

A1 Highway
Non-Technical summary
Environment Impact Assessment

1- Details of studies carried out

The A1 Highway is the main entrance from the North and Mount Lebanon to Beirut and vice versa.

The rehabilitation and widening of the A1 Highway is a must and is the project to execute between Nahr El-Kalb and Tabarja.

EIA detailed study started with the description of the actual status of the A1 Highway followed by the description of the vehicle transportation environmental impact; as well as the noise and vibration impacts. Current status of the coastal environment of A1 Highway as well a seismic study of the project followed as well.

An evaluation of cumulative impacts of the highway was done.

2- Information about protected areas potentially affected by the project

There are no protected areas potentially affected by the project.

Also, widening and rehabilitation of the A1 Highway will not affect :

- The coastal line with its head lands, cliffs, tides and terraces,
- The Nahr El-Kalb River,
- The preservation of rare plants, plant species and diversity,
- The fauna and flora,
- Fishes, forests, natural preserved areas, gardens, since the project is not concerned by these elements,
- The expropriation decrees on this highway done in 2005 and 2008 (remaining unchanged),
- The historical, archaeological and cultural heritage.
- The Fresh water resources and quality
- The existing green areas or lands; instead creation of new green areas will occur.
- The nearby population along the existing highway, in displacing the inhabitant.

3- Public consultation procedures

- Expropriation decrees on the highway are done.
- No objection on October 12th 2009 from the union of the Municipalities in Kesrouan and Ftouh.

- No objection on October 27th 2009 from the Chiefs of Municipalities in the caza of Kesrouan and Ftouh and from influent shop-owners along the highway.
- No objection on October 27th 2009 from Jounieh Municipality and from Jounieh influent representatives.

4- Mitigation measures

Negative Impacts foreseen during construction, as well as mitigation measures are as follows :

- Noise is now between 25 and 76 dB, it will increase during excavation works, programmed on daily part times.
All Engines and motors for site civil works must have acceptable noise level and will be working during working hours only.
- Pollution during works is expected from gas emissions. It has been limited to:
 - Heavy trucks circulating,
 - Generators (if necessary); power limitation will be 30 KVA or less.
 - Asphalt layers when lay out (occasionally)
- In regards to daily waste water pollution per Contractor's workers, the Contractor will respect decree 52/1 Annex 5 related to this item and will follow instructions to where these waste water will be connected; avoiding savage connection.

5- Particular requirements added to the Tender Documents of the project

- Traffic management and deviation during works is included in the tender documents, by the Consultant to be followed by Contractor.
- Security and health management procedures and specifications are part of the administrative documents to be signed by Contractor to respect during works.
- Working hours will be during periods where traffic is low to avoid negative impacts on road users, with intervals to avoid: Peak hours, official day-offs, Saturdays, Sundays, night (for noise purposes)
- Program of works will be submitted by Contractor prior to works, based on environmental expectation as well, and will be examined and agreed by the Supervision Team prior to works.
- The Site Supervision Team includes the Client (CDR) , the A1 Supervision Consultant and the Environmental Engineer
- Gravels excavated must and will be stocked or reused in rehabilitation road works.
- Electric and metal products removed must and will be disposed as per law.
- Materials and refusals related to widening must and will be reused or stocked or disposed as per law.
- Only ready mixed concrete and ready mixed asphalt must and will be used.
- Raw materials such as sand and aggregates must and will be extracted from licensed quarries.
- Preparation of concrete and asphalt must and will be done exclusively inside the legal factories. No chemicals will be used.

- Sprinkles must and will be used continuously during excavation works, backfill and compaction works, to prevent dust spreading in the atmosphere.
- Excavation products must and will be disposed as imposed in appropriate licensed fills.
- Old networks are maintained in function till new networks are operational.
- Explosives must and will not be used.
- Discharge in maritime or river environment must and will not occur.
- Waste water must and will not occur from pouring.
- Noise is now between 25 and 76 dB, it will increase during excavation works, programmed on daily part times, as per Client site instructions. All Engines and motors for site civil works must and will have acceptable noise level and will be working during working hours only.
- Pollution during works is expected from gas emissions. It must and will be limited to only:
 - Heavy trucks circulating,
 - Generators (if necessary); power limitation will be 30 KVA or less.
 - Asphalt layers when lay out (occasionally)
- In regards to daily waste water pollution per Contractor's workers, the Contractor must and will respect decree 52/1 Annex 5 related to this item and will follow instructions to where these waste water will be connected; avoiding savage connection.

6- Land acquisition status including N° of plots needed and N° of residential and commercial

	Total	Buildings within private properties		Buildings extending beyond public domain	
		Residential	Commercial	Residential	Commercial
Total number of affected plots	193	N/A	N/A	N/A	N/A
Total number of affected buildings	50	15	22	1	12
Number of buildings violating set back conditions within private properties	9	9		N/A	
Total number of affected families	17	13	N/A	4	N/A

7- Non-technical summary

- Geometry

The rehabilitation of the A1 Highway as well as new link roads in the vicinity of the highway needed to connect localities independently from the highway in order to alleviate traffic on highway.

Section	Length of highway except service roads (Km)	Number of lanes
A1 Highway in the caza of Kesrwan with service roads on both sides	10	2 x 3 lanes

The required Upgraded Service Roads and the Link Roads have been studied and integrated with the widening of the highway to 3 lanes with lateral roads on both sides.

Section	Length (Km)	Total width of land acquisition (m)	Number of lane
Zouk Mosbeh – Kaslik trough an underpass	0.3	6	1 lane one way
Zouk Mikael – Haret Sakhr	0.5	11	2x1 lane
Sahel Alma – Ghazir	0.3	11	2x1 lane
Kfarhbab – Adma	1.8	11	2x1 lane
Tabarja – Kfaryasine	1.5	10	2x1 lane

The main objective of this study is the rehabilitation and the upgrading of the existing highway and the construction of new lateral roads to eliminate all direct access to the mainline, if possible and assure the traffic continuity.

The design of the rehabilitation works and proposed works is conform to the LIBNOR and AASHTO design criterias, modified only where needed to suit local conditions. The design speed of the highway will be 80 Km/h while that of the lateral roads will be 40 Km/h.

The geometric design criterias, according to AASHTO standards and to LIBNOR, can be summarized in the following Tables A and B :

Table A (Highway)

Geometric Elements	Preferable Value	Min. or Max. Value
Design speed	80 Km/h	80 Km/h
Lane width	3.50	3.00
Minimum horizontal curve radius	80	70
Minimum horizontal curve radius with normal crown	400	
Minimum vertical curve radius		
Crest	800	700
Sag	1005	900
Maximum longitudinal slope	10	12
Minimum longitudinal slope	0.5	0.3
Normal cross slope	2%	2.5%
Maximum super-elevation	6%	8%
Maximum relative gradient for super-elevation change (α)	1/150	1/150
Minimum vertical clearance	5.00m	4.85m
Minimum curve without widening	200	-
Outer shoulder width	2m	1.0m
Stopping sight distance	65m	52.5m - 72.5m
Inner shoulder width	0.70	0.3

Table B (Lateral Roads)

Geometric Elements	Preferable Value	Min. or Max. Value
Design speed	40 Km/h	30 Km/h
Lane width	3.00	4.00
Paved shoulder	2.00	2.00
Minimum horizontal curve radius	50	50
Minimum horizontal curve radius with normal crown	300	-
Minimum vertical curve radius		
Crest	660	418
Sag	440	250
Maximum longitudinal slope	10	12
Minimum longitudinal slope	0.5	0.3
Normal cross slope	2%	2.5%
Maximum super-elevation	6%	8%
Maximum relative gradient for super-elevation change (α)	1/143	1/133
Minimum vertical clearance	5.00m	4.85m
Minimum turning roadway width	5.50m	5.00m
Minimum curve without widening	200	-
Outer shoulder width	2m	1.0m
Stopping sight distance	45m	40m - 49.5m
Inner shoulder width	0.5	0.3

- Lane width

Therefore, we adopted the 3.5m lane width for the three-lane highway, 3m lane width for the unidirectional one-lane lateral roads and a 2m as a paved shoulder.

- Number of lanes

The sections of the highway from Ajaltoun interchange to Tabarja interchange consist of a three lane carriageway in each direction.

The sections of the lateral roads consist of a one lane carriageway and a 2m paved shoulder.

- Retaining walls

Retaining walls shall be provided when economically and physically justified, i.e. in the following situations :

- At limit of expropriations to cut down an expropriation expenses or to protect abutting properties.
- In areas where the road is on fill.
- In areas where the road is in deep cut and the soil is loose.

- In areas as a protection from adjacent rocky cut slopes. In this case, a 1.5m high wall may be proposed at the road edge and at a certain distance away from the mountain to retain falling rocks.

- Structures

- An overpass will be created on the link Kfarhabab – Adma over Wadi Ghazir

Overpasses	At Km	Length (m)	Width (m)	Free Height (m)	Materials
OP 1.1	0 + 935	40	11	15	Pre-stressed concrete

- A new underpass will be designed between Zouk Mosbeh from highway Western side and the highway Eastern side before Kaslik Interchange.

Underpass	At Km	Length (m)	Width (m)	Free Height (m)	Materials
Kaslik New underpass	Kaslik	58.5	5.5	5	Reinforced concrete

- Interchanges

Four interchanges will be worked out:

- Kaslik interchange
- Improvement of Jounieh interchange
- Chnaniir interchange
- Adma interchange