Devoll Hydropower Project
Engineering Services -
Development Phase

ESIA Final Report

Executive Summary

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ES1.1 BACKGROUND AND PURPOSE

ES1.1.1 Devoll Hydropower

Statkraft AS, the Norwegian based European leader in renewable energy and EVN AG, an Austrian based leading utility company, with major investments in Eastern and South Eastern Europe, have formed a 50%/50% Joint Venture - Devoll Hydropower Sh.A. (DHP). On 19 December, 2008 in Tirana, the joint venture company was awarded the right to develop hydropower projects on Devoll River in Albania, by signing a Concession Agreement (CA) with the Government of Albania (GoA). The CA, in force since 1st April 2009, gives DHP a Build, Own, Operate and Transfer (BOOT) Concession for developing and utilising the hydropower potential in Devoll River.

The Concession Area is located about 70 km south of Tirana and includes the mountainous region of the middle and upper reaches of the Devoll River between the town of Maliq and the Banja village. The project area, as defined in the Concession Agreement, includes the entire Devoll Valley between Maliq, situated at the border of the high plateau of Korçë, and the village of Banja located some 40 km south of Tirana.

Topographically Devoll catchment covers the Korçë plateau, the mountainous middle reaches of Devoll and Tomorricë rivers down to Gramsh and the undulated hilly countryside from Gramsh down to Kozare. At Kozare in Kuçovë District the Devoll River joins with Osum River and takes the name of Seman River as shown on Figure ES. 1

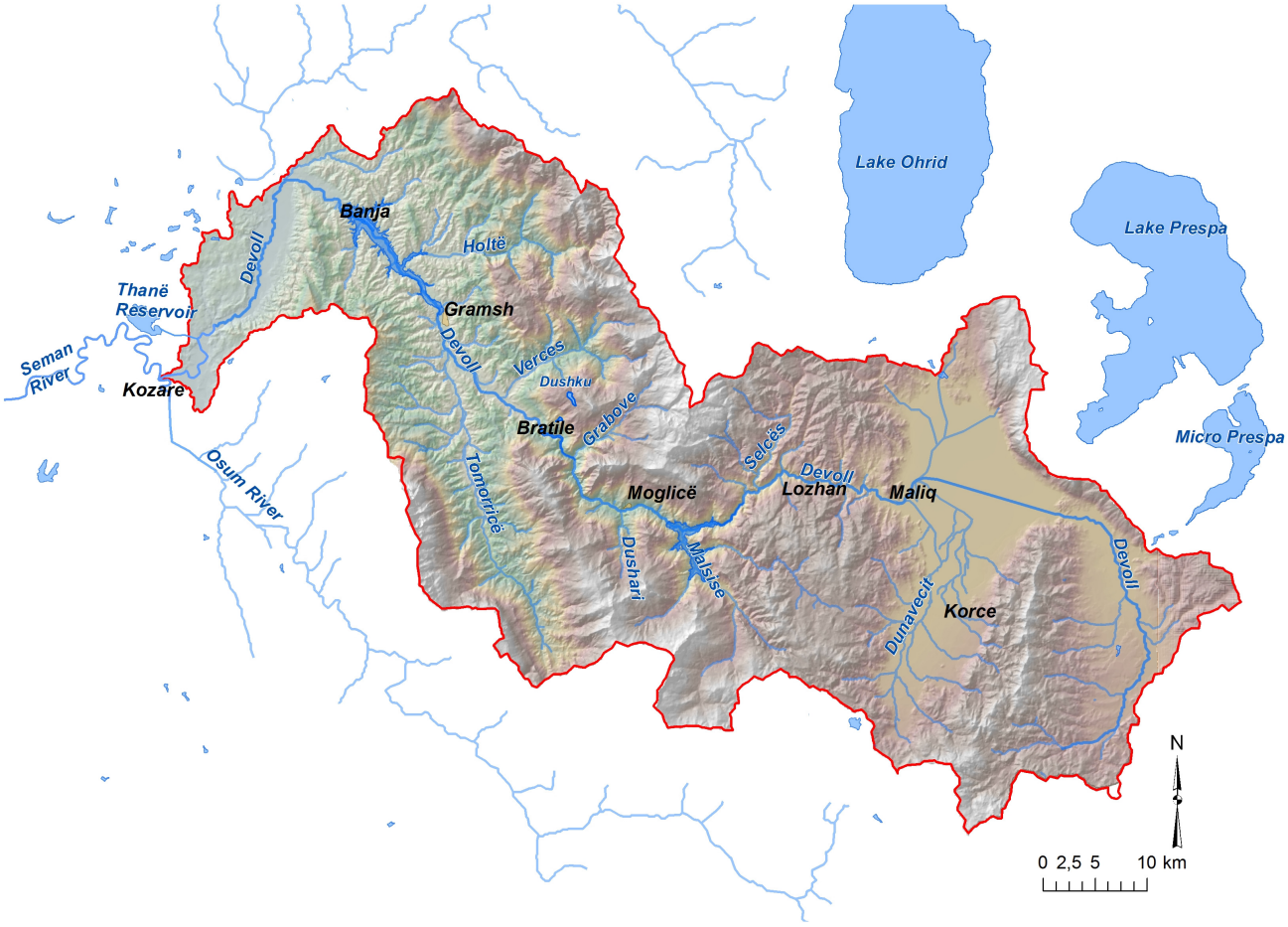

Figure ES. 1: Devoll River Basin - Concession Area Extending from Maliq to Banja

ES1.1.2 EIA/ESIA Requirements, Environmental Declaration and Report User Guide

The Albanian environmental impact assessment (EIA) requirements and processes are described in LAW No. 8990, dated 23.1, 2003 (changed). The law introduces two levels of assessment:

- Profound (advanced) process and
- Summary (outlined) process.

Different categories of project and size limits of project, falling into each category are presented in Appendices to the law. Hydropower is included in Appendix 1 listing "projects to undergo profound process of impact assessment on environment". It is understood that the normal Albanian EIA preparation should follow a standard environmental and social impact assessment (ESIA) sequence, which includes:

- Notification of start of planning
- Environmental and Social Scoping and preparation of TOR for ESIA
- ESIA Report preparation and consultation

DHP having made the decision that the ESIA process for the Devoll HPP should, additional to meeting Albanian ESIA procedures, also be in conformity to IFC's Performance Standards with World Bank references, a harmonization analysis between national and international requirements had to be carried out. This material is found in the appendices to the main report, termed a Gap Analysis.

To adequately address the Albanian EIA requirements and to meet international ESIA practices in line with DHP company policy, a series of steps were designed for the ESIA process with the objective of providing environmental/social input to the engineering planning. In tune with the engineering planning progress, the four phases were identified for the ESIA activities and later supplemented with updated names as follows complying with the latest decision about project phasing:

Phase 1 - Initial Planning:	ESIA Planning Report including irrigation benchmarking.
Phase 2 - Project Formulation:	ESIA Screening Report with environmental/ social ranking of main development alternatives and Scoping Report with draft TOR for ESIA process.
Phase 3 - ESIA Feasibility:	ESIA Feasibility Report as input to the Devoll HPP Feasibility Study
Phase 4 - ESIA process reporting:	Draft ESIA report (review version for DHP and disclosure version for public disclosure and consultation purpose)
Draft and Final ESIA:	Draft and Final (profound[1]) ESIA Report
Transmission ESIA:	Transmission Line Study provided as Appendix U to the ESIA report with findings integrated into Executive Summary.

End Norconsult's role as independent assessor and start as advisor to DHP for:

Environmental and Social Management Plan (ESMP):

	HPP Banja ESMP and HPP Moglicë & HPP Kokël ESMP
Resettlement Action Plans:	RAP HPP Banja and RAP HPP Moglicë & HPP Kokël

[1] The expression used in translated Albanian EIA legislation

The present report refers to Phase 4 in this ESIA process which has been carried out by Norconsult AS of Norway. Independent Social Scientists from UK have undertaken the SIA aspects and a series of senior Albanian professionals and academics have supplied services to both the EIA and SIA activities of the ESIA Team.

The GoA, represented by the Ministry of Environment, Forest and Water Administration, issued on 14 September 2010 an Environmental Declaration based on a Strategic Environmental Assessment (SEA) proposal for energy planning in Devoll River. It outlined a number of conditions that the ESIA process has endeavoured to meet.

This ESIA Report is designed to fulfil Albanian and international EIA requirements but is also a repository of vital environmental and social information and data that will be useful for DHP in the many years of construction and operation that lie ahead. A large amount of data is now available and is presented in the appendices and its annexes. To enable reviewers of different background and duties to get a grasp of where information of different nature is to be found, an Overview User Guide has been devised in Table ES. 1.

Table ES. 1: Overview User Guide for ESIA Report

Report Element	Main Subject Matters	Target User Group
Volume 1- Main Report (publically disclosed 12 August 2011with Executive Summary placed on Internet in English and made available to the affected population as hard copies in Albanian during the week ahead of disclosure. The full report in English is made available in DHP's offices in Tirana and Gramsh.)		
• Executive Summary (in English and Albanian)	Comprehensive summary of ESIA process, report, findings and recommendations	• Decision makers • Public • All reviewers
• Ch. 1, 2 & 3	Introduction; planning frameworks; description of project	• All reviewers
• Ch. 4 & 5	Baselines	• Reviewers with a professional background
• Ch. 6	Impacts	• All reviewers
• Ch. 7	Alternatives	• Reviewers with a professional background
• Ch. 8, 9 & 10	Mitigation/Management/Monitoring Plan	• All reviewers
• Ch. 11	Conclusions and Recommendations	• Decision Makers • All Reviewers

Report Element	Main Subject Matters	Target User Group
Volume 2 A -Appendices A to L		
• Appendix A, B, C, D & E	Biophysical investigations and data of primary and secondary nature	• Reviewers with scientific background • DHP Env. Unit
• Appendix F , G & H	Scientific field work and modelling of regulated river reaches, net emission of GHGs from reservoirs and low flows	• Environmental professionals/scientists • Engineers • Special reviewers
• Appendix I	Water quality information and analysis	• Environmental professionals/scientists • Special reviewers
• Appendix J	Inventory of relevant infrastructure	• All reviewers
• Appendix K & L	Inventory of irrigation activities and infrastructure, upstream irrigation demand and economic costs of inundation.	• Decision Makers • DHP and GoA
Volume 2 B -Appendices M to T		
• Appendix M	Full social impact assessment paper based on impact consultations in communities	• Environmental professionals/scientists • Special reviewers
• Appendix N	Background baseline data acquired by local enumerator teams in the field	• Environmental professionals/scientists • Special reviewers
• Appendix O	Principles to be followed in RAP processes including Gap Analysis	• Environmental professionals/scientists • Special reviewers
• Appendix P	Survey of recognized cultural heritage sites within or near project area	• DHP Env. Unit • Special reviewers
• Appendix Q & R	Mandatory information re. ESIA	• DHP Env. Unit

Report Element	Main Subject Matters	Target User Group
	preparers and sources of information	• Special reviewers
• Appendix S • Appendix V	Record from and verification of Impact Consultation process and reports on Report of the Public Hearing on Draft ESIA	• DHP Env. Unit • Special reviewers
• Appendix T	Background material to environmental policy and legal framework	• All reviewers
• Appendix U	Transmission Line Study	• All reviewers

ES1.2 ENVIRONMENTAL LEGISLATION AND POLICY

The development of a modern legal system for environmental protection in Albania began in 1991. With all the efforts made towards the improvement of the environmental legal system, there are still gaps, especially in the aspects of nature protection, and biological and landscape diversity. The present legal system is therefore under constant refinement. The Government is paying special attention to harmonizing its laws with those of the European Union (EU).

The Constitution, approved in 1998, calls upon the Albanian authorities to preserve a healthy environment, ecologically suitable for present and future generations. To achieve this, the Government should further improve and complete the legal and institutional framework covering the environment, nature and biodiversity protection. Presently the relevant ruling laws are:

- The "Law on Environmental Protection" (1993, amended in 1998, 2002, and 2008)
- The "Law on Environmental Impact Assessment", dated 23.1.2003
- The "Law on Water Resources" (No. 8093/1996)
- Law 8561, dated 22.12.1999, "On Expropriations and Temporary Takings of Private Property for a Public Interest" and four Council of Ministers Decisions define the procedures for expropriation of immovable property in Albania.
- Law 9482 of April 3, 2006 sets out conditions under which an illegally constructed building may be legalized.

ES1.3 BASIN DEVELOPMENT ALTERNATIVES IN CONTEXT OF CONCESSION AGREEMENT

ES1.3.1 Concession Agreement

A Project proposal aiming at harnessing the entire available hydropower potential in the Devoll River formed the basis for Devoll Hydropower Concession Agreement. This proposal should be optimised based on geological, hydrological, environmental and engineering investigations and analyses. A three step development from the Korçë Plains to Banja Dam in a cascade consisting of three hydropower plants was planned. They were (in an upstream to downstream order):

- Lozhan-Grabovë Plant with an installed capacity of 160 MW
- Skënderbegas-Çekin Plant, 114 MW, and
- Banja Plant 45 MW

The analysis of alternatives was initially based on this Project concept and further developed within the premises given by the CA.

ES1.3.2 Initial Analysis of Alternatives

A number of project alternatives and modifications have been assessed by the developers during the period of several years of project planning. The base case designed by EVN was the basis for the Concession Agreement document. The Concession Agreement is, however, flexible as to the precise scheme layout including location and height of dams, power stations, tunnels etc. as long as the basic parameters for the basin development as a whole are met and several rounds of scrutiny of alternatives has taken place.

The final evaluation of alternatives concentrated around the following cases:

- The initial case presented in the Concession Agreement (EVN BC);
- A scheme suggesting some reductions to dam heights and inundation levels, power station locations and tailrace outlet levels, termed the Statkraft Base Case (SK BC);
- Two cases initially developed by the Engineering Services Team (EST) (NC 1 and NC 2).
- Two additional cases developed by the EST during the review of the Screening Report - Preliminary Version, July 2009 (NC 3 and NC 4).

Initial inputs from the ESIA Team to the planning process at the stage of alternative screening have been through the setting of environmental criteria as reported on in ESIA Screening Report. The project alternatives considered at this stage of planning are indicated in Figure ES. 2.

Based on the preliminary design and location details, a qualitative judgement of the key environmental and social features of the six alternative hydropower schemes was carried out as shown in Table ES. 2. It applies a scoring of key categories of environmental and social criteria based on a very general comparison of the proposed project alternatives.

The resulting ranking was presented to the planning team as an environmental/social prioritisation of preference between the alternatives considered. The preliminary conclusion was, however, that all alternatives were judged to be acceptable from an environmental and social point of view provided appropriate mitigation measures and compensation is put in place.

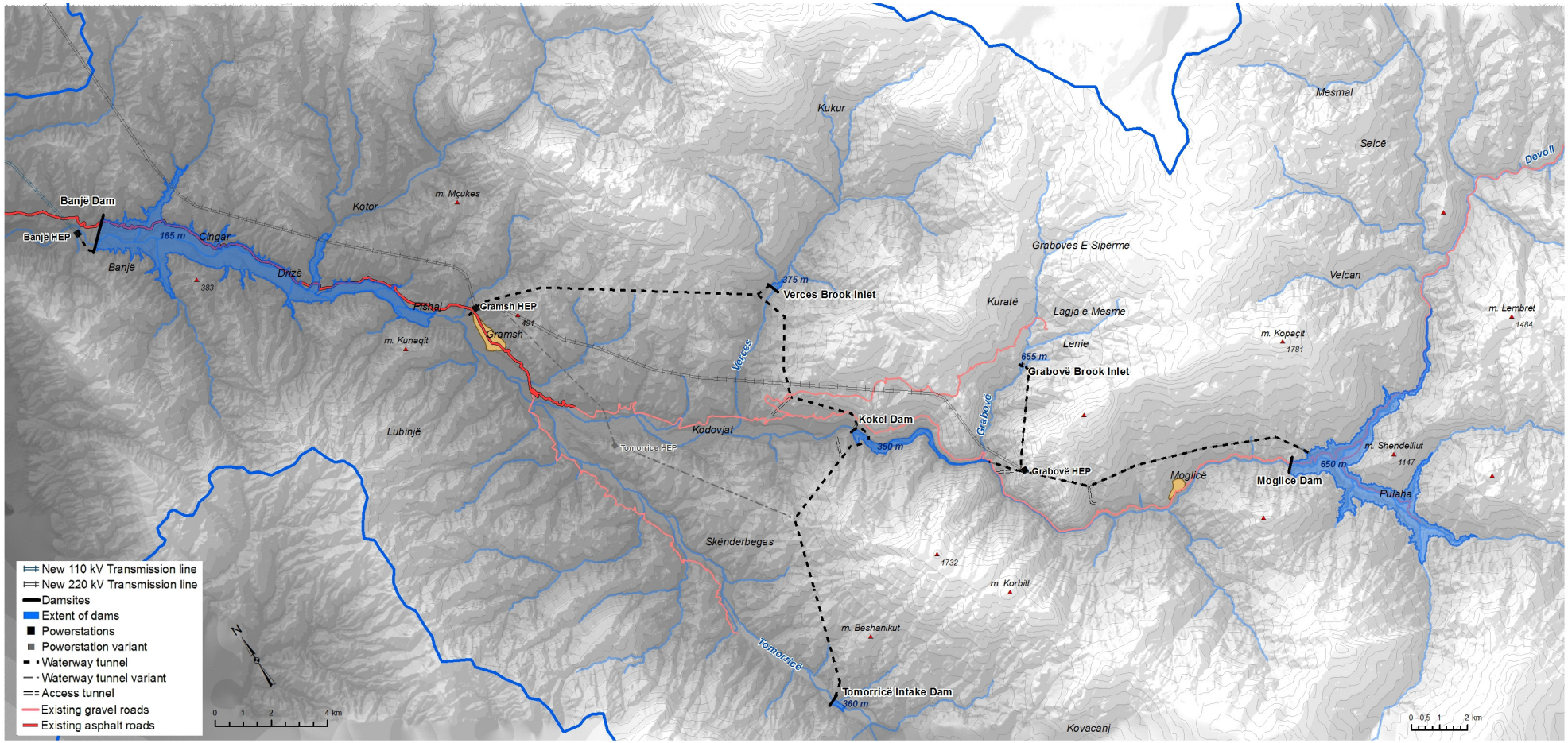

Figure ES. 2: Devoll Basin Hydropower Development Scheme with Variants

Table ES. 2: Assessment and Ranking of Environmental and Social Impacts of the Main Project Alternatives

Scheme Alternative / ESIA Criterion	EVN BC	SK BC	NC 1	NC 2	NC3	NC4
Displacement of people and compensation for properties	÷ ÷ ÷	÷ ÷	÷ ÷	÷	÷ ÷ ÷	÷
Re-settlement needs	÷ ÷ ÷	÷ ÷	÷ ÷	÷	÷ ÷ ÷	÷
Impact on socio-cultural values	÷ ÷ ÷	÷ ÷	÷ ÷	÷	÷ ÷ ÷	÷
Risks of socio-economic upheaval	÷ ÷	÷	÷	÷	÷ ÷	÷
Productive land lost	÷ ÷ ÷	÷ ÷	÷	÷	÷ ÷ ÷	÷
Ecosystem Impacts - aquatic	÷ ÷	÷ ÷	÷ ÷ ÷	÷ ÷	÷ ÷	÷ ÷
Ecosystem impacts - terrestrial	÷ ÷	÷	÷	÷	÷ ÷	÷
Forest lost and need for replanting	÷ ÷	÷	**0**	**0**	**÷ ÷**	**0**
Water user impacts	÷ ÷	÷	÷	÷	÷ ÷	÷
Ranking between project alternatives from environmental and social perspective	**4**	**3**	**2**	**1**	**4**	**1**

In the ranking the impacts the following categories and symbols have been used: High negative ÷ ÷ ÷**,** Medium negative ÷ ÷**,** Small negative ÷**,** Insignificant **0.**

ES1.3.3 Selected Alternatives in Feasibility Studies and Revised Impacts

The preliminary Feasibility Study (FS) of 1 April 2010 presented a 'Selected Scheme' and discussed variants associated with it. Among the scheme alternatives discussed above, either NC 2 or NC 4 (different power station locations) was favoured - the final choice depending on results of ongoing drilling and further planning. Proper names were now attached to the alternatives as follows:

- NC 2: Grabovë HEP with dam at Moglicë + Gramsh HEP with dam at Kokël
- NC 4: Grabovë HEP with dam at Moglicë + Tomorricë HEP with dam at Kokël

The preliminary FS stated that there are doubts as to the viability of the diversion of Tomorricë River and use of tributaries Vërçës and Grabovë to increase power production. These variants are shown on Figure ES.2 as dotted lines with the Tomorricë HEP and (NC 4) shown as a faint broken line. It must be noted that the two tunnels from Kokël to Gramsh, via Vërçës or via Tomorricë HEP, are mutually exclusive alternatives and the boldness of the lines on the map do not indicate any ranking between them.

At this stage the Banja Dam height had been increased by 10 m to HRWL at 175 masl, the Kokël Dam was now approximately 50 m with HRLW at 350 masl and the Moglicë Dam had been heightened to approximately 150 m with HRWL at 650. In environmental terms, the planning process had therefore reduced the environmental and social impacts by moving away from the original base cases (EVN BC and SK BC) with the most severe impacts and was now focusing on the alternatives with priority rank from the ESIA Team presented in Table ES.3. But the inundated areas and impacts on affected villages and homesteads had been increased slightly. For Grabovë HPP i.e. Moglicë Dam an additional 11 buildings would be lost (up from 76), while for Banja HPP i.e. Banja Dam an additional 30 buildings would be lost (up from 15), with no such effect at Kokël Dam[2].

[2] The quantification of buildings (of various uses and state of repair) lost is here based on preliminary field surveys and picture counts - corrected figures following SIA field work are presented in Table ES 19.

These increases in inundation impacts were not considered major by the ESIA Team and no other potential 'show stoppers' of environmental or social/cultural nature had been identified. The Engineering Team was, however, encouraged to take a critical look at the technical/financial feasibility of diverting the tributaries into the scheme since the possible avoidance of such would greatly enhance the environmental footprint of the development.

A so called Final Scheme was presented in an updated version of the feasibility study (UFS) in September 2010. It avoided diversion of tributaries and considered two alternatives for location of power station for the Kokël Dam - either at the foot of Kokël Dam (HPP Kokël) or placing it in the left bank near the Nartë community just upstream of the confluence with Tomorricë River (HPP Nartë).

Environmentally the change in project concept is significant and to the better in aquatic ecology terms. By avoiding regulation of Tomorricë River the entire reach from upstream of Kerpicë to the confluence with Devoll River will be saved from dewatering. Likewise, the Vërçës and Grabovë tributaries will be maintained untouched and their flows into Devoll River will assist in providing a flow in the dewatered sections of Devoll. These changes in impacts are summed up in Table ES. 3.

Table ES. 3: Reduced Dewatering Effects and Social Disturbance due to Power Station Locations from FS to UFS

Feature	Preliminary Feasibility Study, April 2010		Updated Feasibility Study, September 2010	
	NC2: Grabovë + Gramsh HPPs	NC4: Grabovë + Tomorricë HPPs	HPP Moglicë + HPP Kokël	HPP Moglicë + HPP Nartë
Nos. of tributaries regulated	3	3	0	0
Length of dewatered tributaries	25 km	25 km	0 km	0 km
Length of dewatered main Devoll River	29 km	29 km	12 km	25 km
Location of d/s power station related to population centres	Outskirt of Gramsh	Near Nartë community	Away from any population centre	Near Nartë community

Based on a further revision of the UFS (November 2010), DHP decided that design should proceed on the basis of the Kokël HPP alternative with the Nartë HPP alternative omitted for further consideration at this stage. Seen from an environmental and social perspective this decision again moved the project to a socially more benign direction. With power now generated at the foot of Kokël dam rather than downstream at Nartë, the length of dewatered river is reduced to 12 km and the community of Nartë will not be directly impacted.

Almost all engineering design revisions since the base case of the CA have thus moved the project concept in a gradually more environmentally and socially favourable direction. The exception here is the heightening of the HRWL of Banja reservoir which has resulted in additional impacts. Still the ESIA team considers the cascade exploitation of the Devoll River through the HPP Moglicë, HPP Kokël and HPP Banja alternatives a low-impact hydropower scheme seen in a wider hydropower development context.

ES1.4 DESCRIPTION OF PROJECT

The final i.e. selected scheme utilises the head in Devoll River between elevation 650 masl (HRWL Moglicë Dam) and elevation 95 masl, (downstream of Banja Dam). The technical data for the three dams and power plants is presented in Table ES.4. Following decisions made on the revised FS (November 2010) only the Kokël alternative remains in the selected scheme (Figure ES. 3) that is being the subject of this ESIA report.

ES1.4.1 Upper Basin Development - HPP Moglicë

HPP Moglicë utilises a head of 300 m between 650 masl and 350 masl and will be operated as a peaking plant when warranted. Its layout, with location of construction facilities is indicated on Figure ES. 3. The dam reservoir has a live storage volume of about 152 Mm³ and dead storage volume of about 210 Mm^3. It creates a lake with a surface area of 7.2 km^2. By establishing the headrace tunnel (broken blue line) from the dam to the power station upstream of the Grabovë tributary confluence, Devoll River will be dewatered over a reach of 12 km.

ES1.4.2 Middle Basin Development - HPP Kokël

Kokël Dam and Reservoir

The Kokël Dam location is shown in Figure ES-3. Kokël Dam comprises an approximately 50 m high combined concrete and rockfill dam with HRWL at 350 masl and a fixed crest spillway. The dam reservoir has a live storage volume of about 15 Mm³ and dead storage volume of about 4 Mm^3. It creates a lake with a surface area of 0.85 km^2.

HPP Kokël

The layout of HPP Kokël is shown in Figure ES-3 utilising the head from Kokël Dam (350 masl) and Devoll River upstream of Banja reservoir. Utilized head for this project is 55 m. The power plant will be operated in peaking mode as warranted and has, in addition to the dam, main project components as listed in Table ES-4. By establishing the power station and tailrace at the toe of the dam, no downstream dewatering of Devoll River will take place, but the river will be subjected to a new and artificial peaking flow regime.

ES1.4.3 Lower Basin Development - HPP Banja

Design Concept

The Banja Dam, located in the lower part of the Devoll River, near the village of Shtepanj at the right bank of the valley already exists in a partly completed form will be raised to 175 masl and finalised as the first step in the development sequence for the DHP. The reservoir will reach up beyond the village of Çekin and reach the outskirt of the city Gramsh. The powerhouse is situated on the left side of the river, close to the village of Banja about 600 m below the dam. Figures ES-3 and ES-4 show the layout of reservoir with power station basically at the foot of the dam.

The reservoir which is already cleared and have partly been filled to above the road to Gramsh several times during heavy floods, will inundate an area of about 14 km^2 nearly up to Gramsh. HPP Banja utilizes a head of 77 m between 175 masl and 95 masl and will be operated as a peaking plant when warranted. The reservoir is planned to be regulated down 5.0 m at normal water flows, but 10 m further down in dry periods. Maximum flood water level, MFWL, is preliminary assumed to be less than 3 m above HRWL, i.e. 178 masl. The reservoir live storage is 178 Mm^3 with a dead storage of 225 Mm^3.

The Banja Dam and HPP is basically a standalone project and the planning of this project can be progressed faster and is technically independent of the upstream project elements. The dam height

and reservoir filling levels has been optimised independently of the upstream development alternatives. The optimum HRWL is found to be at 175 masl which is 30 higher than the level of filling in 1989-90.

Table ES. 4: Technical Data for Devoll Power Plants

Technical Data	Moglicë	Kokël	Banja	Unit
Direct catchment area	1,671	1,885	2,890	km^2
Specific run-off	13.1	14.4	16.3	$l/s/km^2$
Mean annual run-off	21.9	27.1	47.1	m^3/s
Average yearly run-off	689	854	1,484	Mm^3/year
Tentative MFR from intake dam[3]	0.90	1.0	2	m^3/s
Flood loss and other losses	6.3	7.8	8.2	%
Available for energy production	646	787	1,363	Mm^3/year
Reservoir live storage	152	15.2	178	Mm^3
Reservoir dead storage	210	4.3	213	Mm^3
Reservoir surface area	7.21	0.85	14.11	km^2
River bed elevation	510	300	105	masl
HRWL headwater	650	350	175	masl
LRWL headwater	625	325	160	masl
Tail water	350	295	98	masl
Maximum gross head	300	55	77	m
Length access tunnels	630	-	-	m
Length waterway	11.7	0.06	0.65	km
Powerhouse location	Underground	Surface	Surface	-
Number of units	2	2	2 + 1[4]	-
Turbine type	Vertical Francis	Vertical Francis	Vertical Francis	-
Maximum turbine discharge	65	73	95	m^3/s
Installed capacity (power)	171.2	36.2	63.4+1.2	MW
Average energy equivalent	0.70	0.12	0.19	kWh/ m^3
Average annual energy production	445	92	252	GWh

[3] Applied in Feasibility Study (Sept. 2010) - see Chapter 8 for final ESIA recommendation.
[4] 2 large units and one small unit for release of Environmental Flow

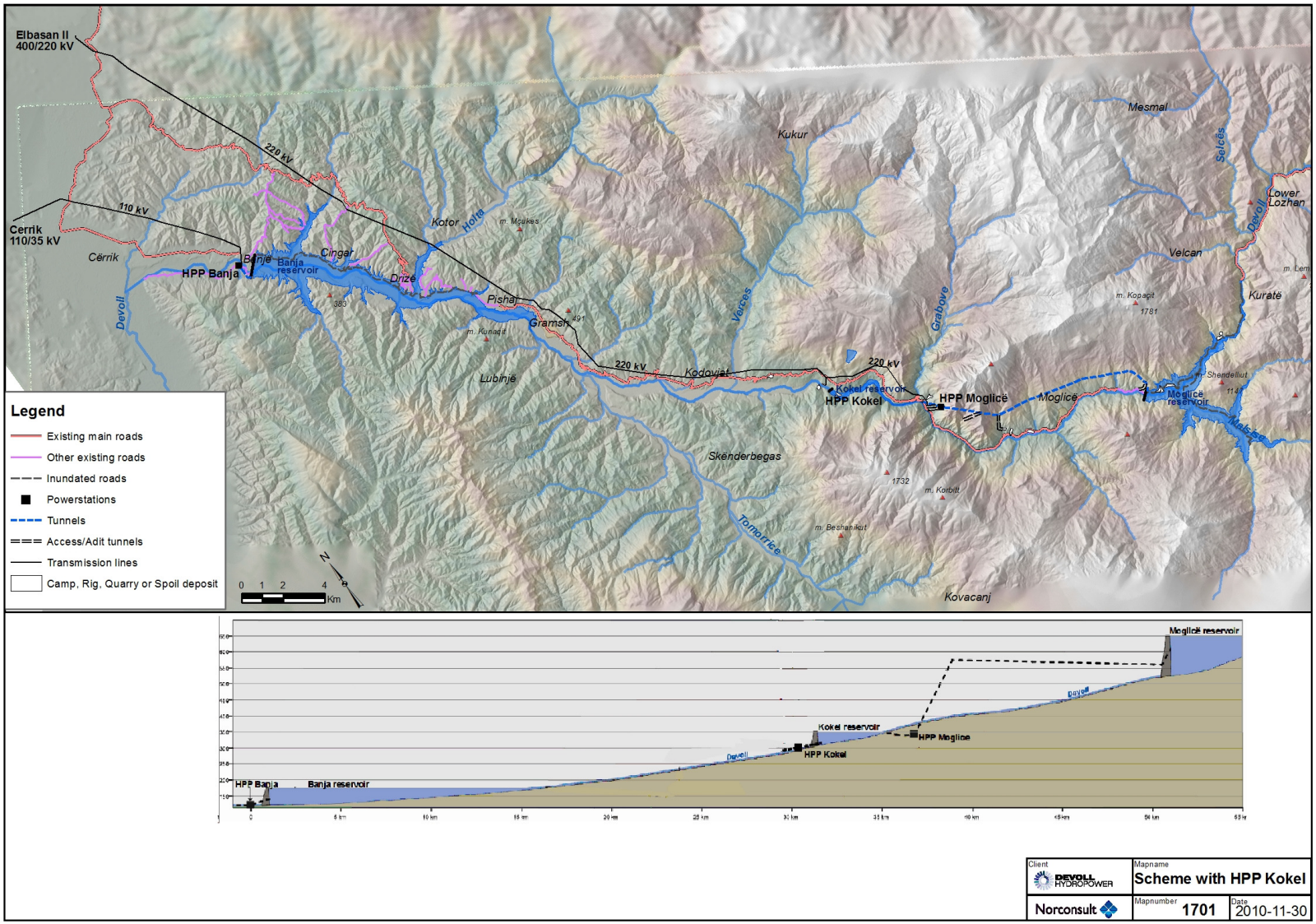

Figure ES. 3: Final Devoll Scheme

ES1.4.4 Roads

The decisions regarding replacement of road connections between Gramsh and Elbasan or Cerrik, and other sections where the existing road will be inundated when the Devoll HPP is implemented, are yet to be made. Assessments of environmental and social impacts of such decisions are GoA's responsibility. However, the present ESIA process has had to face the fact that access questions can not be shut out of the discussions. Therefore, maps used for impact consultations have contained existing roads and some road replacement alternatives which were under discussion and shown just for illustration purposes.

The Public Consultation and Disclosure Plan contain reactions and opinions of local residents in respect of decisions to be made by GoA for the replacement road. The perceived impacts and perceptions of communities may also serve to guide the ESIA for the new road that will need to be commissioned by GoA.

ES1.4.5 Transmission Lines

Two transmission lines are envisaged. The main line will evacuate power from Moglicë HPP and Kokël HPP to Elbasan substation via a 220 kV line. The other takes power from Banja HPP to Cerrik substation to the west in a 110 kV line. The transmission line is covered in Appendix U to this ESIA report. The alignment shown in Figure ES.4 is decided through a joint technical and environmental/social perspective assessment of alternatives. The very final right-of-way for the transmission lines will be decided after detailed land acquisition and technical considerations are completed and will be incorporated in the RAP and SMP activities.

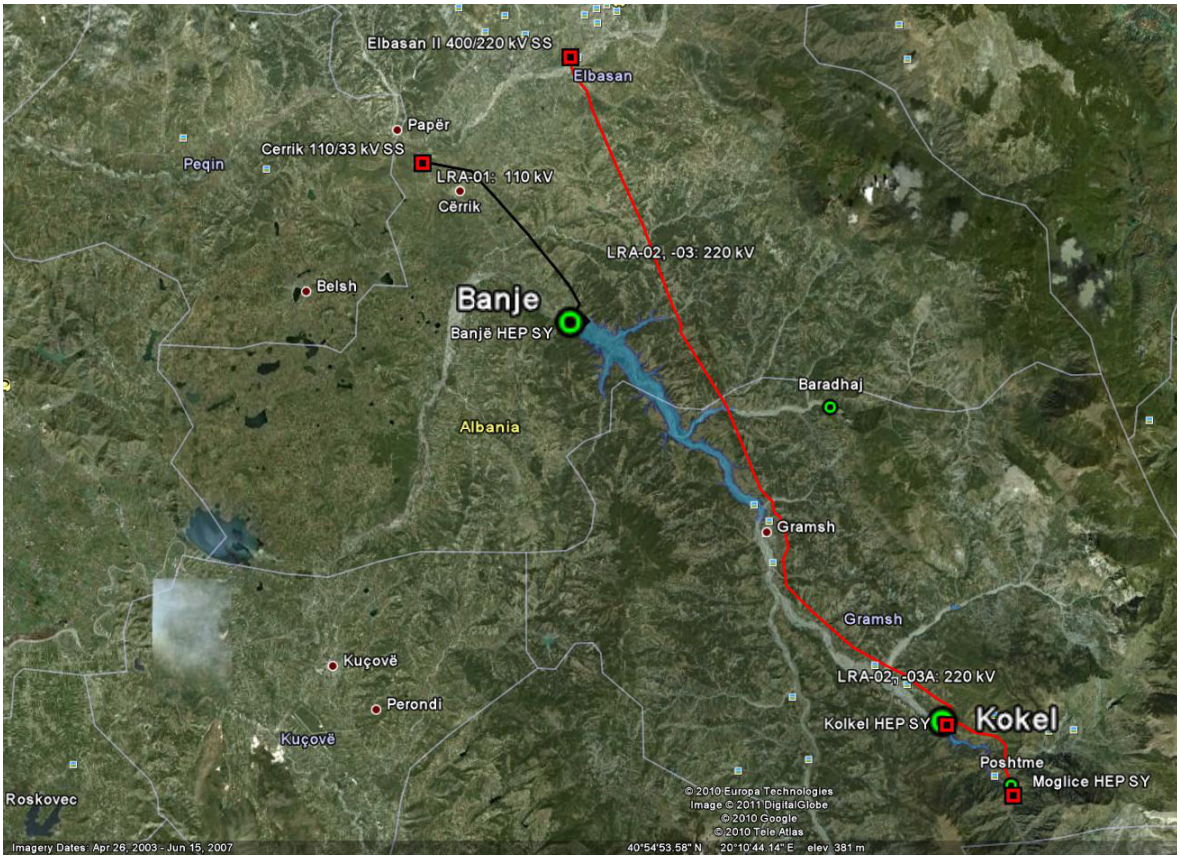

Figure ES. 4: Proposed Transmission Line Alignments

ES1.5 BASELINE CONDITIONS WITHIN THE CONCESSION AREA

Thorough studies have been made of all relevant baseline conditions within the concession area with emphasis in the social sector on identified zones of impact. The collected information is summarised in Chapters 4 and 5 with comprehensive listings and survey results published in the appendices. The map in Figure ES. 1, with key names, is included here as a reference for the discussions that follow in this Executive Summary. Environmental baseline conditions along the TL corridor are not materially different from what is found in the CA – particulars are in App. U.

The Concession Area covers the reach of Devoll and its tributaries between Maliq at 810 masl and Banja at 95 masl. The planned dam sites are located at Moglicë, Kokël near Bratilë and Banja. Some of the hydrological features of the dam sites are presented in Table ES. 5.

Table ES. 5: Dam Site Data

Dam site	Catchment area (km^2)	HRWL (masl)	Average runoff (mill. m^3/y)	Average annual discharge (m^3/s)
Moglicë	1,671	650	694	21.8
Kokël	1,885	350	849	26.9
Banja	2,895	175	1,484	47.1

ES1.5.1 Physical Baseline

Geological conditions are dominated by flysh, a sequence of sedimentary rocks, and Ophiolite, mostly of different magmatic rock types. Although Albania is one of the most seismically active regions in Europe, the project area below Lozhan seems to be in a seismically almost inactive area. Soils vary from shallow with low calcium content, unsuitable for agriculture, in the upper part of the basin to deeper with higher content of calcium in the lower part plus alluvial deposits where intensive agriculture is practiced. Gravel quarries are found all along the Devoll River and Lower Lozhan was earlier a centre for coal mining; most of the mines are now abandoned.

The catchment of the Devoll River covers a large area from the east border of the country to the Seman River. Thus the river passes through zones with different climatic conditions. The main characteristic of the climatic zones of the basin is dry summers and wet winters. The average annual temperatures vary from 7.5 °C at the upstream reaches of the river to 14.7 ° C at the downstream reaches. The coldest month of the year is January where the average temperature ranges from -1.9 °C in Voskopojë in the mountains west of Korçë, at an altitude of 1160 meters to 6.0 °C at Gramsh. The warmest month is July with average temperature values within the watershed from 16.4 °C to 23.6 °C.

The highest amount of precipitation is expected during the cold period of the year and the wettest months are November-December (Korçë 101 mm/month and Gramsh 135 mm/month). The driest month is July with 34 mm in Korçë and 43 mm in Gramsh.

The flow regime of Devoll River is determined by precipitation and snow melting. This has resulted in two periods of high flow maximums; one in November/December and one in March/April. The highest mean monthly flow is observed in April (approx. 47 m^3/s), which is a consequence of snow-melting in this period of the year. The discharge maximum in November/December is linked with start of the period with abundant precipitation. The lowest average flow is observed in August (approx. 7 m^3/s). The average flood at Kokël is 193 m^3/s. The largest observed flow at Kokël station was in February 1963 (405 m^3/s). A frequency analysis of the flood peaks at Kokël leads to a thousand year flood level (Q1000) of 588 m^3/s.

As can be seen from Table ES. 6, all stations have recorded days, or even a full week(s), with little water flowing in the river. In the case of Kozare this can be explained with the periods of diversion of water from Devoll into the Thanë Reservoir upstream of the gauging station.

Table ES. 6: Minimum Flow Levels at Relevant Devoll Gauging Stations (m^3/s)

Low flows (m^3/s)	1-day			7-days			14-days		
Station	**min**	**avg**	**max**	**min**	**avg**	**max**	**min**	**avg**	**max**
Gjinikas	0.38	2.12	6.10	0.50	2.39	6.84	0.53	2.59	7.11
Kokël	1.50	3.86	8.56	1.50	4.34	9.79	1.61	4.68	10.00
Kozare	0.10	2.69	13.00	0.10	2.89	13.97	0.12	3.14	14.36

There are complex systems of drainage pathways with substantial groundwater contribution from both springs and shallower intermediate storage in the transitions zones between upper alluvium and lower less permeable strata. Throughout the main Devoll River and the main side valleys there was sufficient drainage to generate continuous rivers/streams, and thus smaller tributaries to Devoll and its main branches appear to generally being groundwater fed during the dry season. The groundwater inflow to Devoll, Vërçës and Tomorricë are of vital interest for decisions regarding environmental flows and releases at dams and weirs.

Water quality in the basin is generally good and in compliance with the EU regulations regarding drinking water quality and wastewater discharge. No measures are needed at present to reduce impacts of pollutant loads from either wastewater and/or leaching from industrial sites such as abandoned mines and buried wastes. Domestic wastewater is, however, the main source of pollution in the catchment, the future influence of which could be adverse depending on the attenuation capacity in the receiving water body.

Uncontrolled solid waste dumps and uncollected waste are found all over the catchment. A large percentage will enter streams and rivers and reduce the scenic quality of the water courses and create problems for the operation of the planned power stations. The population of the entire project area is about 380,800, which would correspond to a waste production of about 170 thousand tonnes per year. About a third of the population live within two kilometres from Devoll River, and thus about 60 thousand tonnes of solid waste are annually at risk of ending up in the river.

The Devoll catchment is characterised by very active erosion processes. In some places, whole mountain sides are more or less eroded away, and the remaining slopes are steep, unstable and will most probable continue to produce material regardless of any attempts to re-vegetate. In fact, re-vegetation will in many places probably be fruitless since the underlying rock will weather before the vegetation is firmly established. At some other sites, however, re-vegetation will probably have an effect, but this will be local and probably not help much in the presently enormous sediment-generation processes of this valley. An estimate of annual sediment loads is shown in Figure ES. 5.

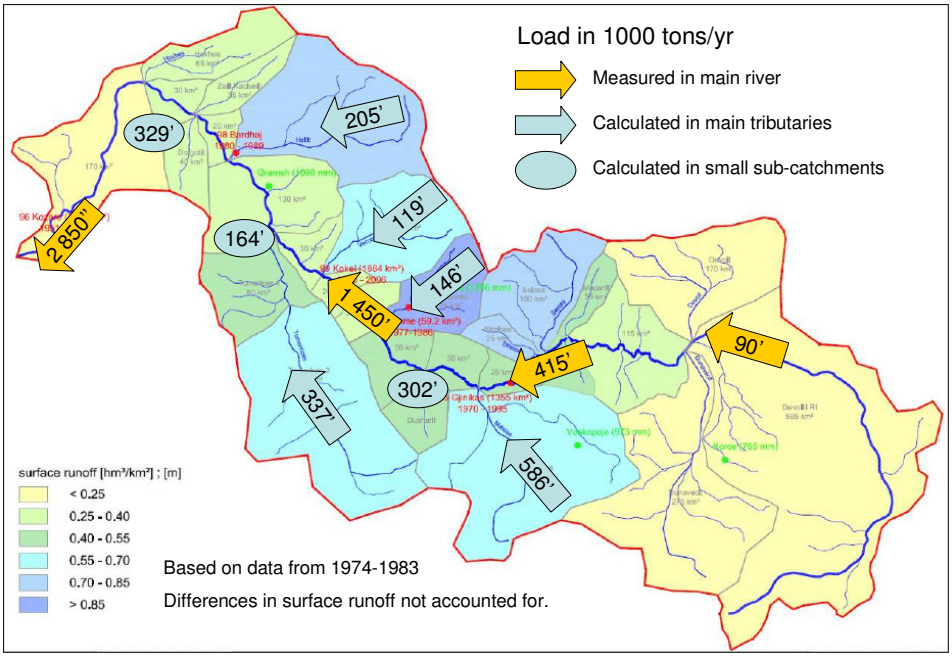

Figure ES. 5: Calculated and Estimated Annual Sediment Load Based on Data from 1974-1983 and Area Specific Loads

As the Devoll River and Osum River joins to form Seman River the character of the river changes into a river meandering through the flat coastal plains. Also the lower part of the river carries high loads of sediments. It is being claimed[5] that Seman is the most turbid river in Mediterranean Sea, with an average turbidity of 4,390 g/m^3 and an estimated load of sediments into the Adriatic of about 16.5 million tonnes/year. The sedimentation process is very dynamic and has caused constant changes in the morphology of the delta. During the last centuries it has influenced a coastal area of about 25 km. There is observed old and present shoreline migration up to 5-7 m/year, during the period from 1918 up to 1998. These processes have formed the Karavasta lagoon system together with Shkumbin and Seman river deltas.

Upland erosion has increased due to deforestation. Agricultural development and canalisation has reduced the area of wetlands, and altered the drainage pattern of the coastal floodplain. The half-finished Banja dam is also believed to have had an influence on the sediment balance of the Seman Delta.

ES1.5.2 Biological Baseline

Fish and Aquatic Ecosystems

A total of 10 fish species were recorded during fish surveys in Devoll and tributaries. Among the common species recorded, one species "false harlequin" or *pseudorasbora* is an introduced species to this region. None of the recorded species can be considered rare. The possible occurrence of two additional species has been frequently mentioned during discussions with local people. These are eel and trout. The conclusion concerning eel is that, since the construction of the Banja dam, this species has not been recorded in this section of the Devoll. Below the Banja dam, eels are present, but their numbers are not known. Concerning the trout, it has not been recorded during the present survey, but has been reported to occur in the upper parts of some tributaries.

Two species were recorded at all sampling localities. These were Prespa barbel and spirlin. The barbel was also dominant or sub-dominant in terms of numbers on all localities. The pindus stone

[5] Source 'Pano and Frasheri (1999)'

loach and chub were found on all but one locality. The locality where these species were missing is a steep tributary with a substratum of boulders, which probably is an unsuitable habitat for many species. If at all present, the stone loach was dominant or subdominant on all localities.

A survey on the presence of otter was conducted in September-December 2009 and April-May, 2010. Evidence of otter presence was found all along the Devoll River and its main tributaries.

The situation of the macrozoobenthic community (mostly water living insect larvae) of Devoll River differs between sites and seasons. The high taxa number and abundance in Miras, Selcës and Tomorricë seems to be related to the good water quality in these areas with well oxygenated waters, rich in organic debris in water suspension. As a general conclusion, based on the assessment of macrozoobenthic community in November 2009 and May 2010, Devoll can be considered as a slightly impacted river.

Terrestrial Fauna

The Devoll River watershed represents an important part of the national biodiversity assets of Albania. A summary of fauna species and their significance is provided in Table ES. 7. Among the mammals are found 23 species of small mammals and bats (20 species). Some 11 species of Carnivores are reported in the study area. Among these are: brown bear, wolf, golden jackal, wild cat and badger. Lynx is expected to be extinct in the study area since late '80. Almost all mammals are protected by the Albanian legislation, except for hare, house mouse, rats and fox.

Forest, woodlands and shrub lands of DHP area host some 63 species of birds, while grasslands and open cultivated areas provide habitat for 48 species. Cliffs and rocks host some 14 species, including some birds of prey, while some 7 bird species are linked with human settlements. Most of the species (155 species out of 177 species) are protected by the Albanian laws. Some of the common birds allowed to be hunted are: rock partridge, grey partridge, quail, spine, woodcock, doves, skylark, black bird, starling and house sparrow.

Table ES. 7*:* **Fauna species present in the DHP area and its Global and National Conservation Importance**

Group	No. of reported Species in Albania	No. of Species in DHP area	No. of species of Global Conservation Concern (GCC) occurring at DHP area		No. of species of National Conservation Concern (NCC) occurring at DHP area	
			Globally threatened (according to IUCN threat categories, 2008)	Lower Risk (according to IUCN, 2008)	Nationally threatened (same IUCN threat categories)	Lower Risk (according to National Redlist, 2006)
Freshwater Fish	60	19	6	10	0	8
Amphibians	16	12	0	12	1	11
Terrestrial Reptiles	34	23	2	11	2	17
Birds	320	177	3	170	39	15
Terrestrial Mammals	69	58	1	57	11	21
Total vertebrates	**499**	**289**	**12**	**260**	**53**	**72**
Invertebrates	N/A	25[6]	6	2	19	5
Grand Total		**314**	**18**	**262**	**72**	**77**

Two species of reptiles hosted by the Devoll catchment, dice snake and Balkan wall lizard belong to the list of Globally Threatened Species, while 10 species are of Global Conservation Concern as

[6] The number refers to only taxa included in the red data book of Albania

included in the IUCN Red list category Lower Risk (LR). Some 19 species are of national conservation concern, of which two species, four-lined snake and European rat snake are considered as threatened species (VU) at national context. Three species are linked with freshwater habitats. All reptile species are protected by national legislation.

The remaining patches of mature forests and riparian galleries along the Devoll River host some 24 insect species (dragonflies, beetles, butterflies and moths), known to be of global and national conservation concern. Of these some 6 species are globally threatened and 19 species are nationally threatened. Some of the main species of global conservation concern are: marsh fritillary, small lappet moth, great capricorn beetle, hermit beetle and rosalia longicorn.

Flora

The Albanian vegetation represents a meeting place for the Central European and Mediterranean floras. The result is a rich flora with more than 3250 species of higher plants but strict endemics are few in number. The endemics constitute only about 1% of the total number, but there are many "near-endemic" species which are found in the border areas with the neighbouring countries.

Plant diversity in the Devoll watershed is high, although some parts of the watershed are poorly studied. Most of the published and available data concern Korçë district, with less available concerning Gramsh and Skrapar districts. Tomorri, Valamare – Guri i Topit, Ostrovica Mountains are the most important mountains in Southern Albania for rare or endemic plants. So far, a total of 400 species are recorded, out of which 44 species or 14 % of total numbers are included in the group of species of national conservation concern and protected by National Legislation. At present, 3 higher plants have been identified as Albanian endemics: *Festucopsis serpentini, Lilium albanicum, Aster albanicus subsp. albanicus.* The percentage of endemic species would increase significantly if included sub-endemic and Balkan species that occur in this area.

The region has forests of black pine and other conifers as well as stand of oak, beech, hazel, etc. (mostly low and underdeveloped). At higher altitudes are found natural meadows with associations of bushes and shrubs. The area shelters a high number of medicinal and aromatic plants. There are 62 species worth to be mentioned for different values of usage. Many of them are well-known also by the local population, which have a long tradition in collecting them either for individual and family use or for sale.

The most dominant habitat types are river related habitats, terrestrial habitats, lakes and artificial water reservoirs and habitats with frequently intensive biogenetic influence.

Nature Protection

No National Parks or formally protected areas are found in the direct impact zone of the Devoll Hydropower Project. However, some protected areas are found within or close to the catchment of Devoll River. These are:

- Tomorri, National Park which covers a total area of 4000 ha of the mountain south of the Tomorricë River, and thus is partly within the catchment area of Devoll River.
- Prespa Lake, National Park, which is a high profiled protected area sheared between Greece, FYR Macedonia and Albania. The Prespa Park region is considered an ecological entity of global significance, and has been characterised as one of Europe's 24 major transboundary "ecological bricks". Prespa Lake is not part of the Devoll catchment in a strict sense, but a now defunct diversion project earlier connected it to the complex irrigation systems on the Korçë Plains. This changed the hydrological history as there was a period when a seasonal exchange of water took place between the Devoll and Prespa catchments.

- Maliq Marshland and Nature Reserve is the remnant of the former large freshwater marshland of Maliq plain. Maliq marshland (cc 100 ha) and Maliq Nature Reserve (50 ha) are both important sites of regional conservation importance as they provide feeding, breeding and resting ground for a number of water birds. During winter a large part of the former marshland is frequently inundated, creating a temporary marsh between 1000-2500 ha.

Between the estuaries of Seman and Shkumbin Rivers are found the Karavasta Lagoon which has the status of a Strict Nature Reserve and a RAMSAR site. In 2008 the border of Divjaka-Karavasta National Park area has been further extended in the south, including the north part of Seman estuary. This complex is one of the largest and most important lagoon systems in Albania and is also important in a regional context. It contains a number of habitat types and is regularly supports high numbers and diversity of waterfowl. It is the only nesting site of the Dalmatian pelican (*Pelecanus crispus*) along the coastal area of Albania.

The list of Natural Monuments in Albania was approved by Governmental Decree no. 676, dated 20.12.2002. Some dozens of natural monuments are located in the vicinity of the DHP project area. The DHP project is not likely to directly impact any of these objects.

ES1.6 SOCIAL BASELINE

ES1.6.1 Approach

The social baseline study comprises a total of 31 villages in the Project Affected Area (Lower, Middle and Upper Devoll), however all villages within the impact area were not included at that time. The social baseline study aims to provide a current status against which to measure any (positive and negative) project impacts and to provide DHP with a preliminary understanding of key community support needs. Directly impacted villages are those that will experience loss of land and access due to inundation.

The social baseline study focuses on the following topics:

- Population and Demographics
- Social Services and Infrastructure
- Economy, Wealth and Agriculture
- Health
- Education
- Natural Resource Use
- Sites of Socio-Cultural Importance

The social baseline study was backed up by a qualitative rapid rural assessment (RRA) that included the direct impact zone and a Wider Project Area. The information provided in the main ESIA report is drawn from the full SIA report and quantitative baseline data included in the appendices.

For each area (Lower, Middle and Upper), a baseline description is provided for the Wider Project Area, which is followed by baseline for the villages in the Project Affected Area. The Wider Project Area for Lower Devoll is Elbasan. For Middle Devoll, it is Gramsh, and for Upper Devoll it is Korçë Region.

ES1.6.2 National Context - Demographic Profile

As well as understanding the political and regulatory context, the Environmental and Social Baseline and ESIA Impact Consultation Teams have considered Albania's larger socio-economic backdrop. In particular, the collapse of the communist regime in 1991, whereupon Albania embarked on a series of structural reforms towards democracy and free market economy. This process of liberalization and privatization reforms in Albania has led to transformation of national production structure. In turn, this process had significant impacts on the country's economic and social affairs and is kept in consideration during performance of consultations.

Albania's demographic profile is characterized by three main phenomena: large internal and external migratory waves, improving mortality rates, and declining fertility rates. The population of Albania was, in 2008, estimated at 3.14 million. It is projected to increase to about 3.7 million by 2025. Albania has one of Europe's youngest populations although the age structure has changed significantly in the past decade with the share of the population over 65 years growing faster than the rest of the adult population, which is linked to out-migration of those of working age (20-55 years).

Migration has been a dominant feature of Albania's socioeconomic landscape over the past 15 years. Migratory flows have been international and internal, permanent and temporary. In relation to this phenomena, the country's reliance on remittances from Albanian workers abroad, although in decline, is still substantial and a 2006 annual report of the Albanian Central Bank (ACB) declared that without remittances Albanians would be living on USD 2 less per day than they are at present .

Albania has one of the highest rural populations in Europe and the highest in the Balkans (51% according to Instat 2010 data) However, the urban population is growing rapidly. Population growth and fertility rates have been falling, but Albania still has one of the highest fertility rates in Europe. The population growth rate has been declining steadily, from above 3 percent in the 1960s to an estimated 0.4% today.

ES1.6.3 Lower Devoll - Banja Dam

The social baseline study in Lower Devoll near Banja Dam comprises twelve villages (Figure ES. 6). Ten of the villages are located upstream Banja Dam. These villages share common potential impacts of DHP due to their location upstream Banja Dam. The most significant impact in this area is inundation of land. Two villages are located downstream of Banja Dam. These two villages have shared potential impact issues due to their location downstream of Banja Dam.

The villages were for baseline studies grouped together into zones according to their location relative to the dam, and their shared potential impacts. In total there are 15 villages along the shores of Banja reservoir and two inland villages also within the impact area of Lower Devoll, some of which were visited during the baseline survey and impact consultations and others that will be included during the further social impact activities (see Table ES.8).

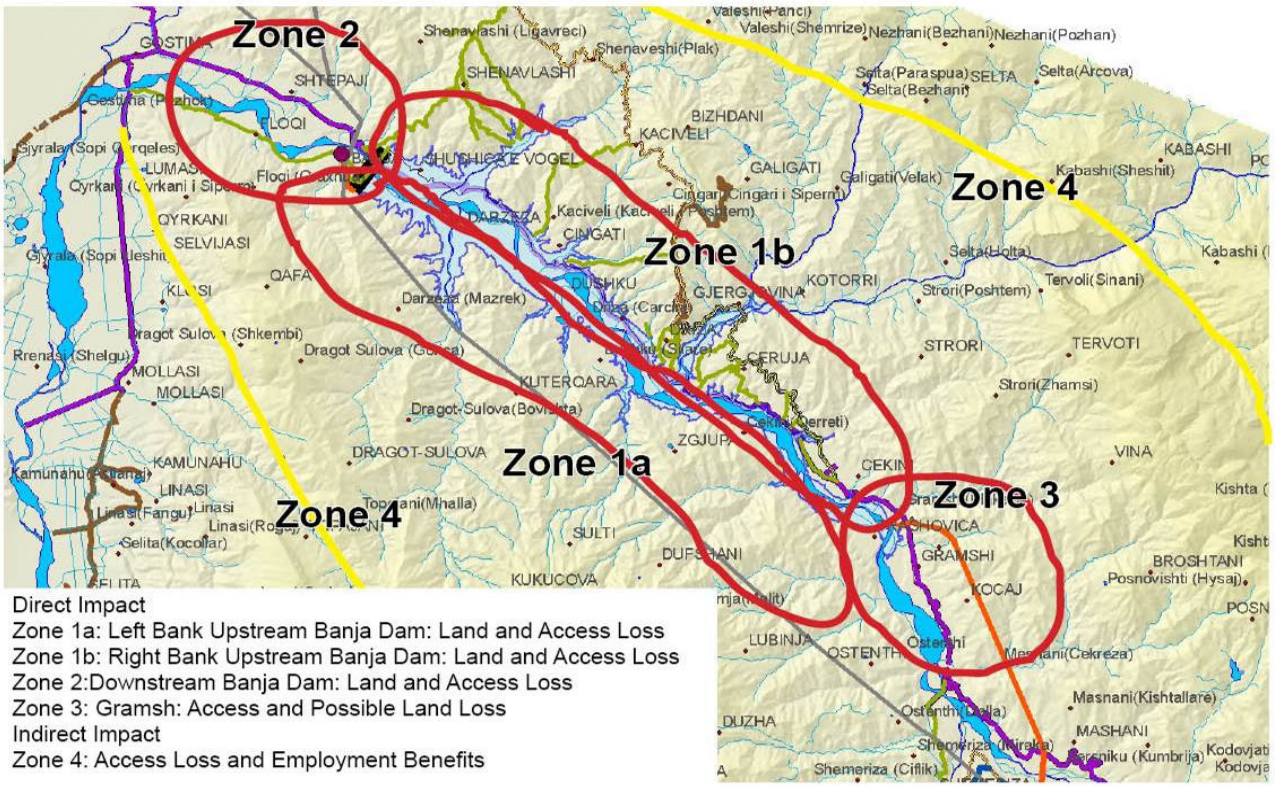

Figure ES. 6: Villages and Zoning in Lower Devoll

Lower Devoll - Direct Project Affected Area

Table ES. 8 shows the number of households in each village for those where impact consultations (IC) were conducted. The table is expanded to include seven villages also within the impact zone that were not included in the sampling by the IC team and therefore only registered with limited baseline information. All villages within the relevant impact zones will be analysed during the SMP and RAP.

There are eight villages with a total of 411 households (permanently occupied) covered by the IC activities. Zgjupë Fushë and Drizë both have a considerable amount of houses that are occupied only during harvesting in summer (40 houses). There are approximately 60 vacant or derelict houses in the eight villages and a high number of similarly vacant/derelict houses in the additional four villages.

For each village information is provided regarding population, education and health service, sewage disposal, waste management, water supply and irrigation. Gramsh is handled under Middle Devoll.

Forests, shrub lands and grasslands are natural resources used by villages on both right bank and left bank. They provide firewood, grazing grounds, fodder, medicinal plants and herbs, and forage grounds for honey-bees. Forests, shrubs and grasslands are also important to wildlife such as wolf, fox, badger, beech marten, wild boar, hare, and several species of birds, of which some are hunted as game species.

Table ES. 8: Number of Households per Village within the Impact Zone

	Number of Occupied Households	Number of Vacant Households	Number of Derelict Houses
	Numbers Derived by Impact Consultation Team		
Silarë	14-15	20	0
Lower Zgjupë	8 permanent+ 30 seasonally occupied	5	0
Lower Cingar	14	23	0
Drizë	91 permanent + 10 seasonally occupied	0	0
Cërujë	100	6	4
Qerret	42	0	0
Small Shushicë (Shushicë e Vogël)	71	no data	no data
Banja	71	no data	no data
TOTAL	**411 permanent + 40 seasonally occupied**	**54+**	**4+**
	Number of Registered Households in Social Baseline		
Çekin	176		
Gjergjovinë	40		
Mazrrekë	57		
Trashovicë	56		
Kaçivel	197		
Pishaj	not included		
Zgjupë Kodër	67		
TOTAL	593[7]		

Thirty one cultural heritage sites have been identified in a study of the larger area around Banja Dam. Of these 31 sites, three sites were located within the area that will be flooded. Table ES. 9 lists the cultural heritage sites inside the flooded area which should receive special attention in the ESMP.

Table ES. 9: Banja Dam Cultural Heritage Sites

No	Site Code	Description	Classification	Importance
Sites inside flooded area				
1	CH-28	Darzezë, Prehist tumulus	Prehistoric burial mound	High
2	CH-29	Dushk (Silarë), Prehist tumulus	Prehistoric burial mound	High
3	CH-43	Darzezë – Dushk (Silarë)	Landscape with archaeology potential	Moderate

ES1.6.4 Middle Devoll - Kokël Dam

The social baseline study in Middle Devoll near Kokël Dam comprises five villages. Two of the villages are located upstream Kokël Dam. These villages share common potential impacts of DHP due to their location upstream Kokël Dam. The most significant impact in this area is inundation of

[7] An unknown number of these households will be vacant and/or houses will be derelict - exact figures will be available in the SMP and RAP.

land. Two villages are located downstream of the dam. These two villages have shared potential impact issues due to their location downstream of the dam.

Gramsh is the second smallest of the four districts housing 10% of the Elbasan's regional population and approximately 40,000 citizens (Table ES. 10).

Table ES. 10: Population for Gramsh District and Town (Source: District Registry Office)

	Number of Citizens	Number of Households	Number of Men	Number of Women
Gramsh District	39, 470	9,066	19,130	20,340
Gramsh Town	14,335	3,284	7,081	7,254

The proportion of people in Gramsh who have migrated is high, and many of these left permanently to cities such as Elbasan, Durres and Tirana. The seasonal migration rates for households remaining in the area are lower than average, but those who do seasonally migrate, usually for five or six months, remit at higher rates than those from other districts. As such, remittances from family members abroad, such as in Italy or Greece, are expected to be significant.

For each village information is provided regarding population, education and health service, sewage disposal, waste management, water supply and irrigation. Figure ES. 7 shows the map used during consultations and Table ES. 11 lists the number of households in each village. There are five villages surveyed with a total of approximately 130 households (occupied). There are a considerable amount of houses that are either vacant or derelict (approximately 170).

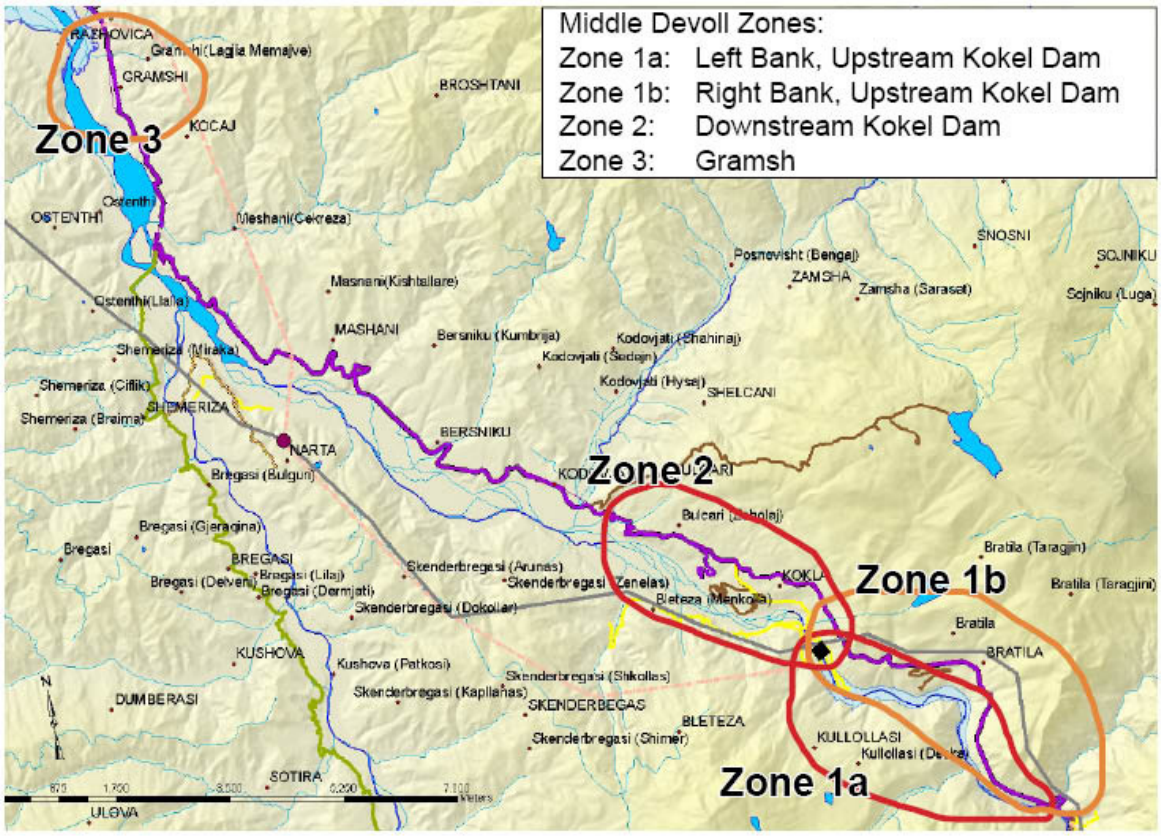

Figure ES. 7: Villages and Zoning in Middle Devoll

Table ES. 11: Number of Households per Village

	Zone	Number of Occupied Households	Number of Vacant Houses	Number of Derelict Houses
Kullollas	1a	7	23	40
Bratilë	1b	10	34	19
Kokël	2	15	22	8
Bulçar	2	30*	no data	no data
Nartë	na*	70	18	5
TOTAL		**132**	**97**	**72+**

* Added during IC to cover new HPP alternative under consideration - map not updated to zone this village which is no longer within direct impact zone.

Forests, shrubs and grasslands provide firewood, grazing grounds, fodder, medicinal plants and herbs, and forage grounds for honey-bees to resident people of Bratilë, Kullollas, Kokël and Bulçar. Additionally, they provide with habitats for wildlife, of which some are game species hunted in the area, such as hare and partridges.

Seven cultural heritage sites have been identified in the larger area around Kokël Dam. Of these 7 sites, none are located within the area that will be flooded. The most important classes of heritage sites identified in this area are from the Late Roman periods (prehistoric finds, medieval graves and traditional architecture are also present). The most common types of sites found are hilltop fortifications, open-air sites, and traditional architecture.

ES1.6.5 Upper Devoll - Moglicë Dam

The social baseline study in Upper Devoll near Moglicë Dam comprises 12 villages (Figure ES. 8). Ten of the villages are located upstream of Moglicë Dam. These villages share common potential impacts of DHP due to their location upstream the dam. The most significant impact in this area is inundation of land. Two villages are located downstream of the dam. These two villages have shared potential impact issues due to their location downstream of the dam.

The villages were for baseline studies grouped together into zones according to their location relative to the dam, and their shared potential impacts.

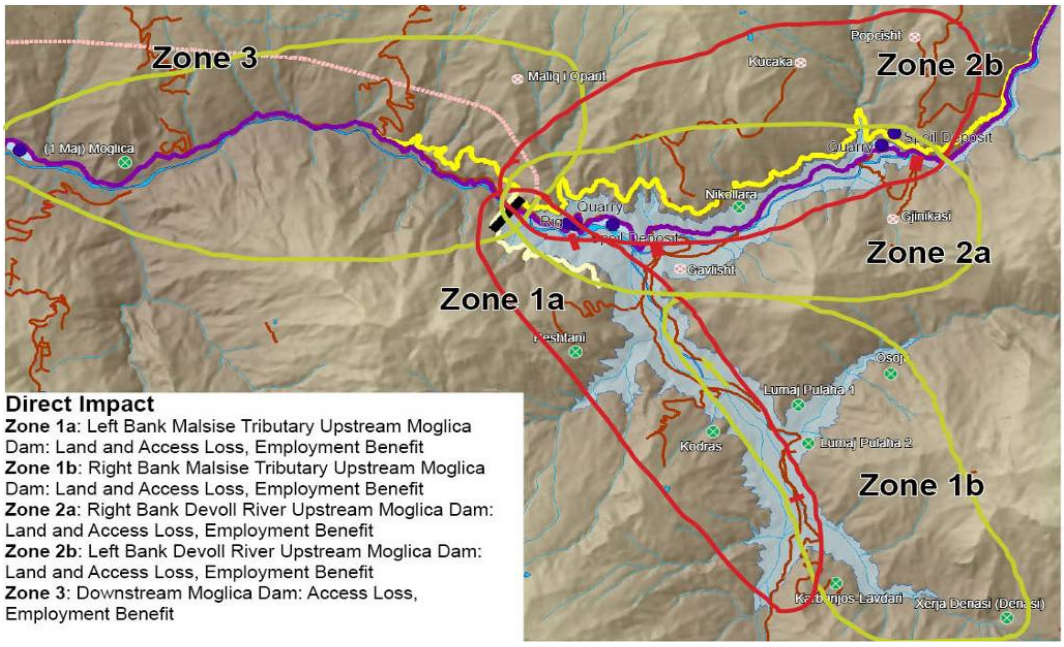

Figure ES. 8: Villages and Zoning in Upper Devoll

Table ES. 12 shows the number of households in each village. There are thirteen villages surveyed in the RRA (one village added to social baseline study) with a total of 209 households (occupied). There are more derelict and vacant houses than occupied houses. There are a total of 463 vacant or derelict houses.

Table ES. 12: Number of Households per Village in Upper Devoll

	Zone	Number of Occupied Households	Number of Vacant Households	Number of Derelict Houses
Peshtan	1a	10	34	19
Kodras	1a	12	14	7
Lumaj	1b	12	28	12
Osojë	1b	9	26	
Gjinkas	2a	2	7	3
Karbanjos Lavdar	1b	2	0	13
Xerje Denasi- Denasi Hamlet	1b	7	6	3
Xerje Denasi- Xerja Hamlet	1b	5	4	121
Popcisht	2b	30	15	25
Kucakë	2b	4	6	6
Nikollarë	2a	6	20	26
Maliq-Opar	3	10	12	4
Moglicë	3	100	40	12
TOTAL		**209**	**212**	**251**

For each village information is provided regarding population, education and health service, sewage disposal, waste management, water supply and irrigation.

The forests on the Right Bank slopes of Malsise tributary is used for firewood, grazing, collecting herbs, medicinal plants and fodder. Forests of the Right Bank are better preserved and used as shelter and feeding ground for wildlife species, including brown bear that is a common species in the area causing periodic damage to villager's crops and livestock.

In the past parts of former forest have been replaced by agriculture land which is currently mostly abandoned and used only as rangeland for grazing. Residents of Peshtan, Kodras and Lumaj use parts of the land along the riverbed for cultivation, mainly corn, as they use the water of Malsise Tributary for irrigation.

Denasi and Osojë also use water from the stream to irrigate their agriculture land situated close to the Osojë and Çemerica streams respectively. Forests, shrubs and pastures are used for firewood, grazing and fodder, beekeeping, collection of medicinal plants and herbs by the villagers.

The desk study and the subsequent field survey identified 6 cultural heritage sites in the larger area around Moglicë Dam of the 6 sites, none are found in the area that will be affected by flooding. As in the other areas, the most important categories of sites are represented by prehistoric burial mounds and chance finds, late Roman settlements and medieval bridges over the river Devoll. A church in Shën Kollas (Nikollarë area) is also included here.

ES1.6.6 Transmission Line

The TL traverses a number of communes and villages. To identify the specific status of the environment, infrastructure and social baseline along the alignments, it has been sectioned as presented in Table ES. 13 and Table ES. 14.

Table ES. 13 Sections of the 220 kV Transmission Line

Section No.	Sections of Transmission line	Commune /Municipa -lity	Villages along or in the vicinity of the Transmission Line
1	Bratila to Kokel	Kodovjat	Bratila
2	Kokel to Bulçar	Kodovjat	Kokel
3	Bulçar to Kodovjat	Kodovjat	Bulcar
4	Kodovjat to Bersnik	Kodovjat	Kodovjat
5	Bersnik to Mashan	Kodovjat	Bersnik
6	Mashan to Çekrez	Kodovjat/ Pishaj	Mashan
7	Çekrez to Koçaj	Pishaj	Cekrez and Kocaj
8	Koçaj to Pishaj	Pishaj	Gramsh-Fshat and Pishaj
9	Pishaj to Gjergjovine	Pishaj	Cekin, Qerret and Ceruje
10	Gjergjovine to Blerimas	Pishaj/ Tregan	Gjergjovine, Cingar, Kotorr and Kacivel
11	Blerimas to Muçan	Tregan	Blerimas, Shenavlash and Mucan
12	Muçan to Tregan	Tregan	Cikallesh and Tregan
13	Tregan to Elbasan (Sub-station)	Tregan/ Mjekes	Tudan, Mjekes and Elbasan

Table ES. 14 Sections of the 110 kV Transmission Line

Section No.	Sections of Transmission line	Commune/ Municipa-lity	Villages in section
1	Banje to Gostime	Gostime	Shushica-e-vogel, Shtepanj
2	Gostime to Shtermen	Gostime	Molosen
3	Shtermen to Thane	Gostime/ Gjergjan	Shtermen and Thane
4	Thane to Cerrik (Substation)	Gjergjan/ Cerrik M.	Cerrik

ES1.7 IMPACT PREDICTIONS

ES1.7.1 Methodologies for Impact Assessment

The methodology applied for impact identification and assessment has been calibrated to take into account the varying nature of bio-physical and socio-economic and cultural impacts. Bio- physical impacts in this context are more amenable to delimitation and quantification whereas the socio-economic impacts are potentially more diffuse and lend themselves to a more qualitative approach. The less tangible aspects of socio-economic and cultural impact also have a risk dimension that is introduced in their assessment that would not be appropriate to the analysis of bio-physical parameters.

For these reasons the assessment methodology has been split to reflect the fact that the two main types of impact are different. However, in the overall presentation of impact significance the outputs derived from this split methodology are reconciled to produce a unified summary of overall environmental and social impact.

ES1.7.2 Physical and Biological Impacts

The presentation of the different categories of impacts or issues has been organised similar to the structure used in the baseline descriptions of this report. Only for a few impact categories will it be possible to describe the potential impacts in quantitative terms. In most impact cases is it only possible to give a qualitative assessment of the strength or importance of the impacts.

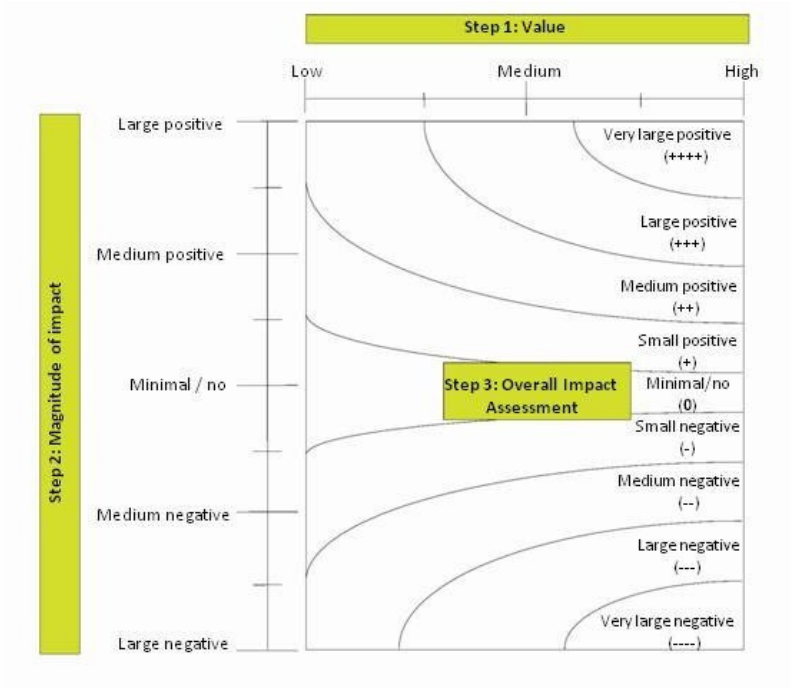

Figure ES. 9: Impact Assessment Methodology

The predictions are related to the phases in project development; construction phase, operational phase and where relevant decommissioning phase.

ES1.7.3 Summary Matrices of Physical and Biological Impacts

The assessment of the severity of the most significant (above medium negative/positive) forms of physical and biological impacts that might result from development of hydropower schemes in Devoll River Basin is extracted from Chapter 6 and presented in Table ES. 15 and Table ES. 16.

Table ES. 15: Summary of Physical Impacts without Mitigation

Physical Impacts			
Issue	**Phase**	**Impact Ranking**	**Potential impacts**
Land and Geology			
Landscape	Construction	– –	Spoil tips, quarries and other construction impacts
	Operation	–	Visual impact of the dams, reservoirs and sections with reduced flow
Soils and erosion	Construction	– – –	Erosion caused by vegetation clearance and construction activities
	Operation	– – –	Risk of reservoir bank erosion and land slides
Sand, gravel extraction	Operation	**0**	Some sites will be inundated. Reduced

Physical Impacts			
and mining			risk of flooding will be beneficial
Climate and Air Pollution			
Micro Climate	Operation	**+ (0)**	A sight modification of extreme high and low temperatures at Banja reservoir might be experienced
Green House Gasses	Operation	**–**	The reservoirs will emit some GHG*.
Air quality and noise	Construction	**– –**	Traffic, stone crushing, tunnelling, etc. will cause air pollution and noise.
	Operation	**0**	No impact
Hydrology			
Establishing reservoirs	Operation	Covered in other sections	
Diversion of river reaches	Operation Moglicë	**– – –**	The reach between Moglicë and Kokël will loose most of its water
	Operation Kokël	**0**	Very short diversion
	Operation Banja	**0**	Very short diversion
Seasonal flow regime change/flood reduction	Operation	**+ + +**	The regulation capacity of the reservoirs will reduce the risk of damaging floods and increase the flow in the dry season
Daily flow regime change	Operation	**– –**	Rapid changes in water flow might cause erosion and make activities in and at the river risky
Water Quality			
Waste water recipient capacity	Operation Moglicë – Kokël reach	**– –**	Diversion of flow will reduce recipient capacity to handle pollution
	Operation other reaches	**0**	Peaking operation might create some recipient problems. Increased dry season flow will be positive
Oxygen depletion in reservoirs	Operation	**– (0)**	Organic materials might cause oxygen depletion in reservoirs and release of oxygen free water downstream of power plants
Solid waste	Construction and Operation	**– –**	Solid waste dumped in or close to the rivers will be trapped in reservoirs
Sediment transport	Operation	**+ + +**	The improved water quality as sediments will be trapped in reservoirs
Sediment flushing	Operation	**– –**	Fluxes of very high sediment concentrations will be a stress to aquatic environment and water users
Water pollution from construction activities	Construction	**– – –**	Increased sediment pollution, domestic waste water from camps and risk of discharge of oil and other hazardous substances

In the ranking the impacts the following categories and symbols have been used: Very large negative **– – – –,** Large negative **– – –,** Medium negative **– –** , Small negative **–,** Minimal/no **0,** Small positive **+,** Medium positive **+ +,** Large positive **+ + +,** Very large positive **+ + + +.**

* Compared to the alternative of thermal power production the impact is “very large positive”.

Table ES. 16: Summary of Biological Impacts without Mitigation

Biological Impacts			
Issue	**Phase**	**Impact Ranking**	**Potential impacts**
Fish and Aquatic Ecosystems			
Loss of aquatic habitats	Operation Moglicë – Kokël reach	**– –**	Loss of water in this reach will significant reduce the conditions for fish and other aquatic organisms.
	Operation Downstream Kokël HPP	**–**	Change in seasonal flow pattern might have impacts on fish an bottom fauna
	Operation Downstream Banja HPP	**–**	Change in seasonal flow pattern might have impacts on fish an bottom fauna
River flow fluctuation	Operation Downstream Kokël HPP	**– –**	Large daily flow fluctuations and flushing will have impacts on fish and bottom fauna
	Operation Downstream Banja HPP	**–**	Large daily flow fluctuations and flushing will have impacts on fish and bottom fauna
Obstruction of migration	Operation	**–**	Hydropower dams will block fish migration
Reservoir developments	Operation	**++**	Reservoirs might develop valuable fish populations
Otter	Operation	**+**	Some otter habitats will be lost but reservoirs will provide improved conditions.
Terrestrial Fauna			
Wildlife habitat loss and changes	Operation Overall impact	**–**	Wildlife habitat and migration corridors lost by inundation
	Operation Moglicë	**– –**	Wildlife habitat and migration corridors lost by inundation
	Operation Kokël	**–**	Wildlife habitat and migration corridors lost by inundation
	Operation Banja	**+**	Wildlife habitat and migration corridors lost by inundation
Thanë reservoir	Operation	**0**	Operation will not influence Thanë bird habitats.
Construction impacts on wildlife	Construction	**– –**	Traffic, noise , increased human presence will have local negative impacts
Terrestrial Vegetation			
Overall Habitat Changes	Operation Overall impact	**–/0**	Vegetation loss by inundation
	Operation Moglicë	**– –**	Vegetation loss by inundation
	Operation Kokël	**–/0**	Vegetation loss by inundation
	Operation Banja	**–**	Vegetation loss by inundation
Loss of wetland habitat	Operation	**0**	No wetland loss.
Endemic and endangered plant species	Operation	**– –**	Some species impacted in particular in the Kokël Reservoir reach
Loss of vegetation during construction	Construction	**– –**	Direct loss of vegetation through land take or indirect trough increased erosion, tree cutting, etc.

Biological Impacts			
Nature Protection			
Loss of protected areas or objects	Operation	**0**	No protected areas in the impact zones.

In the ranking the impacts the following categories and symbols have been used: Very large negative **– – – –,** Large negative **– – –,** Medium negative **– –** , Small negative **–,** Minimal/no **0,** Small positive **+,** Medium positive **+ +,** Large positive **+ + +,** Very large positive **+ + + +.**

ES1.7.4 Environmental Impacts along Transmission Line

Applying the same impact assessment methodology as for the main project, the most significant physical and biological impacts are classified in Table ES. 17.

Table ES. 17 Summary of Potential Environmental Impacts Assessed before and after Mitigation

Impact Issue	Phase *	Assessed Impact Significance Ranking before/ after mitigation		Potential Impact
		Before	After	
Erosion and land slides	C	Very High (---)	Medium (-)	Erosion caused by vegetation clearance and construction activities
Compacting of the soil	C	High (--)	Medium (-)	Loss of soil integrity and increased run-off
Pollution caused by waste/ by-products	C	High (--)	Low (0/-)	Contamination of soils and water from fuels/ lubricants and chemical stores
Interference of natural drainage	C	Medium (--)	Low (0/-)	Altering of drainage/ sediment load from construction activities within river reaches
Destruction of vegetation and flora	C	Very High (---)	High (--)	Clearing of tall trees and vegetation within the RoW
Accelerated propagation of invasive plants	O	High (--)	Medium (-)	Accumulation of weeds within RoW
Bird interference	O	High (--)	Medium (-)	Collision and electrocution of avifauna (birds and bats) with conductors

*(C - Construction, O - Operation)

There are patches of remnant high value oak and broadleaved forests occurring near Tregan reservoir and above Gostima village. Similarly, more erosion prone slopes occur above Bratila village, the crossing of the Verces and Holta tributaries where poorly consolidated flysch rocks dominate and to lesser extent the hilly areas beyond Banja. These impacts are considered manageable and the TL project is assessed as acceptable in environmental terms.

ES1.7.5 Social Impacts

Approximately 50 types of social impacts, as perceived by PAPs during Impact Consultations, have been identified and assessed based on the impact consultations carried out. The process of

identifying and assessing social impacts has been guided according to five defined impact categories as follows:

- Socio-Demographic Characteristics
- Social Services and Community Infrastructure
- Wealth, Economy, Livelihoods and Employment
- Environment and Quality of Life
- Social Inclusion, Social Harmony and Equity

Details on the nature of impacts (positive or negative) within each of the five categories are given in Chapter 6, whilst Table ES. 18 pulls out a few samples for illustration purposes. Potential impacts are described and assessed, the need/possibility for mitigation is assessed, and the significance of the impact after mitigation is assessed according to the methodology described in the SIA-report in Appendix M.

The significance of social impacts is assessed and categorised into one of the following five categories as follows: 1) Very low, 2) Low, 3) Moderate, 4) High and 5) Very High. The categorisation is based on a qualitative assessment of significance as the multiplied score of severity and likelihood:

Table ES. 18: Sample Social Impact Categories, Key Impact Indicators and Nature of Impact

Impact Category	Impact Issue or Indicator	Nature of Impact i.e. Positive or Negative Perceived Positive= Maybe Expectations Perceived Negative= Maybe Concerns
Infrastructure	Roads, Pathways and Transport	New roads perceived as a Positive Impact enhancing transport access links or negative in terms of the dust, noise and extra traffic accidents. The Project labour force and construction vehicles may negatively impact the local transport and road system by additional pressure/use. Flooding from the lake may negatively impact roads and/or pathways close to the river, which may be completely lost or partially cut off.
	Bridges	Flooding from the lake may negatively impact bridges, which provide vital access to grazing lands and wood resources across the river and access to market, health and education. There are also some crossing points which are used for similar purposes that may negatively impact livelihoods.
Economy, Employment and Livelihoods	Wealth & local economy	Local economies may be positively or negatively impacted by the Project. The cost and price of local produce may be increased/decreased by changes associated with the Project.
	House and Land	Changes in land availability or agricultural productivity may positively or negatively impact house or land prices.
	Livelihoods	The (largely land/farm-based) livelihoods may be positively or negatively impacted by changes to water levels or associated micro-climate change.
	Employment and Vocational Skills	Employment is a perceived Positive Impact of the Project, particularly through employment in the construction phase and, to a lesser extent, when the dam is in operation. Whilst a lack of skills may limit access to these jobs, accredited training programmes linked to job opportunities are perceived to be a positive short and long-term impact.

ES1.7.6 Summary of Most Significant Perceived Social Impacts (Negative and Positive)

The analytical process introduced above has resulted in two summary matrices that rank the perceived impacts for negative aspects (Table ES. 19) and in terms of positive impacts (Table ES. 20).

Negative Impacts

Table ES. 19: Summary of Perceived Social Impacts (high to very high significance) without Mitigation

Social Impacts	Phase*	Impact Ranking
New roads and increased traffic disrupt access	C O	Very High
Loss of roads and pathways (due to inundation)	O	Very High
Loss of bridges and river crossing points (due to inundation)	O	Very High
Loss of houses and assets requiring resettlement (due to inundation)	O	Very High
Damage to buildings due to increase of erosion and landslides (due to rising water levels)	O	Very High
Inaccurate compensation of land loss	C O	Very High
Loss of cash crops and farm land (due to inundation)	O	Very High
Loss of access to schools (due to inundation)	O	High
Traffic and Construction Accidents	C O	High
Regional economic decline	C O	High
Marginalisation of excluded groups	C O	High
Increase (or decrease) of political tension (negative or positive)	C O	High
Health damage caused by pollution in reservoir	O	High
Increase of land prices (may also be a positive impact)	C O	High
Temporary and short-term employment leaves higher unemployment	C	High
Risk to cultural heritage sites of historic/religious significance	O	High

* C = Construction O= Operation

The most significant social impacts relate to loss of social services and infrastructure, impact on economy, employment and livelihoods, impact on quality of life and impact to social inclusion and harmony. Social impacts of Very High Significance in Table ES-18 are as follows:

- New roads and increased construction traffic disrupt access. There is particular concern about location of new replacement roads (Lower & Middle Devoll)
- Loss of roads and pathways (due to inundation). Loss of Malsise Riverbed will cause loss of access to several villages (Upper & Middle Devoll)
- Loss of bridges and crossing points (due to inundation). Eleven road footbridges are at risk of inundation. Effect on access to common property/natural resources, vital health and social services and social networking outside the Project Affected Area. Loss of crossing points will restrict animal crossing.

- Loss of houses and assets requiring resettlement (due to inundation). Extent is not clear but indicates that at least a partial RAP is needed (Lower & Upper Devoll).
- Damage to buildings due to increase of erosion and landslides (due to rising water levels, Lower & Upper Devoll)
- Inaccurate compensation of land loss caused by confusion and likely conflict over land ownership and registration (Lower & Upper Devoll).
- Loss of cash crops and farm land (due to inundation)

Loss of roads, pathways, bridges, river crossing points, houses, assets, cash crops and farm land due to inundation are all direct and long term effects of DHP in the reservoir areas to receive the highest attention.

A total of five villages will be partially or fully inundated as a result of DHP. Two villages in Lower Devoll will be partially inundated. These villages are Drizë and Qerret. Parts of additional villages may need resettlement due to location in the buffer zone or on slide endangered areas; one example being 5-10 hoses in Lower Cingar. In Upper Devoll Nikollarë will be partly inundated, but as it sits on what the geologists have classified as an unstable old slide formation, the whole village is considered for resettlement. In the Malsise tributary to Devoll River the villages Lumaj Pulaha 1 and Lumaj Pulaha 2 will be fully inundated. Due to the number and type of displacement impacts, a full Resettlement Action Plan (RAP) is required for each of these areas. The proposed mitigation measures for these impacts are related to compensation and resettlement, starting with detailed land & asset loss mapping and assessment. The proposed mitigation measures should be fed into the RAP process. Where impacts do not result in vital loss of livelihood means, mitigation and compensation will be in accordance with the Environmental and Social Management Plan (ESMP).

Two of the most significant negative social impacts listed in the table may be positive, not only negative. This applies to political tension that may increase or decrease by DHP, and it also applies to land prices that may increase and cause both positive and negative effects. This is indicated in the table.

Positive Impacts

Table ES. 20: Potential and/or Perceived Positive Social Impacts

Social Impacts	Phase*
Economic benefits of influx of migrant workers	C/O
Transference of skills	C/O
Economic benefits of construction workers camp	C
New roads improve access for commercial, health and education services	C/O
Regional economic growth	C/O
Increased accessibility of Devoll region lead to economic growth	C/O
Increased tourism	C/O
Changes to micro-climate improve livelihoods	O
Improved access to markets raises income	C/O
Increased direct and indirect employment	C
Environmental benefit caused by the lake	O
Decreased marginalisation of excluded groups due to improved communications	C/O
(Increase or) decrease of political tension	C/O
Return of youth	C

* C= Construction O= Operation

The perceived positive impact referred to by most PAPs and secondary stakeholders is increased direct and indirect employment. Employment would create economic growth as well as increase social harmony and stability and reunite families with migrant workers. DHP can further enhance employment opportunities by "local first" hire policy and by training PAPs in advance to ensure that they have the necessary skills needed by DHP.

Some PAPs also foresaw regional and local economic growth as a result of infrastructure improvement, in-migrants buying locally, improved access to market and tourism.

Note that PAPs and secondary stakeholders were not always in agreement on positive impacts. For instance, most felt that changes to microclimate (increased humidity) would have negative impacts on crops, while some felt that increase of humidity could have positive impacts on crops (especially those PAPS who were challenged by dry climate).

DHP can potentially decrease marginalisation of excluded groups if DHP enhances community involvement to realise benefits. DHP can also potentially decrease political tension through improved transport routes, infrastructure employment and increased social openness.

ES1.7.7 Social Impacts along TL - Summarised

The impact of the TL passing through or near villages is evidently a major concern of the communities. Land and infrastructure price including compensation regime, if relocation was necessary, was the single most issue of concern mentioned by all communities during impact consultations. Table ES. 21 and Table ES. 22 list these issues relating to the 220 kV and 110 kV lines respectively.

Table ES. 21 Sections of the 220 kV Transmission Line and Infrastructure Affected

Section No.	Sections of Transmission line	Villages along or in the vicinity of the Transmission Line	Houses and other physical structures
1	Bratilë to Kökel	Bratilë	Demolished hut uphill of Bratilë village very close to the TL Land loss-grazing and forage crops. No houses
2	Kökel to Bulçar	Kökel	No houses Land loss-grazing and forage crops.
3	Bulçar to Kodovjat	Bulçar	No houses in RoW Land loss-grazing and forage crops, small olive groves
4	Kodovjat to Bersnik	Kodovjat	3-4 Houses in the RoW TL goes across good arable land and a vineyard
5	Bersnik to Mashan	Bersnik	TL goes close to the Bersnik graveyard. And a hut and possibly some animal sheds are within the RoW. No houses are affected Arable and grazing land.
6	Mashan to Çekrez	Mashan	A house is bordering the TL RoW while 2-3 houses fall within the RoW at Mashan village. Area has good agricultural land which will be loss.
7	Çekrez to Koçaj	Çekrez and Koçaj	1 new hut between the two villages. Used perhaps only in the summer. No houses affected. Grazing and arable land.

8	Koçaj to Pishaj	Gramsh-Fshat and Pishaj	2 houses in the TL Row in Pishaj. Arable land and olive groves will be lost. There is good commune owned pine forest that will be in the RoW.
9	Pishaj to Gjergjovine	Çekin, Qerret and Cërujë	No houses affected. Largely degraded land affected.
10	Gjergjovine to Blerimas	Gjergjovine, Cingar, Kotorr and Kacivel	No houses will be affected. Olive groves, new plantations . All non-agricultural land is communal
11	Blerimas to Muçan	Blerimas, Shenavlash and Mucan	No houses will be affected. Poor land quality.
12	Muçan to Tregan	Cikallesh and Tregan	TL RoW goes over a graveyard, house and hut (one farm), and land associated with this house. High quality vineyard land.
13	Tregan to Elbasan (Sub-station)	Tudan, Mjekes and Elbasan	Commercial building (a coffee bar), 1 house under construction, and 2 houses may be affected by the TL RoW. The land belonging to the above households have olive groves and good arable land affected by the RoW.

Table ES. 22 Sections of the 110 kV Transmission Line and Infrastructure Affected

Section No.	Sections of Transmission line	Villages in section	Houses and other physical structures
1	Banja to Gostime	Shushica-e-vogel, Shtepanj	1 hut lies very close to the RoW. There is good productive agricultural land in the RoW.
2	Gostime to Shtermen	Molosen	No houses in the RoW. There is good productive agricultural and forest land in the RoW.
3	Shtermen to Thane	Shtermen and Thane	2-3 houses fall in the TL RoW. There are olive groves and productive agricultural lots here.
4	Thane to Cerrik (Substation)	Cerrik	There up to 3 houses which fall under the TL RoW. It appeared that there was planned construction in the area as well. Land is used for agriculture - vegetables

The TL project will have some negative impacts, as summarised in Table ES.23, but these are mostly localised and of low to medium significance. There are few places where the transmission lines come into conflict with houses and properties. Although adjustments to reduce these further during the detailed design phase will be sought, some residual impacts will have to be mitigated. Actual compensation rates will depend on Albanian government standards and prevailing market rates to be determined as part of the land acquisition process and further planning for the SMP and RAP.

Table ES. 23 Summary of Potential Social Impacts Assessed before and after Mitigation

Potential Social Impacts	Phase*	Assessed Impact Significance Ranking	Assessed Impact Significance after Mitigation
Loss of houses and assets requiring resettlement	C/O	Very High	Low
Damage to buildings and land due to increase of erosion and landslides	C/O	Medium	Low
Inaccurate compensation of land loss	C/O	High	Moderate
Loss of cash crops and farm land	C/O	High	Low
Traffic Accidents	C/O	High	Low

ES1.7.8 Impact on Cultural Heritage Sites

Three cultural heritage sites are located within an area that will be flooded. All three sites are located near Banja. Two sites are burial mounds while the third site is a *landscape with archaeological potential.*

Additional undiscovered sites are almost certainly present in each of the dam areas due to the very limited archaeological investigations that have been conducted. Banja represents the most problematic area, while Kokël is the less problematic one.

ES1.7.9 Cumulative Impacts

The cumulative impacts are defined as impacts caused by a synergetic or counteracting effect of the proposed hydropower development acting together with other development projects and plans in the same area. Potential cumulative impacts of development projects in Devoll will primarily result from the combined implementation of a cascade of hydropower projects in the Valley together with development plans in sectors like agriculture, industry, mining, tourism, etc. At present it seems that the restructuring of the agriculture sector is the most dynamic process going on in the basin in addition to the plans for hydropower development.

The most important impacts of Devoll Hydropower Project are related to the changes in river flow in the different section of the river and the secondary impacts of such changes (impacts on water use and aquatic biodiversity). Also the positive and negative socio-economic impacts of the hydropower project might impact on, or be impacted by, the developments in other sectors.

A preliminary assessment of the severity of various forms of cumulative impacts that might result from development of hydropower schemes in Devoll River Basin together with other developments in the Devoll Basin is presented in Table ES. 24. An indicative listing of most relevant mitigation measures is also given.

Table ES. 24: Summary of Cumulative Impacts without Mitigation

Cumulative Impacts			
Issue	**Phase**	**Impact Ranking**	**Potential impacts**
Hydrology			
Downstream water flow	Operation - seasonal change	+ + +	Reduction of extreme low flow and high flow situations
	Operation - reduction of Delta discharge	–	Improved conditions for irrigation might lead to less water reaching Seman Delta
Korçë Plain developments	Operation	– –	Development of Korçë Plain agriculture might reduce the water flow in Devoll
Devoll Valley water use	Operation	– –	Increased economic activity might increase competition for Devoll water
Erosion and Sediment Transport			
Basin Erosion	Operation	– –	Increased economic activity might increase erosion and sediment load
Sediment transport	Operation	+ +	Assumed reduced sediment transport will improve operation of irrigation systems
Seman Delta	Operation	–	Assumed reduced sediment transport might change Delta morphology
Water Pollution			
Devoll Valley water quality	Operation	– –	Increased economic activity might increase the level of water pollution
Seman water quality	Operation	+ +	More level water flow will increase the recipient capacity of for handling water pollution form Fier
Biodiversity and Nature Conservation			
Biodiversity	Operation	**0**	Planned development will not impact biodiversity in Seman Delta and Thanë reservoir

In the ranking the impacts the following categories and symbols have been used: Very large negative **– – – –,** Large negative **– – –,** Medium negative **– –** , Small negative **–,** Minimal/no **0,** Small positive **+,** Medium positive **+ +,** Large positive **+ + +,** Very large positive **+ + +**

ES1.7.10 Quantified Key Impacts of Physical and Social Nature

Table ES. 25 sums up the present best estimate of land and social losses due to inundation need for safety zones and potential landslides. It is based on information gathered during the RRA and baseline survey and by counting houses on the detailed aerial photos from the area. An exact count of families or households affected cannot be provided until the RAP survey is completed. The reasons for the lingering uncertainties are caused by:

- Non-residence in village by families still claiming use of properties and right of compensation;
- Changing family sizes due to migrant labour and economy based on remittances;
- Value judgements regarding state of repair, usefulness and value of dilapidated buildings and sheds;
- Changed access conditions may cause need for relocation, but uncertainties surround access issues.
- Potential land slide problems being perceived by people, but the reality of the threat has not yet been verified by professionals in the field.

Table ES. 25: Best Estimate of Land and House/Structure Losses at each HPP Project

Component	Moglicë HPP	Kokël HPP/	Banja HPP	Sum
Loss of 'productive' land considered for compensation (ha):				
Forest inundated	62	3	80	145
Agriculture areas inundated	58	4	313	375
Pasture inundated	21	in agriculture	in agriculture	21
Potential land loss due to slides, preliminary estimate (based on perceived problems - to be corrected when properly checked)	7	-	40	47
Land take of 'productive land' nature	**148**	**7**	**433**	**588**
Loss of 'unproductive' land not considered for compensation[8] (ha):				
Permanent land take by project facilities outside reservoir i.e. rigs, spoil deposits, quarries, camps, 50% dam footprint	18	9	56	83
Residual permanent land take within reservoir (shrubs, river bed, rock faces, etc.)	573	78	978	1629
Temporary land take by rig and camp areas[9]	(9)	(2)	(21)	(32)
Permanent land take by 'unproductive land' nature	**591**	**87**	**1,062**	**1,740**
Sum of estimated total permanent land losses	**739**	**94**	**1,495**	**2,328**
New access roads[10] (km)	4.020	7.305	3.004	**14.329**
Houses lost and families displaced:				
Houses lost to inundation and threatened by landslides	75	-	50	125
Sheds and dilapidated structures lost or threatened	30 nos.	-	20 nos.	50 structures
Bridge structures on local roads lost by inundation	3 vehicular 3 pedestrian	-	2 pedestrian	3 vehicular 5 pedestrian
Residents displaced by inundation and access problems (persons)[11]	80	-	20	100
Cultural heritage sites inundated:				
Prehistoric burial mounds	0	0	2	
Landscape with archaeological potential	0	0	1	

This ESIA has consistently omitted discussions regarding impacts and mitigation connected to the inundation and replacement of the main road through the valley because this is within the realm of

[8] Some areas needed for quarries may also come from 'productive' land, decisions are not yet made but correct information will come in ESMP

[9] Not added into totals.

[10] There are also land losses due to new replacement roads and existing public road upgrading, but these are in the realm of GoA decision-making and not included here.

[11] Only those displaced by inundation included for Banja.

GoA decision-making. Thus Table ES. 25 does not include inundation losses including bridges along this main road through Gramsh.

The TL runs through areas in which frequent land use changes take place and the final estimate of land take for the TL must await further field work during the SMP and RAP activities. A preliminary estimate has been made of the land within the right-of-way of the transmission lines with widths of 50 m and 30 m for the 220 kV and 110 kV lines respectively. Table ES. 26 and Table ES. 27 provide the areas classified according to the Corine Land Classification (CLC) codes.

Table ES. 26 Preliminary Estimate of Land within 50 m Right-of-Way - 220 kV TL

CLC CODES	Land use type	Areas (ha)
222	Fruit trees and berry plantations	2.6
231	Pastures	1.7
242	Complex cultivation patterns	21.7
243	Land principally occupied by agriculture, with significant areas of natural vegetation	56.5
243	Abandoned agricultural areas	12.7
311	Broadleaved forest	31.9
312	Coniferous forest	1.4
313	Mixed forest	0.03
321	Natural grassland	19.0
323	Sclerophyllous vegetation	64,4
324	Transitional woodland-shrub	20.8
331	Beaches, dunes, sands	8.1
	TOTAL	**240.8**

Table ES. 27 Preliminary Estimate of Land within 30 m Right-of-Way - 110kV TL

CLC CODES	Land use type	Areas (ha)
211	Non-irrigated arable land	0.9
223	Olive groves	1.8
231	Pastures	0,7
242	Complex cultivation patterns	12,1
243	Land principally occupied by agriculture, with significant areas of natural vegetation	9,2
333	Sparsely vegetated areas	3.8
121	Industrial or commercial units	1,9
112	Discontinuous urban fabric	0.9
331	Beaches, dunes, sands	0.4
323	Sclerophyllous vegetation	5.1
321	Natural grasslands	1.9
	TOTAL	**38.7**

ES1.8 MITIGATION AND COMPENSATION

ES1.8.1 Biophysical Elements

The discussion on potential measures to avoid or compensate for unwanted negative impacts caused by the planned hydropower development is a key aspect of an ESIA process. The recommendations for mitigation and compensation address several levels of problems with different parties responsible for follow up and implementation. In addition to the developer these parties include government institutions as well as policy makers and political bodies. The possible initiatives might be classified as:

- Mitigation and compensation related to the construction and operation of hydropower schemes
- Supplementary management initiatives
- Systems for improved integrated water management and
- River protection

The discussion of these aspects is summarised comprehensively in Chapter 8.

ES1.8.2 Minimum Flow Release at Dams

Much effort has been invested in providing an adequate analytical basis for recommending MFRs in the reaches to be dewatered by diversion of flow to the power plants. There are no internationally recognised standards for setting environmental flow releases, but there are a number of well recognised methods for assessing such flow regimes and there is an increasing understanding that such flows should be released to meet targeted goals of ecological and social benefits.

For the Devoll HPP it was decided by the ESIA Team to apply a practical approach of 'reach-by-reach' and 'issue-by-issue' assessment of low flow conditions and also to apply the recently developed hydraulic tool of carrying out in-stream mesohabitat investigations. The approach pursued involves special field studies of the following four elements that are crucial in the pursuit of reasonable minimum release rules at dams:

1. Ecological assessments of the natural resource values associated with the river reaches to be dewatered with emphasis on ecological uniqueness
2. Assessment of socio-economic dependence for water supply, irrigation, waste assimilation etc. on river flows.
3. Improved knowledge of site specific in-stream minimum flow occurrences in relevant reaches with emphasis on quantifying tributary inflows that contribute to flow regeneration downstream of dams.
4. Assessing flow and habitat change by means of mesohabitat mapping.

Following recent changes in project concept, MFR proposals are now only relevant for the main Devoll River in the following reaches:

- Moglicë Dam to toe of Kokël reservoir (during normal operation and during off-peak and maintenance operations;
- Kokël Dam to toe of Banja reservoir (only during off-peak and maintenance operations);
- Downstream of Banja Dam.

Based on the conclusions of the impact assessments, low flow assessments and mesohabitat mapping, the conclusions regarding MFRs for each reach in question are given below.

Section Moglicë to Kokël:
In this upstream section of the river to be dewatered, the elements of importance for setting MFR are:

- Medium negative impacts from a biophysical point of view;
- No serious impacts that cannot be compensated from a social perspective;
- Tributary inflows reaching 0.5 m^3/sec at the end of the dewatered reach;
- Acceptable mesohabitat changes at low flows;

which leads to the proposal that the MFR be set at 1.0 m^3/sec, with the possibility to later consider seasonal variations to this release figure. This means that the river reach below Moglicë Dam will always have a discharge of at least 1 m^3/sec increasing to about 1.5 m^3/sec by the time it enters Kokël reservoir. These flows are similar to observed 1-day and 7-day minimum flows.

Section Kokël to Banja reservoir:
The lower section of river, exposed to peaking and maintenance as discussed for Banja Dam below, is judged to experience:

- Medium negative impacts from a biophysical point of view;
- No serious impacts that cannot be compensated from a social perspective;
- Tributary inflows reaching 0.5 m^3/sec at the middle of the dewatered reach;
- 1-2 m^3/sec as a reasonable range for acceptable mesohabitat changes,

which leads to the proposal that the MFR be set at 1.0 m^3/sec, with the possibility to later consider seasonal variations to this release figure. This means that the river reach below Kokël Dam will, during off-peak/shut-down periods, always have a discharge of at least 1 m^3/sec increasing to about 1.5 m^3/sec at the Vërçës confluence and by the time it reaches Tomorricë River it will exhibit a minimum flow of the order of 2 - 3 m^3/sec. These flows are of the order of double the observed 1-day and 7-day minimum flows.

Downstream of Banja Dam:
Devoll River will not be dewatered in the normal sense downstream of Banja Dam, but during peaking operation and plant maintenance it will be desirable to release a minimum of water from the reservoir and into the river bed and canals downstream. Thus for this section of the river, which in general will experience a fairly steady regulated flow, the ESIA team has used the low flow statistics to propose a reasonable MFR. The proposal is that a release of minimum 2.0 m^3/s, will be maintained when the main turbines are out of operation. This release is higher than the observed 1-day and 7-day minimum flows and about 50% of 1-day and 7-day average flows. A small turbine is planned installed to exploit the power that will be available with such release.

Availability of water for irrigation downstream Banja will be improved by the hydropower operation compared to today situation. A new intake for the irrigation channel intake on the left bank just below Banja has to be rebuilt and a small intake weir might be needed. An operation protocol between the Devoll Hydropower Project and the Lushnjë Drainage Board will be needed to avoid problems for diversion of water to the Thanë Reservoir (sediment flushing, unscheduled operation interruptions, etc.). The alternative to such an agreement would be to consider a downstream re-regulation dam. But suitable dam sites for such a facility have not been located and costs would be high. This option has therefore not been suggested at this stage, but may be reconsidered if downstream irrigation interests cannot be satisfied with an operation protocol.

ES1.8.3 Impacts without and with Mitigation

Table ES. 28 below summarises the recommended mitigation measures and their effect on impact ranking.

Table ES. 28: Summary of Impacts without Mitigation and with Mitigation

Physical Impacts	Phase	Impact Ranking without Mitigation	Proposed Mitigation Measures	Impact Ranking with Mitigation
Land and Geology				
Landscape	Construction	– –	Good environmental practise. Landscaping and replanting	–
	Operation	–	Cleaning of vegetation in reservoir	0
Soils and erosion	Construction	– – –	Erosion control. Good environmental practise.	– –
	Operation	– – –	Erosion control. Landscaping and replanting. Catchment Protection Programmes.	– –
Sand and gravel extraction	Operation	0	Not relevant	na
Climate and Air Pollution				
Micro climate	Operation	0	Not relevant	na
Green House Gasses	Operation	–[12]	Reservoir clearance	0
Air quality and noise	Construction	– –	Good environmental practise	–
	Operation	0	Not relevant	0
Hydrology				
Establishing reservoirs	Operation	covered with other items	na	na
Diversion of river reaches	Operation Moglicë	– – –	Minimum Flow Release - 1.0 m^3/s	– –
	Operation Kokël	0	No relevant	0
	Operation Banja	0	No relevant	0
Seasonal flow regime change	Operation	+ + +	No relevant	+ + +
Daily flow regime change	Operation	– –	Minimum Flow Release	–
Water Quality				
Waste water recipient capacity	Operation Moglicë – Kokël reach	– –	Minimum Flow Release - 1.0 m^3/s Sanitation programme in Moglicë	–
	Operation other reaches	0	Minimum Flow Release - 1.0 m^3/s	0
Oxygen depletion in reservoirs	Operation	– (0)	Vegetation clearance. Aeration structures.	0
Solid waste	Construction and Operation	– –	Waste management. Waste screens at intakes	0
Sediment transport	Operation	+ + +	Not Relevant	+++
Sediment flushing	Operation	– –	Schedule flushing when environmentally acceptable	–
Water pollution from construction activities	Construction	– – –	Good environmental practise	–

[12] Compared to the alternative of thermal power production the impact is "very large positive".

Biological impacts	Phase	Impact Ranking without Mitigation	Proposed Mitigation Measures	Impact Ranking with Mitigation
Fish and Aquatic Ecosystems				
Loss of aquatic habitats	Operation Moglicë – Kokël reach	**– –**	Minimum Flow Release - 1.0 m^3/s Weirs? Nature Protection and Compensation Plans	**–**
	Operation d/s Kokël HPP	**–**	Minimum Flow Release - 1.0 m^3/s during off-peak hours and maintenance	0
	Operation d/s Banja	**–**	Minimum Flow Release - 2.0 m^3/s during off-peak hours and maintenance	0
River flow fluctuation	Operation d/s Kokël HPP	**– –**	Minimum Flow Release - 1.0 m^3/s Slow start up and closure.	**–**
	Operation d/s BanjaHPP	**–**	Minimum Flow Release - 2.0 m^3/s. Slow start up and closure.	0
Reservoir developments	Operation	**+ +**	Fisheries Development Programme.	**+ + +**
Terrestrial Fauna				
Wildlife habitat loss and changes	Operation Overall impact	**–**	None	**–**
	Operation Moglicë	**– –**	None	**– –**
	Operation Kokël	**–**	None	**–**
	Operation Banja	**+**	None	**+**
Thanë reservoir	Operation	**0**	Not relevant	**0**
Construction impacts on wildlife	Construction	**– –**	Good engineering practise.	**–**
Terrestrial Vegetation				
Overall habitat changes	Operation overall impact	**–/0**	Reforestation	**–/0**
	Operation Moglicë	**– –**	Reforestation.	**–**
	Operation Kokël	**–/0**	Reforestation.	**–/0**
	Operation Banja	**–**	Reforestation	**–/0**
Endemic and endangered plant species	Operation	**– –**	Stricter protection of remaining localities.	**– –**
Loss of vegetation during construction	Construction	**– –**	Good engineering practise.	**–**

Cumulative impacts	Phase	Impact Ranking without Mitigation	Proposed Mitigation Measures	Impact Ranking with Mitigation
Hydrology				
Downstream water flow	Operation - seasonal change	+ + +	None	+ + +
	Operation - reduction of Delta discharge	–	Integrated water resources management (IWRM)	–
Korçë Plain developments	Operation	– –	Integrated water resources management (IWRM)	–
Devoll Valley water use	Operation	– –	Integrated water resources management (IWRM)	–
Erosion and Sediment Transport				
Basin erosion	Operation	– –	Good environmental practise in construction and agriculture	–
Sediment transport	Operation	+ +	None	+ +
Seman Delta	Operation	–	None	–
Water Pollution				
Devoll Valley water quality	Operation	– –	Pollution control in agriculture, municipalities and industry	–
Seman water quality	Operation	+ +	None	+ +
Biodiversity and Nature Conservation				
Biodiversity	Operation	**0**	None	**0**

In the ranking the impacts the following categories and symbols have been used: Very large negative **– – – –,** Large negative **– – –,** Medium negative **– –** , Small negative **–,** Minimal/no **0,** Small positive **+,** Medium positive **+ +,** Large positive **+ + +,** Very large positive **+ + + +.**

ES1.8.4 Priority Mitigation Actions

The priority mitigation measures are summed up in matrix format in Table ES. 29 with suggestions regarding responsibilities and roles between DHP as developer and GOA as regulator.

Table ES. 29: Summary of Priority Bio-physical Mitigation Actions

Issues	Obligatory mitigation	For consideration by DHP/GoA		Comments
	Included as project element or cost	CSR[13] opportunity	Role of GoA	
MFR at Moglicë Dam	1.0 m^3/sec - seasonal variations to be considered	-	Acceptance	13 km reach, MFR increase to 1.5 m^3/s at toe Kokël reserv.
MFR at Kokël Dam	1.0 m^3/sec	-	Acceptance	150 m dry river bed
MFR at Banja Dam	2.0 m^3/sec	-	Acceptance	Small generator to exploit power
Turbine start-up rate	To be decided	-	Public warning	Signposting down river
River bed enhancement by weirs	Gabion structures or other means of improving habitat	-	Acceptance and collaboration	Fishery biologists to plan/implement weirs

[13] Corporate Social Responsibility i.e. voluntary district development investment by DHP

Issues	Obligatory mitigation	For consideration by DHP/GoA		Comments
	Included as project element or cost	CSR[13] opportunity	Role of GoA	
Reservoir clearing	Bushes and trees to be removed by contractor	-	-	Suitable as sub-contract for local firms
Waste water mgmt. in Gramsh	Repair collection system and est. primary treatment	Add secondary treatment to meet EU standards	Approvals and O&M responsibility	Public health protection; avoid eutrophication
Solid waste mgmt. in Gramsh	Basic measures against floating debris	Est. of solid waste management system	Approvals and O&M responsibility	Improved urban environmental standards
Waste water manage-ment in Moglicë	Basic improvement	Proper collection and primary treatment	Approvals and O&M responsibility	Public health protection; avoid eutrophication
Strengthen water pipes in Bulçar and other vulnerable village w/s	Guard exposed pipes against damage during construction	Strengthening of existing w/s systems	Approvals and O&M responsibility	Improved public health and living standard
Re-establish w/s system in Cerujë and Drizë	Inundation of pumping stations	-	Approvals and O&M responsibility	Full compensation for assets lost
Sediment flushing	Scheduled to minimise harm	-	Approval and supply of criteria	Downstream interests in focus
Reforestation	Replanting according to GoA rules	-	Setting criteria and selecting sites	Village participation required
Relocation of Lumaj and Nikollarë villages	Full compensation in accordance with GoA rules	-	Overseeing agree-ments made and approving solutions	PAP desires and mode of replace-ment identified during RAP proc.
Replacement of roads and bridges	Compensation costs and payment to GoA to be negotiated	Improvement to regional/national road standard	Decision maker and implementer	Issue not included in ESIA; separate ESIA process by GoA
Loss of local access	Re-establishment of access to isolated communities, possibly including passenger ferry service	Improved standards of access including vehicular ferry	Approval and control	Issue discussed thoroughly in SIA and IC parts of ESIA
Landscaping to repair scars to nature	Specified in EMP; in tender documents	-	Approval	Related to project roads, adits, spoil dumps, quarries etc
Dust, noise and air pollution	Specified in EMP; in tender documents	-	Control	Supervised by consultant
Catchment protection	Engineering approach to safeguarding project investments	Watershed mgmt. as wider regional environmental improvement	Approval and collaboration	Reduced erosion is of common interest to all stakeholders
Recreational infra-structure at reservoirs	-	Support to multi-purpose activities	Approval and collaboration	Boating facilities, fishing ramps etc.
River Basin Planning	-	Support IWRM & establishment of River Basin Authority if initiated by GoA	Decision-maker and responsible	Should be initiated at Banja and is approach to avoid potential future water use conflicts
Downstream effects of erosion and sediment transport/trapping	Not included	A complex problem; studies desirable	Approval and collaboration	Effects on beach erosion are possible but highly uncertain
Cultural heritage sites	Preventive excavation and removal of objects; in tender documents	Survey of areas with archaeological potential	Approval and collaboration	A Chance Find con-tingency plan is recommended.

ES1.8.5 Social Elements

Social impact mitigation is generally much more process driven and wider ranging than environmental mitigation where quantification and application are often more straight-forward. The mitigation of social impacts for this project will be undertaken through a series of targeted social management plans under the umbrella ESMP. Based on the findings presented in the ESIA's Social Impact Consultations, DHP should undertake a number of specific mitigation and management measures to ensure the Project minimises or avoids any negative impacts and maximises potential positive social impacts.

Social mitigations should focus on preventing accidents, disease and improving quality of life and healthy lifestyles through assessing and mitigating factors in the environment that can potentially negatively impact the health of present and future generations. Key objectives are to:

- Maximise socio-economic and health gain opportunities of the Project;
- Support local social service (health) capacity;
- Ensure safe practices are implemented for DHP employees/contractors;
- Ensure DHP employees have access to any necessary social, economic and health services without negative impacts on the local community and local/regional community services; and
- Contain or eliminate social and health risks from the Project if any. This includes security risks that impact health and other social aspects.

Four Impacts categories and altogether 53 perceived impacts are listed by the Impact Consultation team in Chapter 8. For this Executive Summary the first impact category with 7 perceived impacts exemplifies the analysis in Table ES. 30. Such mitigation recommendations follow from main impacts identified by the ESIA team and also from perceived impacts arising from the Impact Consultations.

Impacts on Population/Socio-Demographic Baseline Characteristics

DHP is recommended to develop a more detailed, thorough local skills audit and an Employment Plan with local priority hire recognising the capabilities of the local population to meet DHP needs and minimise the potential influx. It should also aim to manage environmental and social stresses, and even possible conflict issues arising from outsider workers who move to Devoll seeking benefits of DHP.

DHP is also recommended to develop employment policies for workers induction and appropriate behaviour according to the socio-cultural context.

Table ES. 30: Sample Summary of Perceived Social Impacts from ICs and Proposed Mitigation Measures

Baseline/ Impact Category	Perceived or Potential Impact	Receptor(s)	Nature (+/-)	Proposed Mitigation/ Means to Enhance Positive Impacts i.e. SMP recommendations
Population/ Demography	**1) Expectation of movement of local people back to Devoll Valley Villages** for employment opportunities created by DHP. Most villages have economic out-migrants with PAPs expecting these 'sons' return	PAPs (all villages), Village leaders, Regional Govt., DHP.	Positive/ Negative	• **Effective PCD**: to manage high job expectations[14]; • Job opportunities enhanced by actions set out in 'Economics, Employment & Livelihoods' sections.
	2a) Out-Migration of Local People Away from Devoll Valley, due to insufficient jobs for local people, land loss/reduced economic opportunity = de-population and community fragmentation.	PAPs (Lower Devoll), Village leaders, Regional Govt.	Negative	• DHP Employment Policy: "Priority PAPs Hire"; • Effective PCD clarifying job opportunities and nature of contracts;
	2b) Out-Migration of Local People Away from Devoll Valley, due to insufficient jobs for local people, land loss/reduced economic opportunity = de-population and community fragmentation.	PAPs (Upper Devoll), Village leaders, Regional Govt.	Negative	• DHP Employment Policy: "Priority PAPs Hire". • Effective PCD clarifying job opportunities and nature of contracts;
	3) Migration of Non-local Workers to the Devoll Valley perceived as a threat to PAPs employment chances	PAPs (all villages), Village leaders, Regional Govt., DHP.	Negative	• **Effective PCD**: to manage unrealistically high job expectations as part of influx control plan; • Job opportunities enhanced e.g. apprentice schemes and on-the-job mentoring;
	4) DHP Workers Perceived as a Threat to village security and/or culture/privacy.	PAPs (all villages, but particular concerns in Upper/Middle Devoll), Women, Village leaders, DHP.	Negative	• DHP Employee Induction and Training Plan with cultural awareness training and code of conduct for workers. • **Effective PCD**: Good Neighbour Policy produced in partnership with PAPs by socio-cultural expert • **Effective PCD**: Set out wider benefits of Project.
	5) Economic Benefits of Influx of Migrant Workers perceived as an opportunity, e.g. increased sales of farm produce,	PAPs (esp. villages close to camp or construction), Village leaders, DHP,	Positive	• Inclusion of 'Local Procurement' initiative in DHP Business Ethics Policy/Good Neighbour' Policy. • Marketing support training for PAPs (Regional Education & Training institutions).

[14] Public Consultation & Disclosure of Employment Intentions (Employment/Hire/training Policy) so expected positive impact does not become Negative Impact due dissatisfaction/expectations not managed.

Baseline/ Impact Category	Perceived or Potential Impact	Receptor(s)	Nature (+/-)	Proposed Mitigation/ Means to Enhance Positive Impacts i.e. SMP recommendations
	6) Expectations) of Transference of Skills perceived by some PAPs as helping the community to learn new skills and enable cultural exchange.	PAPs (males), Village leaders, Regional Govt., DHP, Regional Education Institutions	Positive	• Apprentice schemes and on-the-job mentoring systems as part of Employee Induction & Training Plan; • DHP to consider cultural exchange scheme;
	7) Economic benefits of Construction Workers Camp perceived as opportunity or threat by different villages.	PAPs (all villages, especially Bulçar and Kokël), Village leaders, Regional Govt., DHP.	Positive/Negative	• **Effective PCD**:DHP to consult with Bulcari and Kokël villagers villages regarding interest in camp location nearby with associated expected benefits or to manage expectations; • **Effective PCD**: Identify concerns regarding camp and mitigate in "Good Neighbour" Policy and PCDP.

ES1.8.6 Mitigation of impacts on Cultural Heritage Sites

At Banja, there are three sites that will be impacted by the project. They are located inside the area that will be flooded (site CH-28, CH-29 and CH-43). Sites CH-28 and CH-29 are both *prehistoric burial mounds* of high importance. For site CH-28, preventive excavation accompanied with removal of objects under guidance of staff from the Ministry of Culture is recommended.

Site CH-43 is a *landscape with archaeological potential* between Darzezë and Dushk (Silarë) of moderate importance. An intensive surface survey is recommended for CH-43. For the remaining 29 sites outside of flooded area near Banja, avoidance and monitoring while implementing the project is recommended.

In Moglicë, intensive surface surveys are recommended for the area near Nikolicë. This area has *prehistoric tumulus burial site* of high importance (CH-24) and *prehistoric chance finds* of moderate importance (CH-31).

Moglicë area has two sites of moderate importance that fall close to the transmission line. These two sites are *Late Roman Medieval castle* (CH-22) and *Orthodox church* (CH-25). Careful design when finalising engineering project to avoid direct impact is strongly recommended. Avoidance and monitoring is recommended for the remaining sites in Moglicë.

For Kokël sites, avoidance and monitoring is recommended.

ES1.9 ENVIRONMENTAL AND SOCIAL MANAGEMENT & MONITORING

ES1.9.1 Framework ESMP

One of the objectives of the Environmental Assessment process is to develop procedures and plans to implement the recommendations emerging through the assessment analysis, the public consultation process and the environmental compliance review process. It is important to design realistic plans to ensure that the mitigation measures and monitoring requirements prescribed will actually be carried out in subsequent stages of project development, be it detailed design, construction, regular operation and decommissioning. A standard element of the EIA process is therefore to prescribe Management Plan to set out conditions and targets to be met during these stages. The complete Management Plan can be divided in 2 main elements:

- Environmental Management Plan (EMP)
- Social Management Plan (SMP) and

This ESMP, initially developed to a framework level, is written to comply with both Albanian and international guidelines and principles (EU regulations, IFC, etc.) for Management Plans. The framework specifies mitigation measures, monitoring activities, organisation for implementation, and implementation.

The framework ESMP is based on the information available at this stage of project preparation (November 2010). During the period of detailed project design more information about project layout will be made available and new and revised technical details might emerge. This could change the nature and extent of environmental consequences. Thus the ESMP will need continuous revision and updating. This is in particular the case with the environmental management plan for construction activities. This plan can only be fully determined when the details of the Contractors organisation have been decided and decision have been made regarding construction technologies, composition of the workforce, etc. Thus the final details on this plan have to be prepared by the Contractor based on general standards and requirements determined by the Developer and the Environmental Authorities.

ES1.9.2 Key Parties

For the effective implementation of the ESMP, several parties will be involved with different duties and responsibilities. Clear institutional responsibilities and qualified personnel will be needed manage the ESMP. The main parties will be:

- Devoll Hydropower Sh.A,
- Central Government in particular represented by Ministry of Environment, Forests and Water Administration,
- Regional and local governmental representatives,
- Local (municipal and village) administration,
- Contractors and Sub-Contractors,
- Independent experts and NGO's.

The DHP Company will have the primary overall responsibility to carrying out mitigation measures but will utilise other agencies and take on the role of supervisor and monitor in many cases. Governmental authorities on central and regional level will execute a control and approval function. The Contractor will have a central role during the construction phase.

ES1.9.3 Monitoring

Monitoring is one of the important elements of an Environmental and Social Management Plan (ESMP) and serves a number of functions including:

- Providing a check on the implementation of proposed mitigation measures and ESMP recommendations; and
- Identifying corrective measures or the redesign of mitigation measures, if the originally planned mitigation measures are not sufficiently effective.

Because monitoring is essential to identify undesirable trends, high quality and, if possible, quantified baseline information is needed. Only when the base situation is established can changes be identified through monitoring. Such baseline data has been collected during the ESIA studies and the socio-economic survey.

The monitoring will take place at different stages of the project lifetime. Simplified it can be divided in:

- Monitoring of construction work and construction facilities
- Resettlement and compensation monitoring
- Long term or operational monitoring

More specific details on focus, content and timeframes of monitoring activities are mentioned under the sections of the relevant Sub-Management Plans.

ES1.9.4 Biophysical Sub-Plans

The content of the Environmental Management Plan consists of the elements of the mitigation and compensation measures that need follow up after the detail design has been prepared and the ESIA report has been finished. Thus the different elements or Sub-plans relates to the construction phase and the operation phase of the project. It might also relate to environmental or social enhancement programmes not directly linked to implementation of the Devoll Hydropower Project.

Details of these Sub-Plans a will be revised and further elaborated in the next phases of Devoll HPP development.

ES1.9.5 Social Management Planning

The Social Management Plans, the framework recommendations of which are the final part of the SIA process, are crucial documents to guide management structure and systems for DHP implementation. The framework SMP addresses mitigation, monitoring, capacity development and training, suggests an implementation schedule and addresses integration of the SMP with the RAP and other developments of the Project.

The framework Social Management Plan is part of the overall Environmental & Social Management Plan and sets out the management framework for how the social elements of the Project should be managed from construction through to operations. To finalise the SMP, DHP should incorporate and build on the recommendations from this framework SMP and include the development and delivery of a number of plans, as explained below. DHP should undertake additional targeted SIA studies required during construction for specific aspects of Project Description yet to be defined. At this stage many of the detailed requirements have not been finalised, but it is necessary for DHP to specify the key deliverables and targets for both themselves (company issues) and for the Contractors.

DHP should work closely with the Contractor to develop effective plans and implementation and monitoring mechanisms to ensure responsibilities are met. The environmental and social commitments of DHP should be compiled to form a Commitments Register; the Commitments Register should become a tool to aid compliance.

The continuation of social impact management aspects should also include ongoing consultations and the Grievance Procedure (with the Contractor working alongside DHP), so the local community can make representations to the contractor/DHP and their concerns be addressed. DHP should continue with the stakeholder engagement aspects through the development of an onsite Project Office at Moglicë or Lozhan as well as the Information Centre in Gramsh and community liaison officer (CLO) mobile across the Devoll Valley. This social function should work alongside ESMP staff conducting additional evaluations required and producing the finalised plans. These plans should describe how the Contractor delivers E&S commitments. Induction Training should be mandatory for all Project staff and contractors, by providing the social policies and social context inputs. The final plans should be based on the general requirements of an environmental and social management plan.

For presentation purposes, the recommendations are divided into environmental and social, however a clear distinction does not exist. For example, the Transport Management Plan should be predominantly a plan to avoid adverse impacts to the community and is essentially of a social nature. Moreover management of environmental aspects have great potential for influencing health (social) impacts. Therefore, before the framework SMP is presented, an overview of some key environmental aspects is given.

ES1.9.6 Social Development Strategy (SDS)/Community Investment

In addition to managing the environmental and social impacts of the Project, as required by international procedures[15], for effective goodwill building to support social risk management, DHP should also make voluntary contributions towards Sustainable Development of its neighbouring communities. This Development, also know as Social/Community Investment should aim to support sustainable (i.e. environmentally aware) Socio-economic development of local communities in aspects that are good business case for DHP such as development of:

- **Technical/Vocational skills** that will be of use to DHP during construction;
- **Work Life Skills training** which link to job opportunities (IT training and English);
- **Community Health and Safety** capacity development linked to changed environment e.g. awareness training of STD and pollution related disease, First Aid courses for drowning and road accidents; asthma attacks and safety impact risk reductions e.g. accident mitigation measures, appropriate waste/sanitation systems development;
- **Modernized Agricultural techniques** to support greater yield from less land and sustainable farming as well as protective measures for vulnerable livelihoods such as apiculture;
- **Tourism Hospitality** Training for current and new businesses to support potential change resulting from increased population influx and different consumer preferences from foreign workers;
- **Changed/Lake Environment Resources** for residents interested in developing lake recreational businesses i.e. building boats for access, recreation and tourism development.

The Sustainable Development/Community Investment aspects, are not clear at this stage but should be developed in a participatory manner (i.e. in consultation) with local (primary) stakeholders to ensure that they reflect the priorities of women, men and children of Devoll Valley as well as seeking involvement and advice from Secondary Stakeholders such as local and international NGOs who may become development partners of DHP. This could start in first or second quarter of 2011.

Community Investment Projects for Sustainable Development supported by DHP should be funded through a dedicated (separate) budget and should not overlap with the funding of activities designed to mitigate and manage the environmental and social impacts of the Project in line with ruling international requirements. They should be developed, managed and implemented by Sustainable Development professionals. Funds allocated to community projects in past projects when not allocated by professionals within a framework sustainable development strategy frequently cause more harm than good and can damage both the PAPs and the project.

In Chapter 9 are presented three tables introducing the strategic alignment of these key Social Management Plans and then subsequently the priority monitoring actions for potential social impacts. The plans presented in these tables are:

- Strategic Alignment of Key Social Management Plans
- Community Impacts Management and Monitoring
- Monitoring and Management of Social Mitigation Measures with Indicators and Responsible Party Recommendations

The real substance of the SMP is contained in these tables which have, for ease of presentation, been omitted from the Executive Summary. They should be consulted by reviewers with an interest in the realities of social management planning and monitoring.

[15] International Finance Corporation Social Performance Standards.

ES1.10 CONCLUSIONS AND RECOMMENDATIONS

ES1.10.1 General Conclusion

The most important impact parameters in the described ESIA process have been:

- extent of resettlement and compensation for lost assets caused by establishing hydropower reservoirs and;
- changes in aquatic environment by diversion of water and modified hydrological regime in certain reaches of the Devoll River.

For all the hydropower alternatives considered in the final screening and selection process it was found that the negative social and environmental impacts will be relatively moderate compared to the size (power production capacity) of the Devoll Hydropower Project.

But even for this, in physical and ecological terms low-impact scheme, there are a series of impact and mitigation issues, particularly in the social sector, which will be both problematic, time consuming and expensive to handle well in accordance with Albanian and international safeguard standards.

Thus, it can be concluded that Devoll Hydropower can be developed to the positive benefit of the local population - provided appropriate mitigation and compensation measures are put in place.

ES1.10.2 Main Benefits

The main benefits of the Devoll HPP, additional to power production, are expected to comprise:

- Improved irrigation conditions downstream of Banja Dam with more water available for irrigation to the Lushnjë irrigation system.
- Improved control over floods downstream of Moglicë Dam and in particular downstream of Banja Dam.
- Improved recipient capacity in Seman River to handle the polluted discharges form Fier industrial complexes
- Reduction of sediments in water from Banja Dam will be beneficial to downstream irrigation systems.
- New reservoirs may be made available to public use for recreation.
- New fish populations might thrive in the new reservoirs.
- Habitats for waterfowl will improve.
- Local and regional job opportunities.
- Generally increased economic activity.

ES1.10.3 Potential Conflicts

Among the most significant changes that may cause conflicts to arise, unless properly mitigated when possible, are:

- The transformation of Devoll River reaches into reservoirs will be the most visible impact of the planned development. It will for instance result in:
    - Change the aquatic ecosystems and species composition. River fish fauna will suffer.
    - Terrestrial vegetation and wildlife habitats will be lost.

- Forests and agricultural land will be lost.
- Settlements and private property will be inundated.
- Roads and access for some settlements will be lost or made difficult.

- Between the hydropower dams and the tailrace the river bed will have a very much lower flow maintained only by releases at the dam, inflow from tributaries, groundwater seeps and leakages. Below the tailrace the water might show great fluctuations if the power plant is operated in a strict peaking mode. River ecology and downstream water users might be impacted in several ways. The main concerns are:
  - Aquatic flora and fauna, including fish, might not be able to survive loss of water or dramatic fluctuation in flow.
  - Loss of water or unstable water supply makes water supply for irrigation, water supply, husbandry watering, etc. difficult.
  - Unpredictable water release represents a risk factor for transport or other activities in the river bed
- Like other large scale construction activities the hydropower project will introduce a number of factors for change and stress in the local societies exposed for such activities, such as:
  - Resettlement and vital social changes that will follow.
  - Direct construction related environmental impacts like water pollution, noise, erosion, traffic nuisance, etc.
  - Threat to local social fabric, lifestyles and health due to influx of workers
- Less flooding and less sediment transport might have a negative impact on the ecology and biodiversity values of the Seman Delta.
- Reforms of the in-basin and upstream irrigation systems are underway with eventual effects on water availability for power production and water quality.

ES1.10.4 Recommendations

A number of measures and actions should be taken to avoid, minimise or compensate for potential negative impacts hydropower schemes. Some of these measures will have to be built into the design or operational procedures of the hydropower schemes; other will take the form of compensation of lost livelihood, values or property.

Some negative impacts cannot be directly mitigated because the natural qualities or features that will be lost relates to the communities or population at large. Therefore, to protect the natural values that will be under stress from the development and to safeguard the livelihood of the local communities, development or management programmes shall be established, fully or partly paid by DHP. Some of these activities will take the form of one-time actions or compensation; other will be long term or permanent activities or programmes for provision of benefits to the relevant communities.

Specific Mitigation and Compensation Measures

Water related mitigation measures will focus on the protection of biodiversity and integrity of the ecosystem in the impacted parts of the water system, and mitigate the potential damage to fisheries and other water related use (irrigation, water supply, transport, etc.). The most important mechanism for mitigation will be specific requirements for Minimum Flow Releases. This report has given recommendations for MFR in the relevant river reaches. Only one fixed figure is given in each case. Further monitoring and assessment are needed to decide if a more flexible release regime is required.

The losses of land and properties shall be compensated in cash or in kind based on the Albanian regulations for compensation and re-location and following the overall principle that the affected peoples shall be equally or better off than before. The compensation will be based on a detailed asset evaluation of the impacted areas and will emphasise restoration of livelihood for the primary impacted population.

The measures for minimising the negative impacts of construction activities will have to be specified in the contract documents with the Main Contractor and Sub-Contractors. The basis for these requirements will be the section of the Environmental Management Plan covering construction.

The more complex measures for protection and enhancement of natural values, economic development, welfare and safety of impacted individuals and communities, etc. have to be addressed in the Environmental and Social Management Plans.

Organisation

It is recommended that the DHP Head Office in Tirana establish an Environmental and Social Management Unit with a Manager and support staff for supervision and control of the environmental and social management activities. The ESMU might have a field office in conjunction with the DHP office in Gramsh.

ES1.10.5 Next Steps

ESMP and RAP

The next steps in the ESIA process to carry out are illustrated in Figure ES. 10.

The detailed ESMP to be developed when construction details and schedules are known will expand the framework ESMP contained within this ESIA and address issues defined under IFC Performance Standards relevant to environmental and social management planning including involuntary resettlement. It will produce an ESMP manual with clear priorities and procedures for DHP to implement to ensure compliance with international best practice.

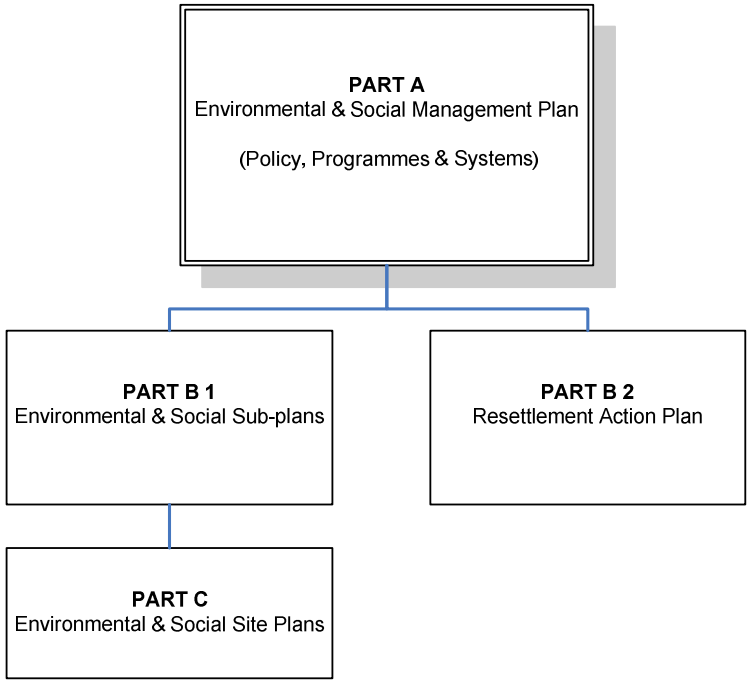

Figure ES. 10: ESMP and RAP Overview

A full resettlement action plan will need to be produced for Devoll Hydropower Project as per IFC guidelines for Full RAP (30+ houses and/or 200+ persons affected) apply. The RAP will complement the ESMP Part B 1 Sub-Plans as indicated in Figure ES. 10 and fall under the umbrella of the ESMP as Part B 2.

A good Public Consultation and Disclosure Plan is key in carrying the ESIA process further. A step in this process is presented in the report from the Open Public Hearings in the project area on the Draft ESIA report which is introduced below.

Summary of the Public Hearing Reports on the Draft ESIA

The Public Hearings on the were held on 12 and 13 September, 2011 at the Cultural Palace "Thoma Prifti" in Gramsh, and on 15 September in a converted warehouse in Moglice. Presentation of the Draft ESIA report of the Devoll Hydropower Project encompassed the planned three hydropower projects (Banja, Kokël and Moglicë HPPs) in the Devoll River. The hearings in Gramsh focused on the Banja and Kokël Hydropower Projects while the Mogilce hearing focused on the Moglice HPP. The presentations elaborated on the baseline, potential impacts and recommended mitigation options. The public hearing solicited the opinions of and answered stakeholders queries.

The main purpose of these public engagement meetings was to share with stakeholders the findings of the ESIA. The proponent DHP called for this open meeting. Of particular relevance is that information was aimed to the project affected persons and the institutions located within the project area. The opinions and reactions of the stakeholders have been incorporated in detail in this final version of the ESIA report as Appendix V and summarised in Table ES. 31.

Table ES. 31: Summary of Salient Issues Relevant to the ESIA

	DHP Public Hearings, September 2011:			
	Place, Date, Target Region/HPP, Numbers	**Stakeholder/Attendee, Makeup and Numbers**	**Purpose of Consultation and Mode of Communication.**	**Key Comments/Concerns, Incorporated in the ESIA and Recommended for Action by DHP**
I **II** **III**	Gramsh town on September 12, 2011, with focus on the Middle Devoll area. This area is affected by the Kokel dam and HPP, Moglice HPP as well as the 220 kV power line. 330 persons attended including representatives from 19 villages present Gramsh town on September 13, 2011, with focus on the Lower Devoll area. This area is affected by the Banja dam and HPP as well as the 220 kV and 110 kV power lines. 434 persons attended including representatives from 23 villages present Moglicë Village on September 15, 2011, with focus on Upper Devoll area. This area is affected by the Moglice dam as well as the 220 kV power line. 308 persons attended including representatives from 20 villages present	***Stakeholders (total 1072)*** From villages in the area, 593 persons attended the hearings. The rest of the audience was predominantly from Gramsh (377), the largest town in the project area and from Elbasan, Korce, Tirana and Cerrik ***DHP*** Management Board, ESIA coordinator, communication team, lawyer ***ESIA Team*:** Erik Helland-Hansen Ferdinand Bego	**Purpose:** 1. Present ESIA findings and recommended mitigation and enhancement measures 2. Solicit opinions, concerns and provide answers. **Mode of Communication:** Presentations and Questions/Answers session	**Concerns:** 1. Titles to land 2. Inundated infrastructure, especially roads and bridges 3. Compensation. Who is entitled? Who will compensate? (Government or DHP) 4. Consequences of inundation - Land stability and safety zones 5. Consequences for river discharges (environmental, irrigation and pollution) **Recommended Actions for DHP**: 1. Provide legal assistance to the affected people related to ownership titles and consult with authorities on national and district level. 2. Support the Government of Albania in formulating appropriate plans concerning replacement infrastructure. 3. Develop DHP entitlement policy and be clear on DHP commitments as well as Government practical contributions 4. Focus on these issues in the upcoming consultations and communicate the importance of respecting the area close to the reservoir in times of rapid water level fluctuations. 5. Monitor the effects of the changed flow and if necessary involve environmental flow specialists from DHP owners and cooperate with Lushunje Irrigation Board regarding seasonal irrigation requirements.