air Quality Law	The investment in any facility or establishment that emanate foul or toxic odors should abide by the different environmental conditions issued by a decision from MOE
2018	Law 80	Integrated Solid Waste Management	Covers the management of non-hazardous and hazardous waste, and responsibilities and penalties related to violations of waste management laws
Health and Safety			
2008	Decree 11802	Occupational prevention, safety, and health in all enterprises subject to the Code of Labor	Provides the general regulations for the prevention of occupational hazards and accidents, and the promotion of health and safety in all industrial establishments subject to the Labor Law. These cover prevention and safety, occupational health, the safe use of chemicals at work, as well as occupational noise standards
Cultural and Municipal			
1933	Law 166 amended by law 37 of 2008	Antiquity Law	This law defines heritage and antiquity, identifies its ownership, states legislation for excavation and judicial procedures due to violation
1977	Decree-Law 118	Municipal Act	Defining the responsibilities of municipalities
2008	Law 37	Cultural Policy Law	Any archaeological artefact located in Lebanon and deemed to be of historical, artistic, architectural or anthropological significance by the Ministry of Culture must be protected
Traffic			
2012	Law 243	New Traffic Law	Provide general driving rules and defines the penalties upon violation of the law
General			
1943	Legislative Decree 340	Penal Code	The law defines the type of crimes such as rape; lewd acts by threat, violence, or against minors; and other similar crimes. It also states punishments and legality of penalties
1991	Law 58	Expropriation law	States general and specific provisions for land acquisition. Also is includes improvement tax resulting from the implementation of public works

Year	Law[4] / Decree[5] / Decision[6]	Title	Relevant Provisions
2017	Law 53	Amendment of Penal Code	Under sexual violence Article 522 of the Penal Code exonerated a perpetrator of kidnapping and adultery who married his victim. This was repealed in this law

In terms of the national legal requirements for speed limits, Lebanon uses the American Association of State Highway and Transportation Officials (AASHTO) 7th edition "Policy on Geometric Design of Highways and Streets" of 2018, which leaves designers to select the design speed which is appropriate for the roadway and correlate the various features of the design. The selected design speed should realistically represent actual or anticipated operating speeds and conditions on the roadway being designed or studied.

It is worth mentioning here that Decree No. 8633/2012 about Fundamentals of Environmental Impact Assessment (EIA) is not relevant to the Project since this latter is not categorized under either Annex I or II of the EIA Decree.

2.2 Institutional

Numerous governmental public institutions will be involved in the different stages of the ESMP of the REP. They are described in Table 2-2, along with their mandate and relevant responsibilities.

Table 2-2: Relevant Institutions

Institution	Main Role	Relevant Role
Council for Development & Reconstruction (CDR)	Securing funding for projects, allocating funds to different government agencies, supervising the execution of plans and contributing to the rehabilitation of public institutions	Securing funds for rehabilitation of road networks, issuing invitations for tenders and awarding construction contracts
Ministry of Public Works and Transportation (MOPWT)	Management of all public roads, for developing a sustainable strategy for the transportation sector, road and street plans within cities and villages	Under the MOPWT, the Directorate General of Roads and Buildings is in charge of the design, execution and maintenance of roads, bridges, walls and water channels. It is responsible for land use planning and cleaning the sides of the roads from wastes
Ministry of Environment (MOE)	Safeguard natural and environmental resources in Lebanon	Setting regulations and standards, and approving implementation and the development of projects sustainably
Ministry of Agriculture (MOA)	The Forestry and Natural Resources Administration of MOA is responsible for constructing public parks and afforestation work in all state lands including communal and private lands. Providing assistance for the implementation of afforestation and reforestation and soil conservation, water conservation and the investment in public and forests	Under decision 476/1 dated 2012 gives permissions for cutting trees for rehabilitation purposes
Ministry of Labor (MOL)	Responsible for all labor issues. It prepares, coordinates and executes legislations in the labor, trade union and social fields	Responsible for ensuring that the labor law is applied for all workers present on the working sites

Institution	Main Role	Relevant Role
Ministry of Interior and Municipalities (MOIM) / Municipalities	The MOIM is responsible for internal policy affairs and maintenance of the system and security, supervises governorates affairs, villages, districts, electors, elective councils, municipalities and municipal federations, parties and associations. The municipalities and the Union of municipalities represent the level of local government with legal status, financial and administrative independence, which exercises powers and responsibilities over the territory it is granted by law	The MOIM is responsible for law enforcement and stopping infractions and violations and oversees the affairs and operations of local authorities. On the other hand, responsibilities of municipalities include general programs of works, cleanliness, health, water, lighting projects, the implementation, rectifying and enlarging of roads, transportation organizing. In addition, it includes preparation of general plans related to sanitary projects, maintenance of infrastructure including wastewater networks, as well as working for the protection of the environment
Ministry of Culture (MOC)	Responsible for the protection of heritage, antiquities, arts, literature, cultural industries and historical property in Lebanon.	Any artefacts of potential historical importance that can be found on a rehabilitation site fall under the jurisdiction of the Directorate General of Antiquities at the MOC

2.3 Environmental Standards

2.3.1 Wastewater Discharge Targets

Table 2-3 represents the allowable contaminants concentration for wastewater when discharged into the surface water bodies, sea, or wastewater network according to the MOE decision 8/1 dated 30/1/2001.

Table 2-3: Limits for Wastewater Discharge into Receiving Water Bodies (MOE Decision 8/1 for 2001)

Parameter	Discharge into Public Sewer	Discharge into Surface Water Bodies	Discharge into the Sea
Color	none	none	none
pH	6-9	6-9	6-9
Temperature	35^0C	30^0C	35^0C
BOD (5 day 20°C)	125 mg/l	25 mg/l	25 mg/l
COD (dichromate)	500 mg/l	125 mg/l	125 mg/l
Total Phosphorus	10 mg/l	10 mg/l	10 mg/l
Total Nitrogen[7]	60 mg/l	30 mg/l	30 mg/l
Suspended solids	600 mg/l	60 mg/l	60 mg/l
AOX	5	5	5
Detergents	-	3 mg/l	3 mg/l
Coliform Bacteria 370 C in 100 ml[8]	-	2,000	2,000
Salmonellae	Absence	Absence	Absence
Hydrocarbons	20 mg/l	20 mg/l	20 mg/l
Phenol Index	5 mg/l	0.3 mg/l	0.3 mg/l
Oil and grease	50 mg/l	30 mg/l	30 mg/l
Total Organic Carbon (TOC)	750 mg/l	75 mg/l	75 mg/l
Ammonia (NH4+)	-	10 mg/l	10 mg/l

[7] Sum ot Kjeldohl-N (orgcnic N + NH3).NO3-N. NO2-N

[8] For discharges in close distance to bathing water stricter environmental limit value could be necessary

Parameter	Discharge into Public Sewer	Discharge into Surface Water Bodies	Discharge into the Sea
Silver (Ag)	0.1 mg/l	0.1 mg/l	0.1 mg/l
Aluminum (Al)	10 mg/l	10 mg/l	10 mg/l
Arsenic (As)	0.1 mg/l	0.1 mg/l	0.1 mg/l
Barium (Ba)	2 mg/l	2 mg/l	2 mg/l
Cadmium (Cd)	0.2 mg/l	0.2 mg/l	0.2 mg/l
Cobalt (Co)	1 mg/l	0.5 mg/l	0.5 mg/l
Chromium total (Cr)	2 mg/l	2 mg/l	2 mg/l
Hexavalent Chromium (Cr vl+)	0.2 mg/l	0.2 mg/l	0.2 mg/l
Copper total (CU)	1 mg/l	0.5 mg/l	1.5 mg/l
Iron total (Fe)	5 mg/l	5 mg/l	5 mg/l
Mercury total (Hg)	0.05 mg/l	0.05 mg/l	0.05 mg/l
Manganese (Mn)	1 mg/l	1 mg/l	1 mg/l
Nickel total [Ni)	2 mg/l	0.5 mg/l	0.5 mg/l
Lead total (Pb)	1 mg/l	0.5 mg/l	0.5 mg/l
Antimony (Sb)	0.3 mg/l	0.3 mg/l	0.3 mg/l
Tin total (Sn)	2 mg/l	2 mg/l	2 mg/l
Zinc total (Zn)	10 mg/l	5 mg/l	5 mg/l
Active (Cl2)	-	1 mg/l	1 mg/l
Cyanides (CN+)	1 mg/l	0.1 mg/l	0.1 mg/l
Fluorides (F)	15 mg/l	25 mg/l	25 mg/l
Nitrate (NO3-)	-	90 mg/l	90 mg/l
Phosphate (POP43-)	-	5 mg/l	5 mg/l
Sulphate (SO42-)	1,000 mg/l	1,000 mg/l	1,000 mg/l
Sulphide (S2-)	1 mg/l	1 mg/l	1 mg/l

2.3.2 Air Emissions Targets

MOE Decision No. 52/1 of 1996 covers the National Ambient Air Quality Standards (NAAQS) for Lebanon and is presented in Table 2-4.

Table 2-4: NAAQS of MOE Decision 52/1-1996

Parameters	NAAQS Maximum Levels (µG/M3)
Nitrogen dioxide (NO_2)	200 (1 hr) 150 (24 hrs) 100 (Annual)
Carbon Monoxide (CO)	30,000 (1 hr) 10,000 (8 hrs)
Ground-level Ozone (O_3)	150 (1 hr) 100 (8 hrs)
Total Suspended Particles(TSP)	120 (24 hrs)
PM_{10}	80 (24 hrs)
$PM_{2.5}$	NA
Lead	1 (annual)
Benzene	16.2 (annual)

2.3.3 Noise Emissions Targets

Article 46 of Law 444 recognizes that loud noises, particularly noises caused from machinery and vehicles, may be harmful to human health and the environment. According to MOE decision 52/1 for 1996, noise pollution levels should not exceed the following listed limits in different workplace locations (Table 2-5).

Table 2-5: Permissible Noise Levels in Various Areas

Type of Area	Noise Limit (dB)		
	Day (7 am – 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7am)
Administrative and commercial area in the City Center	55-65	50-60	45-50
Residential Area with some commercial areas or along main road	50-60	45-55	40-50
Residential Areas in the City	45-55	40-50	35-45
City Suburbs	40-50	35-45	30-40
Rural Areas, hospitals, and gardens	35-45	30-40	25-35
Industrial Areas	60-70	55-65	50-60

Table 2-6 contains the hours of work permitted under various noise levels over 90 dB.

Table 2-6: Hours of Work Permitted under Noise Level

Noise Level (dB)	95	100	105	110	115
Hours permitted to work	4	3	1	0.5	0.25

2.4 Word Bank Policies

2.4.1 Safeguards Policies

The Project activities should comply with two safeguards operational policies and procedures of the World Bank– specifically OP/BP 4.01 on Environmental Assessment and OP/BP 4.12 on Involuntary Resettlement.

The OP 4.01 is triggered as the project could have impacts on the environment due to the rehabilitation of roads infrastructures and associated civil works. Under this policy, this project falls under Category "B" according to the Project Appraisal Document (PAD) and the Environmental and Social Management Framework (ESMF) (CDR, 2018).

Although OP 4.12 was triggered by this project, involuntary resettlement or land acquisition will not take place in the proposed project in Bent Jbeil Caza since they did not occur during the design of any road under study. .

2.4.2 Access to Information

This Policy governs the public accessibility of information in the Bank's possession. The World Bank allows access to any information in its possession that is not on a list of exceptions.
This Policy is based on five principles:

- Maximizing access to information;
- Setting out a clear list of exceptions;
- Safeguarding the deliberative process;
- Providing clear procedures for making information available; and
- Recognizing requesters' right to an appeals process.

2.4.3 Consultation and Disclosure Policy

According to OP/BP 4.01, a public consultation with project-affected people and local nongovernmental organizations (NGOs) must be conducted for all projects under Category A and Category B. The aim of the consultation is to present to the public the components of the project along with potential environmental and social impacts and takes their comments and concerns into consideration.

Accordingly, the Consultant organized a public consultation at the union of Bent Jbeil Municipalities on Friday, 3 January 2020 (see more details in section 8.1). In addition, this ESMP will be disclosed on the CDR website on the following link https://cdr-lebanon.com/en-US/Studies-and-reports/Roads-and-Employment.aspx

2.4.4 Guidelines and Manuals

The World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines are mandatory and need to be adopted throughout the project duration. In addition, the WB has developed guidelines and manuals that need to be adopted during the ESMP implementation phase of the project. These guidelines and manuals include technical reference documents with general and sector-specific examples of good practices during all phases of the proposed project. Guidelines and manuals include:

- WBG Environmental, Health and Safety (EHS) Guidelines.
- Disclosure Handbook.
- The World Bank Participation Sourcebook.
- Roads and the Environment. A Handbook. World Bank Technical Paper.
- Doing Better Business through Effective Public Consultation and Disclosure – A good Practice Manual, issued by IFC.
- Good Practice note addressing Gender Based Violence in Investment Project Financing involving Major Civil Works.

2.5 International Treaties and Conventions

Table 2-7 presents the international conventions that Lebanon is a signatory to whose provisions may be relevant to the project.

Table 2-7: Relevant International Treaties and Conventions

Convention	Ratification	Description
United Nations Framework Convention on Climate Change (UNFCCC) - 1992	Ratified through Law No. 359 (1994)	Considers greenhouse gas emissions from REP activities
Convention on Biological Diversity (CBD) - 1992	Ratified through Law No. 360 (1/8/1994)	Considers terrestrial biodiversity in the vicinity of the project.
Convention 120 concerning Hygiene in Commerce and Offices	Ratified by Lebanon in 1977	Protects workers health and ensures proper sanitation and hygiene.
Convention 136 concerning Protection against Hazards of Poisoning Arising from Benzene	Ratified by Lebanon in 2000	
Convention 139 concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents	Ratified by Lebanon in 2000	

2.6 Environmental Health and Safety (EHS) Guidelines of the WB

2.6.1 Wastewater and Ambient Water Quality

Table 2-8 shows the EHS guidelines for treated sanitary sewage discharges into surface water bodies that are adopted by the IFC of the World Bank Group in the Environmental, Health, and Safety Guidelines for environmental wastewater and ambient water quality (WBG-IFC, 2007) and the allowable contaminants concentration for wastewater when discharged into the surface water bodies according to the MOE decision 8/1 dated 30/1/2001. Note that the limits that will apply for Bent Jbeil Caza are those of WBG EHS guidelines for treated sanitary sewage discharges since they are more stringent.

Table 2-8: WBG EHS and National wastewater effluent quality for the discharge into surface water bodies

Pollutant	WBG EHS guidelines for treated sanitary sewage discharges	National discharge to surface water bodies MOE Decision 8/1
pH	6-9	5-9
BOD	30 mg/L	100 mg/L
COD	125 mg/L	250 mg/L
TN	10 mg/L	30 mg/L
TP	2 mg/L	10 mg/L
Oil and Grease	10 mg/L	30 mg/L
TSS	50 mg/L	200 mg/L
Total coliform bacteria	400	-

Source: EHS 2007 and MOE Decision 8/1 for 2001

2.6.2 Air Emissions and Ambient Air Quality

Table 2-9 shows the WHO Ambient Air Quality Guidelines (WHO, 2005) that are adopted by the IFC of the World Bank Group in the Environmental, Health, and Safety Guidelines of Air Emissions and Ambient Air Quality and the NAAQS of MOE Decision 52/1-1996. As can be noted from comparison of these levels, the NAAQS maximum levels of the ambient air quality are much higher for several pollutants comparing to the same pollutants of the WHO. These elements are SO_2, NO_2, PM10, Lead and Benzene. However, the other pollutants have similar values. Therefore, for this project, the WHO standards apply.

Table 2-9: WHO Guidelines for Ambient Air Quality of 2005 and NAAQS of MOE Decision 52/1-1996

Parameters	WHO Guidelines (µG/M3)	NAAQS Maximum Levels (µG/M3)
Sulfur dioxide (SO_2)	500 (10 minutes) 20 (24 hrs)	-
Nitrogen dioxide (NO_2)	200(1 hr) 40(Annual)	200 (1 hr) 150 (24 hrs) 100 (Annual)
Carbon Monoxide (CO)	30,000 (1 hr) 10,000 (8 hrs)	30,000 (1 hr) 10,000 (8 hrs)
Ground-level Ozone (O_3)	100 (8 hrs)	150 (1 hr) 100 (8 hrs)
Total Suspended Particles (TSP)	150 (24 hrs)	120 (24 hrs)

Parameters	WHO Guidelines (µG/M3)	NAAQS Maximum Levels (µG/M3)
PM10	50 (24 hrs) 20 (Annual)	80 (24 hrs)
PM2.5	25 (24 hrs) 10 (Annual)	NA
Lead	0.5 (annual)	1 (annual)
Benzene	Unit Risk Life 6.10^{-6}	16.2 (annual)

Source: WHO 2005 and MOE Decision 52/1-1996

2.6.3 Noise Management

Table 2-10 shows the noise level guidelines according to the EHS Guidelines. Comparing these levels with the national one, although some characteristics differ for WHO in reference to the type of area and the day hours that extend to 10 pm instead of 6 pm for the national standards, the noise limits for institutional and educational areas by the WHO are more stringent and therefore apply. Noise limits for residential, industrial and commercial areas are more stringent in the national standards and therefore apply.

Table 2-10: WHO Noise Level Guidelines Compared to National Levels

Type of Area	WHO Noise Level (dB)		Noise Standards as per MOE Decision 52/1-1996		
	Day (7 am – 10 pm)	Night (10 pm – 7 am)	Day (7 am- 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7 am)
Residential	55	45	45-55	40-50	35-45
Institutional	55	45	-	-	-
Educational	55	45	55-65	50-60	45-50
Industrial	70	70	60-70	55-65	50-60
Commercial	70	70	55-65	50-60	45-50

3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 Location

The study area where the proposed roads are located, is in the Caza of Bent Jbeil of the Governorate of Nabatiyeh. The total number of the proposed roads to be rehabilitated under this project is three roads with a total length of around 16.8 km. All of the roads are already existing and need rehabilitation works. The land acquisition did not occur during the design of any road under study. The length of each road along with the municipalities that is passes through is presented in the table below (Table 3-1).

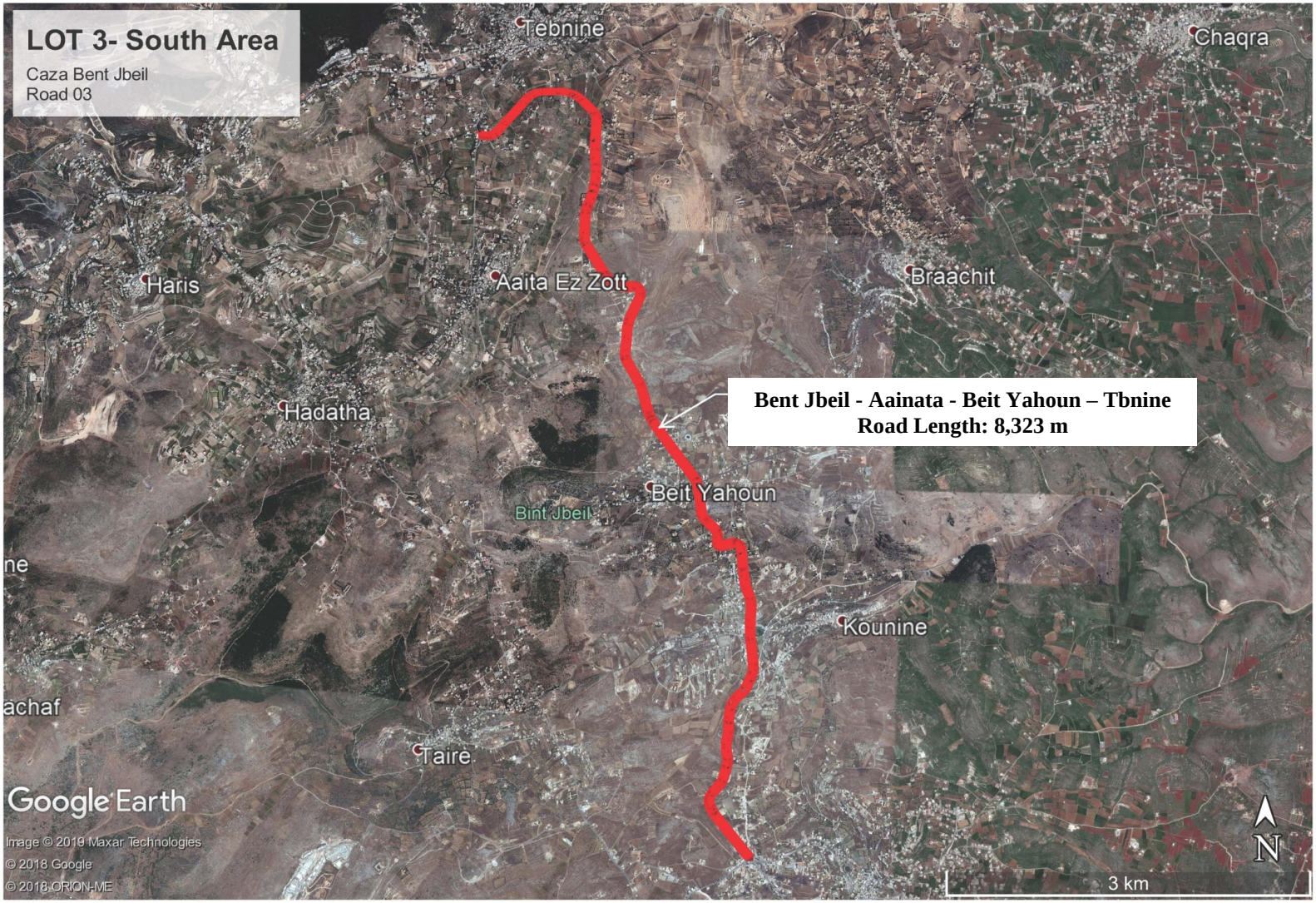
An overview of the proposed roads locations is presented in Figure 3-1, Figure 3-2 and Figure 3-3 and their respective pavement condition plans are presented in Figures 3-3 and 3-5.

Table 3-1: Proposed Roads within the Caza of Bent Jbeil (Roads 03, 05 and 06)

	Road Code	Road Name	Alignment Name[1]	Classification	Municipalities	Length (m)	Average Width (m)
LOT 3B - BENT JBEIL CAZA (L3-BJ)	Road 03	Bent Jbeil-Aainata-Beit Yahoun-Tbnine	L3-BJ-RD03	Primary	Bent Jbeil Aainata Beit Yahoun Tbnine	8,323	9.4
	Road 05	Kaounine-Aainata	L3-BJ-RD05	Tertiary	Kaounine Aainata	2,208	4.8
	Road 06	Bent Jbeil-Yaroun	L3-BJ-RD06	Tertiary	Bent Jbeil Yaroun	6,252	8.2
					Total Length (m)	16,783 m	-

[1] The code for the roads represents the road label for example for L3–BJ–RD03: L3=Lot No.3 (Lot Number as per Contract), BJ=Bent Jbeil (Name of Caza as per Contract), RD03=Road code (as per Contract).

Figure 3-1: Overview of Location of Road L3-BJ-RD03 in Bent Jbeil Caza



Source: Google Earth, 2019

Figure 3-2: Overview of Location of Road L3-BJ-RD05 in Bent Jbeil Caza

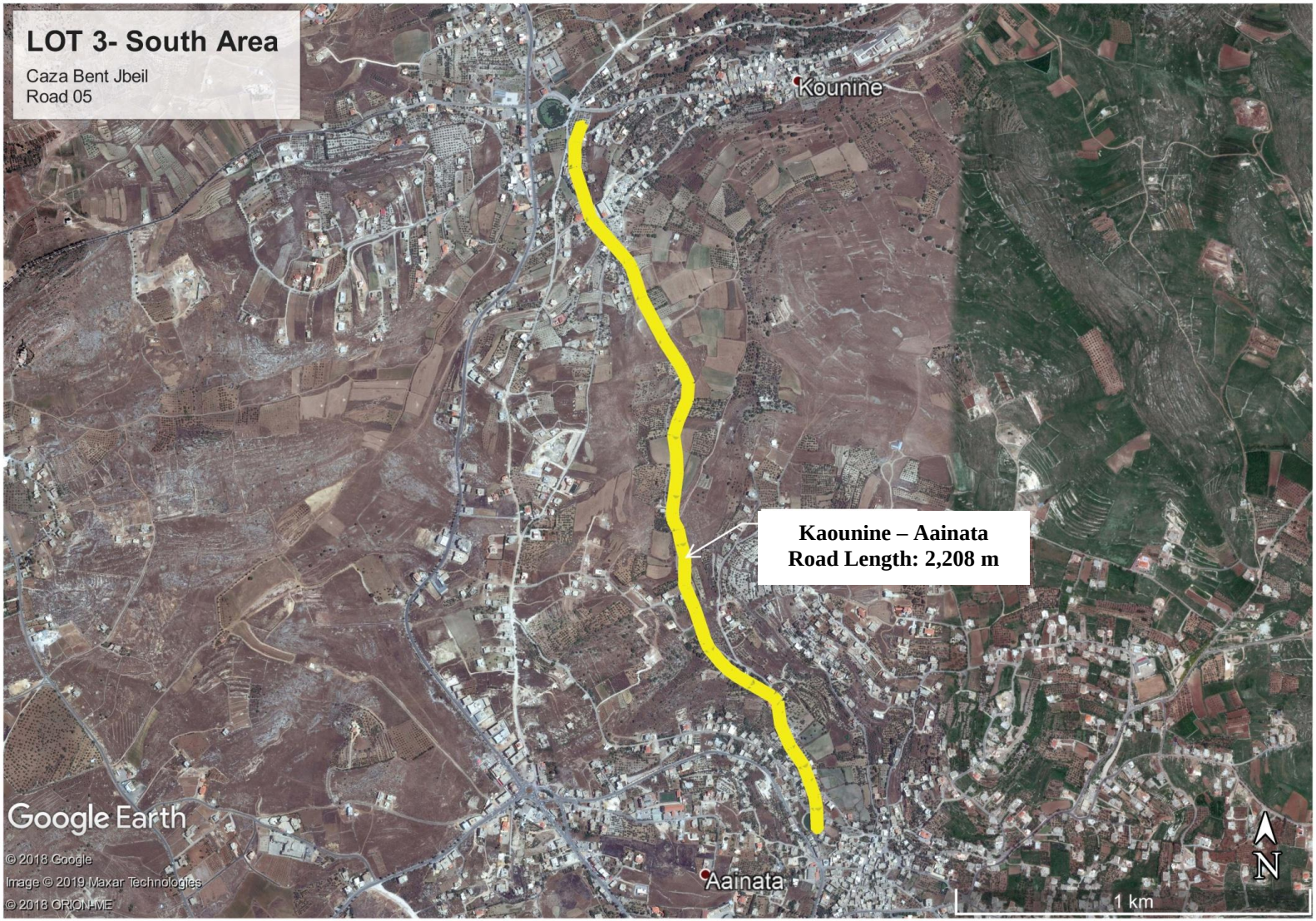


Figure 3-3: Pavement Condition Plan of Road L3-BJ-RD03 and Road L3-BJ-RD05 in Bent Jbeil Caza

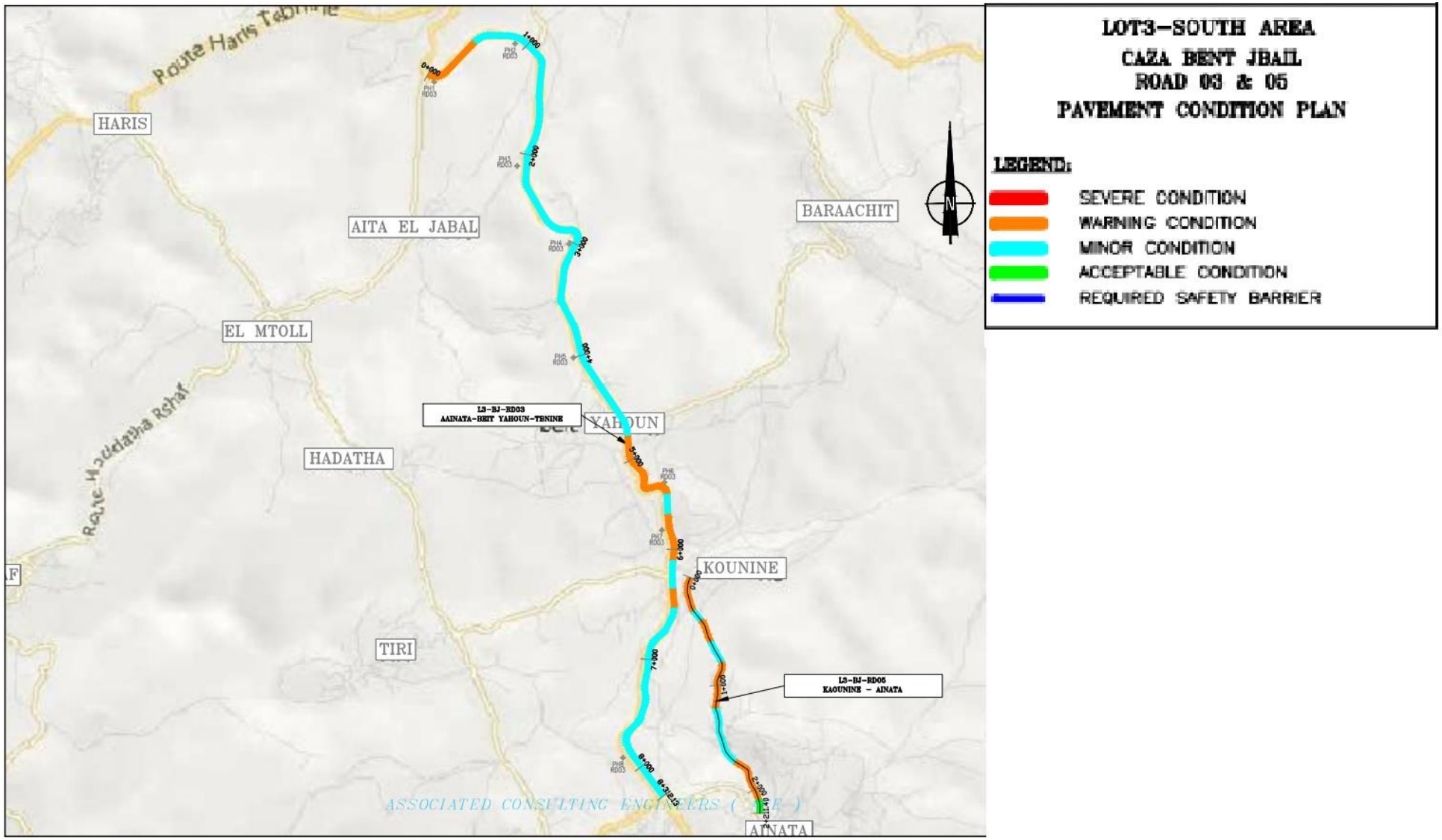
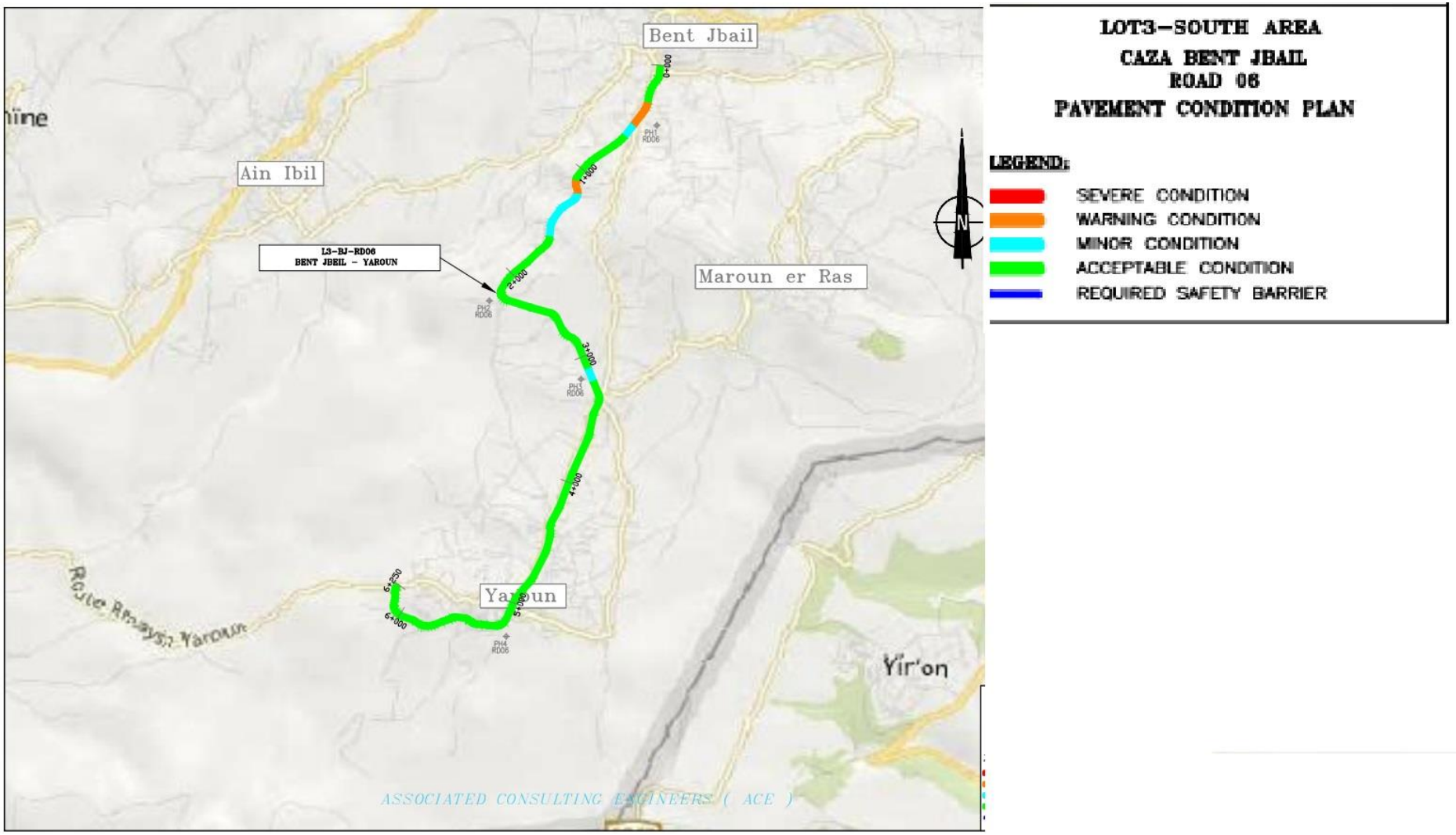


Figure 3-4: Overview of Location of Road L3-BJ-RD06 in Bent Jbeil Caza

Source: Google Earth, 2019

Figure 3-5: Pavement Condition Plan of Road L3-BJ-RD06 in Bent Jbeil Caza



Photos taken during the site visit can be found in Figure 3-6 and Figure 3-7.

Figure 3-6: Road L3-BJ-RD05 (Kaounine - Aainata)

Source: AM, ACE - November, 2018

Figure 3-7: Road L3-BJ-RD06 (Bent Jbeil - Aainata - Beit Yahoun - Tbnine)

Source: AM, ACE - November, 2018

3.2 Project Activities

The proposed project consists of the rehabilitation of existing roads in the Caza of Bent Jbeil.

3.2.1 Road Selection

The road selection was determined by the cabinet of Ministers in their Meeting Number 32 dated 27/06/2019. The assessment of pavement condition follows several steps before identifying the type of repair activity needed for each stretch of road. The first step is the initial visual assessment of the engineering design team. The outcome of such step is reflected in the following Table 3-2.

Table 3-2: Percentage of Asphalt Conditions for Each of the Proposed Roads (Based on visual Assessment)

Road Code	Severe Conditions	Warning Conditions	Minor Conditions	Acceptable Conditions
L3-BJ-RD03	0.00%	21.66%	78.34%	0.00%
L3-BJ-RD05	0.00%	58.56%	36.49%	4.95%
L3-BJ-RD06	0.00%	4.80%	9.60%	85.60%
Total	0.00%	20.26%	47.20%	32.54%

The next step is a thorough visual examination of the identified distresses. After carrying out further studies such as Geotechnical investigation, Automated Traffic Counts and Road geometry the pavement structure calculation takes place leading to identifying the right type of activity needed for each stretch of road.

3.2.2 Rehabilitation Works

Determining the condition of the asphalt is important to assign the proper pavement rehabilitation activities. The pavement rehabilitation activities consist of three activities: (1) either pavement maintenance or (2) overlay on existing pavement or (3) complete removal of deteriorated pavement and constructing a new one.

An estimated 80% of the works to be executed within this project fall under the following pavement related types of activities:

- Patching
- Milling and Overlay
- Pavement Total Reconstruction.

The phases for the main three activities are as follows:

A- Phases of Construction for a stretch of road that needs: Pavement Patching

- A.1- Saw-cut existing pavement in a rectangular shaped area where pavement distresses are located as per tender drawings and specifications.
- A.2- Remove asphalt layer within the limits of the executed saw-cut using hammer drill breaker operated by air compressor.
- A.3- Examine the exposed pavement structure under the removed asphalt using proper testing for base course and sub-base course layers as well as the subgrade level & material.
- A.4- Remove and replace or repair under asphalt layers as per technical assessments and recommendations.
- A.5- Execute asphalt layer(s) similar to surrounding asphalt thicknesses and parameters by either applying binder course asphalt layer and a wearing course asphalt layer (with prime coat & tack coat where required) or by applying directly the final wearing course after spraying prime coat over the prepared base course surface.

B- Phases of Construction for a stretch of road that needs: Milling & Overlay

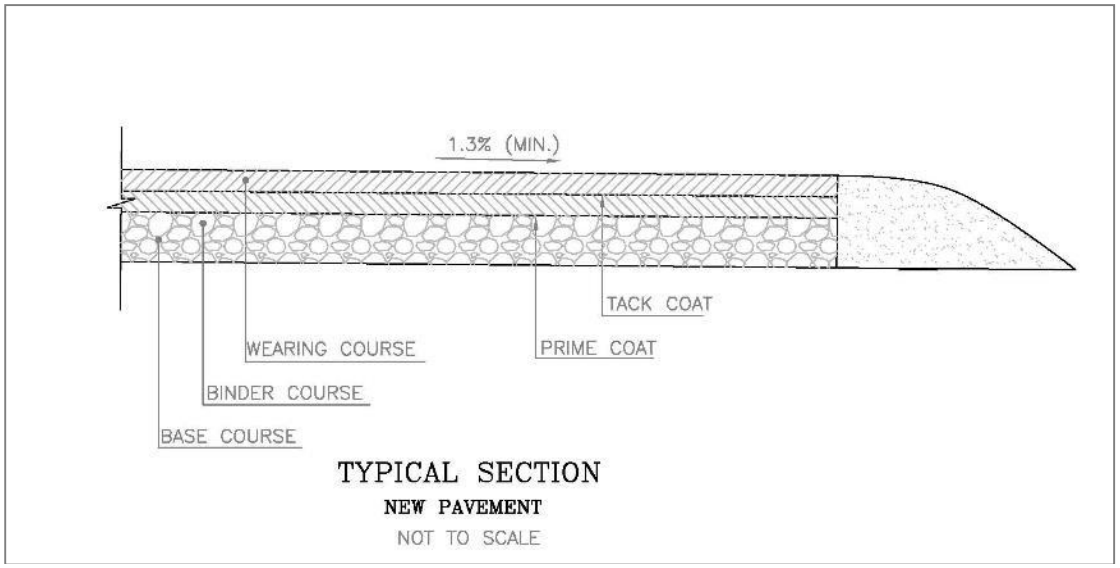
- B.1- Contractor to proceed with the milling activity as described in the tender document with regards to the thicknesses of existing asphalt to be milled.

- B.2- New surface of asphalt obtained after milling shall be cleaned from all debris and dust with the use of mechanical road sweepers and water jets.
- B.3- Tack coat will be sprayed on the newly prepared clean surface of existing asphalt.
- B.4- Asphalting activity will take place using the right thickness of the new asphalt layer as per the design/tender documents. Such activity includes spreading asphalt as well as compaction of the new layer.

C- Phases of Construction for a stretch of road that needs: Pavement Total Reconstruction (Figure 3-8)

- C.1- Scrape and remove asphalt layer(s) to reach base course level.
- C.2- Excavate and remove the sub-base and base course layers to reach subgrade level.
- C.3- Prepare sub-grade surface after making sure by soil tests that reached subgrade level is suitable to receive pavement structure. If not, unsuitable material to be replaced by suitable borrow fill and compacted to reach required compaction percentage.
- C.4- Execute sub-base/base course layers as per specifications and thicknesses according to tender documents. Compact sub-base/base-course layers to reach required compaction level/percentage.
- C.5- Spray prime coat over the prepared and leveled surface of base course in order to receive asphalt binder course layer(s).
- C.6- Spread and compact asphalt binder course layer(s) as per the thicknesses and specifications specified in tender documents.
- C.7- Spray tack coat over the newly executed asphalt binder course in order to receive asphalt wearing course layer.
- C.8- Spread and compact asphalt wearing course layer as per the required specifications and thicknesses).

Figure 3-8: New Pavement Cross Section Scheme



The road sections in Bent Jbeil Caza that require new pavement are as follows:

- From Station 0+000 to 0+500 (Tbnine) of road L3-BJ-RD03

- From Station 4+900 to 6+100 (Beit Yahoun and Kaounine) of road L3-BJ-RD03
- From Station 0+800 to 1+200 (Kaounine) of road L3-BJ-RD05

The proposed project also consists of other activities beside the pavement rehabilitation works. These activities consist of:

- Installing concrete safety barriers
- Adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs
- Marking lanes and stoppage line
- Rehabilitating sidewalks
- Construction or improvement of drainage systems
- Construction or improvement of retaining walls
- Relocation of existing utilities as needed
- Repairing street lighting

During the execution of rehabilitation activities, roads will not be closed or shutdown. Works will be executed on the road right of way/passageway only and will not use or undermine any existing adjacent facilities. Detours and diversions were not included in the design. Therefore, before the execution of rehabilitation works, the Contractor, based on the schedule of works and if needed, will secure the access and traffic movement via other alternative routes and means in coordination with the related Municipality. Accordingly, all detours will be on existing alternative roads (public domain properties) and there is no need to use or rent some land to create the detour.

With regards to electrical street lighting activities, existing networks along the selected roads shall be assessed, repaired and rehabilitated. Works shall be limited to:

- Replacing damaged light poles or brackets,
- Replacing lighting luminaires or bulbs,
- Repairing electrical wiring (directly buried or laid in pipes),
- Adding light poles where needed,
- Removing light poles obstructing the road and placing them at proper locations in addition to executing of other miscellaneous electrical repairs to the existing street lighting network.

As this project is a road rehabilitation project, the speed limit will be assigned based on existing road curves. The designer thus defined the best fit center line for each road, in which the existing radius of each curve could be identified and posted the speed limit that complies with the minimum radius of curvature. The applicable speed limit for most of the roads were 60 kph based on road geometry in general cases and was reduced accordingly at stretches where sharp curves were encountered in which it was reduced as much as to reach 30 kph at very sharp curves. The depth of excavations for each proposed road is not more than 15cm in roads sections, and not more than 1.5m for walls and 3 to 4m for new culverts.

3.3 Materials and Equipment

The required main materials and equipment for the rehabilitation of the proposed roads and its associated works are presented in Table 3-3 and Table 3-4 below.

Table 3-3: Materials Used during the Rehabilitation Works

Materials	Quantity
Aggregates (fine and coarse)	5070 cu.m
Asphalt mix	5470 cu.m
Liquid Asphalt	14910 liters
Concrete mix	2819 cu.m
Water**	The quantity cannot be estimated at this stage
Fuel**	The quantity cannot be estimated at this stage
Thermoplastic Paint Material	8703 sq.m
Steel Guardrails	0
Stones (for stone pitching)	4465 m
Reinforcing Steels	277 tons
Manhole Covers	67
Rubber Bitumen	1030 sq.m
Cat Eyes	1502
Delineators	176
Traffic Signals	388

Table 3-4: Equipment Used during the Rehabilitation Works

Equipment	Quantity
Steel-wheeled Rollers	2
Pneumatic-tyred Rollers	1
Asphalt Distributor	0
Concrete mixing trucks	2
Trucks	5
Excavators	1
Loaders	2
Asphalt Milling Machines	1
Steel Rollers	1
Motor Graders	1
Thermoplastic Road Marking Machines	1
Liquid Asphalt Spraying Tanks	1
Guardrail Post Driving Machines	0
Paver instead of Asphalt Distributors	1
Dumper Trucks instead of Trucks	5
Air Compressors	2
Asphalt Cutters	1

3.4 Site Construction Staffing

The total number of workers for the overall road/project shall be based on the total volume of each activity as per the bill of quantities of the tender documents, as well as the independent assessment of the awarded contractor subject to the project duration and the planner's effort to produce a relevant program of work to cover all project activities. Therefore, the total number will be deduced accordingly.

As a result, the total number of labor (including equipment operators and machinery drivers) shall be in correlation with:

- Volume of each type of work (quantities in Bill of Quantities BOQs)

- Division of work as per the program of works to be submitted for approval by the awarded contractor. Such program of works shall be resource loaded to cover all required activities as per the tender documents and shall reflect actual numbers of labor with regards to each activity and the time dedicated for it, as well as for the total of the Project.

Furthermore, some indicative numbers of workers and drivers are provided in Table 3-5 and Table 3-6 per task and per day. All rehabilitation activities need the involvement of a certain number of workers ranging from unskilled labors to equipment drivers to foremen/engineers.

As described in Table 3-5, the activities vary from pavement works to earthworks, piping, electrical, structural, and road safety. Each such activity requires specialized/skilled resources. As shown in tables below Table 3-5 and Table 3-6, the number of persons involved from engineers, technicians to workers as well as machinery drivers is variable as per the activity needed on each road. It is assumed that an estimate total number of workers shall range between 150 and 250. In addition, efforts will be made by the contractor to minimize potential labor influx and to equally hire local (from the same region as the project location) and foreign (refugees) workers and drivers with equal contractual benefits and working conditions. Since priority will be given to people living in the region, labor influx is not expected. If labor influx is needed, it will be as minimized as possible. It is worth to mention that the workers will sign code of conduct before starting the work and training sessions will be conducted to inform the workers about their responsibility to act ethically. The duration of the project is 18 months with a one-year liability period.

Table 3-5: Number of Workers for the Different Project Activities

#	ACTIVITIES	Site Engineer	Safety Officer	Foreman	Surveyor	Assistant Surveyor	Skilled Carpenter	Semi-skilled Carpenter	Bar Bender (Steel Fixer)	Skilled Electrician	Skilled Welder	Skilled Laborer	Semi-skilled Laborer	Laborer	Total
1	Pavement Patching	1	1	1	1	1						1	1	4	11
2	Milling & Overlay	1	1	1	1	1						1	1	6	13
3	Pavement Total Reconstruction	1	1	1	1	1						2	2	10	19
4	Concrete Retaining Walls	1	1	1			1	1	1					3	9
5	Concrete Safety Barriers	1	1	1			1	1	1					3	9
6	Electrical Street Lighting Work	1	1							1	1			2	6
7	Culverts & Channels	1	1	1	1	1	1	1				1	1	4	13
8	Traffic Marking	1	1		1	1		1	1		1		1	2	10
9	Guardrails Fixing	1	1	1	1	1								2	7
10	Sidewalk & Tiling	1	1	1	1	1						2		4	11
11	Structural Elements	1	1	1			1	4	2					4	14
12	Earthwork (Excavation & Backfill)	1	1	1	1	1						2	4	10	21
13	Piping or Pipe Repair	1	1	1								1		2	6

Table 3-6: Numbers of the Machinery Drivers

#	ACTIVITIES	MACHINERY DRIVERS																
		Loader	Excavator	Motor Grader	Steel Roller	Milling Machine	Dump Truck	Water Tank Truck	Asphalt emulsion	Asphalt Paver	Pneumatic Asphalt Roller	Mobile Crane	Guardrail Post Driving	Concrete Mixer Truck	Mobile Concrete	Road Marking Machine	Pick-up Truck	Total
1	Pavement Patching	1	1		2		1	1	1	1	1						1	10
2	Milling & Overlay	1			1	1	3	1	1	1	1						1	11
3	Pavement Total Reconstruction	1	2	1	2	1	6	1	1	1	1						1	18
4	Concrete Retaining Walls							1				1		1	1		1	5
5	Concrete Safety Barriers							1						1	1		1	4
6	Electrical Street Lighting Work											1					1	2
7	Culverts & Channels	1						1						1			1	4
8	Traffic Marking							1				1				1	1	4
9	Guardrails Fixing						1						1				1	3
10	Sidewalk & Tiling							1									1	2
11	Structural Elements							1				1		1	1		1	5
12	Earthwork (Excavation & Backfill)		2		1		2	1									1	7
13	Piping or Pipe Repair																1	1

3.5 Site Facilities

The Project site will not include any facilities on-site including site offices for Engineers and for the Contractor, laborers camps, lodging on site, containers, power generators and repair garages.

During the work implementation, the Contractor will have to rent a flat located in the Project area to serve as a Project Offices. These offices will be used by the Contractor Engineers, technical skilled workers and Supervising Consultants. The flat will be equipped with toilet, kitchen (including drinking water and appliances), lockers and other supplies needed for the daily administrative activities. It might also serve as a meeting point for all Project workers at the start and end of their shifts. However, this is a potential for sexual exploitation and abuse incidents. GRM for local communities and all relevant stakeholders should be available as well as training to workers on Sexual Exploitation and Abuse /Sexual Harassment (refer to section 6.3.1.2)

The work implementation will also require unskilled workers (laborers) needed to perform earthworks on-site. The Contractor will be encouraged to hire laborers from the local community living in the Project area in order to prevent labor influx. Yet, if not all required labor skills are available locally in the project region, then the Contractor will be obliged to hire laborers from other regions. This may generate a potential labor influx. This option should be kept to the minimum to the extent possible by the Contractor. During working hours, laborers will be entitled with a one-hour break on-site. Usually, every laborer brings from home his own food and drinking water. The on-site rest point will be decided by the Contractor at the time of works.

The Contractor will have to service the site with portable cabin toilet. The porta cabin will be mobile and its placement depends on the length of the work zone. Accordingly, the Contractor will have to move it based on the progress of rehabilitation works. The Contractor should link the porta cabin toilet to the existing wastewater network. In case the network is not available within the work zone, the Contractor will need to link it to a polyethylene storage tank and the Supervising Consultant shall inspect it on a regular basis and ensure the application of proper mitigation measures.

For vehicles and equipment, the Contractor will have to rent a land within the Project area. This land should be fenced and used for parking purpose only. The Contractor shall not perform any repair on site and is obliged to execute vehicles and equipment maintenance in a repair shop preferably located within the Project area.

4. BASELINE ENVIRONMENTAL & SOCIAL CONDITIONS

This section presents an overall description of the baseline environmental and social conditions in the study area, which is the Caza of Bent Jbeil. It is divided into three sections covering the physical, biological and socioeconomic environment. Additional details on environmental components occurring along each of the roads are presented in Annex 1.

4.1 Physical Environment

4.1.1 Topography

The Caza of Bent Jbeil is located in the Governorate of Nabatiyeh and it is about 122 km away from the capital of Beirut (localiban website, 2015). The villages of the project area lie between 594 meters to 786 meters above sea level (a.s.l.).

4.1.2 Geology

The geological formation of the proposed roads that are located within the Caza of Bent Jbeil are presented in Figure 4-1. Based on the geological map below, the main geological formation within the study area is shown in the Table 4-1.

Table 4-1: Main geological formation within the study area

Road Code	Road Name	Geological Period	Formation	Description
Road 03	Bent Jbeil-Aainata-Beit Yahoun-Tbnine	Quaternary	Pleistocene/Recent (Q)	It is composed of loose Eolian and cemented sands. Also residual soil including Terra Rosa are found in this formation. This geological unit is composed of loose alluvium, unconsolidated soil and sediments.
		Tertiary	Eocene (E2)	This rock formation is widespread in South Lebanon. It is composed of marly and chalky limestone with a thickness in the range of 4500 m–550 m. With a thick succession, it has a good potential to store groundwater.
		Cretaceous	Maameltein Limestone (C4-5)	Massive Karste Limestone and Dolomite
		Cretaceous	Senonian and Base of Eocene (C6)	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 that ranges from 400 m to 150 m and is rich in foraminifera fossils.
Road 05	Kaounine-Aainata	Tertiary	Eocene (E2)	This rock formation is widespread in South Lebanon. It is composed of marly and chalky limestone with a thickness in the range of 4500 m–550 m. With a thick succession, it has a good potential to store groundwater.
		Cretaceous	Maameltein Limestone (C4-5)	Massive Karste Limestone and Dolomite
		Cretaceous	Senonian and Base of Eocene (C6)	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 that ranges from 400 m to 150 m and is rich in foraminifera fossils.
Road 06	Bent Jbeil-Yaroun	Tertiary	Eocene (E2)	This rock formation is widespread in South Lebanon. It is composed of marly and chalky limestone with a thickness in the range of 4500 m–550 m. With a thick succession, it has a good potential to store groundwater.

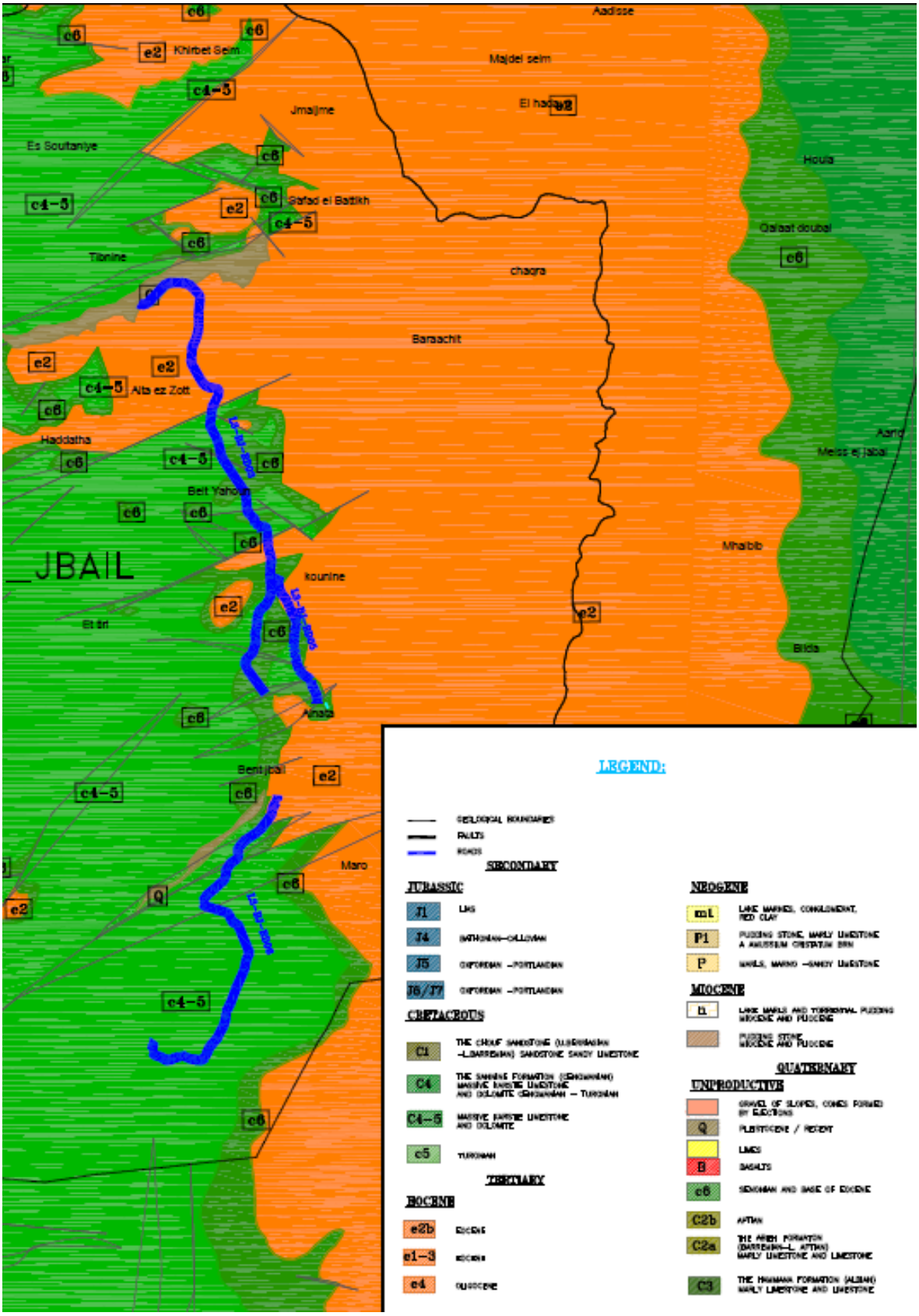
Road Code	Road Name	Geological Period	Formation	Description
		Cretaceous	Maameltein Limestone (C4-5)	Massive Karste Limestone and Dolomite
		Cretaceous	Senonian and Base of Eocene (C6)	Cretaceous and lower Tertiary sediments indistinguishable lithologically; stiff bluish plastic Marl with glauconite, interbedded with chalky marly Limestone and nodules of black chert. This formation has a thickness that ranges from 400 m to 150 m and is rich in foraminifera fossils.

4.1.3 Hydrogeology

The Caza of Bent Jbeil hosts the Litani River that is the longest and most abundant river in Lebanon. The banks of this river have been used for many hydraulic, agriculture, and electric projects such as the water project in Markaba and the project in Al Taybeh that is under implementation to provide potable water for Marjayoun and Bent Jbeil (NNA, 2016). The Litani river is around 10 km away from the proposed roads in the Caza of Bent Jbeil.

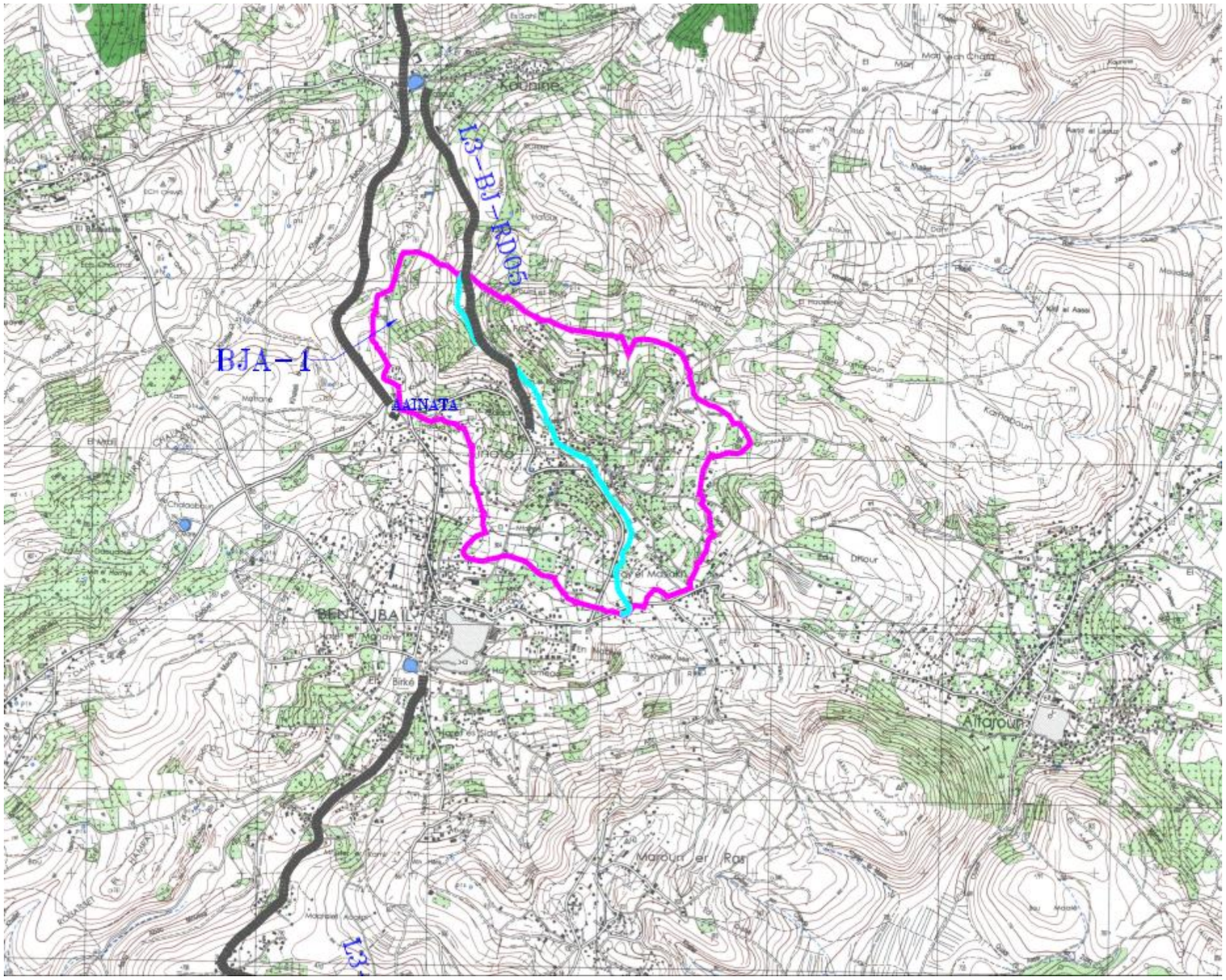
Along the proposed road Kaounine-Aainata (L3-BJ-RD05), a water course spans around 1 km from the nearest point. Even though the catchment area of this water course discharges into the Litani, this water course is a seasonal stream that does not flow during the dry season and due to infiltration and evaporation, does not reach the Litani River. The other two proposed roads do not have a water course along them.

Figure 4-1 Geology Map of the Study Area



Source: Prepared by ACE based on the geological map of Dubertret scale 1/50000

Figure 4-2: Major Rivers in Bent Jbeil District and Location of Existing Project Road (L3-BJ-RD05)



Source: Armée Libanaise, Direction des Affaires Géographiques, échelle 1/20000

LEGEND :

Catchment

River/Water course

Road

CLIENT
REPUBLIC OF LEBANON
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

ACE
المكتب الهندسي الاستشاري - ايس آي بيروت
ASSOCIATED CONSULTING ENGINEERS - BEIRUT

PROJECT
DETAILED ENGINEERING DESIGN FOR THE
REHABILITATION OF SELECTED ROAD LINKS IN LEBANON
LOT 3 - CAZAS OF BENT JBAIL, HASBAYA, JEZZINE, MARJAYOUN, NABATIYE, RACHAYA, SAIDA, SOUR & ZEREA WEST

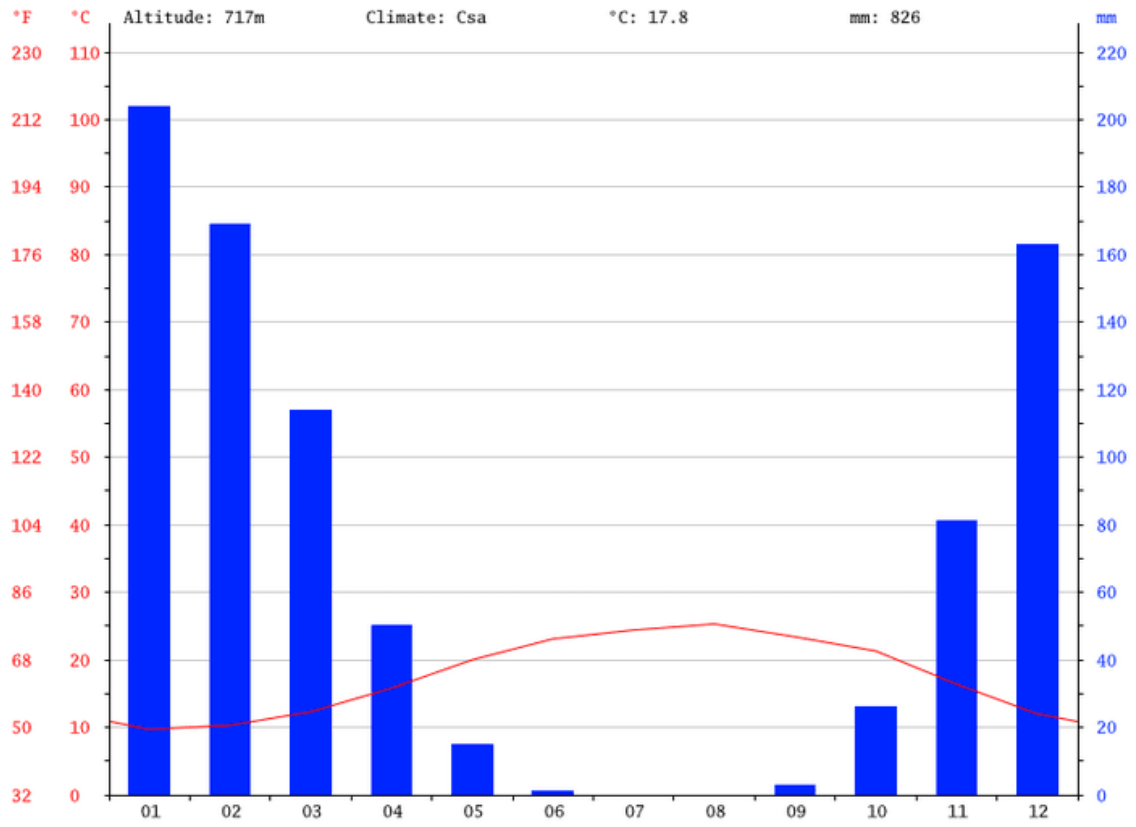
TITLE
WATERSHED AREA
CAZA OF BENT JBEIL

DESIGNED	CHECKED	PROJECT N°.	SHEET	DRAWING N°.	REV.
M.S.	H.K.	L1901		BJ–W–001	0
DRAWN	APPROVED	DATE	SCALE		
S.A.	N.F.	FEB.2020	H: 1/1000 V: 1/100		

4.1.4 Climate and Meteorology

As per the available data, the average annual temperature and precipitation of the village Beit Yahoun was taken into consideration since road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) passes through this village and is also relatively close to Kaounine village of road Kaounine-Aainata (L3-BJ-RD05). The average annual temperature in the area is 17.8 °C. The month of August is the warmest month with an average temperature of 25.3 °C, however, the average temperature occurring in the coldest month that is January is 9.5 °C. The driest months are June and August with almost no precipitation. Most of the precipitation here falls in January, averaging 220 mm. However, the average annual precipitation is 826 mm (climate-data.org, 2020). The Climograph of Biet Yahoun village is represented in Figure 4-3.

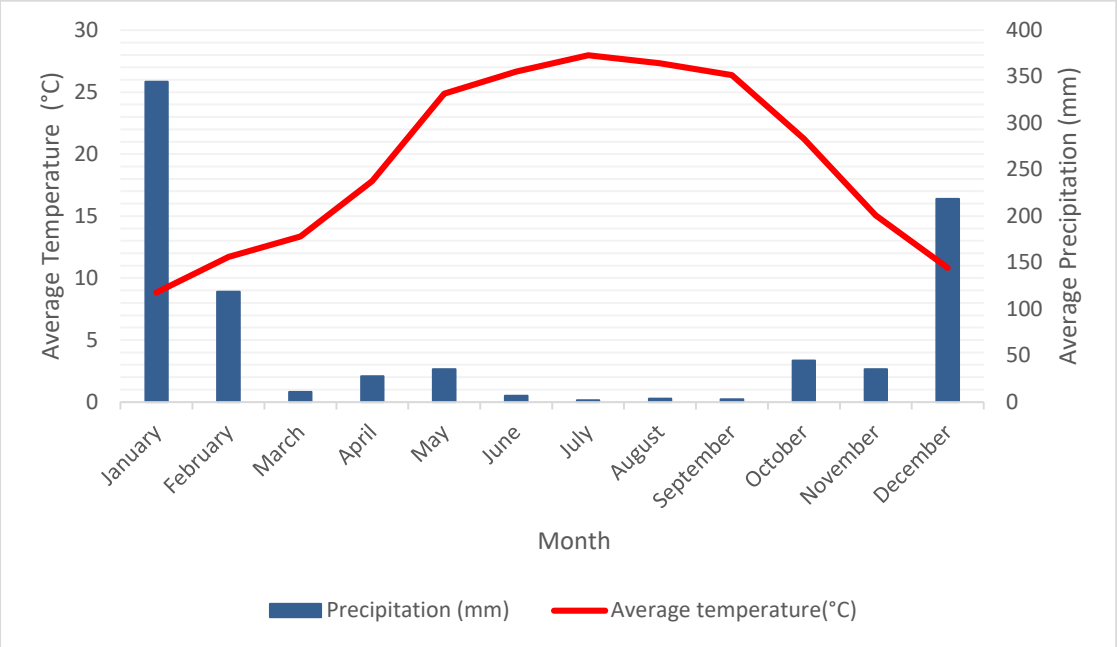
Figure 4-3: Climograph of Beit Yahoun at 717 m (Historical Data between 1982-2012)



Source: climate-data.org, 2019

Additional data on climate in the area was obtained from the Lebanese Agriculture Research Institute (LARI) from its station in the village of Rmeich located at the altitude 564 meters and at around 4 Km away from the village of Yaroun through which the road (L3-BJ-RD03, Bent Jbeil-Yaroun) passes. This data represents the average temperatures and average precipitation of the year 2019 (Table 4-4).

Figure 4-4: Climograph of Rmeich at 564 m from LARI Station for the Year 2019



Source: LARI, 2019

As for the wind data, wind speed and direction data were also obtained from LARI's station in New Nabatiye which was the nearest station to the village of Tbnine with the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) at around 20 Km away. The station in New Nabatiye is at an elevation of 498 m, while the elevation of the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) is around 600 m (Tbnine). Yet, this station for the wind data was taken into consideration since it was the closest station to the proposed roads in Bent Jbeil and had an approximately similar elevation. Table 4-2represents the average monthly and annual wind speed and direction for the year of 2017.

Table 4-2: Monthly and Yearly Averages of Wind Speed (m/s) and Direction (degrees) registered by New Nabatiye LARI Station in 2017

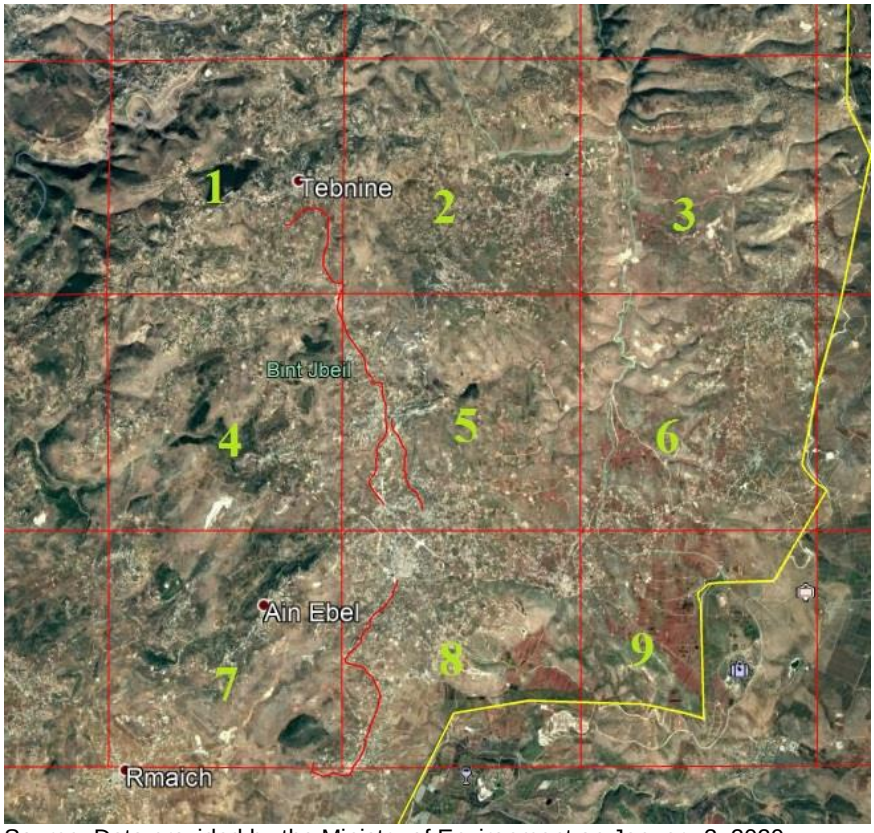
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Average per year 2017
Monthly Average Wind Speed (m/s)	0.05	0.055	0.18	0.16	0.08	0.09	0.1	0.14	0.15	0.14	0.04	0.12	0.109
Monthly Average Wind Direction (Degrees)	166.8	151.78	181.87	183.1	203.3	218.43	231.48	226.16	201.86	193.81	163.93	150.54	189.42

Source: Data provided by LARI on January 21, 2020

4.1.5 Air Quality and Noise

Ambient air quality of the project area was requested from MOE. Data was available from the UNDP project "Environmental Resources monitoring in Lebanon" which is based at the Ministry of Environment for the year 2010. The available data is for criteria pollutants: Particulate Matter (PM), Ozone (O3), Carbon monoxide (CO), Nitrogen dioxide (NO2), Sulfur dioxide (SO2). The project area was divided into different cells (Figure 4-5) and the data of the annual background average concentrations in µg/m3 was obtained. Table 4-3 shows the detected annual concentrations the national limit values dictated in MOE Decision 52/1 dated 1996 and WHO Guidelines. For some parameters, the obtained data on air quality is the annual concentrations while some of the standards are available only for intervals of 8 hours or 24 hours.

Figure 4-5: The Project Area Divided into Different Cells



Source: Data provided by the Ministry of Environment on January 3, 2020

Table 4-3: Annual Ambient Air Quality at the Project Site for the Year of 2010 (The Roads are Located on Cells 1, 2, 4, 5, 7 and 8)

Pollutant ($\mu g.m^{-3}$)	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2	CO
Concentration in Cell 1	10.931	90.079	18.668	15.832	9.715	267.311
Concentration in Cell 2	10.922	89.422	18.883	16.185	9.716	261.260
Concentration in Cell 4	9.419	90.863	18.126	15.289	9.014	246.803
Concentration in Cell 5	9.145	90.205	18.104	15.408	8.900	242.829
Concentration in Cell 7	7.672	91.306	17.589	14.550	8.378	229.384
Concentration in Cell 8	8.043	90.291	17.751	14.895	8.515	229.590
Lebanese Standards	100 (Annual)	100 (8 hrs)	80 (24 hrs)	-	-	10,000 (8 hrs)
WHO Guidelines	40 (Annual)	100 (8 hrs)	20 (Annual)	10 (Annual)	20 (24 hrs)	10,000 (8 hrs)

Source: Data provided by the Ministry of Environment on January 3, 2020

The results have shown that the concentrations of NO_2 in all the cells comply with the national standards and the WHO Guidelines. As for the concentrations of PM_{10}, the obtained values were following the national standards and WHO Guidelines while $PM_{2.5}$ in all the cells were not in compliance with the WHO standards for air quality.

The noise levels in the Bent Jbeil Caza were measured by the team. Three sites have been chosen: Site 1 along the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), Site 2 along the road Kaounine-Aainata (L3-BJ-RD05), and Site 3 along the road Bent Jbeil-Yaroun (L3-BJ-RD06). The measurements were taken in March 2020. At each site, noise measurements were done at a location near a residential area and another location near a calm area. In each site, noise was measured during a period of 10 minutes. For instance, a section of the road Bent Jbeil-Yaroun (L3-BJ-RD06) is in a very quiet and calm area, while the other section of the road which passes through the residential area is

usually a very crowded area. Generally, the calmest area was Site 2 which is along the road Kaounine-Aainata (L3-BJ-RD05), while Site 1 (road Bent Jbeil-Aainata-Beit Yahoun-Tbnine L3-BJ-RD03) is a residential area at some sections of the roads.

Table 4-4 below shows the results of the noise measurements. From the results it is shown that the average noise level at Site 1 and Site 2 were 67.5 dB and 57.17 dB respectively as the value of all sites are above the national standards for noise limits in residential areas (45-55 dB).

Table 4-4: Noise Levels Measurements at Site 1 and Site 2 in Bent Jbeil Caza

Location	Noise Level in Decibels (dB)		
	Minimum	Average	Maximum
Site 1 (Residential site): Road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03)	46.96	67.5	71.96
Site 2 (Calm site): Road Kaounine-Aainata (L3-BJ-RD05)	25.72	57.17	62.46

4.1.6 Land Use/Land Cover

In Bent Jbeil Caza, agricultural activities are seen in different villages as the Caza has arable lands. For several families, tobacco cultivation in Bent Jbeil serves as a breadwinner. It is considered one of the chief agricultural crops next to olives in the absence of alternative crops. Other agricultural crops include apples and vegetables through they are less significant economically due to national level weaknesses of the agriculture sector and have been negatively affected by the limitation on export by land with the Syrian crisis (UNDP, 2016). In addition, Bent Jbeil is also home for 15.5 km^2 of mixed forests (FAO, 2016b).

Table 4-5: Visual Classification of Land Use based on Google Maps

Municipality	Land Use
Bent Jbeil	Moderately populated with agriculture areas
Aainata	Moderately populated with agriculture areas
Tbnine	Presence of agriculture areas with some scattered houses
Beit Yahoun	Moderately populated with few agriculture areas
Kaounine	Presence of agriculture areas with some scattered houses
Yaroun	Densely populated with agriculture areas

Source: Google Maps, 2020

A detailed list of the existing areas along the roads is presented in Annex 1.

4.2 Biological Environment

4.2.1 Flora

The Southern part of Lebanon is covered by Aleppo Pine forests (*Pinus halepensis*) (SOER, 2010). As for the floral species, and in reference to the report 'Setting Conservation priorities for Lebanese

Flora - Identification of important plant areas', the endemic plant species that was identified in different locations in the South is *Centaurea heterocarpa* Boiss. & Gaill. ex Boiss (Bou Dagher-Kharrat M. *et al.*, 2018). However, this species was not identified along the roads proposed or this project.

The project team has conducted site visits during February 2020 to all the project roads in the Caza of Bent Jbeil in order to collect information about the environmental features along the roads. During the site visits, there was no floral and tree species of an ecological importance along the roads of the project area. However, various types of trees and cultivated areas can be found within the project area. These are as follows:

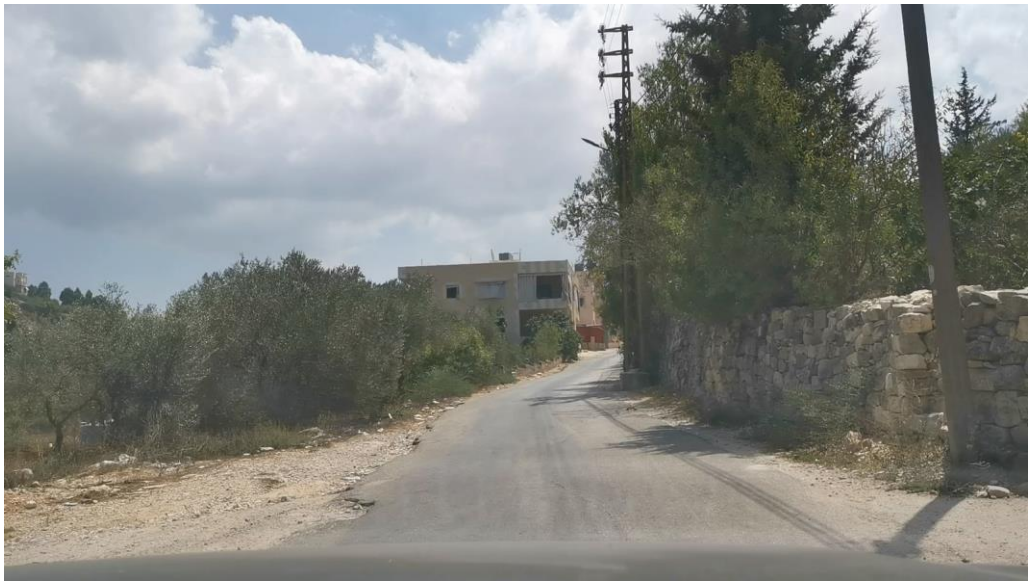
- Eucalyptus trees, pine trees, olive orchards and natural terrains with low or no vegetation cover were observed along roads (L3-BJ-RD03).
- Along road (L3-BJ-RD05), there is a presence of Pine, Eucalyptus, Willow, Melia, olive trees and dried bushes.
- Willow trees, Eucalyptus trees, Olive orchards and some ornamental trees can be found along road (L3-BJ-RD06).

However, all the mentioned tree species that were identified along the three roads are located outside the road delimitations or are private to residential buildings and areas. Some of the observed trees are shown in the Figures 4-6 and 4-7.

Figure 4-6: Observed trees on the road Kaounine-Aainata (L3-BJ-RD05)

Source: AM, ACE - November, 2018

Figure 4-7: Observed trees on the road Kaounine-Aainata (L3-BJ-RD05)



Source: AM, ACE - November, 2018

4.2.2 Fauna

Livestock production is not significant in the Caza of Bent Jbeil. The rearing of goats is mainly confined to the most deprived areas in the south of Lebanon including the Caza Bent Jbeil. Moreover, the war had destroyed around 14,450 beehives in the south of Lebanon, 4,000 of which was in Bent Jbeil (FAO, 2016a).

During the site visits in February 2020, wild animals including mammals and birds along the proposed roads were not observed. Moreover, the presence of grazing livestock was not noticed along the project roads although the governorate has the third highest share of goats in Lebanon (IDAL, 2018).

4.2.3 Ecologically Sensitive Areas

The Caza of Bent Jbeil hosts several natural reserves. The forest of Khorbat Selem that was listed as protected forest in Lebanon in 1992 (SOER, 2010). Khorbet Selem is around 4.7 km away from the nearest road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), hence it is not at a proximity to the road sites. In 2011, the following four sites were listed as nature reserves (FAO, 2020):

- Beit Lif Nature reserve which is 9 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and 8.8 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06).
- Ramyeh Nature reserve which is 11.2 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and 10 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06).
- Kafra Nature Reserve which is 6 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03).
- Debl Nature Reserve which is 5.8 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) and 5.4 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06).

Moreover, the closest Important Bird Area (IBA) to the proposed roads is the Ebel El Saqi IBA found in the governorate of Nabatiyeh which is around 27 km away from the road (L3-BJ-RD03).

4.3 Socio Economic Environment

4.3.1 Demographic Profile

The Caza of Bent Jbeil is part of Nabatiyeh Governorate which has around 330,000 inhabitants (including Syrian and Palestinian refugees) and this is considered the lowest population share among all governorates in Lebanon (IDAL, 2018). The Caza of Bent Jbeil hosts 96,200 Lebanese (CAS, 2019) with a population density of around 281 people per Km^2 (IDAL, 2018). The average household size in the caza is 3.6 compared to the overall average household size of 3.7 individuals (CAS, 2019). The governorate of Nabatiyeh possesses a poverty rate of 25% lower than the national average 27% (IDAL, 2018). Moreover, the unemployment rate in Bent Jbeil Caza is estimated at 10.6%, less than the national average 11.4% (CAS, 2019) and the number of poor[9] Lebanese in Bent Jbeil Caza is 41,079 (OCHA, 2016). Concerning other vulnerable groups, such as female headed households and people with disabilities, unfortunately there is no publicly available information. As for the elderly (seniors above the age of 65), they comprise 11.7% of the total population in the caza compared with the country's national average of 11% (CAS, 2019).

According to the Syria Refugee Response per district (UNHCR, 2019), the total number of Syrian Refugees in Bent Jbeil Caza is 6,549. In each concerned village of the project area where the roads pass, the number of Syrian Refugees registered is presented inTable 4-6, showing that as of end of 2019, the total number of registered refugees only in the project area was 1,962. Moreover, there are no Palestinian Refugees in Bent Jbeil Caza (OCHA, 2016). According to the UNHCR, no informal tented settlements for any Syrian refugees were established in Bent Jbeil Caza (Reliefweb, 2020).

Table 4-6: Number of Syrian Refugees in the villages through which the proposed roads pass

Municipality	Number of Syrian Refugees
Bent Jbeil	904
Aainata	230
Tbnine	541
Beit Yahoun	135
Kaounine	89
Yaroun	63
Total	1,962

Source: UNCHR, 2019

4.3.2 Economic Activities and Infrastructure

Bent Jbeil's agricultural sector has declined over the years the area still has agricultural areas and arable lands. Livestock breeding is not significantly present in the area. There are several craft and trade activities in Bent Jbeil, mainly in the shoe and construction industry. The economic status of the population has severely declined over the years, as many citizens have lost their jobs and have become unemployed due to several challenges such as foreign market competitions. For instance, due to the foreign market competitions and immigration of villagers, out of the 60 shoe factories that used to operate in Bent Jbeil, 5 are still functional. The area also has few carpenters, blacksmiths, and people working in the construction industry (Civil Society Center, n.d.).

[9] Poor is referred to people who are living in bad conditions variously described as marginalised, vulnerable, excluded or deprived. People are in poverty when they are deprived of the basic life conditions such as income, diets, material goods, amenities, standards and services (UNDP, 2006)

Remittance from external migration remains one of the key sources of income for residents in the Caza of Bent Jbeil. This is closely followed in by income from agriculture, mainly from the government subsidized tobacco agriculture. Several Lebanese families, who traditionally labored their own land, particularly in olive and tobacco seasons, are now employing Syrian workers instead. Other agricultural crops include olives, apples and vegetables through they are less significant economically due to national level weaknesses of the agriculture sector and have been negatively affected by the limitation on export by land with the Syrian crisis. Other income sources comprise of small industries (carpets, sweets, construction material) and small commercial institutions, restaurants, and cafes (UNDP, 2016).

The Bent Jbeil village, besides being the center of the Bent Jbeil Caza, is the economic hub of the region. The Bent Jbeil market if well known for its economic importance promoting the production and trade of a large array of products. This particular market place was totally destroyed in July 2006 during which over 1,300 houses and many shops were destroyed. After the war, UNDP & European Commission Humanitarian Aid Department (ECHO) livelihoods project, with a fund of $250,000 USD, entailed supporting 183 micro and small enterprises in the public market of Bent Jbeil through the purchase of needed equipment such as shelves, desks, chairs, refrigerators, curtains, restaurant kits, barber kits, office equipment, and other needed equipment (UNDP & ECHO, 2013). This particular project was one of the most reviving socio economic activities throughout the recovery and reconstruction process. It had a positive effect on the economic activity not only in the village of Bent Jbeil, but also in the Caza (UNDP, 2020).

During the site visits in February 2020, different observations were recorded along the three project roads. For example, along road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), electricity shops, curtain shop, gas stations, clothes shops, aluminum and steel shops were seen along. There were also residential buildings with 2 or 3 stories. As for the road Kaounine-Aainata (L3-BJ-RD05), there were very few shops identified along the way in close proximity to the road stations (Figure 4-8 and Figure 4-9). There were also 1 or 2 residential buildings on the left or right side of the road along most of the stations. In addition, electricity lines and street lights were observed all along the roads. The area also has water supply networks. Moreover, wastewater collection and treatment in municipalities of Bint Jbeil Caza is under preparation since 2016 and it is expected to end in 2022 (CDR, 2018).

Figure 4-8: Residential building and shops along road Kaounine-Aainata (L3-BJ-RD05)

Figure 4-9: Shop along the road Kaounine-Aainata (L3-BJ-RD05)

4.3.3 Education Services

In the Bent Jbeil village, located in the Bent Jbeil caza, there are three public schools, a vocational school and a branch for the Faculty of Sciences of the Lebanese University. The three public schools education for the elementary and intermediate levels. Additionally, there are 3 private schools and a nursery (Civil Society Center, n.d.). As such, many students surrounding the village attend these schools located in the Bent Jbeil village. In addition, the present schools in the Caza suffer from the lack of capabilities to enhance their programs and the curricula, (CDR, 2005). Bent Jbeil has a limited number of local institutions dealing with social matters in the village such as the UNDP Youth Gathering (Civil Society Center, n.d.).

As per the Google Maps, the CIS College is at a distance of 0.03 km away from the proposed road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) at Station 8+200. Moreover, during the site visits, the American University of Technology was seen in proximity of around 500m to the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (Station 1+350 of L3-BJ-RD03). Figure 4-10 below shows the exact location of the university along the proposed roads.

4.3.4 Health Services

The Caza of Bent Jbeil encompasses a hospital known as the Bent Jbeil Governmental Hospital which is around 0.4 km away from the road (L3-BJ-RD05). As for the Tbnine Governmental Hospital, it is around 0.9 kilometers from the nearest project road (L3-BJ-RD03). Figure 4-10 below shows the exact location of the health center along the proposed roads.

4.3.5 Cultural Heritage

The Caza of Bent Jbeil encompasses an important architectural and natural heritage. It hosts many churches and mosques. According to the Ministry of Tourism (2011), there are several cultural sites in the Caza, including:

- In Bent Jbeil village, there are the Byzantine Pillars and Stones, Al-Kabir Ancient Mosque and Saleh Bazzi Heritage House;
- In the Deir Intar village, there is the Al-Nabi Ortary;
- In the Chaqra village, there is the Doubieh Citadel;

- In the Rmeich village, there is the Mar Gerges Ancient Church;
- In Tbnine village, there are the Prophet Seddiq Temple, Tebnin Citadel, and ruins of fortresses.

However, none of these sites of archeological or cultural importance were detected by the team along the roads. As per the Google maps, the Yaroun Church is 0.25 km away from the road Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), while the Tbnine Citadel is around 0.75 km away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03). In addition, the closest mosque in Tbnine area to the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03) is around 0.6 km away. As for the Bent Jbeil Mosque, it is 0.27 km away from the road Bent Jbeil-Yaroun (L3-BJ-RD06). Yet the proposed roads might be used to reach to the worship places and the rehabilitation works may impact the traffic movement and access to these sites. Tbnine hosts a cultural center which is 0.46 m away from the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03). No cultural center was observed in proximity to the other roads.

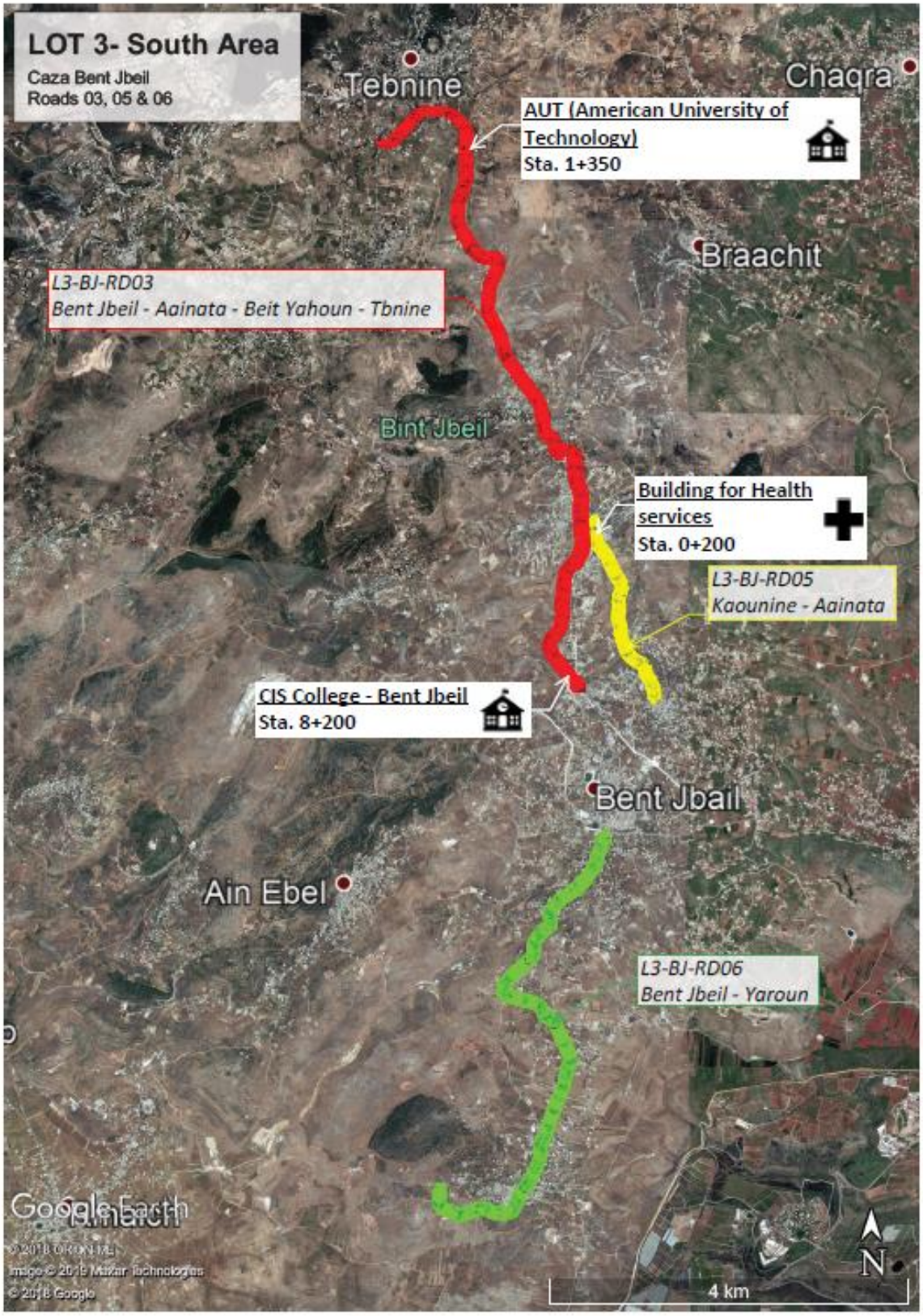
4.3.6 Road Sensitive Receptors

Categories considered as sensitive receptors during road rehabilitation are schools, churches, hospitals, mosques, closest residential buildings and commercial shops, and other archeological features.

As per Google Maps (see Figure 4-10), the CIS College is at a distance of 0.03 km away from the proposed road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03). Moreover, during the site visits, the American University of Technology was seen in proximity to the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03). Moreover, there is no sites of archeological or cultural importance along the road however, the proposed roads might be used to reach worship places located in the study area. As for the residential builds, road L3-BJ-RD06 (Bent Jbeil-Yaroun) passes through Yaroun which includes populated residential areas. At road Kaounine-Aainata (L3-BJ-RD05), there were 1 or 2 residential buildings on the left or right side of the road along most of the stations. Along road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03L3-BJ-RD03), electricity shops, curtain shop, gas stations, clothes shops, aluminum and steel shops were seen. There were also residential buildings with 2 or 3 stories.

Figure 4-10 below and Annex 1 show the exact location schools and health center along the proposed roads.

Figure 4-10: Roads Sensitive Receptors



Source: ACE

4.4 Summary of Baseline

The proposed roads lie within a range of 594 meters to 786 above sea level. The average annual temperature in the village is 17.8 °C and the average annual precipitation is 826 mm. The main geological formation within the study area belongs to the following: Sannine Limestone of Cenomanian age unit (C4) and its subunits, Maameltain or Ghazir Limestone, of Turonian agre (C5), White marl and marl-limestones (C6), Eocene (E2) and the Pleistocene (Q). As for the water sources, a water stream spans around 1 km from the nearest road Kaounine-Aainata (L3-BJ-RD05).

Results of air quality data show that the concentrations of NO2 comply with the national standards and the WHO Guidelines. As for the concentrations of PM10, the obtained values were compliant with the national standards and WHO Guidelines while PM2.5 were not in compliance with the WHO standards for air quality.

Different kinds of trees (Pine trees, Olive trees, Melia and Eucalyptus) were found along the proposed roads at different sections. Natural terrains were also found along some of the proposed roads. These terrains have low vegetation cover.

Densely populated villages within the study area include the village of Yaroun. Other villages are relatively moderately populated while others have mostly an agricultural land cover. The Caza of Bent Jbeil hosts several natural reserves. The forest of Khorbat Selem that was listed as protected forest in Lebanon in 1992 (SOER, 2010). Khorbet Selem is around 4.7 km away from the nearest road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), hence it is not at a proximity to the road sites. In 2011, the four sites listed as nature reserves in the Caza were the Beit Lif Nature reserve, Ramyeh Nature reserve, Kafra Nature Reserve and the Debl Nature Reserve (FAO, 2020), all of which are around 5 to 12 km away from the proposed roads.

The Caza of Bent Jbeil hosts 96,200 Lebanese in addition to 6,549 Syrian Refugees. The economic activities that exist along the proposed roads included electricity shops, curtain shop, gas stations, clothes shops, aluminum and steel shops (mainly along road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03).

5. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

This section describes the potential anticipated positive and negative environmental and social impacts associated with the rehabilitation of the selected roads and the required networks in Bent Jbeil Caza.

5.1 Assessment Methodology

The evaluation of potential environmental and social impacts was based on relevant scientific evidence, literature review and the professional judgment of the Consultant. The impact classification and ranking approach that was applied is as follows:

- Identification of project-related activities (during both rehabilitation/reconstruction and operation phases) and environmental aspects;
- Determination of potential impacts on the natural and man-made environment that might arise from these activities;
- Assessment and evaluation of potential impacts based on the criteria set out in the Environmental and Social Management Framework of the project.

As such, impacts were weighted on the scale of P, 2P, O, N, 2N to signify Positive, strongly Positive, Neutral, Negative, and Strongly Negative impacts respectively.

5.2 Potential Positive Impacts during Rehabilitation

The rehabilitation of the proposed roads in Bent Jbeil Caza is considered as an economic opportunity for the selected contractor and their subcontractors. Local businesses may benefit from rehabilitation activities through selling raw materials, equipment, machinery and goods and the project will create jobs and could hire labors from the local community (Lebanese and Syrian). For example, shops that are located along the proposed roads will benefit from the rehabilitation activities as workers will buy food and drinks from these small shops. In addition, local garages will benefit from increased business in vehicle and equipment maintenance and residents will benefit from the rent fees of the offices and residences as well as vehicle and equipment parking area. The potential influx of workers will also increase economic activity in the area as they will likely purchase their daily requirements from the surrounding shops. This will have a ripple effect within the communities where the roads will be rehabilitated. This impact is, however, temporary and jobs will be discontinued as soon as rehabilitation works are complete.

As such this impact on economic activity in the region is considered as a positive impact (P).

5.3 Potential Environmental Negative Impacts during Rehabilitation

Most impacts resulting from the project will occur during the road rehabilitation phase. However, most of these impacts are temporary for the duration of the works.

5.3.1 Water and Soil Quality

Contamination of soil, underground and surface water from the rehabilitation of the proposed project might occur as a result of several activities. These include the improper disposal of solid waste and excavated material, inappropriate discharge of liquid waste, wastewater, accidental oil and chemical spillages, and diversion of contaminated rainwater runoff from the project site. One lake (Lake of Aainata) is located next to the road Kaounine-Aainata (L3-BJ-RD05). Moreover, a water

stream spans around 1 km from the nearest road Kaounine-Aainata (L3-BJ-RD05) as shown in Figure 4-2. As such, if the generated solid waste and liquid waste were not contained properly, surface water pollution might occur through the transport of pollutants such as debris and suspended solids into the river and water bodies through runoff.

A detailed description of the sources of pollution along with the associated activities is listed below:

5.3.1.1 Liquid waste from rehabilitation

Major rehabilitation activities that lead to the generation of liquid waste include:

- Concrete mixing for the retaining walls and sidewalks;
- Excavation road sections that are in severe conditions generating runoffs contaminated with suspended solids, especially during rainy days if the rehabilitation work will start in the fall season;
- Storm water runoff that contains high amounts of suspended solids.

This liquid waste might pollute nearby water courses, streams and soils if not discharged and managed properly.

5.3.1.2 Wastewater

Workers will be needed during the rehabilitation of the proposed roads and its associated works. As such workers will generate wastewater during the entire rehabilitation phase. Workers will not be accommodated in camps. A porta cabin will be installed on site during works and connected to the wastewater network or emptied adequately If the wastewater was not managed to be discharged in specific tanks or connected to existing sewage network, nearby surface water bodies might be polluted with high organic loads especially where water was identified based on the hydrological map (4.1.3) showing that a water stream spans around 1 km from the nearest road Kaounine-Aainata (L3-BJ-RD05), in addition to the lake (Lake of Aainata) which is also next to the road Kaounine-Aainata (L3-BJ-RD05).

5.3.1.3 Accidental Spillage

Water and soil can be polluted as a result of accidental oil and lubricant spills from the equipment used for rehabilitation of the roads. The spills may occur from the transportation of oil and lubricant and during re-fueling of oil supplies for machinery generators. Accidental spill of oils may occur and contaminate the underground water resources especially in the case where soil layers are permeable to these materials that could be easily infiltrated. The spills may also affect water quality of the water bodies during the rehabilitation of the proposed roads especially that a water stream spans around 1 km away from the proposed road Kaounine-Aainata (L3-BJ-RD05), in addition to the lake (Lake of Aainata) which is also next to the road Kaounine-Aainata (L3-BJ-RD05).

5.3.1.4 Solid Waste Generation

The rehabilitation activities of the roads may generate solid waste from construction workers, construction materials such cement and their resulting empty bags, electrical wiring, rebar, wood and piles of sand, ruined asphalt and dirt due to excavation. Inappropriate waste handling and improper disposal practices of this type of waste may result in ground and surface water contamination due to leaching and runoffs, hence, reduction in overall water quality. In addition, these materials could be directly discharged into the nearby water courses of roads. Furthermore, in

the case of an accidental event of improper disposal of solid waste, inappropriate discharge of wastewater and accidental spills (fuel, oil) can have a negative impact on the soil quality.

As such, the impact on the water and soil quality in the area of the proposed project during rehabilitation is evaluated as negative (N).

5.3.2 Air Quality, Noise and Light

The machinery and vehicles used during the rehabilitation phase produce air emissions and gases that can temporarily affect local air quality. In general, air emissions generated from the combustion of diesel used by machinery and vehicles contain particulate matter, Benzene, Toluene, Xylenes, Ozone, Nitrogen Oxides, and Sulfur Oxides, Carbon Dioxide and Carbon Monoxide.

Rehabilitation activities, movement and transportations practiced by heavy machinery on surfaces generate particulate emissions such as dust that can affect the local air quality. Fugitive dust emissions could disturb many receptors including workers and the residents especially where the proposed roads pass through Yaroun where the road Bent Jbeil-Yaroun (L3-BJ-RD06) passes through the most populated residential areas when compared to the other 2 roads. The proposed roads are also located near Eucalyptus trees that dominated the majority of the study area and near the planted trees of pine scattered on all roads. As such, this type of vegetation will be disturbed by the different rehabilitation activities and all the resulting emissions. The generated emissions include dust and particulate matter that accumulate at the surface of the leaves thus affecting the photosynthesis process. The significance of dust emissions is highly dependent on the wind conditions during the rehabilitation phase. In the case of an accidental event of open burning of solid waste or other material on site could release emissions accompanied by toxins. It is worth to mention that some of the road sections in Bent Jbeil Caza require new pavement. At these stations identified in Section 3.2, the impact on the air quality will be higher than at sections where only patching and overlay is required.

The road sections in Bent Jbeil Caza that require new pavement are as follows:

- From Station 0+000 to 0+500 (Tbnine) of road L3-BJ-RD03
- From Station 4+900 to 6+100 (Beit Yahoun and Kaounine) of road L3-BJ-RD03
- From Station 0+800 to 1+200 (Kaounine) of road L3-BJ-RD05

As such, during rehabilitation, the impact on the air quality in the area of the proposed project is evaluated as negative (N).

As for odor emissions during the rehabilitation phase, the improper storage and disposal of solid wastes and the accidental liquid waste leakages may lead to odor emissions. It is important to note that the improper disposal is not an adopted measure but rather an accidental one. Thus, the generation of odor emissions during rehabilitation is considered a negative impact (N).

Noise will be generated during the rehabilitation of the proposed roads and its associated works. These activities include transportation or delivery of raw materials, trucks movement, concrete mixing, excavation, and operation of heavy vehicle movement such as excavators, stabilizers, pneumatic drills and stone crushers. All these activities require heavy construction machineries and onsite equipment. A list of major machineries and equipment along with their noise levels decibels (dB) is shown in Table 5-1.

Table 5-1: Noise levels emitted from Construction Machinery and Equipment

Machinery/Equipment	Noise Level at 16 m (50 ft) from source in dB (A)
Loader	80
Concrete Mixer Truck	85
Dump Truck	84
Pile Driver	95
Excavator	80
Pneumatic tyred roller	85

Source: Knauer et al., 2006

Therefore, noise from rehabilitation will likely temporarily disturb the workers and town residents of moderately and densely populated areas in Beit Jbeil, Beit Yahoun, Yaroun and Aainata through all of which the proposed roads (L3-BJ-RD03), (L3-BJ-RD05) and (L3-BJ-RD06) pass. Noise from rehabilitation will also affect the animals and birds that use the area for foraging and breeding. However, noise levels are highly dependent on the extent and duration of the rehabilitation activities and are temporary and specific to the rehabilitation phase.

Moreover, during the rehabilitation phase of the project roads, the machinery lights and artificial lights might be used in the periods of insufficient natural lights. This might disturb the passers-by, people living in the residential areas as well as animals that might pass. However, this will likely be temporary as the rehabilitation works will not be extended to the night period.

Thus, the generation of nuisances-noise and lights is considered a negative impact (N).

5.3.3 Use of Natural Resources

5.3.3.1 Energy and Water Consumption

During the rehabilitation phase high consumption rates of fossil fuel is required for the operation of heavy machinery, generators and other construction equipment, thus contributing to overconsumption and depletion of fuel. In addition, water is needed for different processes in the rehabilitation activities. It is needed for concrete mixing, cleaning of tools and the used machinery, dust suppression, and earth works activities. Energy and water consumption in the rehabilitation site may be overused causing overexploitation of energy and water resources. This impact is evaluated as negative (N).

5.3.3.2 Natural Material Sourcing

The proposed project requires the use of borrow material such as aggregates and sand. As such, any potential excavation of lands for the extraction of borrow material may result in removal of land resource. This leads to the change in the morphology of the land. In some cases, the change might be severe whereby the soil loses its fertile top layer affecting the productivity of the area. However, illegal quarries will not be used by local contractors to provide the project with the required borrow material. Hence, this impact is considered negative in nature (N).

5.3.4 Land Cover

The rehabilitation of the proposed roads will not change the land use of the area since the roads already exist and the REP aim is to rehabilitate it. However, at certain sections, some shrubs may be removed to be replaced by the rehabilitated sidewalks or retaining walls thus losing some of the vegetation around the proposed roads. It is worth to mention that trees will not be removed before getting a permit from the MoA which is usually given conditional to the reforestation or a

compensation paid by the contractor to the MoA in order to buy a number of new plants. However, in this proposed project trees will not be removed. As for shrubs, in case of removal, these are not of significant ecological importance, thus this impact is evaluated as neutral (O).

Figure 5-1: Some trees and shrubs along the the road Kaounine-Aainata (L3-BJ-RD05)

5.3.5 Biological Environment (Flora and Fauna)

As mentioned in Section 4.2.5, during the site visits, many trees were observed such as the pine trees, Eucalyptus and olive trees that were planted near residencies. However, these trees are not expected to be affected during project rehabilitation as they are located outside the road delimitations and the period of rehabilitation is not permanent. In addition, most of the area is dominated by a natural low vegetation cover. Moreover, none of these tree species is considered as endangered.

However, trees will not be removed within the area of the proposed project. Shrubs might be removed when necessary to carry out the rehabilitation works of the proposed road. In addition, the main rehabilitation activities that may have a negative effect on the flora of the study area are the activities of heavy machinery movement on unpaved roads and removal of deteriorated asphalt layers. As such, the dust generated from these activities will not have a significant impact on the flora in the project area. The rehabilitation phase is a short-term phase and the impacts of such activities will disappear as soon as the work is completed.

The impact of the rehabilitation activities is therefore assessed as slightly negative (N).

As for the fauna, the animals that are present in the area and may approach or cross the proposed roads have the tendency to be disturbed and escape due to the noise and vibrations emanating from the undertaken activities as well as from the sources of light and generated dust. Nevertheless, this phase is temporary and the disturbance impact will diminish as soon as this phase ends. This impact is considered negative (N).

5.3.6 Visual Intrusion

As mentioned previously this project will not change the landscape of the area since the roads already exist. However, the project contractor will try to the extent possible to prevent visual intrusion for nearby people due to the presence of heavy equipment and machinery, as well as

sources of light, during the rehabilitation works. This impact is temporary and will diminish as soon as the project is completed and is considered as a neutral impact (O).

5.3.7 Existing Infrastructure

The rehabilitation works may impact existing below ground infrastructure including utility cables (phone, electricity, internet), sewage, and water networks. Unplanned digging and milling of deteriorated road pavement may damage the existing infrastructure that is possibly serving nearby areas and residents. This damage will interrupt the functioning of utility cables and will cut-off the operation of water and sewage networks. Consequently, the supply of water to nearby areas will be affected and residents or passengers may smell bad odors from contaminated water accumulated within the broken sewage network. This impact is temporary and will diminish as soon as the project is completed and is considered as slightly negative (N).

5.4 Potential Socioeconomic Impacts during Rehabilitation

5.4.1 Potential Labor Influx

Sexual abuse and exploitation (SEA) induced by the potential labor influx and sexual harassment (SH) in the workplace are potential gender-associated impacts that may arise during the project rehabilitation phase. These impacts will most likely occur due to labor mobilization and the unfamiliar cultural and social settings. Moreover, social interactions between workers living in the area (in rented apartments), surrounding communities, local vendors and sellers can cause culturally insensitive behavior and relationships leading to Gender-Based Violence (GBV) and sexual abuse and exploitation incidents (GGITR & GTGDR, 2018). Yet, the contractor will maximize efforts to hire local workers in order to prevent labor influx. If the latter is needed, it will be minimized as much as possible. This impact is considered to be negative (N).

5.4.2 Traffic

The REP rehabilitation works will not close or shutdown any road under study. The proposed rehabilitation activities, and the onsite traffic management may pose a challenge for the circulation. Moreover, the movement of heavy machinery and rehabilitation activities may lead to temporary traffic jam or might result in accidents and cause inconvenience to the people using those roads especially at densely populated areas such as the villages of Yaroun and Bent Jbeil (L3-BJ-RD06). In addition, traffic could be disrupted by the rehabilitation activities throughout traffic diversions, detours or blockage. The location of these detours will be specified by the contractor during the rehabilitation phase however all detours will be on existing alternative roads (public domain properties) and there is no need to use or rent some land to create the detour. Thus, , these impacts are temporary and will vanish as soon as the project is completed. As such, this impact is assessed as a negative impact (N).

5.4.3 Social Tension

In case of potential labor influx, social tensions may arise between local and foreign workers should the former perceive that most of the job opportunities created are being offered to foreign workers. Social tensions between locals and foreign might also arise if they are not equally compensated as per the scale of market price rates. In addition, discrimination by the local community of foreign workers residing in residential buildings (in rented apartments) may have a negative impact on the wellbeing of these workers. There needs to be transparency, good communication and outreach, and

robust GRM during project implementation to prevent, minimize or mitigate this perception. This impact is considered to be negative (N).

5.4.4 Child Labor

During rehabilitation works, it is possible that the contractor may recruit children who are under the legal age as workers on the site, especially in the case of the day laborers. Without proper mitigation and enforcement measures, this impact would be considered as a strongly negative impact (2N).

5.4.5 Cultural Heritage

The project is not expected to result in any impacts on cultural heritage and archaeological sites as the proposed roads are not located near these sites. The impact is slightly negative due to the unlikeliness to occur (N).

5.4.6 Traffic & Accessibility

During the rehabilitation activities, some of the trade and supply flows of goods will be disturbed in the project area and due to the possible detours and diversions. Moreover, women within the project area might be affected from the presence of rehabilitation activities and workers along the proposed roads. The mobility of women working in different fields such as agriculture and livestock may be affected. This impact is therefore considered negative (N).

5.4.7 Economic Activities

As mentioned previously, different surroundings were observed during site visits. For example, along road (L3-BJ-RD03) in Beit Yahoun, Aainata and Tbnine many shops, gas stations, university, aluminum and steel shops were identified along the way and are in close proximity to some road stations especially in the residential areas. On the other hand, site visits to road Kaounine-Aainata (L3-MA-RD05) only showed that the site has residential buildings on the sides at most of the stations with no shops or other establishments.

During the rehabilitation phase, the economic activity of these existing shops might be affected due to possible change of accessibility, the possible detours and diversions (these will be implemented by the Contractor before work execution as they are not included in the design), the presence of excavation activities and heavy machinery near those shops and visitors. Nevertheless, potential impacts will be limited for the duration of works on that section of the road.

On the other hand, as mentioned previously in Section 5.2, shops are expected to benefit from the rehabilitation activities as workers may potentially buy food and drinks from these small shops. Therefore, the community affected by the roads under study is not expected to experience neither an economic displacement (loss of assets or loss of access to assets that leads to loss of income sources or means of livelihood) nor any physical impacts or any potential damage to the existing facilities. Nevertheless, mitigation measures will be implemented to ensure coordination and transparency as outlined in section 6.3.1.

5.5 Potential Health and Safety Impacts during Rehabilitation

5.5.1 Occupational Health and Safety

During summer, high temperatures could cause heat stress and dehydration to some of the workers. Accident and injuries to workers and the public may be caused by commuting accidents, falls, electric shock from streetlight repairing activities, mishandling of machinery and other rehabilitation related accidents. The high noise generated from the machinery could damage the hearing of the workers and dust generation from the different rehabilitation activities, movements and transportations may cause respiratory problems for workers on site if appropriate personal protection equipment are not being used. As such most of the health problems that might affect the workers results from the generated air pollutants at the construction site. The following are potential airborne health risks along with the associated rehabilitation activity:

- Acute respiratory disorders, lung and heart diseases due to the generation of particulates from vehicular emissions and constructional machinery that operates on fuel as well as silica in dust from the earth agitated by heavy machinery on unpaved roads.
- Acute irritation of the upper airways resulting in coughs and cold from large particulates.
- Acute manifestations including inflammatory conditions like bronchitis, bronchiolitis and pneumonia which may be rapidly fatal from the inhalation of small size particulates (2.5u to 10u).
- Pollutants such as SO_2, NO_2 and CO emitted from vehicular emissions contribute to respiratory ill health.
- Long term exposure is associated with chronic lung diseases such as lung cancer and silicosis (GoG-MRH, 2017).

Other health related effects that area associated with the generation of dust includes irritation of mucous membranes or allergic reactions that might be harmful to the eyes and skin (GoG-MRH, 2017). Thus, occupational health and safety impacts for the workers and nearby residents are evaluated as a strongly negative impact (2N).

Occupational health risks at construction sites also include:

- Over-exertion and ergonomic injuries from repetitive motion, lifting heavy objects, or working in an awkward position
- Slips and falls on the same elevation due to the presence of loose construction materials, oil or liquid spills, and unorganized electrical cords and ropes on the ground
- Falls from elevation associated with working with ladders (especially when rehabilitating streetlights) causing of fatal or permanent disabling injury
- Direct injuries due to the movement of trucks and lifting equipment in the movement of onsite (WB-IFC, 2007).

5.5.2 Public Safety

Residents of villages may be injured as a result of activities associated with the rehabilitation of the proposed roads in the nearby towns. In fact, these activities can lead to car accidents especially when safety and road rerouting signs are not installed properly. Accidents are also more likely to occur with the local residents who are not familiar with presence of heavy equipment and machinery. In addition, the generated dust and noise from the rehabilitation activities can also cause health problems to nearby residents. Since this impact will vanish as soon as the project is complete, the impact of public safety is considered temporary and negative (N).

5.6 Potential Positive Impacts during Operation

5.6.1 Socioeconomic Environment

5.6.1.1 Economic Activities

Once the project is completed the improved infrastructure will encourage new business opportunities and marketing activities in project region. Moreover, according to the women session in the public hearing the rehabilitation of roads will improve the access to education and healthcare facilities especially for women and children. They also believe by making transportation safer and more convenient, women's participation in the economy will improve. Moreover, women participants also said that there are well educated women in the Caza that can be involved in the project during rehabilitation

Tourism is expected to increase in the region since the improvement of the road infrastructure conditions in the region will attract more visitors (WB/GoKP/IDA, 2019).

As such, this impact on economic activities in the region is considered as a strongly positive impact (2P).

5.6.1.2 Traffic and Road Safety

The rehabilitation of the roads including adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs will improve road conditions resulting in a smoother vehicular movement providing safer conditions for locals and tourists to commute. Thus, this is evaluated as a positive impact (P). This issue is addressed further in Section 5.8.

5.6.2 Cultural Heritage

There is no evidence of any historical vestige in the location of the proposed roads. Thus, the proposed project will not impact the cultural heritage of the region. However, the improvement of road conditions will enhance touristic activities to religious, historical and archaeological landmarks in the region. Thus, it is assessed as a positive impact (P).

5.7 Potential Negative Environmental Impacts during Operation

5.7.1 Soil & Water Quality

The rehabilitation of the already existing roads will not have major negative impacts on groundwater and surface water during the operational phase. However, some accidental oil spills might be released from vehicles, oil tankers and infrequent spills in the service areas. Such spills contain high oil and grease content and could be transported through runoff into nearby surface and groundwater bodies during heavy rain events. Although the project will include the rehabilitation of drainage system, these systems could be blocked by sediments and debris leading to storm water overflow. If overflow occurs, this water might be transported into nearby water bodies and soils. This impact is occasional and restricted up to the road surface nature.

As such, the impact on the water quality in the area of the proposed project during operation is evaluated as negative (N).

5.7.2 Air Quality

The rehabilitation of the proposed roads will improve the road condition thus reducing traffic related emissions by inducing a smoother traffic flow in the project area. Nevertheless, in the long run, as business opportunities will increase and different establishments will be newly constructed along the rehabilitated roads traffic levels might increase leading to increased vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area. The increase of such pollutants in the atmosphere may cause public health risks and other impacts on the environment.

As such, during operation, the impact on the air quality in the area of the proposed project is evaluated as negative (N).

5.7.3 Noise

During the operation, noise is expected to arise due to traffic related noise pollution; vibrations from engines and tires and use of pressure horns. Noise pollution might disturb wildlife and nearby residential areas. This impact is permanent and negative in nature (N).

5.7.4 Use of Natural Resources

5.7.4.1 Energy and Water Consumption

Energy will be consumed during the operation phase for lighting purposes thus slightly contributing to the depletion of natural resources if the new lighting infrastructure was not based on renewable energy. In some cases, the cleaning of the roads include washing by water thus consuming a significant amount of water. However, this type of cleaning is infrequent and will not cause depletion in the water resources if properly used.

Thus, the impact of energy and water consumption is evaluated as a negative impact (N).

5.7.5 Biological Environment

Improving the conditions of the proposed roads will increase the traffic load in the area. As a consequence, if some animals cross the roads they might be exposed to direct mortality or avoidance behavior. The probability of crossing these roads is higher at night and the possible animal hitting accidents will be lower. However, this impact will not affect drastically the condition as the road and this impact already exist.

As for the terrestrial ecosystem, the increase in traffic will lead to increased exhaust emissions from the vehicles passing through the proposed roads thus affecting the life cycle of the trees and vegetation around the roads.

Thus, the impact on the biological environment is evaluated as a negative impact (N).

5.7.6 Visual intrusion

As the project is the rehabilitation of existing roads in Bent Jbeil Caza, the surrounding environment, vegetation, and the aesthetical value of the surrounding areas is not likely to be significantly affected. The impact is therefore evaluated as neutral (O).

5.8 Potential Health and Safety Impacts during Operation

5.8.1 Traffic and Road Safety

After the rehabilitation of the proposed roads an increase in traffic rates will occur as people will frequently use the rehabilitated roads. In addition, improving the conditions of the road will lead to enhanced vehicular movement and speed thus increasing the chances of road accidents. However, installing safety walls, safety signs, speed limit signs and speed bumps along the proposed roads will decrease the possibility of such accidents and protect pedestrians. In addition, the law enforcement in Lebanon is not always implemented in the country and limited law enforcement is anticipated in Bent Jbeil. As such, this impact is evaluated as negative (N).

5.9 Summary of Potential Impacts

After evaluating the potential negative and positive impacts that might arise from the proposed project during both phases (rehabilitation and operation), it was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated wastewater and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of heavy rehabilitation activities especially where new pavement is proposed for the roads. On the other hand, job opportunities will be created to the local community during the rehabilitation. It is worth to mention that these impacts are short in term and will disappear as soon as the project is completed. As for the operational phase, the assessed socioeconomic impacts were mostly positive in nature in terms of livelihood improvement within the project area. However, on the long term the proposed project will contribute to increasing vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area as well as traffic related noise causing public health problems and other impacts on the environment. Table 5-2 and Table 5-3 summarize the impacts during the rehabilitation and operations phases.

Table 5-2: Summary of Environmental and Social Impacts during Rehabilitation Phase

Impact	Media	Nature
Environmental		
Air pollution from emissions of machinery, trucks or open burning activities	Air, nearby communities and workers	N
Dust pollution from rehabilitation and excavation activities	Air, nearby communities	N
Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators	Nearby communities and workers	N
Disturbance of nearby areas and animal escape from noise and vibrations	Biodiversity and sensitive habitats	N
Contamination of surface water from improper disposal of wastewater from workers, water coming from cleaning of machines and equipment Reduction in overall surface water quality due to improper disposal of construction waste Water pollution due to accidental spill of oils and chemicals	Water resources, soil, nearby communities	N

Impact	Media	Nature
Contamination of soil from accidental spills of oils and chemicals on the soil from machines and trucks and from transportation of chemicals and oils	Soil, subsoil and land	N
Improper disposal of cut volume may cause contamination of water bodies in rainy weather	Water resources	N
Surface water and soil pollution from improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Water resources, soil, subsoil and land	N
High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Energy resources	N
High consumption rates of water for construction related activities	Water resources	N
Over extraction of borrowing material and depletion of natural resources (sand, aggregates, …)	Soil, subsoil and land	N
Tree and floral species disturbance near the site during rehabilitation activities	Biodiversity and sensitive habitats	N
Disturbance of animals in the area	Biodiversity and sensitive habitats	N
Potential damage to existing infrastructure	Existing infrastructure and nearby communities	N
Socioeconomic		
Creation of job opportunities for local communities	Local workers, socio-economic activities	P
Local garages will benefit from the equipment oil maintenance and residents will benefit from the rent fees of the offices and the equipment parking area.	Nearby communities, socio-economic activities	P
Small shops may benefit from workers buying food and drinks	Shop owners/renters	P
Potential labor influx	Foreign Workers	N
Potential social tensions due to discrimination from the local community against the foreign workers	Foreign Workers	N
Social tensions in the event of potential labor influx as a result of perception that foreign workers being offered a major proportion of the jobs created by the project	Local and foreign workers	N
Potential child labor for construction activities	Local and foreign children	2N
Traffic congestion in the concerned towns due to transport of construction materials, the material that may fall or due to temporal road closure	Nearby communities, socio-economic activities	N
Potential occurrence of sexual abuse and exploitation and GBV incidents	Nearby communities	N
Disruption of local community to access services due to construction activities and temporal road closure	Nearby communities and socio-economic activities	N
Disruption to access to shops as a result of rehabilitation activities and temporary road closure thus affecting livelihood of shop's owners and the recreational site visitors	Shop's owners	N

Impact	Media	Nature
Material falling from vehicles during transport may cause traffic accidents or congestion	Nearby communities	N
Community and Occupational Health and Safety		
Accident and injuries to workers because of construction activities risks and injuries include: respiratory health risks, over-exertion and ergonomic injuries, slips and falls	Workers	2N
Injuries from car accidents due to the presence of construction sites and closure of some roads	Nearby communities	N
Dust generation and noise may cause health related problems to nearby residents	Nearby communities	N

Table 5-3: Summary of Environmental and Social Impacts during Operation Phase

Impact	Media	Nature
Environmental		
Increased vehicular pollutant levels in the area causing public health risks and other impacts on the environment	Air, Nearby communities	N
Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Nearby communities, biodiversity and sensitive habitats	N
Depletion of natural resources (fuel) used for street lighting purposes	Energy resources	N
Disruption of animals movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Biodiversity and sensitive habitats	N
Possible oil spills events transported through runoff and storm water overflow polluting nearby surface and groundwater bodies	Water resources, soil, subsoil and land, nearby communities	N
Accident occurrence due to the enhancement of vehicular movement resulted from the improvement of road conditions	Socio-economic activities, nearby communities	N
Socioeconomic		
Encouragement of new business opportunities, and marketing activities in project region, the increase in land values and facilitate the access to services and improve the living standards	Socio-economic activities, nearby communities	2P
Improvement in road conditions due to installation of proper safety signs	Socio-economic activities, nearby communities	P
Enhancement of tourism	Socio-economic activities, nearby communities	P
Community and Occupational Health and Safety		
Increased traffic, accidents rates and risk on pedestrians	Socio-economic activities, nearby communities	N

6. MITIGATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

This section outlines the measures required in order to mitigate all impacts identified in Section 5 as well as ensure proper monitoring. These measures have been included in an Environmental and Social Management Plan (ESMP).

6.1 Environmental Mitigation Measures during Rehabilitation

6.1.1 Soils and Water Quality

The contractor should install temporary structures (i.e. barriers) to prevent runoff from reaching nearby water courses and collection lakes and avoid working in rainy weather. The contractor should also ensure that the volume of cut will be disposed properly during the rehabilitation phase in controlled disposal sites to be identified by the contractor in coordination with the relevant municipality. It is also recommended to reuse the excavated material whenever possible. In addition, the contactor should ensure that proper waste management practices are being implemented and train workers on waste reduction procedures including reuse or recycle the generated waste whenever possible.

As for the wastewater generated from the workers on site, it is important to ensure the installation of the porta cabin toilets. These toilets should be connected to the existing network or to the polyethylene tank if sewerage network is not available within the project site. The collected wastewater in the polyethylene tank should be discharged into nearby operational wastewater treatment plants if any. In addition, the discharge of wastewater into nearby water courses should be prohibited under any condition.

In addition, the contractor should present and abide by a spill prevention and management plan that includes the following:

- Proper handling of chemical and oil on a paved ground;
- Used oil or chemical must be stored in an appropriate area until it's collected and disposed in licensed sites;
- A spill response plan including a spill clean-up procedure should be present at the construction site and all workers should be trained in order to implement it in case of accidental spillage;
- The reduction in use of chemicals and the regular maintenance of the used vehicles and machines;
- A spill collection tank must be installed under generators and specific equipment
- Used oil from occasional maintenance of machinery should be collected in specific containers and stored on concrete ground

6.1.2 Air Quality

In order to reduce the project's impact on air quality, the following mitigation measures must be implemented:

- Vehicles, equipment and machinery used during rehabilitation should be regularly maintained;
- Mix material in an enclosed space;
- Open burning of solid waste must be prohibited;

- Vehicles must move at a low speed on unpaved (20-30km/h);
- Loading of raw material should be done under dust preventive measures (i.e. water sprinkling);
- Raw material storage areas should be covered;
- Water should be sprinkled in order to suppress dust. During windy weathers, dust generating activities should be stopped;
- Transported material should be covered.

6.1.3 Noise

In order to reduce and control the noise generated during the rehabilitation phase especially in residential areas Qana (L3-SO-RD04), El Buss, Maachouq, Burj El Chemali (L3-SO-RD10), the following mitigation measures must be implemented:

- Regular maintenance of all noisy equipment and machinery. This includes changing lubricants, replacing damaged parts, and installing mufflers;
- Drilling and excavation activities should be executed only during working hours;
- Heavy machinery such as percussion hammers and pneumatic drills should not be used during the night without prior approval of the municipality or client.

6.1.4 Use of Natural Resources

Several mitigation measures can be implemented in an effort to reduce natural resource depletion and consumption. These measures include:

- Use water efficiently and reduce water wastage whenever possible;
- Regular site inspection to detect water leakages;
- Whenever possible, use dry-cleaning instead wet cleaning;
- Training and awareness should be raised to workers concerning water usage best practices and water conservation;
- Water use for rehabilitation activities should be obtained in such a way that doesn't disturb the water availability and supply to the existing communities;
- Regular maintenance of the generators and trucks;
- The light in the offices must be shut down during the night when offices are not in use;
- Construction workers must be trained and provided with awareness sheets on efficient energy use;
- Machinery and equipment must be turned off when not in use;
- Ensure that the borrow material are extracted from legal quarrying sites;
- Avoid agriculture land for borrow materials.

6.1.5 Land Cover and Biological Environment

As mentioned earlier, the flora within the project site will not be significantly affected; however, it is important to suppress dust by sprinkling water during rehabilitation especially when rehabilitation activities generate significant amounts of dust. It is also recommended not to undertake dust emitting activities during windy weather. This can minimize the impact of dust accumulation on nearby trees. Moreover, in case of any tree removal, ensure that the contractor will get a permit

from the MoA prior to the removal on any tree which is usually given conditional to the reforestation or a compensation paid by the contractor to the MoA in order to buy a number of new plants.

As for the fauna, the following mitigation measures must be implemented:

- Maintenance of vehicles and machinery;
- Drilling, excavation and any other noisy activity only during working hours;
- Prohibit solid waste disposal into nearby areas.

6.1.6 Visual Intrusion

Although visual intrusion during the rehabilitation phase is temporary and will diminish at project completion, some mitigation measures must be implemented during this phase to minimize the impact of visual intrusion on nearby residents. These measures include:

- All sources of light must be shut down during nighttime to avoid disturbance from light pollution at night;
- Green landscape areas must be preserved whenever possible.

6.1.7 Existing Infrastructure

The impacts on the existing infrastructure were assessed as temporary and were considered as neutral. Following are the mitigation measures:

- Regular coordination with relevant municipalities and authorities should be done in order not to affect existing infrastructures (water, wastewater networks, phone cables...). Splitting works into the road segments will be done to ensure quick progression through roads while causing minimal disruption to traffic.

6.2 Environmental Mitigation Measures during Operation

6.2.1 Water and Soil Quality

The rehabilitation of the already existing roads will have minimal negative impacts on groundwater and surface water during the operational phase. Although the project will include the rehabilitation of drainage system, however, local authorities are responsible for regularly maintaining these systems in order to prevent the storm water runoff carrying pollutants, deposits and residues from road surfaces and reaching at the end surface and groundwater water resources and soil and to prevent their blockage and storm water overflow. It is recommended to maintain this system especially before the start of the rainy season and continually collect solid waste in order to prevent the blockage of the drainage system.

6.2.2 Air Quality

The following mitigation measures must be implemented in order to reduce traffic related pollutant emissions:

- Ensure that the road is regularly maintained to ensure good surface conditions;
- Fixing speed limit along then roads;
- Frequent air quality monitoring must be done along the roads area to ensure that ambient air quality parameters are within the standards.

6.2.3 Noise

Mitigation measures that should be implemented in order to minimize the traffic related noise sound signs should be placed near sensitive areas to prevent people from using the pressure horns.

6.2.4 Use of Natural Resources

The following mitigation measures must be implemented in order to reduce the impact on natural resources:

- If possible, use of eco-friendly light bulbs as during the operation phase of the project this will reduce the consumption of energy;
- Cleaning activities that requires a lot of water must be replaced by dry cleaning techniques.

6.2.5 Biological Environment and Land Resources

In order to minimize the impact on the existing biological environment the following must be implemented:

- Install signs such as speed limit signs and animal crossing signs at areas where animals (i.e. cats, sheep, goats, dogs) cross from one side of the road to another;
- Prohibit solid waste disposal in undesignated locations areas;
- Ensure that the road is regularly maintained to ensure good surface conditions.

6.2.6 Visual Intrusion

As the project is the rehabilitation of existing roads in Bent Jbeil Caza, the surrounding environment, vegetation, and the aesthetical value of the surrounding areas is not likely to be significantly affected. Hence no mitigation measures are proposed.

6.3 Social Mitigation Measures during Rehabilitation

6.3.1 Socioeconomic

6.3.1.1 Economic Activities

The following mitigation measures are proposed to prevent any disturbance caused by the change in circulation to the local community:

- Warn the staff strictly not to involve in any unethical activities and to obey the local standards and cultural norms;
- Select specific timings for the rehabilitation activities especially near residential areas;
- Ensure that the generated solid waste and liquid waste is disposed or discharged of in an environmentally friendly way and in selected areas;
- Ensure GRM is accessible to local communities and workers to send their suggestions, concerns and complaints.

Particular mitigation measures should be implemented for the owners of the identified shops along the road Bent Jbeil-Aainata-Beit Yahoun-Tbnine (L3-BJ-RD03), road Kaounine-Aainata (L3-BJ-RD05), and road Bent Jbeil-Yaroun (L3-BJ-RD06), and the visitors/students of the CIS College in Bent Jbeil

(L3-BJ-RD03), the American University of Technology in Tbnine (L3-BJ-RD03), and visitors/patients of the building of health services in Kaounine (L3-BJ-RD05). These measures are as follows:

- Install temporary structures (wooden boards) from the road to the shops and the visited places;
- Ensure that access to small shops is not blocked by installing wooden boards where necessary
- Maintain a passing corridor within the alignment to grant access to nearby properties;
- Inform the shops' owners ahead of time about rehabilitation date and coordinate with relevant municipalities
- Proper installation of sign boards;
- Timely completion of the rehabilitation phase;
- Proper communication and coordination with affected shop owners and robust GRM that is fully functional and operational which should be widely disseminated.

6.3.1.2 Potential Labor Influx

The proposed project is not expected to cause labor influx. Yet, in case of potential labor influx, the risk of sexual abuse and exploitation and sexual harassment, induced by labor influx, should be reduced as much as possible. The contractor should implement the following prior to project rehabilitation:

- Draft Codes of Conduct and the guidelines for a GBV and Violence Against Children (VAC) Action Plan;
- Ensure that workers at the rehabilitation site understand and sign the Code of Conduct, presented in annex 2 that targets GBV risks, specifically Sexual Exploitation and Abuse and/or Sexual Harassment induced by labor influx, and penalizes the perpetrators of GBV
- Conduct training sessions for workers on Sexual Exploitation and Abuse and/or Sexual Harassment
- All workers including contractor, foreign workers and possibly international consultants should sign codes of conduct written in a language that is appropriate;
- All workers are committed to prevent and report sexual abuse and exploitation incidents within the work site and in its immediate surrounding communities;
- Respond to the reported incidents as a matter of priority. The contractor should coordinate with a service provider in this regard;
- Inform workers and the local communities that a GRM is available. Coordination is important with the relevant municipalities in order to ensure that they are informed of all the contractor activities including a potential labor influx. The GRM should be widely disseminated and include an anonymous channel for potential gender-based violence survivors to report incidents (see more details in Section 8.2.2).

6.3.1.3 Social Tensions

The following mitigation measures must be implemented in order to minimize the social tension during the rehabilitation works between local and the foreign workers as a result of potential labor influx:

- Conduct awareness campaigns for the local community regarding the potential foreign worker influx and how their engagement can affect the local economic sector in a positive way. These campaigns must also inform the local community that these workers will sign code of conduct before stating the work and thus their behavior will be controlled. There needs to be transparency, good communication and outreach, and robust and fully

functional GRM during project implementation to prevent, minimize or mitigate this perception;

- Ensure that all workers (locals and foreign, skilled and unskilled) will be compensated equally as per the scale of market price rates and have equal contractual benefits and working opportunities.
- Ensure GRM is accessible to local communities including all relevant stakeholders who can use this mechanism to send their suggestions, concerns and complaints.

6.3.1.4 Child Labor

The following mitigation measures must be implemented in order to ensure that the contractor will not recruit children who are under the legal age as workers on the site, especially in the case of the day laborers:

- Daily registrations of workers and verification of their age to prevent child labor;
- Abide by the Labor Law and ensure that workers below 18 years are not engaged in construction works;
- Ensure the contractor is aware of the penalties that Labor Law is imposing in the case of child labor;
- Oblige the contractor to strictly abide by the Labor Law through the CDR tender documents that should include prohibition of child labor
- The contractor should follow a code of labor practice that details the policy for hiring individuals and that prevents child labor.

6.3.1.5 Traffic & Road Safety

As mentioned earlier, improving the conditions of the road will lead to enhanced vehicular movement and speed thus increasing the chances of road accidents. However, implementing the several mitigation measures can decrease the possibility of such accidents and protect pedestrians. Implementing the following measures can also minimize the traffic congestion and resident's inconvenience and ensure road safety during the rehabilitation of the roads:

- Install safety walls, safety signs, speed limit signs and speed bumps along the proposed roads;
- Ensure that the road is regularly maintained to ensure good surface conditions;
- Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage;
- In case the works imply the temporary closure of some of the busy roads within the project site, traffic shall be secured via alternative routes to reach relevant destinations;
- Inform public about schedule of rehabilitation and place signs near the working areas;
- Take into consideration to restrict the period of rehabilitation works during summer as suggested by the women during the public hearing session;
- Prepare and abide by a Spill Prevention & Management Plan;
- Abide by traffic regulations;
- Install proper warning in culturally appropriate languages and written in clear and understandable manner;
- A flagman should be positioned on the proposed roads to warn the passing cars and ensure the traffic is not blocked;

- Coordinate with the municipality police to help in traffic management;
- Vehicles carrying construction materials will be restricted during the daytime;
- The contractor should also ensure that the transported material by the trucks is well covered;
- Ensure access to external GRM.

6.3.2 Cultural Heritage

The proposed project is located within an area that does not include cultural heritage and archaeological site. However, unknown artefacts may be uncovered during drilling activities. If any archaeological finding was therefore suspected during this phase, work should be halted immediately, and the Directorate General of Antiquities must be informed.

6.3.3 Existing Infrastructure

Regular coordination with relevant municipalities and authorities should be undertaken in order to avoid any existing infrastructures along the road (water, wastewater networks, phone cables) and in case of accidental damage, coordination with the relevant authorities should be undertaken immediately to avoid interrupting any services from the local population.

6.4 Community and Worker Health and Safety Measures during Rehabilitation

6.4.1 Occupational Health Safety

6.4.1.1 Personal Protective Equipment and Worker Safety

The contractor should ensure workers safety from any possible accident. Workers should wear personal protective equipment (PPE) and the contractor should supplement the working site by a first aid kit:

- Workers should wear hard hats to avoid any potential objects fall or accidental head contact with electrical hazards;
- Safety glasses should be worn during the rehabilitation phase in order to avoid the exposure to flying particles or harmful chemicals;
- Workers should wear the right gloves to protect their hands. Different type of gloves could be used according to the undertaken rehabilitation activity;
- Boots with slip-resistant and puncture-resistant soles should be worn by the workers on construction site;
- Contractors should submit an Occupational Health and Safety plan to be reviewed and approved by the Supervision Engineer;
- The contractor should abide by the assigned work schedule (OSHA, 2011).

Additional measures to minimize the occupational health risks the following mitigation measures must be implanted at the construction site:

- Training of workers in lifting and materials handling techniques;
- Planning work site layout to minimize the need for manual transfer of heavy loads;

- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks;
- Sorting and placing loose construction materials or demolition debris in established areas away from foot paths;
- Cleaning up excessive waste debris and liquid spills regularly;
- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight;
- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic;
- Ensuring moving equipment is outfitted with audible back-up alarms (WB-IFC, 2007).

An effective Occupational Health and Safety Plan for construction should include at least the following components:

- Proper signage in and around the site in local languages;
- Fire-fighting measures;
- Guard rails and toe boards on all openings and edges;
- Proper storage and signage of materials including Material Safety Data Sheets;
- Safety measures during demolition works;
- Safety measures according to type of equipment;
- Personal safety equipment;
- Medical services which includes medical examination for all workers, first aid kit and personnel, and keeping logs of all medical records;
- Fencing around the construction site at all times;
- Sanitary facilities;
- Sanitary facilities to be covered, easily accessible, ventilated, well lit, maintained, and sanitized;
- Safe drinking water in accordance with regulations.

6.4.1.2 Electrical Safety

The following mitigation measures must be implemented in order to minimize electrical hazards and accidents:

- The electrical activities and working on new and existing hot electrical circuits should be prohibited if all power is still turned on.
- All frayed, damaged or worn electrical cords or cables should be replaced and flexible cords and cables should be protected from damage.
- All electrical tools and equipment should be maintained and checked regularly for any defect.

6.4.2 Community Health and Safety

Local resident safety and passers-by should be ensured as well. For this purpose, the following mitigation measures must be implemented:

- Proper safety and diversion signs must be installed at sensitive areas within the project area (i.e. near schools, medical centers, hospitals and shops) as well as physical obstacles such as bumps and rumble strips;
- Secure the site and restrict access to it;
- Access to hospitals should not be impeded at no time;
- Training of heavy machinery drivers about road safety;
- Inform the local community about the rehabilitation schedule and abide by assigned timing;
- Install pedestrian and vehicular passages near residential areas Accidental oil spillage shall be well controlled;
- Develop a site-specific Public Health and Safety Plan and Occupational Health and Safety;
- Apply Best Applicable Practices on Road Safety;
- Ensure access to external GRM.

6.5 Social Mitigation Measures during Operation

The socioeconomic conditions of the area where the proposed roads are rehabilitated will be improved positively. However, public health and safety should always be ensured through applying the best practices on road safety along the rehabilitated roads.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

7.1 Institutional Setup and Capacity Building

7.1.1 National Institutions

The project works will be executed on the main road network which is under the jurisdiction of the MOPWT. In Lebanon, donor-funded road works projects are implemented by CDR upon the request of the Council of Ministers (COM). Therefore, in the context of REP project, CDR (Road and Transport Department) will execute the project on behalf of the Government/MOPWT.

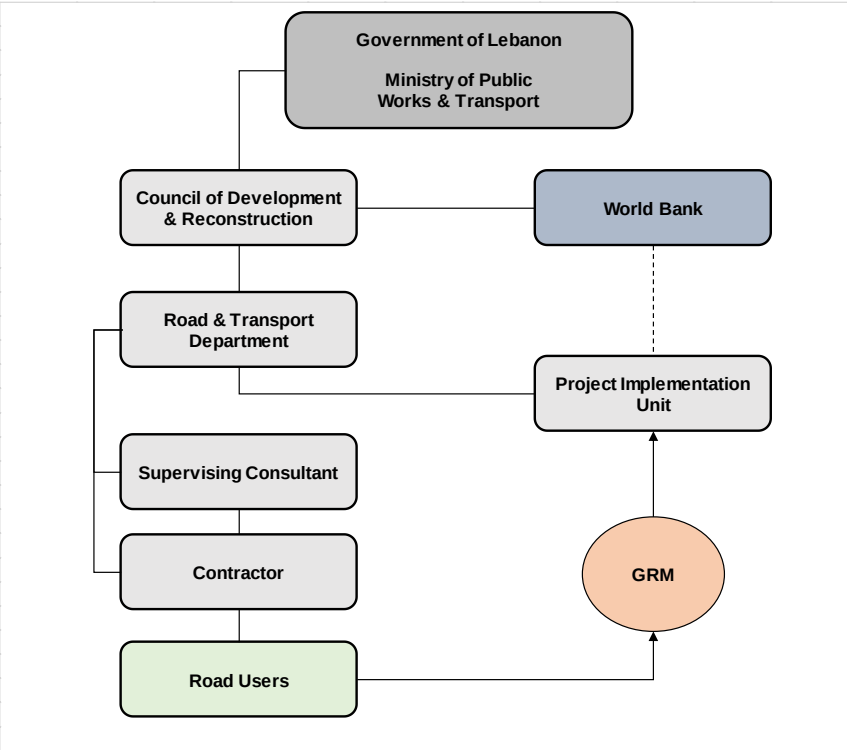
In order to achieve proper environmental and social management and monitoring, a clear, functional institutional structure was defined (refer to Figure 7-1). During the rehabilitation phase, the contractor would be the primary actor; ensuring compliance of works with the different items specified in the environmental and social management plan. Accordingly, the contractor will be supervised by several entities appointed by CDR. CDR will be responsible for constant monitoring of the rehabilitation works through weekly and/or monthly reports (sent by the contractor) and site visits, ensuring and enforcing mitigation measures.

More specifically, the CDR will develop a Project Implementation Unit (PIU) dedicated to the project, which includes social and environmental specialists to monitor and evaluate the project. Moreover, it will engage a supervising consultant to 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, technical support, appraisal and validation of environmental and social management plans, and monitoring of environmental compliance and progress reporting to the World Bank. 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 environmental and social safeguards) who will be in charge of ensuring sound application of the ESMP. Finally, implementation of the ESMPs will mainly be the Supervising Engineer duty and consequently the Supervising Engineer will have to appoint qualified environmental, health and safety consultant and a social development consultant in order to ensure that the Contractor is compliant with the ESMPs during the rehabilitation phase of the project.

The main concerned municipalities will be involved in managing and communicating local community's potential complaints to the CDR (PIU) through the Grievance Redress Mechanism (GRM) process through a local GRM based in each project site road location for local communities' accessibility.

Figure 7-1: Roads and Employment Project Management Structure



7.1.2 Training

In the context of the proposed project, the supervising consultant will prepare environmental and social training course (environmental management, health and safety issues) prior to the handover of the road project for the contractors and field supervision staff.

The main objective of the training is to:

- Meet regulatory requirements in capacity development in support of road rehabilitation;
- Develop technical and administrative procedures for monitoring air quality, traffic scheme recording accidents number;
- Implement data collection for monitoring activities;
- Establish a continuous improvement process for safety;
- Ensure that staff knows and understands the potential risks associated with road safety;
- Enhance knowledge and skills of municipality employees, enabling them to perform their responsibilities in the areas of health and safety.

Training programs must be incorporated with a feedback loop to ensure their relevance and acceptance by staff and will be reviewed periodically and updated when necessary. The implementation of the training programs will raise awareness to the involved municipalities of the Caza in the following topics:

- Environmental laws, regulations, and standards;
- Traffic and Road Management System;
- Occupational hazard and personal protective equipment;
- Emergency response and chemical spills;
- Sampling techniques and environmental monitoring guidelines;

- Risks associated with road conditions, lack of safety measures and signage;
- Pollution health impacts and prevention measures;
- Operating procedures on the rehabilitated roads (Incident Reporting and Investigation);
- Grievance Redress Mechanism (GRM);
- Codes of Conduct.

7.2 Environmental and Social Mitigation Plan

Table 7-1 presents the Environmental Mitigation Plan for road rehabilitation project during the rehabilitation and operation phases respectively. The plan for the rehabilitation phase should be included in the contractor's tender documents to ensure that all requirements have been taken into consideration by them and will be implemented during the rehabilitation phase.

Table 7-1: Environmental and Social Mitigation Plan during Rehabilitation and Operation

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
Rehabilitation	**Environmental Impacts**				
	Air pollution from emissions of machinery, trucks or open burning activities	Use properly maintained equipment Abide by a dust management plan Water the ground when extremely windy Mix material in an enclosed space Cover material when transporting	Contractor	Supervision Engineer	4,000 $
	Dust pollution from rehabilitation and excavation activities				
	Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators	Maintenance of vehicles and machinery Excavation and any other noisy activity only during working hours Prohibit solid waste disposal into undesignated sites	Contractor	Supervision Engineer	3,000 $
	Disturbance of nearby areas and animal escape through noise and vibrations				
	Contamination of surface water and pollution of ground water from improper disposal of wastewater from workers and of wash water coming from cleaning of machines and equipment	Install temporary structures to prevent runoff from reaching nearby water bodies Avoid working in rainy weather Connect the generated wastewater from workers to the sewage network or to polyethylene tank Discharge the pumped wastewater from the polyethylene tank into nearby operational wastewater treatment plants Prohibit the discharge of wastewater into nearby water bodies under any condition	Contractor	Supervision Engineer	5,000 $
	Water pollution due to accidental spill of oils and chemicals from trucks and from	Prepare and abide by a Spill Prevention & Management Plan	Contractor	Supervision Engineer	5,000 $

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
	transportation of chemicals and oils Improper disposal of cut volume may cause contamination of water bodies in rainy weather	Used oil from occasional maintenance of machinery or chemicals must be stored in an appropriate area until it's collected and disposed in a controlled disposal site Minimize soil exposure time Proper storage of raw material including chemicals and fuel and handling must be on a paved and sealed floor Regular maintenance of vehicles Minimize the use of chemicals Reuse of excavated material whenever possible Disposal of excavated material in controlled disposal site			
	Contamination of soil and surface water bodies from the improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Proper disposal of construction waste in controlled disposal site to be identified by the contractor in coordination with the relevant municipality Proper waste management practices Reuse or recycle the generated waste whenever possible Reuse of excavated material whenever possible Disposal of excavated material in controlled disposal site to be identified by the contractor in coordination with the relevant municipality Train workers on waste reduction procedures	Contractor	Supervision Engineer	1,500 $
	High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Maintenance of the generators and trucks Light in the site offices shut down during the night Construction workers must be trained and provided with awareness sheets on efficient energy use	Contractor	Supervision Engineer	5,000 $

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
		Machinery and equipment must be turned off when not in use			
	High consumption rates of water for construction related activities Reduction in overall ground and surface water quality due to improper disposal of construction waste	Use water in the most efficient way and reduce wastage Regular site inspection to detect water leakages Whenever possible, use dry-cleaning instead wet cleaning Training and awareness should be raised to workers concerning water usage best practices and water conservation Proper disposal of construction waste	Contractor	Supervision Engineer	5,000 $
	Depletion of natural resources due to the unsustainable extraction of borrowing material (sand, aggregates, …)	Ensure that the borrow material are extracted from legal sites Avoid agricultural lands to extract borrowing material	Contractor of the quarry site	Supervision Engineer	
	Potential disruption of existing flora	Suppress dust by sprinkling water during rehabilitation In case of any tree removal, ensure that the contractor will get a permit from the MoA	Contractor	Supervision Engineer	-
	Socioeconomic Impacts				
	Temporary potential Labor Influx	Priority hiring to qualified local community GRM for local communities	Contractor	Supervision Engineer	-
	Economic Activities and its effect on the livelihood of the shop owners	Install overpass structures from the road to the shops and the recreational site entrance Ensure that access to small shops is not blocked by installing wooden boards where necessary Inform the shops' owners ahead of time about rehabilitation date and coordinate with relevant municipalities	Contractor	Supervision Engineer	-

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
		Maintain a passing corridor within the alignment to grant access to nearby properties Proper installation of sign boards in culturally appropriate languages and written in clear and understandable manner Timely completion of the rehabilitation phase Ensure access to external GRM			
	Discrimination from the local community against the potential influx of foreign workers	Conduct awareness campaigns for the local community regarding foreign workers influx Inform the local community that worker will sign code of conduct before starting the work GRM for local communities and all relevant stakeholders	Contractor	Supervision Engineer	
	Possible unequal wage benefits between local and foreign workers	Ensure that all workers (locals and foreign, skilled and unskilled) shall be compensated and are contracted equally as per the scale of market price rates, have equal contractual benefits and working conditions, and have access to internal GRM	Contractor	Supervision Engineer	-
	Possible recruitment of children who are under the legal age as workers on the site, especially in the case of the day laborers	Daily registrations of workers and verification of their age to prevent child labor Abide by the National Labor Law Ensure the contractor is aware of the penalties that Labor Law imposes in the case of child labor Oblige the contractor to strictly abide by the Labor Law through the CDR tender documents that should include prohibition of child labor	Contractor	Supervision Engineer	-

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
	Disruption of local community to access services due to construction activities and temporal road closures	Traffic shall be secured via alternative routes to reach relevant destinations in case the works imply the temporary closure of this road Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage Ensure access to external GRM	Contractor	Supervision Engineer	-
	Damage of existing infrastructure	Regular coordination with relevant municipalities Conducting trial pits	Contractor	Supervision Engineer	-
	Potential occurrence of sexual abuse and exploitation incidents	Draft Codes of Conduct and the guidelines for a GBV and VAC Action Plan Conduct training sessions for workers on Sexual Exploitation and Abuse and/or Sexual Harassment All workers should understand, and sign codes of conduct written in their native language Respond to the reported incidents of sexual abuse exploitation as a matter of priority Regular training on gender-based aspects, internal and external GRM Availability of a GRM with multiple channels to initiate a GBV complaint, which ensures confidential reporting with safe and ethical documenting of GBV cases, including Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)	Contractor	Supervision Engineer	-
	Slight increase in traffic due to the transport of construction materials or due to the material that may fall	Ensure traffic is not blocked during transportation Inform residents and place signs near the working areas in culturally appropriate	Contractor	Supervision Engineer	1,500$

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
	Traffic congestion in the town due to temporal road closure Material falling from vehicles during transport may cause traffic accidents or congestion	languages and written in clear and understandable manner Ensure communities have access to GRM Cover transported material Abide by traffic regulations Operate well maintained vehicles			
	Accident and injuries to workers and public because of rehabilitation activities Dust generation and noise may cause health related problems for workers and disturbance to residents	Workers to wear proper safety gear (PPE) Presence of first aid kits (at least three) on the construction site Inform residents and place signs near the working areas Proper management of trucks and heavy machinery entering and exiting the construction site Develop a site-specific Public Health and Safety Plan and Occupational Health and Safety Apply Best Applicable Practices on Road Safety	Contractor	Supervision Engineer	3,000 $
	Accident and injuries to workers and public because of rehabilitation activities Dust generation and noise may cause health related problems for workers and disturbance to residents	Develop and implement a site-specific Public Health and Safety Plan and Occupational Health and Safety Plan Workers to wear proper safety gear (PPE) Presence of first aid kits (at least three) on the construction site Inform residents and place signs near the working areas Proper management of trucks and heavy machinery entering and exiting the construction site Apply Best Applicable Practices on Road Safety	Contractor	Supervision Engineer	3,000 $
Operation	**Environmental Impacts**				

Project Activity	Potential Impact	Proposed Mitigation	Responsibility of Mitigation	Responsibility of Direct Supervision	Estimated Cost
	Increased vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area causing public health risks and other impacts on the environment.	Ensure that the road is regularly maintained to ensure good surface conditions Frequent air quality monitoring must be done along the roads area to ensure that ambient air quality parameters are within the standards	Local authorities	-	3,000 $
	Blockage of drainage systems and overflow of storm water transporting residues and pollutants to nearby water bodies and soils	Ensure that the drainage system is regularly maintained especially before the start of the rainy season and that solid waste is continually collected	Local authorities	-	-
	Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Installation of signs near sensitive areas to prevent people from using the pressure horns	Local authorities	-	4,500 $
	Depletion of natural resources (fuel) used for street lighting purposes	Install eco-friendly light fixtures for the streetlight infrastructure to reduce the consumption of non-renewable sources of energy	Local authorities	-	Quotation to be provided from local or international suppliers
	Disruption of animal movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Install speed limit and animal crossing signs at areas were animals cross the roads	Local authorities	-	2,500
	Community and Occupational Health and Safety				
	Increased traffic, accidents rates and risk on pedestrians	Apply Best Applicable Practices on Road Safety	Local authorities	-	1,500

7.3 Monitoring Plan

Continuous monitoring during both rehabilitation and operation of the project will be required to ensure the effectiveness of the proposed mitigation measures. Through sound environmental and social management and implementation of a monitoring plan, the rehabilitation of the roads in Bent Jbeil Caza will avoid incurring the major adverse impacts. The aims of the monitoring plan are:

- Verify the environmental and social impacts predicted in the ESMP study;
- Determine project compliance with national and international requirements and standards;
- Monitor the performance of the project and the effectiveness of mitigation measures;
- Take remedial action if unexpected problems and unanticipated impacts arise.

For additional information, refer to Section 7.3.2 for Reporting and Section 7.1 for Institutional setup and capacity building. Table 7-2 shows the Environmental Monitoring Plan for the rehabilitation and operation phases.

7.3.1 Monitoring Plan Implementation

To ensure implementation of the plan during rehabilitation, a Health, Safety and Environmental Officer and a social development consultant should be appointed on site by the Supervision Engineer at all times and at all the locations of the sensitive receptors that were presented in Figure 4-10.
In order to properly implement the monitoring plan during operation, suitable equipment and technical skills are required. These are necessary to ensure the proper implementation of all proposed mitigations activities that this report recommends. The monitoring plan should be implemented in collaboration with CDR and local authorities.

7.3.2 Documentation and Reporting

7.3.2.1 During Rehabilitation

During the rehabilitation phase, regular monitoring results must be documented in order to track and analyze the frequency of potential impacts and accidents that might occur. The project supervision engineer is responsible for the reporting and establishing a comprehensive database for all monitoring activities. The report must include key indicators such as:

- Type of the activity monitored;
- Date of monitoring and weather conditions;
- Photographic documentation;
- Name of the person that is conducting the monitoring;
- Method of monitoring (sampling, visual inspection, …);
- Number and type of samples;
- Results of the monitoring (concentrations, accidents, frequency, etc.);
- Number of internal and external grievances as per the log

- Code of conduct trainings and number of signed forms, attendance sheets to GBV trainings, worker's age, GRM log, etc…
- Dates of trainings;
- Mitigation measures undertaken;
- Title and dates of training programs.

After documenting, the supervision engineer must submit the reports to the CDR and the WB on a quarterly basis. In addition, there should be immediate reporting of severe incidents (such as fatal accidents)

7.3.2.2 During Operation

Quarterly environmental and social monitoring reports should be prepared to analyze the collected data, assess monitoring activities and provide recommendations to ensure the effectiveness of the overall environmental and social monitoring and management plan during the project life span.

An independent monitoring and evaluation consultant will be responsible for submission of an annual report concerning the different updates of the project status during post-completion phase.

Table 7-2 presents the Environmental and Social Monitoring Plan for the rehabilitation and operation phases.

Table 7-2: Environmental and Social Monitoring Plan during Rehabilitation and Operation Phases

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
Rehabilitation	**Environmental Impacts**						
	Air pollution (Dust /GHG Emissions)	• Volume of dust dispersion • Plume color	Supervision Engineer	Weekly and during activities that generates significant amount of air pollutants	Throughout the project area near sensitive receptors	Visual observation and photographic documentation of dust dispersion (scale and direction) and 1-hr and 24-hr measurements when significant amount of air pollutants are generated	$1,500/event
	Noise and Light Pollution	• Leq, Lmin and Lmax	Supervision Engineer	Weekly and during activities generating significant noise levels or upon receiving a complain	Throughout the project area near sensitive receptors	Single sample per location (average 1hr reading-15minintervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	$300 (cost of noise monitoring machine)
	Contamination of surface water bodies and soil from the generated domestic wastewater from workers and liquid waste from	• Check for leakages in the connections between the porta cabin toilets and the existing network or polyethylene tank • Check the discharge endpoint of the pumped wastewater from the polyethylene tank	Supervision Engineer	Weekly	Throughout the project area and at the porta cabin toilet sites	Visual inspection	-No Cost

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
	rehabilitation activities	• Effluent from construction activities (Concrete mixing, dust minimizing, washing of equipment…)					
	Contamination of surface water bodies and soil from the generated solid waste	• Ensure active solid waste management plan • Construction and demolition waste • Waste of the workers on site	Supervision Engineer	Weekly	Collection points present on sites	Visual inspection	-
	Reduction in overall surface water and soil quality Accidental Releases	• Ensure active spill prevention and management plan • Chemicals, oils and fuel spill incidents	Supervision Engineer	Weekly	Active construction sites	Visual inspection	-
	Depletion of non-renewable energy resources	• Inspection of the quantities and types of the used fuel and oils	Supervision Engineer	Weekly	Fuel and oils purchase bills	Visual inspection	-
	Depletion of water resources	• Inspection of water quantities • Monitoring the different drilling and construction activities • Ensure active spill and accident prevention plan	Supervision Engineer	Weekly	Water purchase bills	Visual inspection	-

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
	Destruction of existing Land Resources	• Check the infrastructure locations and that excavation works do not interfere with it	Supervision Engineer	Weekly	In location where excavation and drilling is planned (mainly where new pavement is assigned)	Visual inspection	-
	Tree and floral species disturbance near the site during rehabilitation activities	• Site observation	Supervision Engineer	Weekly	Around proposed roads	-	-
	Social Impacts						
	Traffic congestion	• Check traffic conditions during transportation of materials • Ensure traffic is not blocked • Ensure traffic is relocated properly • Ensure all safety precautions are abided by	Supervision Engineer	Daily	Throughout the project area	Visual inspection	-
	Labor conditions	• Proportion of Lebanese vs Syrian workers • Worker's age • GRM log • Attendance sheets to GBV trainings	Supervision Engineer	Monthly			

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
		• Number of workers trained to SEA • Number of workers who signed Code of Conduct					
	Labor Influx	• Number of reported Sexual abuse and exploitation (SEA) incidents	Supervision Engineer	Monthly			
		• Number of reported inappropriate communication and language incidents among the workers	Supervision Engineer	Monthly			
	Community and Workers Health and Safety						
	Accident and injuries to workers	• OHS plan approved by the Owner and implemented by Contractor. • Worker training records • Permit to Work for high risk activities • OHS supervisor notes • Ensure signs are in place before works begin • Visual inspections to ensure that all workers are wearing their PPEs	Supervision Engineer	Daily	Along the proposed roads	Visual inspection Accidents records	-

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
		• Accident log recording injuries and accidents within the workers					
	Accident and injuries to the public	• Ensure the installation of pedestrian and vehicular passages near residential areas • Ensure road diversion and construction attention signs are in place before works begin • Record injuries and accidents within passers-by • Site-specific Public Health and Safety Plan approved by Engineer and implemented by contractor • Best practices are applied • Community complains	Supervision Engineer	Daily	Along the proposed roads	Visual inspection Accidents records Complains	-
Operation	**Environmental Impacts**						
	Water and soil pollution (Storm water overflow due to drainage systems blockage)	• Clean water drainage systems • Visual inspection of water overflows on the roads	Local authorities	Before the beginning of the winter season	Along the drainage systems and culverts	Visual inspection	-

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
	Air pollution (dust emissions)	• Total Suspended • Particles (TSP), PM10, • PM2.5 (wherever feasible), SOx, NOx and CO	Ministry of Environment	As nationally or locally planned or upon community complain	At main receptors along the proposed roads	1-hr and 24-hr measurements, and visual observation of dust dispersion (scale and direction)	Within MoE budget
	Noise pollution	• Leq, Lmin and Lmax	Ministry of Environment	As nationally or locally planned or upon community complain	At main receptors along the proposed roads	Single sample per location (average1hr reading-15minintervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	Within MoE budget
	Community and Workers Health and Safety						
	Car accidents	• Number of car accidents • Cause of accidents • Location of accidents	Traffic Authorities	Annually	Along the proposed roads	Records of car accidents, cause of accidents and location of accidents	-

7.3.3 Guidelines for Health and Safety Plan during Rehabilitation

An effective Occupational Health and Safety Plan for construction should include at least the following components:

- Proper signage in and around the site in local languages and access to an internal GRM;
- Fire-fighting measures;
- Guard rails and toe boards on all openings and edges;
- Proper storage and signage of materials including Material Safety Data Sheets;
- Safety measures during demolition works;
- Safety measures according to type of equipment;
- Personal safety equipment;
- Medical services which includes medical examination for all workers, first aid kit and personnel, and keeping logs of all medical records;
- Fencing around the construction site at all times;
- Sanitary facilities (washing basin, urinal);
- Sanitary facilities to be covered, easily accessible, ventilated, well lit, maintained, and sanitized;
- Safe drinking water in accordance with regulations;
- Access to an Internal GRM.

All construction staff should be trained on the Health & Safety Plan and the specific safety measures related to their own activities.

8. CONSULTATION, DISCLOSURE AND GRM

8.1 Public Consultation

A public hearing was held at the union of Bent Jbeil Municipalities on Friday, 3 January 2020. The purpose of the hearing was to inform the stakeholders, including the municipality representatives, local residents and the public about the proposed project that will rehabilitate three roads in Marjayoun Caza and three roads in Bent Jbeil Caza and their accompanying infrastructural works and to take into account their concerns and feedback. The hearing was organized in coordination with CDR and the union of Bent Jbeil Municipalities to ensure proper representation of various communities. Moreover, different NGOs were invited to the public hearing. Table 8-1 represents the name of the invited NGOs and their work.

During the hearing, the Consultant presented the Project design and activities, preliminary findings of the ESMP study and obtained feedback of the participants in order to include in the report.

Thirty-three people participated in the meeting including 10 women, two working in the Municipality of Al Taybe, two at the municipality of Aainata, two at the municipality of Al Aadayseh, two woman working in two NGOs in Tbnine, one working in a woman organization in Yaroun and another woman is a teacher in Aainata. Participants were informed that a GRM procedure will be developed for the project and were given contact information of the Project Consultant in order to inquire about it.

During the session, different concerns were raised by the attendees:

- Concerns were raised about as whether the design of the roads will be presented to the public before implementation. The consultant and CDR responded to this comment by saying that they will do another meeting with the municipalities to have a look on the design before the contractor starts working.
- Moreover, when participants also asked of the reason that a part of the road was excluded from the proposed rehabilitation project, the Consultant and CDR noted that this was due to budget issues.
- Another comment was raised concerning the issue of the road widening and if the project includes this work. The CDR and the consultant responded to this comment by saying that the project will not cover the widening of the road except for special safety conditions. The consultant also ensured that land acquisition will not be considered in this project.
- Furthermore, all participants were noting that CDR and the Consultant must stress on the contractor to hire local workers. As for the impacts that might result from the rehabilitation of roads, the public does not see any major environmental, health and safety concerns.

Employment opportunities were discussed for both Lebanese and Syrian workers. The latter contributes significantly in the construction sector throughout Lebanon including Bent Jbeil Caza. Besides private entities, the municipalities are resorting to Syrian labor in this sector in particular. There appears to be a clear split in job types between the two communities. The delineation line is between skilled jobs (mainly taken by the Lebanese workforce) and unskilled labor (filled primarily by Syrian workers). This split has resulted in a control of potential tensions or conflict between the communities.

Moreover, the women that participated in the women's session stated the following:

- They believe the project will contribute positively to improving women's participation in the economy by making transportation safer and more convenient.
- None of the women expressed any concerns about restriction of movement during the construction works due to potential the influx of workers to the area. However, the women

felt that it is important to hire local workers in such projects. In fact, there are well educated women in both cazas, such that they can be involved in the project during rehabilitation (for office work, engineering work or supervision, etc.)

- There must be clear coordination mechanism with the municipalities and other authorities during the rehabilitation phase to quickly address potential problems and to not duplicate the road rehabilitation works.

Moreover, GBV aspects and GRM were clearly communicated to the women participants during the women's session. In addition, before project implementation GBV aspects and GRM will be clearly communicated and documented accordingly.

The list of attendees, in addition to the proceedings of the hearing, along with the presentation made to the public hearing participants can be found in Annex 3.

As for NGOs Consultation, this ESMP has targeted them according to their position in Lebanon. They consist of two levels as follows:

Local NGOs: they are specific to each Caza. Their mission is to address different concerns and issues among the local society including social, economic, gender equality, environment, poverty, women empowerment, etc. Local NGOs were invited to the public hearing that was held at the Union of Bent Jbeil Municipalities on Friday, 3 January 2020. the local NGOs who were invited are represented in Table 8-1 along with their names and their field of activity.

During the public consultation, one local (SHEILD) NGO attended the session. Those local NGOs may serve as advocates to reduce projects' social and environmental risks and promote good practice. They believe this project can have a positive impact if the associated risks, during both the rehabilitation and mitigation phases, are minimized and good practices are put in place.

Table 8-1: Invited Local NGOs to the Public Hearing and their Activities

Name of the NGOs	Activity
Social, Humanitarian, Economical Intervention for Local Development (SHEILD)	Promoting economic development by supporting livelihood and capacity building of the marginalized community groups. It provides direct assistance in terms of protection, food allocations and other commodities especially for Syrian refugees and those affected by the Syrian crisis
Amel Association International	Lebanese organization dedicated to saving lives and generating a democratic and prosperous Lebanon. Amel offers quality services in the health, psychosocial, human rights, child protection, rural development and vocation training fields
Amal El Hourani Association	Association from Marjayoun who has been working in reconstruction projects such as of bridges reconstruction.

International NGOs: they are covering the whole country and their consultation will be applied to all the ESMPs of the REP. They provide relief and developmental aid to many developing countries. They support the society in responding to crises and helps people whose lives and livelihoods are shattered by conflict and disaster to survive, recover and gain control of their future. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrian in Lebanon by providing aid and responding to their critical situation.

This ESMP consulted International NGOs (see Table 8-2) 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 rstephan@cdr.gov.lb or register by hand an official letter at the CDR. During the public consultation, one international (World Vision) NGO attended the session.

In Bent Jbeil Caza, the total number of registered Syrian is 6,549 individuals (UNHCR, 2019). 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 8-2: Consulted International NGOs and their Activities

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	• Children & Youth • Development • Education • Relief Services • Water sanitation and hygiene	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	• Development • Infrastructure & Services Rehabilitation • Labor & Livelihoods • Shelter • Water sanitation and hygiene	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.

8.2 Grievance Redress Mechanism (GRM)

The purpose of a grievance mechanism is to ensure that all feedback and complaints received from stakeholders, customers, employees, contractor staff and the public in general are documented, considered and addressed in an acceptable and timely manner. It is important to note that this mechanism was shared with the participants and that there are two mechanisms for filing a grievance, one for the surrounding communities and one for the workers. Moreover, GRM will be disseminated to the affected municipalities prior to rehabilitation works. Anonymous grievances will be addressed in both levels and the maximum anticipated time needed to close a GRM case is 45 days.

8.2.1 GRM for Communities

The GRM will be accessible to all relevant stakeholders who can use this mechanism to send their suggestions, concerns and complaints related to the project. The complaints, suggestions and concerns can be sent by email, mail, phone (through a hotline), in person and other means such as a grievance complaint logging sheet where grievances are registered in writing and maintained as a database. The phone number, e-mail address, and address for receiving complaints will be disclosed among the population and will be posted at the rehabilitation sites in Bent Jbeil Caza, before commencement of project implementation. Moreover, the information on how to access the GRM should be available through billboards, CDR website (http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm), etc.

The GRM levels of the project are the following (see Figure 8-1: Grievance Mechanism Process):

- Level 1: If any person has any complaint, concern or suggestion regarding the project implementation, he or she can lodge an oral or written grievance through e-mail (GRM.REP@cdr.gov.lb@cdr.gov.lb), phone call or text message (01980096 ext:317), or website link (http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm) to the site engineer or manager of the roads to be rehabilitated in Bent Jbeil Caza. In case an oral complaint is made, it should be written on paper by the receiving unit. The above issue will be resolved within a maximum duration of one week.
- Level 2: If the person is not satisfied with the action of the site manager's Office, he or she can bring the complaint to the attention of the Environmental and Social Specialist of the PIU for the project through e-mail (rstephan@cdr.gov.lb), phone call or text message (01980096 ext:317), or website link (http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm). The issue shall be resolved within a maximum of two weeks.
- Level 3: If the person is not satisfied with the decision of the Environmental and Social Specialist of PIU, he or she can bring the complaint to the attention of the PIU Director's Office through e-mail (elieh@cdr.gov.lb), phone call or text message (01980096 ext:159), or website link (http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm). Once the PIU Director receives the complaint, it needs to be resolved within a maximum of two weeks.

Meanwhile, it is recommended that the aggrieved party is consulted and be informed of the course of action being taken, and when a result may be expected.

Moreover, reporting of the complaints to the PIU should be done on a monthly basis except for urgent cases. 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. The report should also inform the PIU of complaints that could not be resolved at the lower levels and are being elevated to the PIU Director's attention. The PIU aggregates information received into a status report

each quarter, indicating the number and subject of complaints. The quarterly status report also provides up-to-date information on the number and subject of complaints that have been resolved, and the manner in which they have been resolved. This information will be shared with the Bank.

The Complaints Register form (refer to Annex 4) includes the following:

i) Details and nature of the complaint;
ii) The complainant name and their contact details;
iii) Date;
iv) Length of time needed to close the complaint case;
v) Corrective actions taken in response to the complaint.

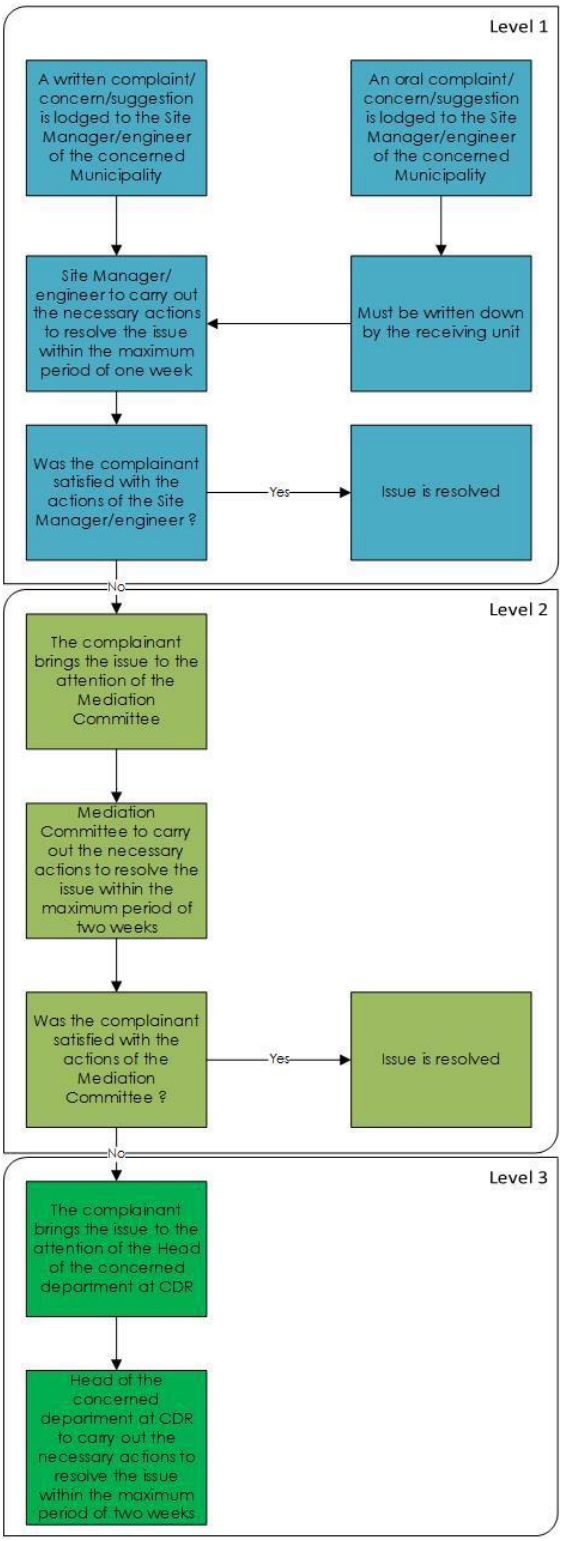
The GRM does not exclude the formal legal process of the national law. If a grievance remains unresolved following application of the project GRM process, the affected person can initiate legal proceedings in accordance with national law and may have recourse to the Appeals Court as warranted.

Figure 8-1 (overleaf) presents a detailed flowchart describing the process of grievance starting form reception of grievance to implementation of corrective measures.

8.2.2 GRM for Workers

A GRM for internal employees, namely the laborers onsite are also necessary. It aims to allow labors to report any wrongdoings in their favor or important concerns they might have. 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 of the contractor 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 4).

Figure 8-1: Grievance Mechanism Process



Source: CDR, 2018

9. CONCLUSION

After evaluating the potential negative and positive impacts that might arise from the proposed project during both phases (rehabilitation and operation), it was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated liquid waste and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of rehabilitation activities especially where new pavement is proposed for the roads.

On the other hand, job opportunities will be created to the local community during the rehabilitation phase. It is worth to mention that these impacts are short in term and will diminish as soon as the project is completed. As for the operational phase, the assessed socioeconomic impacts were mostly positive in nature in terms of traffic and road safety and livelihood improvement within the project area. However, on the long term the proposed project will contribute to increasing vehicular pollutant levels (CO, NO_x, SO_x, PM_{10}) in the area as well as traffic related noise causing public health problems and other impacts on the environment.

However, the negative environmental impacts that might arise from the rehabilitation of the proposed roads in Bent Jbeil Caza can be minimized and even eliminated through proper management and mitigation practices. The proponents of the proposed project are committed to putting in place several measures to mitigate the negative environmental and social impacts associated with the rehabilitation and operation of the proposed project. It is recommended that in addition to this commitment, the proponents shall focus on implementing the measures stated in the ESMP as well as abiding with all relevant national and international policies, standards and regulations.

10. BIBLIOGRAPHY

BirdLife International (2020) Important Bird Areas factsheet: Hima Ebel es-Saqi. Available at http://datazone.birdlife.org/site/factsheet/hima-ebel-es-saqi-iba-lebanon. Accessed on 12/03/2020

Bou Dagher-Kharrat M. *et al.* (2018). Setting conservation priorities for Lebanese flora—Identification of important plant areas. *Journal for Nature Conservation.*

CAS. (2019). Labour Force and Household Living Conditions Survey (LFHLCS), 2018-2020, Lebanon. Central Administration of Statistics. Lebanon.

CDR. (2005). Quick Social Search. Nabatiyeh, Sour, Bent Jbeil, Marjayoun Cazas. Available at http://www.cdr.gov.lb/study/CDP_RSA/Sour.pdf Accessed on 20/1/2020.

Climate Data Website, 2020. Beit Yahoun Climate. Available at: https://en.climate-data.org/asia/lebanon/qada-bint-jubayl/beit-yahoun-413117/#climate-graph. Accessed on 12/3/2020.

Council of Development and Reconstruction (CDR). (2018). Roads and Employment Project (REP). ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF).

Council of Development and Reconstruction (CDR). (2018). Progress Report.

El Laithy, H., Abu-Ismail, K., & Hamdan, K. (2008). Poverty, growth and income distribution in Lebanon (No. 13). International Policy Centre for Inclusive Growth.

FAO. (2016a). Damage and Early Recovery Needs Assessment of Agriculture, Fisheries and Forestry. Available at http://www.fao.org/newsroom/common/ecg/1000445/en/LebanonDNAMFinalReportTCP.pdf. Accessed on 14/3/2020.

FAO. (2016b). Non Wood Forest Procut Value Chains in Lebanon. Available at: http://www.fao.org/3/a-i6506e.pdf. Accessed on 14/3/2020

FAO. (2020). FAOLEX Database. Available at: http://www.fao.org/faolex/results/details/en/c/LEX-FAOC155363. Accessed on 12/3/2020.

Government of Ghana (GoG) - Ministry of Roads and Highways (MRH). (2017). ENVIRONMENTAL AND SOCIAL ASSESSMENT FOR TRANSPORT SECTOR IMPROVEMENT PROJECT (P151026).

IDAL. (2018). Invest Opportunities in Nabatiyeh. Baseline Analysis.

IGSPS. (2012). National Health Statistics Report in Lebanon. Institute of Health Management and Social Protection (IGSPS) at Saint-Joseph University.

Knauer, H. S., Pedersen, S., Reherman, C. N., Rochat, J. L., Thalheimer, E. S., Lau, M. C., ... &Corbisier, C. (2006). FHWA highway construction noise handbook (No. DOT-VNTSC-FHWA-06-02). United States. Federal Highway Administration.

Localiban website, 2015. Bent Jbayl District. Available at https://www.localiban.org/bent-jbayl. Accessed on 12/3/2020.

NNA. (2016). Litani River: Between Enemy's Ambitions and Chronic Neglect... Who Will Save It From Pollution And Benefit From Its Water? National News Agency Website. Available at http://nna-leb.gov.lb/en/show-report/884/nna-leb.gov.lb/en Accessed on 16/3/2020

OCHA. (2016). Lebanon, South and El Nabatieh Governorates Profile. The United Nations Office for the Coordination of Humanitarian Affairs. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/30052016_South%20and%20El%20Nabatieh%20profile.pdf. Accessed on 10/2/2020

OSHA. (2011). Occupational Safety and Health Administration. Workers Safety Series. Protecting Yourself from Noise in Construction.

ReliefWeb Website (2020). Syria Refugee Response: Informal Tented Settlements (ITS) - 15 March 2014. https://reliefweb.int/map/lebanon/syria-refugee-response-informal-tented-settlements-its-15-march-2014 Accessed on 11/03/2020

SPNL Website. (2020). Hima. Society for the Protection of Nature in Lebanon. Available at https://www.spnl.org/hima/ Accessed on 4/2/2020

Taylor, K. C. (1984). Automobile catalytic converters. In Catalysis (pp. 119-170). Springer, Berlin, Heidelberg

Transport Global Practice (GGITR) and the Gender Group (GTGDR). (2018). Good Practice Note: Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works. Retrieved from: http://documents.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf

UNDP. (2016). The Social Stability Context in the Nabatieh & Bint Jbeil Qazas. https://www.lb.undp.org/content/lebanon/en/home/library/crisis_prevention_and_recovery/The-Social-Stability-Context-in-the-Nabatieh-and-Bint-Jbeil-Qazas.html. Accessed on 14/3/2020

UNDP. (2020). Communication & Outreach. Bint Jbeil Market Place. http://www.undp.org.lb/communication/successstories/archive.cfm#BintJbeil. Accessed on 14/3/2020

UNDP/CEDRO. (2012). The National Bioenergy Strategy for Lebanon. United Nations Development Programme. Available at https://www.undp.org/content/dam/lebanon/docs/Energy%20and%20Environment/Publications/The-National-Bioenergy-Strategy-report.pdf. Accessed on 11/2/2020.

UNDP & ECHO. (2013). Restoration and Preservation of Lives and Livelihoods. https://www.lb.undp.org/content/lebanon/en/home/library/poverty/restoration-and-preservation-of-lives-and-livelihoods.html. Accessed on 14/3/2020

UNHCR. (2019). SYRIA REFUGEE RESPONSE. LEBANON South and Nabatiyeh Governorates. Map of Registered Syrian Refugees by District. 31 December 2019. United Nations High Commissioner for Refugees. Available at https://data2.unhcr.org/en/documents/download/73797 Accessed on 10/2/2020.

UNHCR. (2019). SYRIA REFUGEE RESPONSE. LEBANON South and Nabatiyeh Governorates. Distribution of the Registered Syrian Refugees at Cadastral Level. 30 September 2019. United Nations High Commissioner for Refugees. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/71731.pdf Accessed on 12/3/2020

World Bank (WB), Government of KP (GoKP), and International Development Association (IDA) (2019). KHYBER PAKHTUNKHWA INTEGRATED TOURISM DEVELOPMENT PROJECT. ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) AND ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP).

World Bank Group-International Finance Corporation. (2007). Environmental, Health, and Safety (EHS) Guidelines. GENERAL EHS GUIDELINES: ENVIRONMENTAL WASTEWATER AND AMBIENT WATER QUALITY.

WHO. (2005). Air Quality Guidelines Global Update. PM 24-hour value is the 99th percentile. World Health Organization.

World Food Programme (WFP). (2016). Lebanon Road Network.

ANNEX 1: ENVIRONMNETAL & SOCIOECONOMIC COMPONENTS ALONG THE ROAD

Road Code	CAZA	Name	Natural Environment (Trees, land use, surface water …)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals, …)	Socio-Economic (Shops, Residential areas, traffic, …)
Road 3	Bent Jbeil	Aainata – Beit Yahoun – Tbnine	S0: pine trees on the right side of the road, green areas on the left side S250: pine trees on the right, S500: pine trees on the right and left sides of the road, green areas on the left S750: low vegetation density area on the left (lower than the road level) S1000: pine trees on the right and left side of the road, fig trees, Eucalyptus and other trees S1350: Eucalyptus trees on the left side of the road, S1550: Eucalyptus trees on the left side of the roads S1800: Eucalyptus trees right and left sides of the road S2000: land with a low vegetation cover on the right S2300-S2550: valley on the left side of the road S2850: valley on the left side of the road, trees on the road sides	Electricity lines and lightening networks all along the road S0: waste bins S500: waste bins S2300: partly paved road on the right S2550: paved road on the right	S0: electricity shop on the right, residential (two stories), curtains shops, Coral gas station on the left, S500: 2 residential buildings (2 stories) S1000: minimarket, clothes shops S1350: a residential building (3 stories), AUT (American University of Technology) on the right S1550: Aluminum shops, bakery, steel shops S2300: Medco gas station on the right S2550: residential on the right side of the road S3000: Lebanese army point S8200: CIS College
Road 5	Bent Jbeil	Kaounine – Aainata	S0: pine trees on both sides of the road, olives trees on the left side, eucalyptus trees on the right. S100: pine and olive trees on both sides of the road S200: olive trees on the left, eucalyptus trees on the right	Electricity lines and lightening networks along most of the road S0: waste bins S100: waste bin S200: waste bin S300: waste bin S400: waste bin S1400: waste bin	S0: 2 residential buildings (2 stories) S100: 1 residential building (2 stories) S200: 1 residential building (2 stories), a building for health services (2 stories) S300: 1 residential house S1700: 1 residential building (2 stories) S1800: 1 residential building (3 stories) S2000: 2 residential building (2 stories)

Road Code	CAZA	Name	Natural Environment (Trees, land use, surface water …)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals, …)	Socio-Economic (Shops, Residential areas, traffic, …)
			S300: olive trees on the left, eucalyptus trees on the right, valley on the left side of the road S400: olive trees on the right, dried bushes on the left, willows and eucalyptus trees on both sides of the road, valley on the left side of the road S500: Eucalyptus and willow trees on the right, olives and bushes on the left, valley on the left side of the road S600: Eucalyptus and willow trees on both sides, valley on the left side of the road S700: eucalyptus and dried bushes on both sides, olive trees on the right S800: dried bushes on both side, eucalyptus trees on the left, olive trees on the right S900: dried bushes on both sides, pine trees on the left, eucalyptus trees on the right S1000: dried bushes on both sides, olive trees on the right, willow trees on the left S1100: dried bushes on both sides, eucalyptus trees on the left, olive trees on the right S1200: dried bushes on both sides, eucalyptus and willow trees on both sides S1400: dried bushes on the left, willow and eucalyptus trees on both sides S1500: olive trees on the left, eucalyptus and dried bushes on the right S1600: olive trees on the left, dried bushes on the right S1700: dried bushes on the left, olives on the right S1800: pine, olive trees and dried bushes on the left, eucalyptus, willow and fig trees on the right S1900: dried bushes and eucalyptus trees on the left, olive trees on the right S2000: fig and eucalyptus trees on the left, olive trees on the right	S1600: waste bins S1700: waste bins S1800: waste bins S1900: waste bins S2000: waste bins	S2100: 1 residential building (2 stories)

Road Code	CAZA	Name	Natural Environment (Trees, land use, surface water …)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals, …)	Socio-Economic (Shops, Residential areas, traffic, …)
			S2100: eucalyptus trees on the left, melia trees on the right, the Lake of Aainata at the end of this road		
Road 6	Bent Jbeil	Bent Jbeil - Yaroun	S0: dried land on the right, olive trees on both sides S300: some scattered trees on both sides, dried lands on both sides S600: dried land on both sides with scattered trees S900: scattered trees on both sides S1100: some scattered trees on the right, dried land on both sides S1400: trees along the right side of the road, dried land on the left S1700: scattered trees on right S2000: Scattered trees on both sides of the road S2600: Scattered trees alongside the road S3200: Scattered trees alongside the road S3800: Scattered trees on both sides, few agricultural lands on the left S4400: Scattered trees on both sides, no major greenery S5800: Scattered trees on both sides of the road	Road signs at some stations Waste bins at some stations	S0: Residential buildings next to each other on the left S300: residential building on both sides S600: residential buildings on the right S900: few residential buildings on both sides S1100: 4 residential buildings on the left S1400: few residential buildings next to each other on the left and the right sides S1400: few residential buildings next to each other on the left and the right sides S1700: few residential buildings on the left and the right sides S2600: Scattered residential houses alongside the road S3200: Some residential buildings alongside the road S3800: Several residential buildings on both sides S4400: Residential buildings next to each other alongside both sides of the road S5800: Scattered residential buildings alongside the road

ANNEX 2: CODE OF CONDUCT

1. Background

The purpose of these *Codes of Conduct and Action Plan to Prevent Gender-based Violence (GBV) and Child Abuse/Exploitation (CAE)* is to introduce a set of key definitions, core Codes of Conduct and guidelines that establish mechanisms for reporting, addressing, monitoring and sanctioning GBV and CAE within the work site and in its immediate surrounding communities.

The Codes of Conduct aim to prevent and/or mitigate the risks of GBV and CAE within the context of Roads and Employment Project for the Government of Lebanon to be funded under the World Bank financed Roads and Employment Project (REP). These Codes of Conduct are to be adopted by the civil works contractors, as well as supervision consultants.

Mutual respect and fair treatment by all parties, that include an understanding on the impact their presence has on the communities living in the areas targeted by the project, are deemed of utmost importance to create a respectful, pleasant and productive work environment. This will help prevent issues with GBV and CAE, thereby guaranteeing a safe environment to work in and around. The Codes also present clear guidelines for sanctions of staff should they be warranted. By ensuring that the project's staff respects the project environment and its communities, a successful attainment of the project objectives will be achieved.

2. Definitions

The following definitions apply:

- **Gender-Based Violence (GBV)** – is defined as any conduct, comment, gesture, or contact perpetrated by an individual (the perpetrator) on the work site or in its surroundings, or in any place that results in, or is likely to result in, physical, sexual or psychological harm or suffering to another individual (the survivor) without his/her consent, including threats of such acts, coercion, or arbitrary deprivations of liberty.

- **Child Abuse and Exploitation** (CAE)- is defined as physical, sexual or psychological harm of minor children (i.e. under the age of 18) including using for profit, labor, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, or video and digital cameras appropriately, and never to exploit or harass children or to access child pornography through any mediums

- **Child Protection (CP)** - An activity or initiative designed to protect children from any form of harm, particularly arising from CAE.

- **Child-** is used interchangeably with the term 'minor' and, in accordance with the United Nations
  United Nations Glossary on Sexual Exploitation and Abuse, refers to a person under the age of 18

- **Grooming** – is defined as behaviors that make it easier for a perpetrator to procure a child for sexual activity. For example, an offender might build a relationship of trust with the child, and then seek to sexualize that relationship (for example by encouraging romantic feelings or exposing the child to sexual concepts through pornography).

- **Online Grooming-** is the act of sending an electronic message with indecent content to a recipient who the sender believes to be a minor, with the intention of procuring the recipient to engage in or submit to sexual activity with another person, including but not necessarily the sender. For further details, refer to the *Criminal Code Act 1995,* Division 474 (telecommunications offences, subdivision C).

- **Survivor/Survivors-** is defined as the person(s) adversely affected by GBV or CAE. Women, men and children can be survivors ofGBV; children of CAE.

- **Perpetrator-** is defined as the person(s) who commit(s) or threaten(s) to commit an act or acts of GBVorCAE.

- **Work site-** is defined its the area in which Roads Rehabilitation works are being conducted, as ·part of interventions planned under the World-Bank-funded Roads and Employment Project (REP).

- **Work site surroundings-** are defined as the' Project Area of Influence' which are any area, urban or rural, directly affected by the project, or located within the distance of three kilometers radius from the work site and/or worker's camps, including all human settlements found on it.

- **Consent** – is defined as the informed choice underlying an individual's free and voluntary intention, acceptance or agreement to do something. No consent can be found when such acceptance or agreement is obtained through the use of threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. Any use of a threat to withhold a benefit, or of a promise to provide a benefit, or actual provision of that benefit (monetary and non-monetary), aimed at obtaining an individual's agreement to do something, constitutes an abuse of power; any agreement obtained in presence of an abuse of power shall be considered non-consensual. In accordance with the United Nations, the World Bank considers that consent cannot be given by children under the age of 18, even in the event that national legislation of the country into which the code of conduct is introduced has a lower age Mistaken belief regarding the age of the child and consent from the child is not a defense.

- **Contractor** – is defined as any fim1, company, organization or other institution that has been awarded a contract to conduct Roads Rehabilitation works in the context of the Roads and Employment Project (REP) and has hired managers and/or employees to conduct this work.

- **Consultant** – is defined as .any firm, company, organization or other institution that has been awarded a contract to provide consulting services in the context of the REP, and has hired managers and/or employees to conduct this work.
- **Manager-** is defined as any individual offering labor to the contractor or consultant, on or off the work site, under a formal employment contract and in exchange for a salary, with responsibility to control or direct the activities of a contractor's team, unit, division or similar, and to supervise and manage a pre-defined number of employees.

- **Employee-** is defined as any individual offering labor to the contractor or consultant on or off the work site, under a formal or informal employment contract or arrangement, typically but not necessarily in exchange for a salary (e.g. including unpaid interns and volunteers), with no responsibility to manage or supervise other employees.

- **Grievance Response Mechanism (GRM) -** the process established by the REP project to receive and address complaints.

- **Standard Reporting Procedure** – is defined as the prescribed procedure to be followed when reporting cases of GBV or CAE.

- **Accountability Measures-** is defined as the measures put in place to ensure the confidentiality of survivors and to hold contractors, consultants and the client responsible for instituting a fair system of addressing cases of GBV and CAE.

- **Response Protocol** – is defined as the mechanisms set in place to respond to cases of GBV and CAE.

- **GBV and CAE Compliance Team:** A team established by the Contractor and/or Consultant to address GBV and CAE issues with the work force.

3. Codes of Conduct

This chapter presents three Codes of Conduct for use:

- **Company Code of Conduct:** Commits the company to addressing GBV and CAE issues;

- **Manager's Code of Conduct:** Commits managers to implementing the Company Code of Conduct, as well as those signed by individuals; and,

- **Individual Code of Conduct:** Code of Conduct for each individual working on REP.

Company Gender Based Violence and Child Abuse/Exploitation Code of Conduct

Contractors and consultants are obliged to create and maintain an environment which prevents gender based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project. In order to prevent GBV and CAE, the following core principles and minimum standards of behavior will apply to all employees without exception:
1. GBV or CAE constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All fonns of GBV and CAE including grooming are unacceptable be it on the work site, the work site surroundings, or at worker's camps. Prosecution of those who c01mnit GBV or CAE will be pursued.
2. Treat women and children (persons under the age of 1·8) with respect regardless of race, color, language, religion, political or other opinion, national, etlmic or social origin, property, disability, birth or other status.
3. Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Sexual activity with children under 18-including through digital media-is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
5. Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
6. Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited (see definition of consent above). This includes relationships involving the withholding, promise of actual provision of benefit (monetary or nonmonetary) to community members in exchange for sex- such sexual activity is considered "nonconsensual" within the scope of this Code.
7. Where an employee develops concems or suspicions regarding acts of GBV or CAE by a fellow worker, whether in the same contracting finn or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
8. All employees are required to attend an induction training course prior to commencing work on site to ensure they are familiar with the GBV and CAE Code of Conduct.
9. All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV and CAE Code of Conduct.
l 0. All employees will be required to sign an individual Code of Conduct confirming their agreement to support GBV and CAE activities.

Company Gender Based Violence and Child Abuse/Exploitation Code of Conduct

Contractors and consultants are obliged to create and maintain an environment which prevents gender based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project. In order to prevent GBV and CAE, the following core principles and minimum standards of behavior will apply to all employees without exception:

1. GBV or CAE constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV and CAE including grooming are unacceptable be it on the work site, the work site surroundings, or at worker's camps. Prosecution of those who commit GBV or CAE will be pursued.
2. Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
3. Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Sexual activity with children under 18—including through digital media—is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
5. Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
6. Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited (see definition of consent above). This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.
7. Where an employee develops concerns or suspicions regarding acts of GBV or CAE by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
8. All employees are required to attend an induction training course prior to commencing work on site to ensure they are familiar with the GBV and CAE Code of Conduct.
9. All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV and CAE Code of Conduct.
10. All employees will be required to sign an individual Code of Conduct confirming their agreement to support GBV and CAE activities.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent and respond to GBV and CAE. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in disciplinary action.

FOR THE COMPANY

Signed by _____

Title: _____

Date: _____

Manager's Gender Based Violence and Child Protection Code of Conduct

Managers at all levels play an important role in creating and maintaining an environment which prevents GBV and prevents CAE. They need to support and promote the implementation of the Company and Individual Codes of Conduct. To that end, they must adhere to the Manager's Codes of Conduct. This commits them to support and developing systems which maintain a GBV-free and child safe work environment. These responsibilities include but are not limited to:

1. Mobilization

1. Establish a GBV and CAE Compliance Team (GCCT) from the contractor's and consultant's staff to write an Action Plan that will implement the GBV and CAE Codes of Conduct.
2. The Action Plan shall, as a minimum, include the
    a. **Standard Reporting Procedure** to report GBV and CAE issues through the project Grievance Response Mechanism (GRM);
    b. **Accountability Measures** which will be taken against perpetrators; and,
    c. **Response Protocol** applicable to GBV survivors/survivors and perpetrators.
3. Coordinate and monitor the development of the Action Plan and submit for review to the CDR and the PIU safeguards specialist , as well as the World Bank prior to mobilization.
4. Update the Action Plan to reflect feedback and ensure the Action Plan is carried out in its entirety.
5. Provide appropriate resources and training opportunities for capacity building so members of the GCCT feel confident in performing their duties. Participation in the GCCT will be recognized in employee's scope of work and performance evaluations.
6. Ensure that contractor, consultant and client staff are familiar with the REP GRM and that they can use it to anonymously report concerns over GPV and CAE (See Section 4.2 in the Action Plan).
7. Hold quarterly update meetings with the GCCT to discuss ways to strengthen resources and GBV and CAE support for employees and community members.

2. Training

1. All managers are required to attend an induction manager training course prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in upholding the GBV and CAE Codes of Conduct. This training will be separate from the induction training course required of all employees and will provide managers with the necessary understanding and technical support needed to begin to develop the Action Plan for addressing GBV and CAE issues.
2. Provide time during work hours to ensure that direct reports attend the mandatory REP facilitated induction GBV and CAE training required of all employees prior to commencing work on site.
3. Ensure that direct reports attend the monthly mandatory training course required of all employees to combat increased risk of GBV and CAE during civil works.
4. Managers are required to attend and assist with the REP facilitated monthly training courses for all employees. Managers will be required to introduce the trainings and announce the self- evaluations.
5. Collect satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of training.

3. Prevention

1. All managers and employees shall receive a clear written statement of the company's requirements with regards to preventing GBV and CAE in addition to the training.

2. Managers must verbally and in writing explain the company and individual codes of conduct to all direct reports.
3. All managers and employees are to sign the individual 'Code of Conduct for GBV and CAE', including acknowledgment that they have read and agree with the code of conduct.
4. To ensure maximum effectiveness of the Codes of Conduct, managers are required to prominently display the Company and Individual Codes of Conduct in clear view in public areas of the work space. Examples of areas include waiting, rest and lobby areas of sites, canteen areas, health clinics.
5. All posted and distributed copies of the Company and Individual Codes of Conduct should be translated into the appropriate language of use in the work site areas (ex. Arabic, French, English).
6. Managers will encourage employees to notify the GRM of any acts of threats or violence to women or children they have witnessed or received, or have been told that another person has witnessed or received, or any breaches of this code of conduct.
7. Mangers should also promote internal sensitization initiatives (e.g. workshops, campaigns, on-site demonstrations etc.) throughout the entire duration of their appointment in collaboration with the GCCT and in accordance to the Action Plan.
8. Managers must provide support and resources to the GCCT to create and disseminate the internal sensitization initiatives through the Awareness-raising strategy under the Action Plan.

4. Response

1. Managers will be required to provide input, final decisions and sign off on the **Standard Reporting Procedures** and **Response Protocol** developed by the GCCT as part of the Action Plan.
2. Once signed off, managers will uphold the **Accountability Measures** set forth in the Action Plan to maintain the confidentiality of all employees who report or (allegedly) perpetrate incidences of GBV and CAE (unless a breach of confidentiality is required to protect persons or property from serious harm or where required by law).
3. If a manager develops concerns or suspicions regarding any form of GBV or CAE by one of his/her direct reports, or by an employee working for another contractor on the same work site, s/he shall immediately refer the case to the competent authorities (Police) and, at the same time, report the case to the GRM and the GCCT for internal processing according to the established reporting and accountability measures. Always respecting the survivor's choices if a survivor has been identified.
4. Once a sanction has been determined, the relevant manager(s) is/are expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision was made.
5. Managers failing to comply with such provision can be in turn subject to disciplinary measures, to be determined and enacted by the company's CEO, Managing Director or equivalent highest-ranking manager. Those measures may include:
    a. Informal warning
    b. Formal warning
    c. Additional Training
    d. Loss of up to one week's salary.
    e. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
    f. Termination of employment.
6. Ultimately, failure to effectively respond to GBV and CAE cases on the work site by the contractor's managers or CEO may provide grounds for legal actions by authorities.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent and respond to GBV and CAE. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in disciplinary action.

FOR THE EMPLOYER

Signed by _____

Title: _____

Date: _____

ANNEX 3: PUBLIC DISCLOSURE HEARING

Roads and Employment Project
Public Hearing Session
ESMP for the rehabilitation of Selected Roads in
Bent Jbeil and Marjayoun Caza

Location: Union of Bent Jbeil Municipalities
Date & Time: 03/01/2020 from 2:30 pm to 3:30pm
Attendees: 37 attendees (List below)

Proceedings:

1. Welcome Remarks

The public hearing opened with a word from ACE representative who introduced the overall project and its objectives and relevant organizations including CDR and the World Bank.

2. Presentation

The Environmental Expert from ACE provided a detailed description of the roads and proposed rehabilitation works, purpose of the hearing, EIA process, World Bank requirements, and listed the potential environmental issues associated with construction and operation of the project.

3. Discussion

The hearing was attended by 37 participants. The floor was then opened for discussion and questions. The main issues that were raised are as follows:

- One of the participants from Deir Siriane municipality asked if the project will include the installation of rain water drainage. This comment was raised since rain water accumulates on one of the proposed roads in Marajouyn caza and then it is transported to nearby private lands. The consultant and CDR responded to this comment by asking the municipality representatives to present their suggestions regarding the management of this rain water runoff as they were suggesting several options for this problem and some of these options are already designed.
- One of the suggestions was to divert this rain water runoff to irrigation ponds, thus using this water for irrigating agricultural lands.
- ACE also noted that the input of the municipalities regarding the current conditions of the roads is highly recommended since this will help in the detailed design.
- Head of Bent Jbeil Municipality asked whether the design of the roads will be presented to the public before implementation. The consultant and CDR responded to this comment by saying that they will do another meeting with the municipalities to have a look on the design before the contractor starts working.
- Head of Aainata municipality was asking that a part of the road is not included in the proposed rehabilitation project. In fact he was asking why it was excluded. The Consultant and CDR noted that this was due to budget issues.
- A member of Aainata municipality also mentioned the issue of the road widening and if the project includes this work. CDR and the consultant responded to this comment by saying that the project

will not cover the widening of the road except for special safety conditions. The consultant also ensured that land acquisition will not be considered in this project.
- Concern were raised regarding the inaccuracy in the traffic count. The Consultant responded by noting that the traffic count was done during the summer in order to take into account the heavy traffic season.
- One of the participants asked about the duration of the project and when will the rehabilitation work starts. The consultant and CDR mentioned that the project will start in the summer.
- All participants were noting that CDR and the Consultant must stress on the contractor to hire local workers and that Clear communication and transparency is needed throughout the project implementation with widely disseminated GRM in place and awareness of GBV and mitigation measures.
- In general, the public supports this project and do not see any major environmental, health and safety concerns. They are also hoping to get form funds in order to continue the rehabilitation of other roads in the caza of Bent Jbeil and Marjyoun.

4. Women's Session

Following the main discussion, a separate session was held with the female participants (4 women). The purpose of the session was to obtain women's feedback on the project and focus on their concerns and suggestions. The main issues raised during this session are as follows:

- All women agreed on the fact that the project will affect the cleanliness of their houses during the rehabilitation phase especially if the proposed road passes near residential areas. However, they will be patient during this phase since the end result will be a safer road to pass on.
- None of the women expressed any concerns about restriction of movement during the construction works due to potential influx of workers to the area. However the women felt that it is important to hire local workers in such projects. In fact, there are well educated women in both cazas, such that they can be involved in the project during rehabilitation (for office work, engineering work or supervision, etc.).
- All women participants stressed on the need for clear coordination mechanism with municipalities before the implementation of the project not to duplicate the road rehabilitation work.
- The female participants felt that during operation, the project will contribute positively to improving the economy in a direct and indirect way. In fact, the stated that when improving the conditions of the roads more visitors will come to the villages and people will be encouraged to build houses in their home towns.

Photographic documentation of the public hearing can be found on the following pages.

List of Attendees

جلسة مشاركة عامة - الحضور

PUBLIC HEARING - ATTENDANCE SHEET

مشروع الطرق والعمالة في لبنان

3.2 - Bent Jbeil - Marjayoun

Date: 3-Jan-20

الامضاء Signature	الهاتف Telephone	الصفة Position	البلدة Town	المؤسسة Institution	الاسم Name	
[illegible]	03-929296	Senior Env Consultant	Beirut	Eco centra /ACE	Sania El Nakib	1
				ACE	Firas	2
				OR	Roland	3
				ACE	Ali Meer	4
[illegible]	71-645876	عضو بلدية تبنين	تبنين		عبد الأمير [illegible]	5
[illegible]	03/103487	رئيس بلدية كونين	كونين		محمد [illegible]	6
[illegible]	03-100855	مدير الاتحاد	شبنين	اتحاد بلديات القلعة	علي حسن فواز	7
[illegible]	03313305	رئيس الاتحاد		اتحاد بلديات جبل عامل	علي طاهر ياسين	8
[illegible]	03/869244	رئيس بلدية	بنت جبيل	رئيس بلدية بنت جبيل	عفيف بزي	9
[illegible]	03998610	رئيس البلدية	عيناثا	رئيس بلدية عيناثا	رياض فضل الله	10
[illegible]	76456688	رئيس لجنة الاشغال	عيناثا	بلدية عيناثا	حسن كامل ابراهيم	11
[illegible]	70070640	مندوبة عن البلدية	الطيبة	بلدية الطيبة	[illegible]	12
[illegible]	٧١/٠٨٨٤٤٢	مندوبة عن البلدية	الطيبة	بلدية الطيبة	صباح محمد [illegible]	13
	03179900	مندوبة اجتماعية	يارون	بلدية يارون	نجوة صالح صالح	14
[illegible]	70215369	مندوبة الهيئات النسائية	يارون	بلدية يارون	[illegible]	15
[illegible]	70/043527	Child protection Development coordinator	تبنين	Worldvision Lebanon	رشا ذكي	16
[illegible]	71/959612	Detention Monitor South	تبنين	SHEILD	مريم قدوح	17
[illegible]	76/064159	هيئات نسائية	يارون	بلدية يارون	ديانا [illegible]	18
[illegible]	03-630172	منسق البلدية (مدير البلدية)	الطيبة	بلدية الطيبة	حسين علي حيدر	19
[illegible]	70-776416	مهندس الاتحاد	ميس الجبل	اتحاد بلديات جبل عامل	Zein Chamma	20
Ahmad [illegible]	03047900	[illegible]	عديسة	بلدية عديسة	أحمد محمد ابراهيم	21
[illegible]	03137094	عضو مجلس بلدي	يارون	بلدية يارون	محمد عطا [illegible]	22

جلسة مشاركة عامة - الحضور

PUBLIC HEARING - ATTENDANCE SHEET

مشروع الطرق والعمالة في لبنان

3.2 - Bent Jbeil - Marjayoun

Date: 3-Jan-20

الامضاء Signature	الهاتف Telephone	الصفة Position	البلدة Town	المؤسسة Institution	الاسم Name	
[illegible]	03/899869	رئيس	يارون	رئيس بلدية	علي قاسم [illegible]	1
[illegible]	03/133575		يارون	[illegible]	[illegible]	2
[illegible]	03/341401		عيناثا	[illegible]	نزار جعفر	3
[illegible]	03/326820		عيناثا	مدرسة	فاتن عدنان إبراهيم	4
[illegible]	03/399598	رئيس	بيت ياحون	رئيس بلدية	[illegible]	5
[illegible]	03-12-10-11	مختار البلدة	بيت ياحون	مختار	علي خليل شعبان	6
[illegible]	03-879750	عضو مجلس بلدي	بيت ياحون	بلدية بيت ياحون	احمد حسن [illegible]	7
[illegible]	03 367428	عضو مجلس بلدي	حداثا	بلدية حداثا	[illegible]	8
[illegible]	17/435913	موظفة	عديسة	بلدية عديسة	رندة حسن الأشقر	9
[illegible]	70/902311		عديسة	بلدية عديسة	[illegible]	10
[illegible]	70/334614	[illegible]	يارون	بلدية يارون	[illegible]	11
[illegible]	76/169866	مهندس [illegible]	يارون	بلدية يارون	حسن [illegible]	12
[illegible]	03,579033	عضو بلدي	دير سريان	بلدية دير سريان	[illegible]	13
[illegible]	03(740182)	[illegible]	[illegible]	اتحاد بلديات [illegible]	محمود [illegible]	14
[illegible]	03683743	نائب رئيس	دير سريان	بلدية دير سريان	د. علي احمد ابراهيم	15
						16
						17
						18
						19
						20
						21
						22

Presentation during Public Hearing

2/20/2020

1

2/20/2020

4. وصف المشروع

4.1 الطرق التي سيتم إعادة تأهيلها في قضاء بنت جبيل

- عيناتا - بيت ياحون – تبنين (Road 03)
- كونين – عيناتا (Road 05)
- بنت جبيل – يارون (Road 06)

مجموع طول الطرق المذكورة أعلاه: 18.5 كيلومتر

3. مراحل إعداد الخطة البيئية والإجتماعية

4.2 موقع المشروع في قضائي بنت جبيل و مرجعيون

4. وصف المشروع

4.1 الطرق التي سيتم إعادة تأهيلها في قضاء مرجعيون

- علمان مرجعيون - دير سريان - مدخل الطيبة (Road 06)
- العديسة – الطيبة (Road 07)
- مركبا – حولا – شقرا (Road 05)

مجموع طول الطرق المذكورة أعلاه: 17.9 كيلومتر

4.3 الطرق المقترح تأهيلها في قضائي بنت جبيل و مرجعيون

2/20/2020


LOT 3- South Area
كونين – عيناتا
كونين - عيناتا
Google Earth


LOT 3- South Area
بنت جبيل - يارون
بنت جبيل - يارون
Google Earth


LOT 3- South Area
مركبا – حولا - شقرا
مركبا - حولا - شقرا
Google Earth


LOT 3- South Area
علمان مرجعيون - دير سريان - مدخل الطيبة
علمان مرجعيون - دير سريان - مدخل الطيبة
Google Earth


LOT 3- South Area
الحديسة – الطيبة
الحديسة - الطيبة
Google Earth


4.4 صور لعدة مواقع ضمن المشروع في قضائي بنت جبيل و مرجعيون
Bent Jbeil Road 3 – Sta 5+440

3

2/20/2020

4.4 صور لعدة مواقع ضمن المشروع في القضاء بنت جبيل و مرجعيون

Marjayoun Road 3 – Sta 1+500

4.4 صور لعدة مواقع ضمن المشروع في القضاء بنت جبيل و مرجعيون

Marjayoun Road 3 – Sta 1+500

5. ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

بناءً على الدراسات الهندسيّة، إن أعمال التأهيل المقترحة خلال مرحلة التنفيذ تضمّ التّالي حسب المتطلبات الفنية والسلامة العامة:

- تأمين/تأهيل أقنية، عبارات لتصريف مياه الأمطار
- تأهيل شبكات إنارة
- تأهيل أرصفة

5. ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

بناءً على الدراسات الهندسيّة، إن أعمال التأهيل المقترحة خلال مرحلة التنفيذ تضمّ التّالي حسب المتطلبات الفنية والسلامة العامة:

- تأمين/تأهيل الطبقات الإسفلتية والاساس
- تأمين/تأهيل إشارات سير و تخطيط الطرقات
- تأمين/تأهيل جدران دعم إستنادية
- تأمين/تأهيل حواجز سلامة جانبية

6. الآثار البيئية والاجتماعية الإيجابية للمشروع

- تقليل الازدحام المروري وتسهيل التنقل في وإلى الضناء
- خلق فرص عمل لأبناء المنطقة والمساهمة في التنمية الاقتصادية المحلية
- المحافظة على السلامة العامة في الطرقات من خلال تقليل حوادث السير والانجرافات
- تشجيع الشركات المحلية من خلال بيع المواد الخام والآلات والسلع
- ازدهار التنمية الاقتصادية والاجتماعية في المناطق الريفية
- التقليل من تلوث الهواء والغبار

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

النشاط	الأثر المحتمل
أعمال بناء أوإصلاح مجاري مياه الأمطار	أضرار على البيئة التحتية
قلع الأشجار والنباتات	ضرر على النوع الحيوي
التخلص غير السليم من النفايات الصلبة	تلوث التربة والمياه
احتمال لحالة حوادث تسرب	تلوث التربة والمياه
التدابير التخفيفية	
• التخلص السليم من النفايات الصلبة الناتجة عن أعمال التنفيذ	
• صيانة كافة الآليات بشكل دوري لمنع حوادث التسرب	

8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التشغيل

النشاط	الأثر المحتمل
زيادة حركة المرور	زيادة احتمال حوادث السير
زيادة حركة النقل على الطرق	زيادة انبعاث ملوّثات الهواء والضجيج والارتجاجات
زيادة الانسكابات والتسربات الناتجة عن المركبات المتنقّلة	تلوّث التربة والمياه
التدابير التخفيفية	
• الصيانة الدوريّة للطرق	
• صيانة البنية التحتيّة مع تفادي تأثيرها على الطرق	
• تقليل حركة مرور الشاحنات الثقيلة بهدف المحافظة على الطريق	

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

النشاط	الأثر المحتمل
حركة الآليات والمركبات	زيادة احتمال حوادث السير
انبعاثات الغبار وزيادة نسبة الضجيج	ضرر على السلامة العامة وسلامة العمال
التدابير التخفيفية	
• إدارة حركة المرور أثناء تنفيذ المشروع وتعيين موظف لهذه المهمة	
• التأكد من أن الإشارات التحذيرية وأنظمة الإضاءة ظاهرة وموجودة في الأماكن المكتظة وخاصة قرب المدارس والمستشفيات والمداخل التجارية	
• حصر أعمال التنفيذ خلال فترة النهار	

شكـــــراً لحضوركم ومشاركتكم

أسئلة ومناقشة عامة

يمكنكم إبداء رأيكم:

عبر التواصل مع
المكتب الهندسي الإستشاري
هاتف: 01/497250
ماكس: 01/497550
بريد الكتروني: ace@ace-intl.com

أو

عبر التواصل مع
وحدة مشروع الطرق والعمالة
في مجلس الانماء والاعمار
هاتف: Ext. 317 01/980096
بريد الكتروني: rstephan@cdr.gov.lb

ANNEX 4: GRIEVANCE REDRESS MECHANISM (GRM) FORM

Reference No:	
Contact Information **Please mark how you wish to be contacted (mail, telephone, e-mail).**	☐ **By Post: Please provide mailing address:** _____ _____ _____ ☐ **By Telephone:** _____ ☐ **By E-mail** _____
Preferred Language for communication	☐ **Arabic** ☐ **English**

Description of Incident or Grievance:	What happened? Where did it happen? Who did it happen to? What is the result of the problem?
Date of Incident/Grievance	
	☐ **One time incident/grievance (date _____)** ☐ **Happened more than once (how many times? _____)** ☐ **On-going (currently experiencing problem)**
What would you like to see happen to resolve the problem?	

Signature: _____

Date: _____

GRM Log Book

Name/group of commenter/complainant	Complaint Received date	Description of Issues	Proposed Corrective Actions	Date of Response	Status		
					Solved	Ongoing	Pending