

Supplemental E&S Assessment and ESMP for the Shuakhevi Hydroelectric
Power Plant's 35kV Overhead Transmission Line (OHL)



Final Report
August 2017

Table of Contents

1	Introduction.....	1
2	Project Alternatives Analysis.....	2
3	Stakeholder Engagement.....	8
4	Assessment Scope and Method.....	10
5	The Project Community and Cultural Heritage.....	13
6	The Project and Ecology.....	25
7	The Project and the Environment.....	50
8	Environmental and Social Management Plan.....	55
9	Conclusion.....	81

Annexes

Annex A	Annexure 2: Alternatives New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)
Annex B	Stakeholder Engagement Annex B (i) Stakeholder Engagement Plan (SEP) AGL, (December 2016) Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line Annex B (ii) Minutes of Stakeholder Engagement Meetings, January 2017 Annex B (iii) Minutes of Public Hearings, July 2016
Annex C	Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP) ACT, (February 2017) 'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project
Annex D	Section 4: Project Description New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)
Annex E	Annexure 7: Archaeological Opinion New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)
Annex F	Section 5.4: Biological Environment New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)
Annex G	Annexure 4: Geology New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)
Annex H	Annexure 3: Waste Management New Metal Georgia, (October 2016) Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)

- Annex I [Non-Technical Summary \(NTS\)](#)
New Metal Georgia, (October 2016) Skhalta - Shuakhevi 35 kV Overhead Power Line.
- Annex J [Chance Finds Procedures \(CEMP01\) Extract](#)
AGL, (November 2016) Cultural Heritage and Chance Finds Procedure.
- Annex K [Spill Prevention and Chemicals Storage Plan \(CEMP04\) Extract](#)
AGL, (November 2012) Spill Prevention and Chemicals Storage Plan.
- Annex L [Air Quality Management Plan_Rev B \(CEMP05\) Extract](#)
AGL, (November 2012) Air Quality Management Plan.
- Annex M [Noise Management Plan_Rev B \(CEMP06\) Extract](#)
AGL, (November 2012) Noise Management Plan.
- Annex N [Traffic Management Plan_Rev B \(CEMP07\) Extract](#)
AGL, (November 2012) Traffic Management Plan.
- Annex O [Labour Grievance Plan_Rev B \(CEMP08\) Extract](#)
AGL, (November 2012) Labour Grievance Plan.
- Annex P [Waste Management Plan_Rev B \(CEMP09\) Extract](#)
AGL, (November 2012) Waste Management Plan.
- Annex Q [Erosion and Sediment Control Plan_Rev B \(CEMP10\) Extract](#)
AGL, (November 2012) Erosion and Sediment Control Plan.
- Annex R [Water Quality and Water Resources Management Plan_Rev B \(CEMP11\) Extract](#)
AGL, (November 2012) Waste Quality and Water Resources Management Plan.

1. Introduction

1.1 Background to the Project

Adjaristsqali Georgia LLC (AGL), is a special purpose vehicle set up to develop the hydropower resources on the Adjaristsqali River and its tributaries. AGL is a joint venture between Clean Energy Invest AS, Tata Power and the IFC.¹ AGL has been awarded the development rights for the Adjaristsqali Hydropower Cascade Project (also referred to as the 'Shuakhevi HPP' or 'the Project') in Georgia. The Environmental and Social Impact Assessment (ESIA) for the Shuakhevi HPP was prepared during the Feasibility Study stage (July 2011-August 2012) with the final version issued in October 2012. In 2014, the need for the 35kV Skhalta-Shuakhevi Overhead Transmission Line Project (the '35kV OHL [Project]') was identified. The 35kV OHL is a 22.3 km single circuit overhead power line that will be constructed along the Adjaristsqali and Skhalta rivers, connecting Skhalta and Shuakhevi substations. It is an associated facility of the Shuakhevi HPP scheme.

In 2016, New Metal Georgia was assigned as the construction contractor ('the Contractor') of the 35kV OHL Project. In October 2016, an Environmental and Social Impact Assessment (ESIA) was prepared for the Ministry of Environment and Natural Resources Protection of Georgia, as part of Georgian project permitting requirements.² The environmental permit was approved on the 20th April 2017.³ The ESIA assessment has subsequently been updated to meet the lending requirements of the Project's international lenders⁴ and translated into English.⁵

1.2 Purpose of the Supplemental E&S Assessment and ESMP

This Supplemental Environmental and Social (E&S) Assessment for the 35kV OHL Project provides an overview of the E&S assessments that have been undertaken for the OHL,⁶ bringing the measures specified therein, in-line with the commitments made for the overall Shuakhevi HPP scheme. It focusses on the key environmental and social risks and impacts of the 35kV OHL and presents an Environmental and Social Management Plan (ESMP) that draws together the mitigation, management and monitoring commitments made by AGL and its Contractor; to meet both Georgian environmental permitting requirements and those of the international lenders to the Shuakhevi HPP.⁷ Source information used in the preparation of this Supplemental E&S Assessment is provided as annexes.⁸

¹ The Shuakhevi HPP is being developed in cooperation with International Finance Corporation (IFC) InfraVentures, an early stage project developer launched by IFC, a member of the World Bank Group and other lenders, including the European Banks for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB).

² In accordance with the Law of Georgia on Environmental Impact Permit, 2007.

³ Email communication with AGL. July 2017.

⁴ IFC Performance Standards (2012), European Bank of Reconstruction and Development (EBRD) Performance Requirements (2014) and Asian Development Bank (ADB) Safeguard Requirements (2009).

⁵ The original ESIA submitted to the MoE is not available in English. AGL has provided information in the ESMP (Section 8) regarding the commitments and conditions contained therein.

⁶ All information presented is accurate and complete only to the extent that the source information is itself accurate and complete. No new assessment has been undertaken during the preparation of this report; it presents existing evaluations.

⁷ The Policy, Legal and Institutional Framework for the 35kV OHL Project is provided in: Mott MacDonald (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment* (ESIA).

⁸ Source information presented as annexes has not been amended as part of the drafting of this assessment.

2. Project Alternatives Analysis

2.1 Introduction and Background

At the time of finalising the ESIA for the Shuakhevi HPP (2012), the route of the transmission line to transfer power generated by the Project to the Georgian national grid, was unknown¹. The local distribution network was unable to support the additional 9MW load from the scheme and so the requirements and routing for the 35kV OHL were determined in 2014. An ESIA for the line was then prepared in October 2016.

2.2 Alternatives Analysis

In determining the best option for the transmission line, several alternatives have been assessed. Both the route of the OHL and the location of its towers have been analysed. Route alternatives have utilised maps of the area and computer modelling, which have then been verified and evaluated during site visits by specialists² and engagement with local stakeholders (see Box 2.1). The following key parameters were considered during the alternatives analysis:

- Technical complexity of construction;
- Geology and geohazards;
- Access to the 35kV OHL; and
- Environmental and social constraints.³

A summary of the alternatives assessment is presented in Table 2.1, with full details in Annex A (35kV ESIA, Annexure 2: Alternative Routes for 35kV Skhalta – Shuakhevi Line). Following selection of the preferred route and a desk-top analysis of technical constraints, the location of 133 steel towers on prefabricated concrete foundations was determined, with input from local stakeholders. The final number and precise location of towers will be finalised during detailed design, which will be concluded following detailed geotechnical analysis and completion of the remaining environmental and social surveys, as detailed in Section 8 of this ESMP. Figure 2.1 presents an overview of the routes considered for the 35kV OHL Project (Alternatives II-1, II-2, II-3 and III) and the proposed tower locations for the preferred route (Alternative III). There are some slight amendments to the illustrated preferred route around towers 112 to 113 and 130 to 132. These are described in Section 5.4.2 of this assessment.

Box 2.1 Stakeholder Engagement During Route Selection

Local community stakeholders have been involved in the route and tower selection process since April 2016.⁴ A summary of engagement undertaken is presented in the Stakeholder Engagement Plan (SEP)⁵ for the 35kV OHL and Appendix C to the LALRP Addendum (see Annexes B (i) and C of this Supplemental E&S Assessment). Details of the January 2017 meetings are not currently captured in the SEP but will be added as part of the next update and are provided as Annex B (ii). The siting of towers has been discussed with stakeholders on site, so that their views and any social constraints could be taken into consideration during route finalisation. Stakeholder engagement meetings have also been held. Issues raised have been responded to during meetings and logged for consideration in route planning and finalisation. Issues raised have largely focused on land acquisition and ownership disputes between families (see Section 3).

¹ The ESIA for the Shuakhevi HPP stated that it would be connected to a double circuit 220 kV transmission line; work that would be undertaken by the Government of Georgia, but that no details were available at the time of reporting.

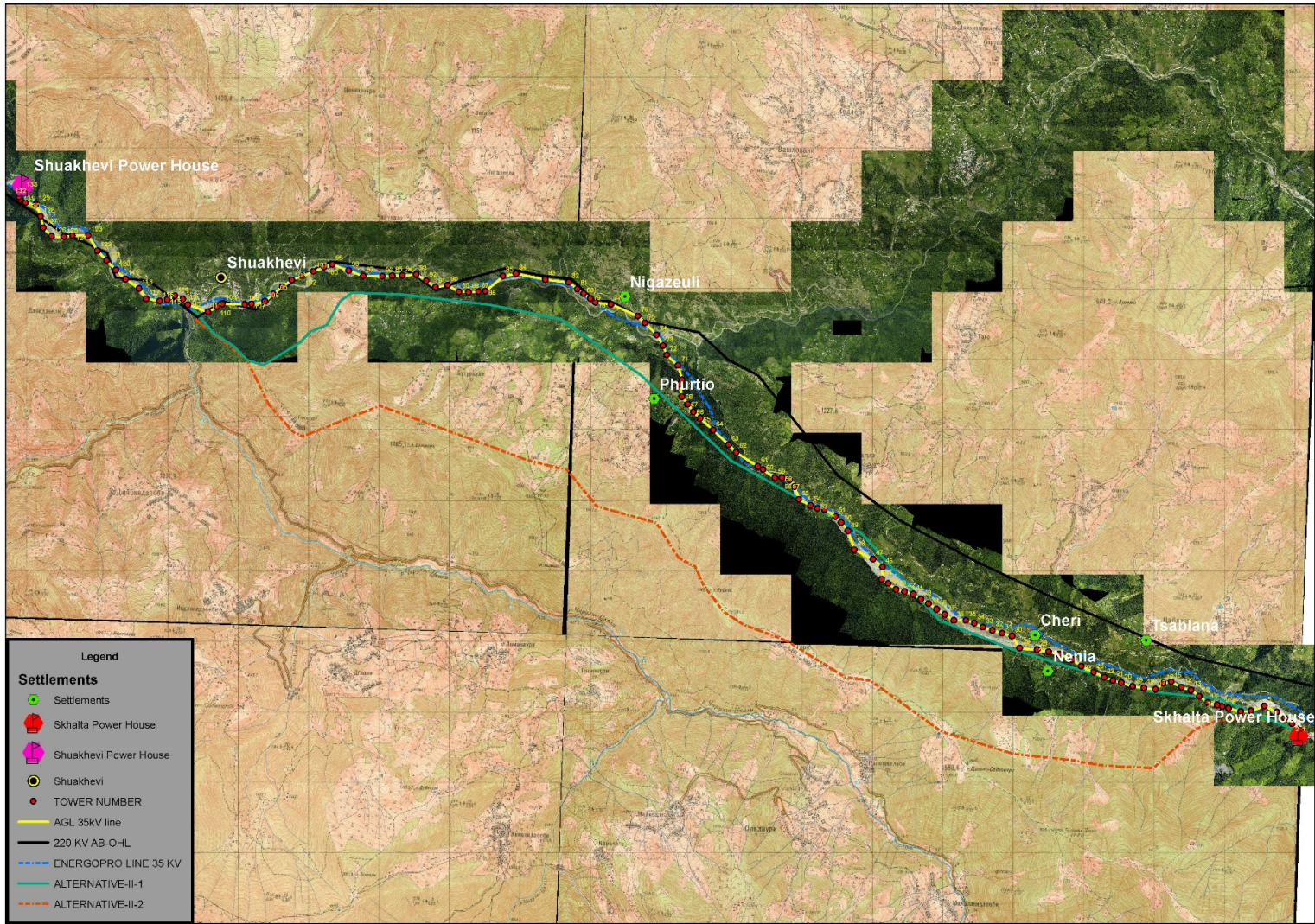
² Including OHL engineers, CAD and GIS specialists, geologists and environmental consultants. Stated in, New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)*, Annexure 2. (See Annex A).

³ The analysis of social constraints predominantly focussed on the impacts associated with land acquisition.

⁴ This process has been led by New Metal Georgia with support from AGL's Public Information Officer (now believed to be called the Community Liaison Officer (CLO)), as detailed in the Lenders Monitoring Report (Q4 2016).

⁵ AGL (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*.

Figure 2.1 Overview of the Routes Considered for the 35kV OHL Project



Source: New Metal Georgia

Table 2.1 Summary of 35kV OHL Route Selection Analysis

Option	Description	Technical and Financial Considerations	Environmental and Social Considerations	Decision
No Action	Utilising the existing Energopro 35 kV OHL	<ul style="list-style-type: none"> The existing single circuit transmission line does not have the capacity to take an additional 9 MW power load. 	<ul style="list-style-type: none"> Technical constraints predominate. 	Not feasible
Alternative I	Upgrading the existing Energopro 35 kV OHL to double circuit	<ul style="list-style-type: none"> Many of the existing towers are in a poor state of repair and would need to be reconstructed to accommodate a double circuit configuration. This option would result in towers being used by 3 different parties (AGL, Energopro and Sanalia HPP) with resulting legal and financial risks associated with construction costs and ongoing maintenance. Rehabilitation and future maintenance would be challenging. 	<ul style="list-style-type: none"> There would be significant power supply outages for the local communities as this is the only power line supplying the area. The upgraded OHL would need to be re-routed in some sections due to the need for larger foundations to house the double-circuit towers and restricted road widths along some of the existing route. 	Not feasible
Alternative II	Construction of a new line along Chirukhistqali river and along the ridge between Chirukhistqali and Shkalta valleys. ¹⁴	<ul style="list-style-type: none"> This option has legal/permitting constraints as additional permits would be required due to the construction of tower foundations on slopes > 35°. Construction would be more challenging on this route due to the steep terrain and associated geohazards (e.g. landslips). The line would cross the existing 220kV line, the 35kV Energopro line and the Adjaristsqali river. 	<ul style="list-style-type: none"> Less impact on private land as higher up the slopes of the river gorge. New access roads would need to be constructed to access much of the route. Comparatively high ecological impact as this route would pass through higher alpine forested terrain, which includes a higher number of protected species. 	Not preferred
Alternative III	Construction of a new line parallel to the proposed 220kV line and existing 35kV line route following the Adjaristsqali and Shkalta rivers.	<ul style="list-style-type: none"> The route does not require additional permits for construction and would be fully owned by AGL. No access roads on steep slopes will be required, therefore reducing the landslide risks. The route follows the existing overhead lines. 	<ul style="list-style-type: none"> Less trees need to be cut compared to the other alternatives as most of the route runs along the largely treeless floodplain area (approx. 38 ha of forest will need to be trimmed and 0.3 hectares of forest cleared).¹⁵ Access is generally good along the whole route with minimal additional access roads being required (compared to Alternative II). Approx. 5% of towers are expected to require new access routes. Impacts on private (and productive) land is comparatively higher due to the river valley location. 7,140m² of productive land will be permanently impacted, but smaller fruit bearing trees will be maintained, where possible.¹⁶ 	Selected

¹⁴ Multiple sub-alternatives of this option were also examined based on mapping and route walks with local community stakeholders.

¹⁵ The total land requirement for the 35kV OHL is 96 hectares.

¹⁶ This does not currently include land take associated with access roads, which will be added to the LALRP Addendum.

2.3 Description of the Selected 35kV OHL Route

After analysis of the alternatives, 'Alternative III' has been assessed as the most suitable route option. It runs parallel to the existing Energopro 35kV line, following the river closely on either the left or right bank, switching over to avoid residential houses, steep hills and landslide prone areas. It is characterised by a relatively simple elevation profile and access is simpler than the considered alternatives, with approximately 90% of towers accessible from existing roads and walkways.^{17,18} The 35kV OHL will mostly run along the opposite bank to the existing Energopro 35kV line to maintain required clearance distances between them.

The route does not cross any nature conservation areas or bird migration routes, with the closest reserve (Kintrishi IBA) being 18 km from the 35kV OHL corridor (see Figure 6.1 in Section 6). Routing through forest areas has been minimised, but it has been identified that careful micro-siting of towers will be needed between Towers No. 10 and No. 30 (from Skhalta substation through land between Tsalana and Kinchauri) due to the extensive forests that extend from the riverbank to the slope ridges on both sides of the river. This has been identified as an area of high biodiversity value, potentially containing critically endangered or endangered fauna (see Section 6). The left bank of the river is preferred for this section of the route so that it avoids the existing Energopro 35kV line, private land plots and a memorial.¹⁹ The line will cross between river banks more than 15 times to avoid construction of towers on steep slopes and therefore avoid landslide risks. There is one residential property that is situated within the Sanitary Protect Zone (SPZ)²⁰ for the preferred route. AGL is currently reviewing options to ensure that this house is outside the SPZ for the 35kV OHL. There will also be some economic displacement as a result of land requirements for the 35kV OHL (see Section 5).

2.4 Summary of 35kV OHL Construction and Maintenance

Construction of the 35kV OHL is expected to be completed within 6 months²¹ and will include RoW (Right of Way) land acquisition, land clearing, earth works,²² installation of precast foundations and erection and assembly of towers. There will then be stringing of the overhead power line and the installation of conductors and other hardware, before final commissioning. Each tower is expected to be constructed in approximately 6 to 10 days.²³ The Project will utilise existing roads or walkways where possible, but some new access routes and widening of existing tracks will also be necessary. 6-7 towers will likely require the construction of new access routes, averaging about 50m in length. This is a total of 300 to 350 metres of new roads/walkways for the 35kV OHL.²⁴ Appropriate assessment of the preferred access routes will be undertaken during detailed design, and due process followed for any required land acquisition. Access routes are likely to only be required temporarily during construction (approximately 6 to 10 days for each tower) after which they will be fully reinstated.²⁵

¹⁷ Surveys have indicated that existing roads and river crossings will be sufficient to access approximately 80% of the towers. A further 5% can be accessed via these existing roads, along with existing river cross-overs, 10% of towers can be reached after reinforcement of existing walkways. The remaining 5% may require construction of short access routes. Information provided by AGL's Transmission Planning Engineer. Telephone communication. March 2017.

¹⁸ The precise location of the access roads has not been confirmed, but the main thoroughfares for traffic will be the Batumi-Akhalsikhe and Zomleti-Khikhadziri roads. Email confirmation from New Metal Georgia, via AGL. April 2017.

¹⁹ This is a memorial for the local people who lost their lives during a large landslide in the 1980s.

²⁰ A restricted area of 40m.

²¹ 180 days is estimated, assuming normal weather conditions. Email communication with AGL Transmission Planning Engineer. March 2017.

²² To including the creation of terraces.

²³ Approximately 2 days for foundations, 2 days for tower assembly and 2 days for stringing and associated activities. Email communication with AGL Transmission Planning Engineer. May 2017.

²⁴ Tower infrastructure can be transported in relatively small vehicles and so access routes do not need to be large. Access routes are the responsibility of the Contractor and will not be owned by AGL. The process of securing access will, however, be in accordance with the principles, methodology and entitlement framework established in the Project's LALRP and as agreed with the Lenders' group.

²⁵ During detailed design, it will be confirmed whether any of the new/widened access routes are required for maintenance work access.

The OHL will mainly include 35kV class lattice steel towers²⁶ and pre-fabricated foundations;²⁷ 100kV class steel towers will be used in difficult geographic locations to maintain electrical clearances. 133 towers are currently planned,²⁸ but this may vary slightly following detailed design. All towers will be located at a minimum of 30m from the river bed. ACSR conductors²⁹ are to be used, insulated with composite ceramic insulators. A 40m RoW will be maintained for the 35kV OHL to maintain electrical clearances, in line with the Sanitary Protection Zone (SPZ) requirements of the Electric Installation Code (PUE).³⁰ It is estimated that 38ha of forest will be trimmed and 0.3ha cleared, out of a total 96 ha of land required for the OHL.³¹

It is estimated that approximately 30 workers will be employed during construction and the Project is committed to employing local labour, where possible. It is expected that there will be two teams of six workers during the construction period (up to 6 months) starting from each end of the 35kV OHL. This will be increased to four teams of six workers during peak times. Each team will have one or two support workers, such as drivers and/or security personnel. Workers are expected to travel from Shuakhevi, Khulo or Skhalta.³² Workers will not be living on site, but travelling back to their own residences (by minibus or car) at the end of each work day. The exception to this is security personnel, who will overnight at AGL’s construction camps. There may be a requirement for security personnel to look after equipment and materials at the tower locations overnight. Should this be required, it will be carefully managed. Details will be provided in the Contractor’s Security Plan³³ and agreed with AGL prior to construction. Such arrangements will also be discussed with local communities’ close to the sites.

The existing construction camps of AGL will be used for the storage of vehicle and materials (see Figure 2.2).³⁴ Vehicle movements associated with the construction of the 35kV OHL are detailed in Table 2.2. Once on site, the construction vehicles will move between the towers, waste storage/disposal areas and refuelling points.³⁵

Table 2.2 *Passenger Vehicles During Construction of the 35kV OHL Project*

Type of Vehicle	Number of Vehicles	Duration of Use (months)	Total Trips During Construction	Average Trip Distance (km)
Excavator	4	4	240	10
Bulldozer	4	4	240	10
Crane	2	4	120	10
Dumper/high sided truck	2	4	240	20
Mini Bus	2	4	480	40
Car	2	4	480	40
Material pick up van	2	4	480	40

Source: New Metal Georgia, April 2017

²⁶ Tower design specifications are provided in Annex D (Section 4 of the 35kV OHL ESIA. New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)*).

²⁷ Foundation details will be confirmed based on the tower type, its location and the soil conditions.

²⁸ There will also be 2 portal/gantry towers at respective substation ends of the OHL.

²⁹ Aluminium conductor steel-reinforced cable (ACSR) is a type of high-capacity, high-strength stranded conductor typically used in overhead power lines. The outer strands are high-purity aluminium and the centre strand(s) are steel.

³⁰ Issued by The USSR Ministry of Energy and Electrification, (1985, 6th Edition) *Electric Installation Code (PUE)*, Moscow.

³¹ This is based on 135 towers (which includes 2 portal/gantry towers at respective substation ends) with an average footprint of 5m x 5m and a construction area of 7m x 7m.

³² The road distance between Shuakhevi to Skhalta is 43km. Two teams are expected to travel from Shuakhevi or Khulo and two teams from Skhalta. This is an approximate 40km round trip for each team. Information provided by AGL. Email communication. April 2017.

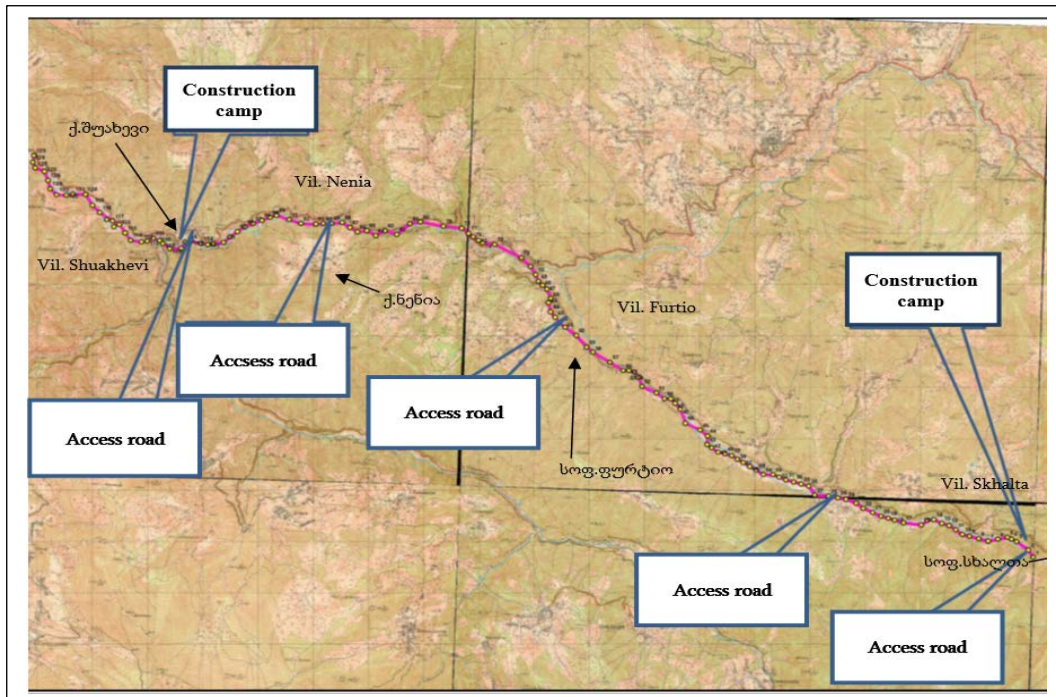
³³ To be developed.

³⁴ The suitability of the construction camp sites was assessed as part of the overall Shuakhevi HPP scheme. No further assessment was undertaken for the 35kV OHL Project. It is presumed that the access routes indicated on the map are existing roads, but this has not been confirmed.

³⁵ It has been estimated that the excavators, bulldozers and cranes will make on average 10 movements of approximately 10km every month, while the dumper/high sided trucks will make 20 movements of approximately 20km each month, transporting materials and waste. Information provided by AGL. Email communication. April 2017.

Once constructed, the transmission line will require minimal maintenance. Yearly visual inspection of the OHL towers and conductors is expected, plus any surveys needed to identify faults. The maintenance team will undertake a physical examination of the transmission line and its component parts to ensure its safety, security and integrity. Maintenance activities will involve occasional removal of trees or branches where they start to grow too close to the OHL. Some access rights will need to be maintained to allow for these maintenance works³⁶. Emergency maintenance and repairs may also be required. An Operation and Management (O&M) Plan will be developed by the Project, to manage activities during this phase of the 35kV OHL Project.

Figure 2.2 Location of AGL Construction Camps and Potential Access Roads



Source: New Metal Georgia

The 35kV OHL is likely to remain in place for over 25 years, albeit with repair and replacement of components. At the point of decommissioning an appropriate Closure Plan will be developed by the Contractor and (as necessary) submitted to the appropriate regulatory authority (currently the Ministry of Environment and Natural Resources Protection of Georgia) for review and approval. Decommissioning will involve the dismantling of towers, the removal/recycling/reuse of materials and, as needed, disposal. Any disturbed areas will be restored to pre-project conditions.³⁷ Environmental and social impacts associated with the decommissioning process will be identified and appropriately managed through the Decommissioning Environmental Management Plan.³⁸

This Supplemental E&S Assessment has been prepared based on the design described herein. Any substantive change(s) to the design assessed in this Supplemental E&S Assessment and its annexures will be subject to the design change management procedure for the overall Shuakhevi HPP scheme, as set out in Section 2.2.2.3 of the CEMPOO.

³⁶ The precise location of these routes will be confirmed during detailed design.

³⁷ Details of operation, maintenance and decommissioning activities all confirmed with AGL's Transmission Planning Engineer. Email communication, April 2017.

³⁸ A detailed assessment of the impacts associated with decommissioning has not been undertaken for the 35kV OHL. Such works would be a long time in the future. There are likely to be disturbance impacts associated with decommissioning of the OHL, but they would be short term (approximately 3 months) and minimised through the implementation of a decommissioning environmental management plan.

3. Stakeholder Engagement

3.1 Overview

Stakeholder engagement for the 35kV OHL commenced in around April 2016 and is summarised in the *Stakeholder Engagement Plan for 35kV Skhalta-Shuakhevi Overhead Transmission Line, December 2016 (Rev C)*¹ (Annex B (i)). Engagement activities have been led by the Contractor, with AGL closely involved since May/June 2016, as part of LALRP development. All engagement for the 35kV OHL is implemented within the framework of the SEP² for the overall Shuakhevi HPP scheme and in line with the dedicated 35kV SEP.³ Stakeholder engagement activities undertaken to date and key issues raised are summarised in Box 3.1.

3.2 Grievance Mechanism

A grievance mechanism has been developed for the 35kV OHL project and is the responsibility of AGL, through the Land and Social Director and the Community Liaison Officer (CLO). In alignment with the International Finance Corporation (IFC) Performance Standards, the grievance mechanism will *'seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible, and at no cost and without retribution to the party that originated the issue of concern'*.⁴

Full details of the process are provided in the SEP (see Annex B). Grievances can be raised with the Contractor or AGL representatives verbally, in writing or via a grievance form.⁵ They are acknowledged within 10 days and, depending on the immediacy of the action needed,⁶ are responded to within a maximum of 21 days. An appropriate team⁷ is assembled to manage grievances, which are recorded in a grievance log, managed by AGL.⁸

3.3 Ongoing Engagement

Stakeholder engagement will continue throughout the life of the 35kV OHL Project. The SEP contains details of the types of project information to be shared (e.g. construction schedules, information about the grievance mechanisms) and the methods for engagement (e.g. progress reports, leaflets, press releases, project website). It will continue to be updated as the project progresses in order to provide a clear plan for engagement. Public information centres have been set up by AGL in Shuakhevi, Khulo and Skhalta to aid information disclosure and provide a location for local stakeholders to meet with the AGL Community Liaison Officer (CLO) and Land and Social Director.⁹

¹ The SEP for the 35kV OHL has been developed to manage engagement activities throughout the life of the 35kV OHL project.

Stakeholder engagement is an ongoing process and the SEP is a working document that will be reviewed, and if necessary, adjusted as the 35kV OHL project progresses. It provides a framework to manage effective and meaningful engagement with stakeholders.

² Mott MacDonald (2013) *Adjatistsqali Hydropower Cascade Project, Stakeholder Engagement Plan*. As updated by AGL in 2016. Available from <http://agl.com.ge/uploads/media/SEP-G-Revision-Final-07-July-2016.pdf>

³ Engagement activities for the Shuakhevi HPP have been ongoing since 2011.

⁴ IFC (2012) *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*, paragraph 35

⁵ Grievance forms are available on the Project website and at the public information centres in Shuakhevi, Khulo and Skhalta. Grievances can be raised anonymously.

⁶ If immediate corrective action is available, it will be implemented within 10 days.

⁷ Including external parties and/or regulatory authorities, as needed.

⁸ AGL, (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*. Available from <http://agl.com.ge/uploads/media/35kV-line-SEP-Rev-C---Corrected.pdf>

⁹ Grievances are recorded by AGL representatives at these meetings, as needed.

Route Selection Engagement Activities

As detailed in Section 2, local community stakeholders have been involved in the route and tower selection process since April 2016.¹⁰ Discussions have been held with community representatives from the Project Affected Communities (PACs) to optimise tower micro-siting with regards to environmental and social constraints. Key issues raised have largely focused on land acquisition and ownership disputes between families.

Information Meetings with Project Affected Communities

Between April and June 2016, nine information meetings were undertaken with representatives from the 13 villages identified as affected by the 35kV OHL. Meeting participants¹¹ were informed about the preferred route and proposed design of the OHL. The ESIA process was also presented and impacts associated with the 35kV OHL (particularly those on land) discussed. Project information booklets and land acquisition procedure brochures (see Annex B (i)) were given to all participant and they were encouraged to raise any concerns, general comments or feedback. Responses were given during the meetings and the discussions recorded (see Annex B (i)). The grievance mechanism for the Project was disclosed during these meetings and points of contact for the Project provided.

EIA Public Hearings

On the 14th July 2016 public hearings (consultation meetings) for the 35kV OHL EIA were held in Khulo and Shuakhevi municipalities as part of the Georgian project permitting process (see Annex B (iii)).¹² The local EIA Report was subsequently resubmitted to the Ministry of Environment and Natural Resources Protection due to a requirement to formally submit under AGL's name (the initial submission was made by AGL's subcontractor, New Metal Georgia) EIA hearings were held again on 10th January 2017, in Khulo and Shuakhevi municipalities.¹³ All of the EIA consultation meetings were advertised in local newspapers and on information boards in the municipalities. Copies of the Georgian EIA were also available at the municipal buildings for 50 days prior to the consultation meetings. Minutes of the meetings were taken in both July 2016 and January 2017 and were submitted to the Ministry of Environment and Natural Resources Protection.

Typical Issues Raised

- | | |
|---|---|
| ~ OHL route alignment and tower micro-siting; | ~ Land compensation and timing of payments; |
| ~ Tower design alternatives; | ~ Land disputes and ownership rights; |
| ~ Land valuation; | ~ Employment requests; and |
| ~ Land registration and concerns about unregistered land; | ~ The availability of felled trees for local communities. |

¹⁰ This process has been led by New Metal Georgia with support from AGL's Community Liaison Officer (CLO).

¹¹ The 35kV OHL SEP states that around 250 people attended these nine meetings in total.

¹² The 35kV OHL SEP states that around 30 people attended the July hearings.

¹³ Details of the January 2017 meetings are not currently captured in the SEP but will be added as part of the next update and are presented in Annex B (ii).

4. Assessment Scope and Method

4.1 Overview

Information has been collated from a range of sources as part of the assessment of potential risks and impacts of the 35kV OHL. These have included secondary sources, including publicly available information, primary data collection and stakeholder engagement. As the 35kV OHL is an associated facility of the overall Shuakhevi HPP, the ESIA for the scheme has underpinned the assessment of impacts for the 35kV OHL. Additional studies have then been undertaken for those aspects where significant impacts are most likely, to refine the analysis. The focus has been on collecting primary data for those resources/receptors which have a reasonable potential to experience significant impacts. Box 4.1 summarises the main sources of information informing the assessment of impacts for the 35kV OHL project.

Box 4.1 E&S Studies for the 35kV OHL Project

Reference E&S Assessments:

- Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.
- Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*;
- Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Cascade Project Construction Environmental Management Plans (CEMPs)*;
- New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)* (see Annexes A, D, E, F, G and H for relevant sections);
- New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)* (see Annex I)
- AGL, (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line.* (see Annex B)
- ACT, (February 2017) *'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)*. (see Annex C);
- DG Consulting Limited, (March 2014) *ESIA for the Construction of the Akhaltsikhe – Batumi 220kV Power Transmission Line.*,¹

Field surveys for the 35kV OHL:

- Socio-Economic Survey (SES) focusing on land related impacts (June-July 2016);
- Detailed Measurement Survey (DMS) of lost assets (land, structures, crops and trees) conducted in 13 villages affected by the 35kV OHL (April–May 2016);
- Cultural heritage survey and route inspection undertaken by Batumi Archaeological Museum (March-April 2016);
- Flora: OHL walkover with surveys extending 25 m on either side of the OHL corridor (May 2016);
- Birds: Direct visual observations from vantage points, point counts and bird song detection during transect surveys (May 2016);
- Mammals: Methods included signs of activity, tracking on transects, direct visual counts (May 2016); and
- Reptiles: Suitable habitat identification, direct counts (May 2016).

4.2 Study Area

The Study Area for the 35kV OHL is the zone that has been studied to adequately understand and describe the baseline conditions likely to be affected by the project. The Study Area has necessarily varied across the various assessment topics, depending on the nature of the potential resource/receptor and their interaction(s) with the 35kV OHL Project. However, at a minimum, the Study Area has encompassed the 35kV OHL footprint and the Area of Influence (AoI). In line with IFC PS1 the AoI includes areas likely to

¹ The 220kV OHL route runs close to the 35kV OHL in sections 5 and (part of) Section 6.

be affected by project activities (both indirect and direct impacts), associated facilities and cumulative impacts.² As such, it includes all resources/receptors near construction sites and storage/laydown areas, near roads to be used by construction traffic and those directly impacted by land acquisition or land use restrictions.

4.3 Assessment of Impacts

The assessment of impact significance has followed the methodology used in the ESIA for the overall Shuakhevi HPP scheme. Mitigation measures embedded into the design of the 35kV OHL have been taken into account, and the level of significance evaluated based on the magnitude of the impact and sensitivity of the receptor.

Stakeholder engagement for the Shuakhevi HPP commenced in 2011 and stakeholders potentially affected by the 35kV OHL were consulted in 2016 (see Appendices B (i) and (iii)) and January 2017 (see Annex B (ii)). Good practice is that all impacts (perceived or real) raised as concerns by stakeholders are assessed, unless there are clear, technically-defensible reasons not to do so.³ Issues raised by stakeholders were reviewed during the assessment of impacts to ensure appropriate focus on key issues. Stakeholder comments and feedback were utilised to validate survey findings and considered during the routing of the 35kV OHL and development of mitigation measures. No route adjustments have been required on the basis of feedback from local community members.⁴ However, there is a slight re-alignment around towers 112 and 113 to ensure that a local house and potential future church site are outside of the 40m restricted SPZ. Re-alignment around the future church site was requested by the local municipality and the Georgian State Electrosystem (GSE).

The criteria for determining significance are specific to each environmental and social aspect and details are provided in the relevant chapters of the ESIA for the overall scheme. Tables 4.1, 4.2 and 4.3 present an overview of the designations for magnitude and sensitivity and how impact significance has been assigned. In line with the methodology for the Shuakhevi HPP ESIA, impacts of major or moderate significance have been classified as significant impacts.⁵

Table 4.1 Criteria for Determining Magnitude

Magnitude (Beneficial or Adverse)	Description
Major	Fundamental change to the specific conditions assessed resulting in long term or permanent change, typically widespread in nature, and requiring significant intervention to return to baseline; exceeds national standards and limits.
Moderate	Detectable change to the specific conditions assessed resulting in non-fundamental temporary or permanent change.
Minor	Detectable but minor change to the specific condition assessed.
Negligible	No perceptible change to the specific condition assessed.

Source: Mott MacDonald (2013)

² IFC (2012) *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*, paragraph 8.

³ Perceived impacts should be captured and considered in the assessment of impacts, but differentiated from 'actual' impacts; mitigation is likely to focus on awareness raising and engagement activities.

⁴ Some stakeholders requested the towers be put on their land to receive compensation which was not deemed a logical reason for making route re-alignments. There were no requests to avoid specific plots. Information provided by AGL. Email correspondence. July, 2017.

⁵ Mott MacDonald (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*. Section 5.3.4.

Table 4.2 Criteria for Determining Sensitivity

Magnitude (Positive or Negative)	Definition (considers duration of the impact, spatial extent, reversibility and ability to comply with legislation)
High	Vulnerable receptor (human or ecological) with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.
Medium	Vulnerable receptor (human or ecological) with limited capacity to absorb proposed changes or limited opportunities for mitigation.
Low	Vulnerable receptor (human or ecological) with some capacity to absorb proposed changes or moderate opportunities for mitigation
Negligible	Vulnerable receptor (human or ecological) with good capacity to absorb proposed changes or and good opportunities for mitigation

Source: Mott MacDonald (2013)

Table 4.3 Impact Significance Matrix

Magnitude of Impact	Sensitivity of Receptors			
	Negligible	Low	Medium	High
Negligible	Insignificant	Insignificant	Insignificant	Insignificant
Minor	Insignificant	Minor	Minor	Moderate
Moderate	Insignificant	Minor	Moderate	Major
Major	Insignificant	Moderate	Major	Critical

Source: Mott MacDonald (2013)

4.4 Cumulative Impacts

Cumulative impacts are those impacts that may result from the combination of past, present or future actions of existing or planned activities in a project's Area of Influence (AoI). While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) in the same geographical area and occurring at the same time, result in a cumulative impact that is significant.

Any cumulative impacts identified for the 35kV OHL are described under the respective topic in this Supplemental E&S Assessment. The Cumulative Impact Assessment (CIA) takes into account the 35kV OHL, as well as any other known, present and planned developments in the OHL's AoI. Those of relevance to the 35kV OHL project have been identified as the GSE (Georgian State Electrosystems) Akhaltsikhe to Batumi 220kV OHL and the other elements of the Shuakhevi HPP scheme.⁶ Construction of both these developments may overlap with that of the 35kV OHL and so potential cumulative impacts associated with traffic and transport, waste management, air quality and socio-economic impacts have all been considered within the relevant sections of this Supplemental E&S Assessment.

⁶ Construction of the Shuakhevi HPP scheme is expected to continue until August 2017. Construction of the 220kV OHL is planned to start in April 2017, but scheduled to start from the Akhaltsikhe end of the OHL, away from the 35kV OHL. Information provided by AGL. Email communication. March 2017.

5. The Project, Community and Cultural Heritage

5.1 Introduction

This section focusses on the impacts of the 35kV OHL on communities and cultural heritage. It draws on existing assessments undertaken for the Shuakhevi HPP scheme, focusing on the social and cultural receptors likely to be affected by the 35kV OHL. Potential impacts resulting from the 35kV OHL are presented, along with required mitigation and management measures. AGL will ensure that all such measures are included in the construction and operational management plans for the 35kV OHL project.

5.1.1 Primary and Secondary Data Sources for the Assessment

A desk-based review of available information from national and international sources was undertaken to support the preparation of the ESIA for the 35kV OHL and this Supplemental E&S Assessment. Key sources included:

- New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)*;
- New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*;
- ACT, (February 2017) *'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)*;
- AGL, (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*.
- Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*; and
- DG Consulting Limited, (March 2014) *ESIA for the Construction of the Akhaltsikhe – Batumi 220kV Power Transmission Line*.¹

A Socio-Economic Survey (SES) was conducted in June-July 2016 to collect primary data for the assessment of the 35kV OHL. The focus of the survey was those households that would be losing assets (land or other) as a result of the project. Approximately 75% of the total affected households (167 out of 221) were surveyed and the results captured in the Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)². A key objective of the SES was to generate a socio-economic profile of the Project Affected Communities (PACs).

Since 2011, AGL has also been undertaking engagement activities with local communities, as part of the overall Shuakhevi HPP Project. Information collected during these engagements informed the 35kV OHL ESIA and this Supplemental Assessment. Additionally, in March to April 2016 a survey was undertaken to assess cultural heritage impacts of the 35kV OHL. Specialists from the Batumi Archaeological Museum submitted an archaeological opinion which included a summary of historical finds in the area and the results of their route inspection.³ Full details are presented in Annex E (35kV ESIA, Annexure 7: Archaeological Opinion).⁴

¹ The 220kV OHL route runs close to the 35kV OHL in sections 5 and (part of) Section 6.

² ACT, (February 2017) *'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)*. Available from http://agl.com.ge/uploads/media/35kV-S_OHL_LALRP_V4_Eng_28.02.2017---disclosure.docx.pdf

³ The 35kV OHL does not require an archaeological permit under Georgian legislation.

⁴ To date, only tangible forms of cultural heritage (as defined in IFC Performance Standard 8) have been assessed.

5.2 Area of Influence

The socio-economic Area of Influence (AoI) for the 35kV OHL has been delineated based on the guidance of IFC PS 1⁵ and indicates where proposed works, including related facilities and infrastructure, will have a direct or indirect impact on the social environment. The area includes the 35kV OHL corridor and project activities and facilities that are directly owned, operated or managed by the Project (including by contractors) that are likely to generate social risks and impacts. The AoI also considers indirect project impacts, as well as cumulative impacts from other existing, planned or reasonably defined developments. As such, the AoI includes communities that are:

- near construction sites and storage/laydown areas;
- near roads to be used by construction traffic;⁶ and
- where land will need to be acquired or new restrictions on use will apply.

The following 13 communities have been identified as likely to be affected by construction, operation and decommissioning of the 35kV OHL project and fall within the AoI: Shuakhevi, Beselashvilebi, Gurdzauli, Dabazveli, Nenia, Nigazeuli, Okropilauri, Phurtio, Kinchauri, Zmagula, Tsalblana, Cheri and Chanchkhalo.⁷ For the purposes of this Supplemental E&S Assessment, they are collectively referred to as the OHL Project Affected Communities (PACs).

5.3 Community and Cultural Heritage Profiles

5.3.1 Overview of the Socio-Economic Profile

The 35kV OHL is located within the rural municipalities of Khulo⁸ and Shuakhevi⁹, which are in the Adjara region¹⁰ in the south-west of Georgia. Batumi (situated 64 km from the 35kV OHL route)¹¹ is the administrative centre of the Adjara region and Georgia's third largest city. The average population density in Adjara is 135.32 people per km², twice that of the national average (66 people/km²).¹² For many years, Georgia had a declining population, although its current growth rate is estimated at about 0.6% per year.¹³ Statistics on population change within the PACs was not available, but anecdotally there is a trend of out-migration of people from the mountainous areas to urban centre, such as Batumi in search of work.¹⁴ Table 5.1 provides population and household information for each of the Project Affected Communities.

⁵ IFC (2012) *Performance Standard 1, Assessment and Management of Environmental and Social Risks and Impacts*, paragraph 8. Available from https://www.ifc.org/wps/wcm/connect/3be1a68049a78dc8b7e4f7a8c6a8312a/PS1_English_2012.pdf?MOD=AJPERES

⁶ Maintenance vehicles during operation will be few and are not expected to impact local stakeholders, therefore only the construction phase is considered.

⁷ Annexure 2 of the 35kV OHL ESIA mentions that the preferred route of the OHL passes through Buturauli. This was not subsequently identified as an affected village during the SES for the LALRP.

⁸ Total population of 23,500 in 2016, a decrease from 2013 when it was recorded as 35,900 but it is also noted that there was a change in administrative borders between 2012 and 2013, which accounts for some of the change. Retrieved from: http://www.geostat.ge/index.php?action=page&p_id=473&lang=eng (National Statistics Office of Georgia. March 2017).

⁹ Total population of 15,100 in 2016, a decrease from 2013, when it was recorded as 22,800. Retrieved from: http://www.geostat.ge/index.php?action=page&p_id=473&lang=eng (National Statistics Office of Georgia. March 2017).

¹⁰ The total area of Adjara Region is 2,900 km² and population is 337 thousand people (down from 394 thousand in 2013). Retrieved from: http://www.geostat.ge/index.php?action=page&p_id=473&lang=eng (National Statistics Office of Georgia. March 2017).

¹¹ Batumi to Shuakhevi is 64km, data provided by AGL. Email communication. March 2017.

¹² Mott MacDonald (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

¹³ United Nations Department of Economic and Social Affairs, Population Division, (2015) *World Population Prospects*, Retrieved from: <https://esa.un.org/unpd/wpp/> and <http://worldpopulationreview.com/countries/georgia-population/> March 2017.

¹⁴ During scoping meetings for the Shuakhevi HPP ESIA, participants stated that income from agricultural activities was not sufficient and people have to migrate from the region in search of employment. Cited in, Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

Table 5.1 Population Data for the Project Affected Communities of the 35kV OHL

Village Name	Municipality ¹⁵	Population		Number of Households	
		2014	2016	2014	2016
Okropilauri	Shuakhevi	213	252	51	77
Dabadzveli	Shuakhevi	158	222	39	58
Shuakhevi ¹⁶	Shuakhevi	797	700	232	226
Nenia ¹⁷	Shuakhevi	604	997	143	222
Tsablana	Khulo	659	694	154	126
Kinchauri	Khulo	281	335	58	67
Furtio	Shuakhevi	787	924	165	264
Cheri	Khulo	217	233	51	48
Gurdzauli	Khulo	115	135	23	31
Dzmagula	Khulo	184	270	33	54
Beselashvilebi	Shuakhevi	143	181	28	48
Nigazeuli	Shuakhevi	706	987	161	235
Chanchkhalo	Shuakhevi	486	562	133	177
TOTAL		5,350	6,492	1,271	1,633

Source: National Statistics Office of Georgia data (2014) and census of local municipalities (2016) collected by AGL, March 2017¹⁸

Overpopulation in the mountainous areas¹⁹ means that land is scarcely available. Local officials in Khulo and Shuakhevi municipalities stated that Adjaran families typically own 0.25-0.75ha of land.²⁰ Lack of land is exacerbated by natural hazards, such as landslides and erosion, prevalent in Khulo and Shuakhevi municipalities;²¹ which have been linked to anthropogenic activity such as over-farming, high density of water channels and deforestation. 37% of respondents in the SES stated landslides as a natural hazard affecting agricultural work.

The majority of the population in the PACs are ethnic Georgians (largely of Christian Orthodox and Muslim denomination). Agriculture is a key livelihood activity in the Adjara region and the mainstay of the economy in Khulo and Shuakhevi municipalities. All but 5 households surveyed during the SES cultivated their land. Crops grown vary according to altitude of the land and include hay, corn/maize, potatoes, beans, tomato, tobacco and fruit. Results of the SES indicated that hazelnut²² trees are widely grown in the PACs, along with walnuts, plum, cherry, apple and grape.²³ Animal husbandry is also practiced, with 74% of households surveyed during the SES owning cattle (on average 1.65 per household) and 19% owning poultry (average of 1.14 per household). In the broader area, households are recorded as having sheep and goats. Fishing is also practiced.²⁴

The employed population surveyed during the SES (totalling 26%) worked in the service sector (30%), education (28%), construction (11%) and transportation (8%). Approximately 25% of those surveyed

¹⁵ The five villages from Khulo municipality are also known as belonging to 'Skhalta community', as referenced in other assessments.

¹⁶ Administrative capital of the municipality. 2016 data presents population figures for Shuakhevi town.

¹⁷ Nenia is also referenced in other assessments as belonging to the Zamleti community, along with Nigazeuli and Furtio.

¹⁸ The data for 2014 have been gathered through the general census conducted by the Office of Statistics, while data for 2016 have been collected by municipalities and so they do not provide a direct comparison. There is no equivalent population data available for 2013 or 2015 as the Department of Statistics was abolished in municipalities. The Adjaristsqali HPP ESIA obtained data from the municipalities.

¹⁹ As stated in, Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

²⁰ Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*, Section 7.3.5.

²¹ Between 2004 and 2010 there were 763 families resettled from Adjara (including from the municipalities of Khulo and Shuakhevi) due to natural disasters, such as flooding and landslides. Government resettlement programmes classify affected persons as 'eco-migrants'. As stated in Mott MacDonald (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

²² Table 3.4 of the LALRP refers to chestnut trees but it has been confirmed by AGL that these trees are hazelnuts. Email communication with AGL, March 2017.

²³ This is data for households closest to the 35kV OHL who have land affected and so focusses on land plots closest to the river.

²⁴ Fishing is understood to be small scale, for subsistence, as stated in, Mott Macdonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

during the SES were unemployed. This is higher than the regional and national averages (15% and 12% respectively)²⁵ although likely to include those who are dependent on subsistence farming. 16% of those surveyed were classified as below the poverty line and receive social allowance²⁶ from the State. Additionally, 17% of those surveyed receive a disability allowance and 15% were retired²⁷ and receiving a State pension.²⁸ 9% of the households surveyed in the SES were headed by women. Average monthly incomes in the households of the PACs vary from 230 (approximately 93 USD)²⁹ for those on social allowance, to 805 GEL (approx. 324 USD) for those working in private business. Those working mainly in agriculture stated an average monthly income of 800 GEL (approx. 323 USD). 61% of households stated that they barely have enough money for food and approximately 30% stated that their socio-economic status has deteriorated over the last 3 years.

Most households surveyed during the SES were connected to a water supply (87%) and the central electricity system (98%), but most were not connected to the centralised sewerage system (92%) or waste disposal services (only available to 9% of those surveyed). The SES established that primary social services, such as local roads and schools are on average 3km from those surveyed in the PACs. District/city hospitals are on average about 15km away but there are medical stations available in some villages.³⁰

5.3.2 Cultural Heritage Overview

The archaeological opinion for the 35kV OHL Project (Annex E) confirmed that the Adjaristskhali gorge has been inhabited since the Stone Age, circa 300,000–200,000 BC. Monuments of material culture from that time and subsequent eras have been studied both at the bottom of the gorge, alpine meadows, and on specific plots. There are four known cultural heritage monuments within 250 to 1,800m of the 35kV OHL corridor, illustrated in Figure 5.1 and further described in Table 5.2. They are the remains of the church of Nenia, Furtio bridge, remains of the church of Furtio and Skhalta monastery complex.³¹ All the recorded monuments represent above ground archaeological and historical remains; there are no records of buried cultural heritage remains within the 35kV OHL corridor area, however this does not preclude their existence.

²⁵ National Statistics Office of Georgia (2015) *Integrated Household Survey*. Available from <http://www.geostat.ge/index.php?action=0&lang=eng>

²⁶ In Georgia, the poverty line calculation is based on production, consumption, cash income and asset valuation. The amount of social allowance received is based on the points assigned to each household. Households below 300,001 points receive a monthly allowance equal to 60 GEL per household member, whereas households below 60,001 points receive 30 GEL per household member. Source: Decree 758, dated 31 December 2014, Government of Georgia. Cited in, ACT, (February 2017) *'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)*.

²⁷ Retirement age is 60 for women and 65 for men. Information received from AGL, Email communication. March 2017.

²⁸ It was stated in the 35kV OHL LALRP that every fifth person in Khulo and Shuakhevi municipalities is a pensioner and almost every fourth person receives state allowances. ACT, (February 2017) *'Skhalta-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP)*.

²⁹ All currency conversions retrieved from <http://www.xe.com/currencyconverter> 17th March 2017.

³⁰ Details of PACs with medical stations were not available. It is known that 41 out of 77 villages in Khulo have medical stations. Cited in, Mott MacDonald, (September 2013), *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

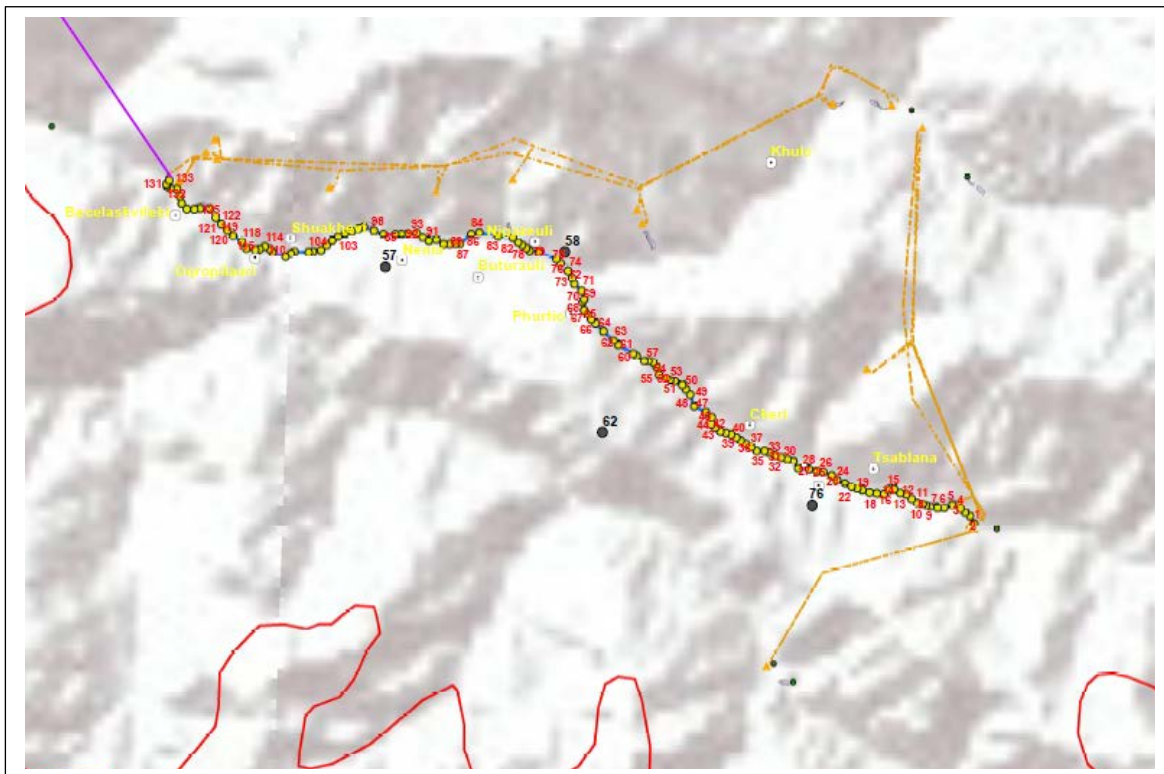
³¹ The ESIA for the Shuakhevi HPP indicated a further monument (former church of Tsablana, map position No.62 in Annex H) as close to the 35kV OHL corridor, but it has subsequently been confirmed to be 12km away. Information provided by AGL, Email communication. April 2017.

Table 5.2 Cultural Monuments Located Near the 35kV OHL Project

Map Ref #	Monument Title	Monument Location	Coordinates in UTM system	Dist. from edge of SPZ	Designation
57	Remains of the church of Nenia	Located at the end of Nenia village (yard of R. Kamadadze), Shuakhevi	X=267808 Y=4611503	750m	Local importance monument
58	Furtio bridge	Near Zamleti village, Shuakhevi	X=271842 Y=4611845	250m	National importance cultural heritage monument
62	Remains of the church of Furtio ³²	Located on the left bank of Skhaltistskali river, at the end of Furtio village, Shuakhevi	X=272688 Y=4607781	1,800m	National importance cultural heritage monument
76	Skhalta Monastery Complex	In Skhalta River gorge, Khulo	X=277415 Y=4606141	750m	National importance cultural heritage monument The monument is protected in Adjara.

Source: New Metal Georgia, 2017

Figure 5.1 Cultural Heritage Monuments



Source: New Metal Georgia, April 2017

³² In the Shuakhevi HPP ESIA, Furtio church is labelled as map position No. 59.

5.3.3 Vulnerable Groups

An important aspect of assessing impacts on communities is identifying individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status.³³ There are a number of distinct factors that make people in the PACs particularly vulnerable³⁴. These are summarised in Box 5.1. It is important to understand these factors, so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in sharing any development benefits and opportunities.

Key causes of vulnerability in the area are natural disasters and lack of available land. People, especially the elderly, sick and disabled, are vulnerable to heavy snowfall, flooding from heavy rain and snowmelt, and isolation caused by flooding, snow or landslides. Landslides also damage property, farmland, assets (including livestock) and cause injury or loss of life. Households generally practice subsistence farming as there is not enough land to grow cash crops.³⁵

Box 5.1 Vulnerability Factors in the Project Affected Communities

- **Rural poverty:** 16% of the households surveyed for the SES were below the poverty line and depend on state pensions and allowances. Poor households lack the ability to invest in their future and purchase assets such as transport or farm equipment which help to improve production.
- **Ecological Migrants (Eco-Migrants):**³⁶ These are people who have had their homes damaged or destroyed due to natural disasters, such as flooding and landslides. Stakeholder engagement identified 8 households registered as eco-migrants, in Skhalta and one in Shuakhevi.³⁷ Those in Skhalta have been resettled, whilst the household in Shuakhevi is awaiting resettlement by the State.³⁸ Eco-migrants are reliant on support from the State in the form of replacement housing and land to maintain their livelihood. Those waiting for resettlement are often landless, with little means of generating income.
- **Female headed households.** Women and particularly female-headed households, widows and divorcees may not have the same access to income generation. Often with a lack of support, they have a double day burden, handling domestic work whilst also being the main wage earner, simultaneously. Women are less likely to be land owners making them more vulnerable to any land losses. During the socio-economic survey, 9% of the households surveyed in the PACs were headed by a female. They are understood to have small land parcels on which they undertake subsistence agriculture. They are reliant on state pensions and social allowances.³⁹
- **Unemployed:** A large proportion of the households in the area are unemployed (25% of those surveyed for the SES), relying on subsistence livelihoods. Those who do not have a reliable source of income are more vulnerable to any changes that may impact their ability to sustain their households.
- **Elderly:** 15% of those surveyed for the SES were retired. The ability of elderly men and women to work in farming is limited and there may be challenges for them to gain employment. Government pensions are not sufficient to cover basic household needs.⁴⁰
- **Lack of available land:** Local households are reliant on land for their subsistence. With limited access to farm inputs, those without adequate land are particularly vulnerable and particularly at risk from any environmental shocks (e.g. poor weather, landslides).
- **People with disabilities or chronic diseases:** Those with disabilities or chronic disease often have a lower ability to gain employment and generate income. The physically disabled are likely to be particularly vulnerable members of the community as they tend to need more support and often rely on family care.

³³ This disadvantaged or vulnerable status may stem from an individual's or group's race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. Gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources are also potential factors; IFC (2012) *Performance Standard 1, Assessment and Management of Environmental and Social Risks and Impacts*, paragraph 12. Available from https://www.ifc.org/wps/wcm/connect/3be1a68049a78dc8b7e4f7a8c6a8312a/PS1_English_2012.pdf?MOD=AJPERES

³⁴ Vulnerability is a pre-existing condition independent of the Project, which is reflected in an individual or groups ability to access socioeconomic or environmental resources, or low status in certain socioeconomic indicators (health, education, income etc.).

³⁵ Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

³⁶ The Georgian Geological Department categorises eco-migrants as those who have lost all or part of their house as a result of natural disaster. Additionally, those whose house is damaged and unsuitable for habitation; it cannot be restored. Stated in, Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

³⁷ Information provided to AGL by Shuakhevi municipality administration and a representative of Khulo mayor in Skhalta. April 2017.

³⁸ Established during communication with AGL. Email correspondence. March 2017.

³⁹ Information provided by AGL. Email correspondence. March 2017.

⁴⁰ 180 GEL (~ 73USD) per person. Social Services Agency, http://ssa.gov.ge/index.php?lang_id=GEO&sec_id=378 Provided by AGL. Email communication. March 2017.

5.4 Impacts and Mitigation

5.4.1 Energy Provision, Infrastructural Improvements and Employment Opportunities

The benefits of the overall HPP scheme (including the 35kV OHL) with regards to energy provision, and the improvement of infrastructure⁴¹ are discussed in Sections 7.4.3.4 of the Shuakhevi HPP ESIA and not covered again in this Supplemental E&S Assessment.

During construction of the 35kV OHL, employment of local labour will be maximised and staff requirements disclosed locally in advance of opportunities arising. However, with approximately 30 personnel employed for up to six-months of construction,⁴² opportunities for PACs will be minimal. Additionally, permanent employment during operation will be mainly for staff with medium to high skill levels, so opportunities for those living in PACs are likely to be negligible. There may be employment opportunities for local people on other parts of the HPP scheme during construction and the Project will ensure that those in communities affected by the 35kV OHL are considered, subject to availability of candidates.⁴³ These potential opportunities proposed for the overall scheme are described in Section 7.5.2.1 of the Shuakhevi HPP ESIA.⁴⁴ Any employment generation by the Project would be a beneficial impact.

5.4.2 Land Acquisition and Involuntary Resettlement

The 35kV OHL will affect 287 land plots that are in private use by 221 Affected Households (AH). 534,683.44 m² (53.4 ha) of this land will be affected; 7,140.39 m² (0.7 ha), used by 89 AHs, will be permanently impacted and 527,543.05 m² (52.7 ha), used by 221 AHs, will be partially impacted (this will be over the long term⁴⁵ due to access restrictions). The land to be impacted by the 35kV OHL is used for agriculture and grazing. 62 AHs will lose trees (1,300 in total) and 40 will lose annual crops (a total of 53,585 m²). One cattle shed (in current use) and two remnant buildings (no longer in use), owned by 3 AHs, will also be impacted. There is one residential building (between towers 112 and 113) which has been condemned by the municipality as being unsafe for habitation.⁴⁶ There is a family currently residing in this building⁴⁷ who may not have moved in advance of construction and so AGL is currently identifying the best option to re-route the 35kV OHL away from this building to maintain the 40m SPZ. The municipality and GSE have also requested some re-alignment of these towers, as there are plans for a church to be constructed near this location, in the future. AGL will ensure that both the house and proposed church site are outside of the SPZ.⁴⁸ There will either be minor relocation of towers 112 and 113 or an additional tower (113A) constructed to divert the overhead line around the house and church site.⁴⁹

Engagement will be undertaken with the residents of the households located closest to the 35kV OHL (at a minimum those within 10m of the SPZ)⁵⁰ to discuss the 35kV OHL in more detail and the schedule for construction.⁵¹ Potential impacts will be discussed, along with proposed mitigation. Any new issues raised will be captured in the issues log for the project and carefully considered by AGL.

⁴¹ Such as road and bridge rehabilitation in the region.

⁴² 180 days has been estimated under normal climatic conditions. Established via email correspondence with AGL, March 2017.

⁴³ The potential for job opportunities was raised by stakeholders during engagement meetings. Referenced in, AGL (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*.

⁴⁴ Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

⁴⁵ For the life of the 35kV OHL Project.

⁴⁶ Information provided by AGL. Email correspondence. May 2017.

⁴⁷ It is understood that the owner of the property lives elsewhere. Information provided by AGL. Email correspondence. July 2017.

⁴⁸ There has also been some slight realignment of towers 130 to 132, moving them further away from the river. Email correspondence with AGL, May 2017.

⁴⁹ Information provided by AGL. Email correspondence. July 2017.

⁵⁰ There are two houses near Tower 71, for example, which are at a distance of 1.2m and 5.8m from the SPZ.

⁵¹ It is likely that these houses have been consulted as part of the LALRP process but it is important that those closest to the OHL are appropriately consulted, prior to construction.

The vulnerability of local people to land acquisition and livelihood impacts is considered to be high as there is little alternative to subsistence farming in the area, for which land is a pre-requisite and under high demand. There are many households living below the poverty line who have limited ability to adapt to change and for whom impacts may be felt more severely. An addendum to the Land Acquisition and Livelihood Restoration Plan (LALRP) for the Project has been prepared to cover land acquisition associated with the 35kV OHL (see Annex C). It has the objectives of improving, but at a minimum restoring, the livelihoods and standards of living of economically displaced persons to pre-project levels. The Shuakhevi HPP ESIA determined that following effective implementation of the LALRP, impacts associated with land acquisition would not be significant. The LALRP for the overall Shuakhevi HPP scheme has 19 households classified as severely affected (i.e. losing over 50% of their land).⁵² There are no households classified as severely affected⁵³ as a result of the 35kV OHL and so residual impacts are thus determined to be less.

Access routes required for the construction of the 35kV OHL have not yet been confirmed, but initial surveys have indicated that existing roads and river crossings will be sufficient to access approximately 80% of the towers. A further 5% can be accessed via these existing roads, along with existing river cross-overs (to access the alternate bank) 10% of towers can be reached after reinforcement of existing walkways. The remaining 5% may require construction of short access routes; this is a total of 6-7 towers with access routes averaging around 50m in length. This is a total of 300 to 350 metres of new roads/walkways. The construction of each tower is expected to take 6 to 10 days, after which the access routes will likely no longer be required. All temporary land required for access routes will be secured in accordance with the principles, methodology and entitlement framework established in the Project's LALRP⁵⁴ and as agreed with the Lenders' group. Provided these are appropriately followed, and considering the extent of additional land required (up to 300-350 metres), it is not anticipated that residual impacts associated with temporary land use for access routes will be significant.

5.4.3 Risks to Community Health, Safety, Security and Wellbeing

During construction, communities living within the Aol could experience disturbance due to the movements of heavy machinery, earth works and the installation of towers. Without mitigation, impacts from dust, noise and vibration would be significant. They will, however, be short term and the planned works at each site, small-scale in nature; each tower is expected to take approximately 6 to 10 days to install, followed by stringing and final checks.⁵⁵ The final details regarding access have not been confirmed, but only 5% of the towers are likely to require new access routes during construction. Minimising the number of new access routes that are needed during design of the 35kV OHL, has reduced the magnitude of disturbance impacts. The Construction Environmental Management Plan (CEMP00) and associated sub-plans⁵⁶ have been designed to effectively minimise and manage potential impacts associated with dust, noise and vibration. The Community Grievance Mechanism will also be monitored to identify any disturbance impacts that require additional mitigation.

Health and safety risks associated with the 35kV OHL may result from the presence of construction sites close to communities, an increase in heavy construction vehicles and the presence of a construction workforce. In the absence of appropriate mitigation, there could be an increased risk of accidents. However, access to construction sites will be restricted and safety management is a key element of the CEMPs. Security personnel will be deployed at AGL's construction camps and carefully managed in line

⁵² Communication with AGL, March 2017.

⁵³ There are two households losing over 10% of their productive assets (14% and 16% of land with trees). Stated in, ACT, (February 2017) 'Skhalka-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP).

⁵⁴ ACT, (February 2017) 'Skhalka-Shuakhevi' 35kV Overhead Transmission Line Project. Addendum to Land Acquisition and Livelihood Restoration Plan (LALRP).

⁵⁵ Foundations are expected to take 5 days, tower erection 4 days, stringing 2 days and final checks 2 days. Information received from AGL. Email communication, March 2017.

⁵⁶ Of particular relevance are the Noise Management Plan (CEMP05) and Air Quality Management Plan (CEMP06).

with good international industry practice.⁵⁷ Security arrangements will be proportionate to the needs of the local area, and personnel will be properly trained, equipped and monitored. Security arrangements will be detailed in the Contractors Security Plan⁵⁸ and relevant details discussed with local communities.⁵⁹

The access routes to be used by the Project will be determined by the Contractor during detailed design, prior to construction. The route selection process includes an assessment of existing road conditions,⁶⁰ baseline traffic flows and distance to sensitive social receptors.⁶¹ Construction vehicle movements along the main thoroughfares⁶² are not expected to pose a significant increase in baseload traffic levels. The focus is on the smaller access roads, where impacts will be greater. The Contractor will implement the relevant aspects of the Project's Traffic Management Plan (CEMP07)⁶³ [see Annex N] prior to construction. Additionally, the Contractor will develop an Environmental, Health and Safety Plan (currently in draft form) that aligns with the Health and Safety Plan⁶⁴ for the overall scheme, which includes measures related to road safety.⁶⁵ Community engagement in local communities will also cover road safety awareness.

The presence of a non-local workforce could result in tension with the local community if workers are unaware of cultural norms. However, construction workers are few in number and will not be living on site; the exception being security personnel who may need to stay close to the towers under construction, but will mostly overnight at AGL's construction camps.⁶⁶ Workers will travel back to their own residence at the end of each work day. Operational/maintenance staff will be much fewer in number and their time near local communities of short duration. All workers will be required to follow the Project's Code of Conduct which sets out the behaviour expected from employees and all contractors. The Project has also committed to employ local people, where possible, which should minimise impacts of an external workforce.

Potential landslide risks were carefully evaluated during the route alternatives assessment, with such risks minimised as far as possible with the preferred route option. However, landslides are prevalent in the area and emergency preparedness and response procedures will be included in the Contractor's Environmental, Health and Safety Plan for the 35kV OHL, to respond to any emergency incidents.

In addition to the measures already described, there will be a grievance mechanism available to the communities to raise any problems or concerns about Project activities. AGL's Community Liaison Officer (CLO) will manage all grievances raised, implementing additional measures where required. The Project will also continue to engage with Project stakeholders throughout construction and operation so that the effectiveness of mitigation and management measures can be discussed and amended, as necessary. Following effective implementation of the mitigation measures described, the assessments concluded that impacts during construction will be insignificant to minor.

During operation, impacts could include electric and magnetic fields (EMF) from the 35kV OHL. There is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power

⁵⁷ IFC, (January 2012) *Performance Standard 4: Community Health, Safety, and Security*; and European Bank for Reconstruction and Development (EBRD), (May 2014) *Performance Requirement 4: Health and Safety*.

⁵⁸ This plan has not yet been developed. This will be done prior to construction (see Section 8).

⁵⁹ This detail will be added to the SEP.

⁶⁰ The existing routes being considered are mostly of adequate quality for the movement of construction vehicles and moderately lit. Information obtained from AGL Transmission Planning Engineer. Email correspondence. March 2017.

⁶¹ AGL has committed to restore roads to their pre-construction condition if damaged by transportation required for the 35kV OHL.

⁶² The Batumi-Akhaltzikhe and Zomleti-Khikhadziri roads will predominantly be used by construction traffic. Information received from New Metal Georgia, via AGL. Email correspondence. April 2017.

⁶³ Shuakhevi HPP Adjaristsqali Georgia (AGL), (November 2012) *Construction Environmental Management Plan, CEMP07: Traffic Management Plan*.

⁶⁴ AGL's H&S Plan was not reviewed as part of the development of this Supplemental E&S Assessment.

⁶⁵ Such as maximum speed limits for site and access routes.

⁶⁶ The details regarding security arrangements need to be confirmed. They will be detailed in the Contractors Security Plan, developed prior to Construction.

transmission lines and equipment⁶⁷ but concern has been raised during local engagement.⁶⁸ The Project will evaluate potential exposure to the PACs against the EMF reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and ensure that average and peak exposures remain below the ICNIRP recommendation for General Public Exposure. Resolution No.366 of the Government of Georgia⁶⁹ regarding the installation of overhead lines, requires the establishment of a 15m Sanitary Protection Zone (SPZ), measured from the outermost lines; this equates to a total width of 40m as the transmission line infrastructure is 10m wide. It is expected that EMF will be well below the safe levels recommended by ICNIRP at the edge of the 40m buffer zone. The engineering team for the 35kV OHL have inferred from the PUE and EU-OSHA guidance on clearance distances, that EMF will be below safe levels within the specified clearance distance of 3 metres of the outermost line. This will be confirmed prior to construction.⁷⁰

No noise impacts are anticipated during operation. Studies have showed that there is no perceptible sound produced under properly installed 155kV lines during dry weather conditions and 18 to 26 dB(A) under wet conditions.⁷¹ Sound produced by the 35kV OHL will be less than these estimates and so will not exceed national regulatory requirements or the thresholds specified in the World Bank EHS Guidelines.⁷² The Project will ensure that noise levels associated with the 35kV OHL remain within these thresholds throughout operation. Any grievances related to noise will be carefully reviewed in case additional monitoring is needed. All noise related impacts will be managed through the Noise Management Plan (CEMP06), relevant extracts of which are in Annex M.

Electrocution is a risk associated with live cables in overhead lines. This could be through direct contact (for example if a cable was to fall down) or through indirect contact (for example, through tools, vehicles, ladders that come into contact with the cables). Whilst the risk of electrocution is long term, it is of low probability. Information regarding these risks will be communicated to the PACs during engagement activities (as prescribed in the SEP) and appropriate signage will be installed on the towers to warn of the risk.

Whilst of low likelihood, the Project will consider the risk of tower or cable failure/fall within its Operation and Maintenance (O&M) Manual for the operations phase of the 35kV OHL Project. This plan will set out the actions to be taken in the event of a failure/fall and this will be shared with the PACs as part of planned stakeholder engagement activities.

Safety management will form a key component of the Operation and Maintenance (O&M) Plan, which will be drawn up by the O&M engineers and safety specialists. The O&M Plan will define safety monitoring requirements and any potential problems identified will be followed up promptly with detailed investigations and required actions.⁷³ Following effective implementation of the mitigation

⁶⁷ International Commission on Non-Ionizing Radiation Protection (ICNIRP) (2001); International Agency for Research on Cancer (2002); U.S. National Institute of Health (2002); Advisory Group to the Radiation Protection Board of the UK (2001), and U.S. National Institute of Environmental Health Sciences (1999)). Cited in, IFC (April 2007) *Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution*.

⁶⁸ AGL, (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*.

⁶⁹ Ministry of Energy of Georgia, (25 December 2013) *Electricity Grid Linear Facilities Protection Procedures and their Protective Zones*, Government Resolution №366; <http://www.energy.gov.ge/projects/pdf/pages/Elektruli%20Kselebis%20Khazobrivi%20Nagebobebis%20Datsvis%20Tsesisa%20Da%20Mati%20Datsvis%20Zonebis%20471%20geo.pdf>

⁷⁰ The International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommends a residential exposure limit of 833 mG and an occupational exposure limit of 4,200 mG for magnetic field. The standard is designed to provide a very large margin of safety. ICNIRP (1998) Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 ghz), *Health Physics* 74 (4):494-522; <http://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf>

⁷¹ California Energy Commission (2010). Cited in NEPA (2011) *EIA of Kirkwood Meadows Power Line*. Information provided by AGL. March 2017.

⁷² IFC, (April 2007) *Environmental, Health, and Safety (EHS) Guidelines*, Environmental Sect.1.7: Noise Management <https://www.ifc.org/wps/wcm/connect/06e3b50048865838b4c6f66a6515bb18/1-7%2BNoise.pdf?MOD=AJPERES>

⁷³ Further details are provided in Mott Macdonald, (September 2013) *Adjariistsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*, Section 7.5.2.3.

measures described, the assessments concluded that impacts during operation will be insignificant to minor.

5.4.4 Risks to Wellbeing of Workers

Workers on the Project will be exposed to a range of occupational health and safety risks during construction and operation, such as working at height, manual handling, contact with hazardous material, electrocution risk, dust, noise and vibration, amongst others. In the absence of appropriate standards and preventative practices, the health, safety, security and wellbeing of workers would not be adequately protected.

The Project has committed to implement labour policies and procedures in accordance with Georgian law, ILO core labour standards and Good International Industry Practice (GIIP)⁷⁴. The Contractor for the 35kV OHL will comply with these, along with the Project's human resources requirement,⁷⁵ Retrenchment Plan, Labour Grievance Plan (CEMP08) (which is disclosed and available to all staff), worker Code of Conduct, and the Contractor's (currently draft) Environmental, Health and Safety Plan. The contractor will identify all hazards related to the works prior to construction and AGL will review all HAZOPs and H&S Plans to ensure alignment with the Project's EHS requirements. Following effective implementation of the prescribed mitigation, the risks to the wellbeing of workers has been assessed as insignificant.

5.4.5 Cultural heritage

During construction of the 35kV OHL, there is a risk of physical damage to cultural monuments, resulting from accidental collision or vibration from the movement of heavy machinery during construction or maintenance works. In accordance with the Cultural Heritage Law of Georgia, an archaeological chance finds procedure has been developed for the construction phase, as detailed in CEMP01 [see Annex J].⁷⁶ The Contractor will implement the requirements of the chance finds procedure⁷⁷ prior and during construction activities for the 35kV OHL. In the absence of any such mitigation measures potential impacts to cultural heritage resources could be of major significance, depending on the sensitivity of any discovered remains.

The nearest monument to the 35kV OHL is Furtio Bridge⁷⁸ located 250m from the SPZ for the 35kV OHL. In line with the Chance Finds Procedure for the Project (CEMP01) the Contractor will produce a brief memo for all above ground archaeological and historical remains identified within 250m of a construction site/activity, detailing any required mitigation measures, such as avoidance, fencing, boarding, signposting etc. Such measures are to ensure the sites are protected from any damage. There is also the potential for previously undiscovered, buried cultural heritage remains to be impacted by the Project. With effective implementation of the mitigation measures prescribed, the assessments for the 35kV OHL determined that potential impacts on cultural heritage would not be significant.

There is currently no information regarding any unique natural features or tangible objects that embody cultural values for those in the PACs or others. It will be important that local communities are consulted with regards to cultural heritage in the project area; the knowledge of local communities is particularly important for identifying cultural heritage that may be tied to the natural environment.⁷⁹ There have been no issues raised to date regarding concern for cultural heritage features but the Project will ensure

⁷⁴ Specified as IFC, (January 2012) *Performance Standard 2: Labor and Working Conditions*; EBRD, (May 2004) *Performance Requirement 2: Labor and Working Conditions*; IFC, (April 2007) *Environmental, Health, and Safety General Guidelines*; and, IFC, (April 2007) *Guidelines for Power Transmission and Distribution*.

⁷⁵ Such as ensuring competitive and fair remuneration. Terms of employment and working conditions will be clearly communicated to employees, including wages and benefits, hours of work, overtime and compensation, breaks, and provisions for leave.

⁷⁶ AGL, (November 2012) *Cultural Heritage and Chance Finds Procedure, Construction Environmental Management Plan (CEMP01)*.

⁷⁷ Updates/additions to this plan will be made prior to construction, should they be necessary.

⁷⁸ A cultural heritage monument of national importance (see Section 5.3.2).

⁷⁹ IFC, (January 2012) *Guidance Note 8: Cultural Heritage*, paragraph GN7.

these discussions have been undertaken and any additional mitigation and management measures developed, as necessary.

5.4.6 Cumulative Impacts

The main developments identified as potentially resulting in cumulative impacts for PACs are the GSE (Georgian State Electrosystems) Akhaltsikhe to Batumi 220kV OHL and the other elements of the Shuakhevi HPP scheme. There may be additional employment benefits associated with these developments. Additionally, there is the potential for cumulative impacts associated with traffic and transport, waste management and air quality, which are discussed in Section 7 of this Supplemental E&S Assessment. No other significant cumulative impacts on local communities or cultural heritage have been identified in assessments for the 35kV OHL.

5.5 Management and Monitoring

5.5.1 Introduction

To verify that the proposed mitigation and management measures are successful, a series of monitoring activities will be undertaken before, during and after construction. Full details are provided in the Shuakhevi ESIA but a summary of the proposed monitoring measures of relevance to the 35kV OHL is provided in Section 8 (Environmental and Social Management Plan). AGL will confirm the responsibilities indicated for each of the monitoring activities, based on the phase of the Project and the details contained within the relevant management plans.

6. The Project and Ecology

6.1 Introduction and Overview

This section focusses on the impacts of the 35kV OHL on ecology. As the OHL is an associated facility of the Shuakhevi HPP, measures to address the risks and impacts to ecological resources are to be included in the Biodiversity Action Plan (BAP)¹ for the overall scheme. The BAP will therefore be updated to take account of any new requirements specifically for the 35kV OHL.

Location Overview

Georgia is located within the southern Caucasus region, which is one of World Wide Fund for Nature's (WWF) Global 200 ecoregions, identified as globally outstanding for biodiversity.² This global ecoregion comprises some of the most diverse and distinctive temperate forests in Eurasia, where endemism is very high. More than 10,000 plants, 700 vertebrate animals, and 20,000 invertebrate animals have been catalogued in the Caucasus mixed forests. It is a biodiversity hotspot and classified as one of the top 25 biological rich regions by Conservation International. In 2002, the IUCN Red List identified 50 globally threatened animal species and one plant species in the Caucasus, of which 18 were restricted range or endemic species. The region as a whole is considered to be of very high conservation value.³

The Shuakhevi HPP is located within the Adjaristsqali river system, which falls within the Priority Conservation Area (PCA) of the West Lesser Caucasus, stretching from the Borjomi-Kharagauli National Park to the Altindere Valley in Turkey. Additionally, it runs within the Trialeti-Western Lesser Caucasus Corridor, an important wildlife corridor that connects the PCA of the West Lesser Caucasus with Trialeti PCA.⁴

There are several nature conservation areas near the 35 kV OHL, namely the Kintrishi Nature Reserve and Important Bird and Biodiversity Area (IBA) and Key Biodiversity Area (KBA), Shavsheti Ridge IBA/KBA, Adjara-Imereti Ridge IBA/KBA, Machakhela National Park and Mtirala National Park. These areas are described in further detail in Annex F (35KV OHL ESIA, Section 5.4: Biological Environment) and the Shuakhevi HPP ESIA. The eastern coast of the Black Sea, and in particular the Batumi area, is one of the most important bottlenecks for raptor migration (especially during autumn) in the Eurasian-African migration system.⁵ However, the 35kV OHL is approximately 60 km from the Batumi bottleneck.⁶ The location of the main nature conservation areas are illustrated in Figure 6.1.⁷ The 35kV OHL will not cross any of these nature conservation areas or migration routes, with the closest reserve (Kintrishi IBA) being 18 km from the 35kV OHL corridor.

6.1.1 Data Sources for the Assessment

A desk-based review of available information from national and international sources was undertaken to support the preparation of the ESIA of the 35kV OHL and this Supplemental E&S Assessment. Key sources relevant to the assessment of impacts of the 35kV OHL Project on ecology include:

¹ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

² WWF Global, (2017) *The Caucasus Ecoregion*.

http://wwf.panda.org/what_we_do/how_we_work/protected_areas/pa4lp/caucasus/index.cfm

³ Critical Ecosystem Partnership Fund (CEPF), (2004) *Ecosystem profile: Caucasus biodiversity hotspot*. Cited in Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

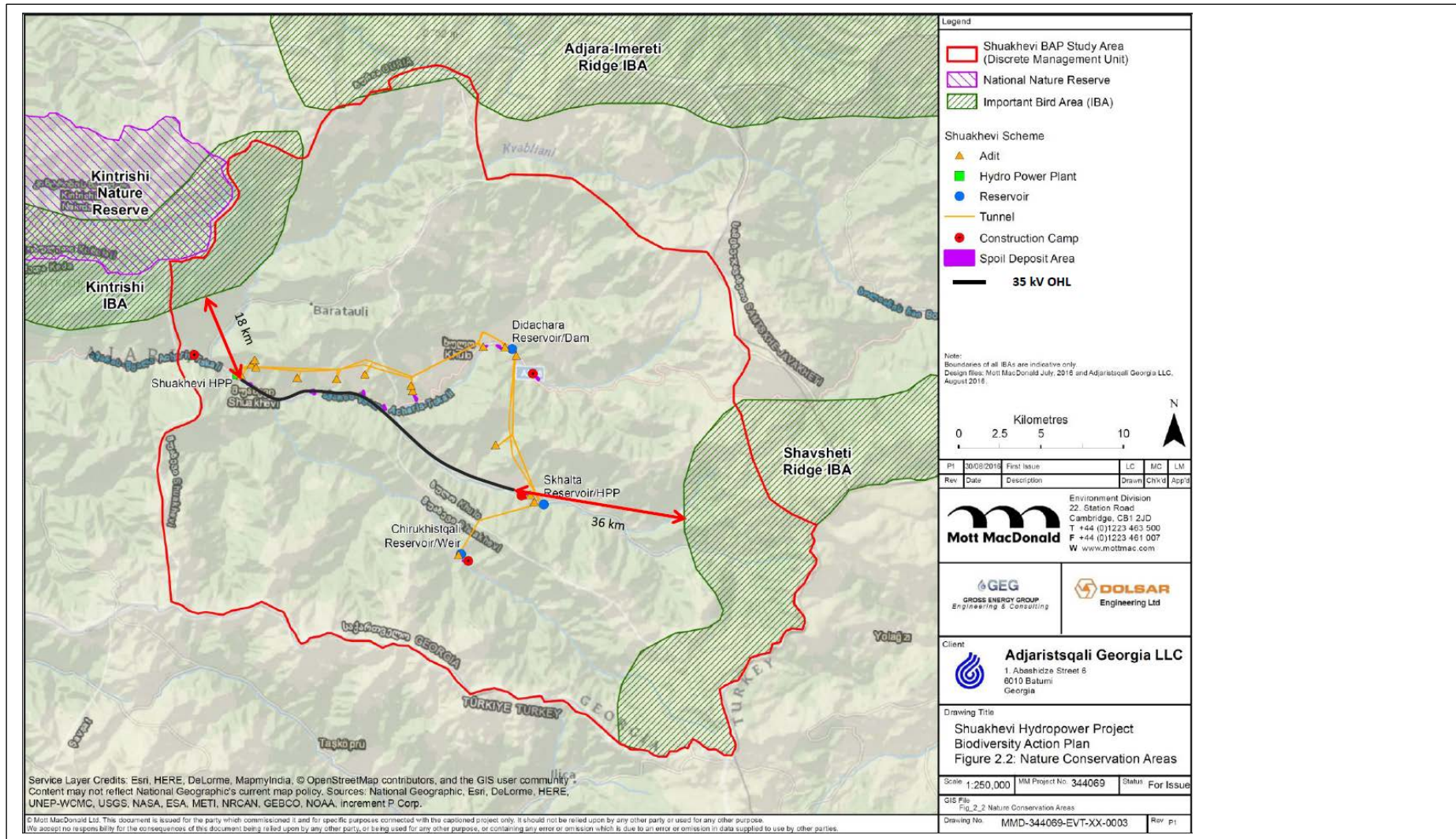
⁴ WWF, (May 2006) *An Ecoregional Conservation Plan for the Caucasus*. Cited in, DG Consulting Limited, (March 2014) *ESIA for the Construction of the Akhaltsikhe – Batumi 220kV Power Transmission Line*.

⁵ Verhelst, B., Jansen, J., & Vansteelant, W., (2011) South West Georgia: an important bottleneck for raptor migration during autumn, *Ardea* 99 (2), 137-146. Cited in, Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

⁶ Distance provided by AGL. Email communication. April 2017.

⁷ Mapped details of key bird migration routes were not available at the time of reporting.

Figure 6.1: Nature Conservation Areas and the 35kV OHL Project



Source: AGL, 2017

- New Metal Georgia (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)*, Section 5.4 (see Annex F).
- *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*, New Metal Georgia, October 2016;
- *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*, Mott MacDonald, September 2013;
- *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*, Mott MacDonald, December 2016; and
- *ESIA for the Construction of the Akhaltsikhe – Batumi 220kV Power Transmission Line*, DG Consulting Limited, March 2014⁸.

Baseline biodiversity surveys for the assessment of the 35kV OHL were undertaken in May 2016. The 35kV OHL ESIA states that systematic field techniques were used to survey areas along the OHL corridor and each group of species was surveyed for at least 12 days.⁹ In addition to these surveys, data collected by AGL as part of ongoing monitoring (between 2013 and 2016) was utilised for preparation of the 35kV OHL ESIA. This monitoring included faunal surveys, ongoing bird monitoring, a bird breeding survey, mammal surveys and fish catch surveys. The sampling sites for these surveys were not specific to the corridor of the 35kV OHL, but provided context and information about the biodiversity in the upper part of the Adjaristsqali River Basin, in which the OHL is situated. A summary of all surveys undertaken is presented in the Shuakhevi HPP BAP.

Table 6.1 Biodiversity Surveys Undertaken for the 35kV OHL

Survey Type	Summary Survey Details
Flora and Vegetation Survey	The precise methods used for the vegetation and floristic surveys has not been detailed, but a walkover of the route was undertaken with surveys extending 25 m on either side of the OHL corridor. Main habitat types were recorded and an inventory taken of protected, threatened, rare and endemic plant species. The focus was to record plant species listed under the Red Data Book of Georgia, the Adjara Plant Red List or Caucasus List of Endemic Plants.
Bird Survey	Direct visual observations from vantage points, point counts and bird song detection during transect surveys.
Mammal Survey	Methods of observation included signs of activity, tracking on transects, direct visual counts.
Reptile and Amphibian Survey	Suitable habitat identification, direct counts.

6.2 Overview of Key Sensitive Habitats and Species Potentially Impacted by the Project

6.2.1 Habitats

The Shuakhevi HPP ESIA and BAP present the baseline for the overall scheme. The 35 kV OHL corridor sits within the Study Area defined for these assessments and the ESIA for the 35kV OHL (see Annex F for relevant sections of the ESIA) provides a more focused description of the baseline for the OHL corridor.

The 35 kV OHL is situated in the upper part of the Adjaristsqali River Basin and its corridor runs along the Adjaristkali and Skhalta rivers which have deep gorges containing many different habitat types; riparian forests located near to the rivers, mixed forest covering the steep slopes and meadows at the top of the forested slopes. The transmission line passes through several sensitive forested areas, but much of the route is degraded due to anthropogenic impact. The lower sections of the mountain slopes (where the OHL towers will mostly be situated) have experienced significant forest removal for agricultural expansion and cattle farming.¹⁰ Table 6.2 presents the key habitats in the area surveyed for the 35kV OHL and their conservation value, as determined in the 35kV OHL ESIA.

⁸ The 220kV OHL route runs close to the 35kV OHL in sections 5 and (part of) Section 6.

⁹ No further details regarding these surveys have been made available, but it has been confirmed by the ecologist who led the work that they covered all habitat types (i.e. including natural and modified habitats). Email communication, May 2017.

¹⁰ New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

Table 6.2: Key Habitats and Conservation Value

Habitat Type	IFC Category ¹¹	Conservation Value ¹²
Oak forest – <i>Quercus petraea</i> subsp. <i>dshorochensis</i>	Natural/Critical	High
Liana-rich mixed deciduous forest with mixed spruce trees – <i>Picea orientalis</i> , <i>Carpinus caucasica</i> , <i>Alnus barbata</i> , <i>Salix caprea</i>	Natural/Critical	Medium
Degraded spruce forest with mixed species – <i>Quercus dshorochensis</i> , <i>Fagus orientalis</i> , <i>Ulmus glabra</i> , <i>Carpinus caucasica</i>	Natural/Critical	Medium
Alder - <i>Alnus barbata</i> dominant	Natural/Critical	Medium
Walnut plantation <i>Juglans regia</i> , <i>Alnus barbata</i> , <i>Picea orientalis</i>	Modified	Low
Pontic (<i>Rhododendron ponticum</i>) scrub	Natural/Critical ¹³	High
Riverside grassland- river terrace typically used for agricultural/grazing purposes	Modified	Negligible
Bare rock, cervices and riverside deposits	Natural/Modified	Low

Source: Shuakhevi HPP ESIA, Table 5-10

Whilst modified habitats were also surveyed, attention has been given to forested areas in the OHL corridor as they are considered to be special environmental protection areas, unique, and one of the most important ecosystems with high ecological, aesthetic, cultural, historical and geological properties.¹⁴ Of note in the study area for the 35kV OHL is the oak forest which occurs along the gorge of the Adjaristsqali river and the areas of Pontic rhododendron scrub along the tributaries of the Adjaristsqali; both these habitats are considered to be of high conservation value. Two specific locations within the OHL corridor are considered to contain habitats of high sensitivity, and one with habitats of medium sensitivity. These are detailed in Box 6.1 with full details presented in Annex F.

Box 6.1 Habitats of High and Medium Sensitivity in the 35kV OHL Corridor

Habitats of High Sensitivity:

- Sampling plot 44 (Tower 79 and 80) Oak forest: Located on the right bank of the river Adjaristskali at 574 m a.s.l. Trees include *Quercus dshorochensis*, Kolkheti sub-endemic species, *Pinus kochiana* (propagation from seeds). Shrubs include *Clinopodium vulgare*, *Sedum album*, *Trifolium medium*, *Viola alba*, *Polypodium vulgare*, *Myosotis densiflora*, *Asplenium pseudolanceolatum*, *Hypericum ptarmicifolium*, *Euphorbia pontica* (South Caucasus sub-endemic species) and *Hieracium piloselloides*. There is well developed moss cover.
- Sampling plot 45 (Tower 81) Oak forest: Located on the right bank of the river Adjaristskali at 573 m a.s.l. Trees include: *Quercus dshorochensis*, Kolkheti subendemic species: *Pinus kochiana* (young pine under forest). Shrubs include *Crataegus microphylla*. Grass species include *Clinopodium vulgare*, *Myosotis densiflora*, *Orobis hirsutus*, *Taraxacum officinale*, *Viola alba*, *Pteridium tauricum*. There is well developed moss cover.

Habitats of Medium Sensitivity:

- Sampling plot 46 (Tower 82) Oak forest (degraded): Located on the right bank of the river Adjaristskali at 580 masl. Trees include *Quercus dshorochensis*, sub-endemic species of the Kolkheti, and Minor Asia (in Chaneti, Artvin), *Pinus kochiana* (seed propagated), *Picea orientalis* (young) – Caucasian sub-endemic species. Shrubs include *Juniperus rufescens* and *Cytisus hirsutissimus*. Grass species include: *Agropyron repens*, *Trifolium medium*, *Cardamine parviflora*, *Erophila verna*, *Hieracium piloselloides*, *Muscari szovitsianum*, *Clinopodium vulgare*, *Nostoc commune*, *Gymnosporangium juniperi-virginianae*. There is well developed moss cover.

Source: 35kV OHL ESIA, Section 5.4.9.

¹¹ The IFC category column has been updated to align with the BAP for the overall scheme. Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*, Table 5.4.

¹² Assessment of conservation value was undertaken in the 35kV ESIA and takes into consideration the potential for restoration of some degraded habitats (e.g. degraded coniferous forest).

¹³ The BAP (Mott MacDonald, December 2016) for the overall Shuakhevi scheme classified Pontic scrub as natural/modified habitat. The upcoming pre-construction floral inventory of the 35kV OHL corridor will review and confirm these conservation values.

¹⁴ Isik K., Yltirik F., & Akesen A., (1997) The interrelationship of forests, biological diversity and the maintenance of natural resources, *Unasylyva* 190/191, 48, 19-29. Cited in, New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA)*.

6.2.2 Species

The surveys of the 35kV OHL corridor area identified various flora and fauna species present in the area, including those of conservation value. These are detailed in Annex F and summarised here.

Flora: The 35kV OHL corridor sits within the Adjara region, which is well known as being of significant botanical interest with high floristic diversity. Adjara is indicated to be the richest province of Kolkheti relict flora, some of which are endemic to the area. No Georgian red listed species were identified, nor any species protected by the Bern Convention. One species, *Picea orientalis* (Oriental Spruce) is listed in the IUCN Red Book as a species of ‘Least Concern’ and several rare and endemic species were identified, as detailed in Table 6.3. These species have been identified as priorities for conservation. None of these species are restricted to the Study Area of the overall HPP scheme; they are known or likely to occur in other parts of Adjara and Georgia. No species recognised globally as being invasive have been recorded within the Study Area for the Shakhevi HPP, but *Ambrosia artemisiifolia* and *Robinia pseudacacia* are recognised as being invasive in Georgia.¹⁵

Table 6.3 Sensitive and Endemic Plant Species Occurring in the 35kV OHL Corridor

Latin Name	Endemic	IUCN Red Book	Endemic
<i>Quercus dshorochensis</i> or <i>Quercus petraea</i>	Sessile oak	-	Kolkheti sub-endemic species
<i>Epimedium colchicum</i>	Colchian barrenwort	-	Relict species of the tertiary Flora. Caucasian endemic species.
<i>Euphorbia pontica</i>	Black Sea Spurge	-	South Caucasian sub-endemic
<i>Digitalis schischkinii</i>	Foxglove	-	West –Caucasian sub-endemic species
<i>Primula woronowii</i>	Primrose	-	Caucasian sub–endemic species
<i>Helleborus caucasicus</i>	Helleborine	-	Caucasian endemic species
<i>Picea orientalis</i>	Oriental spruce	Least Concern	Caucasian sub-endemic species
<i>Cyclamen venum’s populations</i>	Cyclamen		Protected by the Convention on International Trade in Endangered Species (CITES)

Source: 35kV OHL ESIA, Section 5.4.10.

Birds: Bird diversity within the 35kV OHL corridor area is poor.¹⁶ Recorded species were largely widespread and numerous; characteristic for the region.¹⁷ However, several Georgia Red List bird species may occur in the corridor of the 35kV OHL, during their migration period.¹⁸ These are the Griffon Vulture (*Gyps fulvus*), Golden Eagle (*Aquila chrysaetus*), Eastern Imperial Eagle (*Aquila heliaca*), Spotted Eagle (*Aquila clanga*) and the (Boreal) Tengmalm’s Owl (*Aegolius funereus*). The Boreal Owl has specific ranges within the 35kV OHL corridor, whilst the other species are rare or occasional visitors.

Some migratory waterbirds have been assessed as rare in the 35kV OHL corridor but may be found during migration periods, including the Little Ringed Plover (*Charadrius dubius*) and the Common Sandpiper (*Actitis hypoleucos*). No endemic avian species were found to nest in the 35kV OHL corridor, except the Caucasian Chiffchaff (*Phylloscopus lorenzii*), which is found in the area seasonally.

Amphibians: Surveys undertaken for the 35kV OHL found 6 of the 12 known amphibian species recorded in Georgia, within the corridor area. Three of those found are endemic to Georgia: the Banded newt (*Ommatotriton ophryticus*), the Caucasian toad (*Bufo verrucosissimus*) and the Long-legged wood frog (*Rana macrocnemis*). The Caucasian salamander (*Mertensiella caucasica*) which is also endemic and considered Vulnerable in the IUCN Red List, was not observed, but has been observed in the lower reaches of the

¹⁵ Kikodze, D., Memiadze, N., Kharazishvili, D., Manvelidze, Z., & Mueller-Schaerer, H., (2009) *The Alien Flora of Georgia*. Unknown Publisher. Cited in, Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

¹⁶ According to the ESIA for the 35kV OHL (Section 5.4)

¹⁷ Number of recorded wintering birds was low, along with breeding bird fauna. Seasonal migrations in spring (April to early May) and autumn (late August to early November) saw an increase in species numbers. As stated in the 35kV OHL ESIA Section. 5.4.6. (Annex F).

¹⁸ The 35kV OHL ESIA considered that any time these bird species spend in the corridor is short. They were not assessed as utilising the corridor area for resting, hunting or breeding and are characterised with a transit flight height of over 100m from the terrain surface.

Adjaristskali river and near the Skhalta River. Its potential to occur in small creeks of the 35kV OHL corridor was not excluded.

Reptiles: Of the 10 species of reptiles recorded during surveys for the 35kV OHL, three were assessed as endemic: Spine-tailed lizard (*Darevskia rudis*), Georgian (red-belled) lizard (*Darevskia parvula*) and Derjugin's (Artvin) lizard (*Darevskia derjugini*).

Mammals: Over 35 different mammal species occur in the 35kV OHL corridor area. Four endemic species were assessed as present. These were the Caucasian mole (*Talpa caucasica*), Caucasian shrew (*Sorex satunini*), Robert's snow vole (*Chionomys roberti*) and Daghestan pine vole (*Terricola daghestanicus*). Additionally, three of the native species recorded are included in the Georgian Red List with Vulnerable (VU) or Endangered (EN) status. These are the Caucasian Squirrel (*Sciurus anomalus* - VU), the Brown Bear (*Ursus arctos* - EN) and the Eurasian Otter (*Lutra lutra* - VU).

Several bat species were identified as occurring in the 35kV OHL corridor area. These were the Greater horseshoe bat (*Rhinolopus ferrumequinum*), whiskered, Brandt's and Natterer's bats (*Myotis mystacinus*, *M.brandti*, *M.nattereri*), Common pipistrelle (*Pipistrellus pipistrellus*), Common noctule (*Nyctalus noctula*), Serotine bat (*Eptesicus serotinus*) and Brown big-eared bat (*Plecotus auritus*). None of these species are threatened in Georgia or globally. However, most bat species are protected under the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) (1992). The bats identified as present in the 35kV OHL corridor area are listed on Annex IV of the Habitats Directive, which means they are of community interest in need of strict protection.

Fish: No fish surveys were undertaken as part of the 35kV OHL ESIA but results of ongoing monitoring surveys for the overall scheme have identified that fish communities are diverse but not very abundant. A total of 47 fish species from 17 families are known to be present in the Adjara rivers, which include freshwater and anadromous fish species.¹⁹ The threatened and endemic species of fish recorded and confirmed within the BAP Study Area during the 2011-2016 surveys were the Freshwater trout (*Salmo labrax fario*)²⁰ and the Colchic khramulya (*Capoeta sieboldii*)²¹, both identified as present in the Adjaristsqali river and the latter also in the Skhalta river. Other endemic species in the BAP Study Area included the: Colchic nase (*Chondrostoma colchicum*), Colchic barbel (*Luciobarbus escherichii*), Anatolian khramulya (*Capoeta tinca*), Colchic minnow (*Alburnoides fasciatus*), Angora loach (*Oxynoemacheilus angorae*), Transcaucasian loach (*Cobitis satunini*) and the Caucasian goby (*Ponticola constructor*); they are all also present outside of Georgia.²²

6.3 Critical Habitat Assessment

6.3.1 Introduction and Methodology

A two-stage approach has been undertaken for the Critical Habitat Assessment (CHA) of the 35kV OHL corridor. First, a CHA was undertaken for the main HPP scheme, as presented in the Shuakhevi HPP BAP. This defined Adjaristsqali River Basin (upstream of Dandallo Bridge and excluding the sub-alpine and alpine zones) as the Discrete Management Unit (DMU)²³ for the assessment.²⁴ The CHA for the main scheme ascertained that the DMU qualifies as critical habitat by being globally important for biodiversity, based on the presence of *Astragalus sommieri* (Milk-vetch species), *Arbutus andrachne* (Greek strawberry tree), *Symphytum*

¹⁹ Mott MacDonald, (2012a) *Adjaristsqali Hydropower Project ESIA – Volume III. Technical Appendices*. Adjaristsqali Georgia LLC. Cited in, Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

²⁰ Georgia vulnerable and IUCN least concern found in the middle and upper reaches of the Adjaristsqali and most tributaries.

²¹ Colchic endemic and 'least concern' on the IUCN Red List endemic to the rivers on the eastern coast of the Black Sea.

²² Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

²³ In line with IFC PS6, the DMU used for the CHA is larger than the Zone of Influence (Zoi) of the Project, at 83,264.16 ha (832.64 km²).

²⁴ 'An area with a definable boundary within which the biological communities and/or management issues have more in common with each other than they do with those in adjacent areas'. IFC, (2012) *Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources*, GN65.

grandiflorum (Dwarf comphrey), *Tripleurospermum szovitsii* (Caucasian chamomille) and *Mertensiella caucasica* (Caucasian salamander). The CHA determined that the Project is unlikely to have any residual impacts on these critical habitat triggers, but all natural forest has been classified as critical habitat.²⁵

The 32kV OHL corridor area sits within this DMU, so the second phase of the CHA focused on the habitats and species of conservation significance within the 35kV OHL corridor area itself.²⁶ The methodology used for the CHA is fully described in the Shuakhevi HPP BAP and Box 6.2 provides an overview of the key elements.

Box 6.2 CHA Methodology Overview

The CHA is designed to identify areas of high biodiversity value in which development would be particularly sensitive and require special attention²⁷. Determination of critical habitat is based upon quantitative thresholds of biodiversity priority which are largely based on globally accepted precedents such as IUCN Red List (IUCN, 2016) criteria and Key Biodiversity Area (KBA) thresholds. There are grades of critical habitat of varying importance. The IFC Guidance Note 6 distinguishes two main grades of critical habitat:

- Tier 1 critical habitat of highest importance, in which development is generally very difficult to implement and offsets are generally not possible except in exceptional circumstances; and
- Tier 2 critical habitat of high importance, in which development can be implemented through appropriate planning and mitigation. Offsets may be possible under some circumstances under Tier 2.

In addition, the identification of IFC Critical Habitat is based on five criteria:^{28,29}

- Criterion 1: Habitat of significant importance to Critically Endangered and/or Endangered species;
- Criterion 2: Habitat of significant importance to endemic and/or restricted-range species;
- Criterion 3: Habitat supporting globally significant concentrations of migratory and/or congregatory species;
- Criterion 4: Highly-threatened and/or unique ecosystems; and
- Criterion 5: Areas associated with key evolutionary processes.

EBRD criteria for critical habitat³⁰ are relatively similar to the IFC criteria; one important difference is that EU Habitats Directive Annex IV species (animal and plant species of community interest in need of strict protection) are triggers of critical habitat where there is habitat of significant importance to them. This aspect has been addressed in the CHA and incorporated under IFC critical habitat Criterion 1.

Based on the assessment presented in the Shuakhevi HPP BAP, the following potential critical habitat features are known or likely to be present in the study area for the 35kV OHL corridor:

- Critically endangered and/or endangered species, and EU Habitats Directive Annex IV species;
- Endemic species and/or restricted-range species; and
- Legally protected areas and internationally recognised areas.

²⁵ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

²⁶ The location of the 35kV OHL was not known at the time of the original CHA for the Shuakhevi HPP (see Section 1), but critical habitat criteria were triggered during this original assessment and so it has been important to also assess the 35kV OHL corridor area.

²⁷ As stated IFC, (2012) Guidance Note 6: *Biodiversity Conservation and Sustainable Management of Living Natural Resources*, GN 66: The project type, impacts and proposed mitigation are not relevant in the CHA process.

²⁸ IFC, (2012) Performance Standard 6: *Biodiversity Conservation and Sustainable Management of Living Natural Resources*, paragraph 16.

²⁹ In addition to the above five biological criteria, the IFC Guidance Note 6 clarifies further circumstances in which an area may be recognised as Critical Habitat. Legally Protected Areas in IUCN Categories I-II and certain categories of Internationally Recognised Areas are classified as Critical Habitat.

³⁰ European Bank for Reconstruction and Development, (2016) Guidance Note: *EBRD Performance Requirement 6*.

6.3.2 Critically Endangered and/or Endangered species, and EU Habitats Directive Annex IV Species

The species assessed for this critical habitat feature are summarised in Table 6.4.³¹ They are species that are critically endangered, endangered or Annex IV, and which are known, or likely to occur in the 35kV OHL corridor.

Two Georgian endangered species that met the critical habitat threshold (Tier 2) for the overall Shuakhevi scheme, but were not found during ecology surveys in the 35kV OHL corridor³² were *Arbutus andrachne* (Greek strawberry tree) and *Astragalus sommieri* (Milk-vetch species).

6.3.3 Endemic and/or Restricted Range Species

6.3.3.1 Endemic plant species

The floral surveys undertaken for the 35kV OHL ESIA and the main HPP scheme identified the presence of Caucasus, Colchic (western Caucasus) and Adjara-Lazetian (Adjara and north-east Turkey) endemic plant species in the area of the overall Scheme (see Section 4.4.2 of the BAP). *Epimedium colchicum* (Colchian barrenwort) and *Helleborus caucasicus* (Helleborine) were identified as Caucasian endemic species and present in the 35kV OHL corridor; but were not listed as being endemic or restricted range species as per the definition in IFC Guidance Note 6.³³ They are therefore not considered to be Critical Habitat.

Two Georgian endemic species were confirmed in the DMU, *Symphytum grandiflorum* (Dwarf comphrey) and *Tripleurospermum szovitsii* (Caucasian chamomile). However, neither species are on the red list of Georgia or restricted to the DMU or Adjara Province. These plant species have not been identified in the 35kV OHL corridor but were assessed as meeting the Tier 2 threshold for critical habitat in the DMU.³⁴

³¹ For Georgia Red List species Vulnerable is indicated as VU and Endangered as EN.

³² They were not assessed as part of the ESIA for the 35kV OHL

³³ IFC, (2012) Guidance Note 6: *Biodiversity Conservation and Sustainable Management of Living Natural Resources*, GN79 and GN80.

³⁴ Tier 1 threshold for critical habitat is not triggered by these species because the habitats in the DMU do not sustain more than 10% of the global population of this species. Cited in: Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

Table 6.4 Species that are critically endangered, endangered or Annex IV, and which are known, or likely to occur in the 35kV OHL Corridor

Latin Name	Common Name	IUCN Red List	Georgia Red List	EU Habitats Directive Annex IV	Summary of Assessment
<i>Sciurus anomalus</i>	Caucasian squirrel	Least Concern	VU	Yes	<p><i>There was evidence of the Caucasian squirrel in the Tsalana/Kinchauri area on the Skhalta Valley (between OHL towers No.9 and No.29) and along the Adjaristsqali Valley downstream of the Purtio Bridge.</i></p> <p>The species does not meet the criteria for critical habitat under IFC PS6, but is assessed here using EBRD PR6 criteria (Annex IV species). The DMU for the 35kV OHL does not support habitats of significant importance for this Annex IV species because:</p> <ul style="list-style-type: none"> • The DMU (832.64 km²) includes a high proportion of forest (72.08%), which is the preferred habitat of Caucasian squirrel; however, the forest types in the DMU are widespread in Georgia; • Caucasian squirrel has a wide distribution in Georgia; and • Caucasian squirrel records confirmed in the DMU are sporadic. <p>Therefore, this species <u>does not trigger EBRD PR6 critical habitat criteria</u> in the DMU.</p>
<i>Ursus arctos</i>	Brown Bear	Least Concern	EN	Yes	<p><i>Surveys for the 35kV OHL recorded some signs of brown bear on forested low slopes on the left side of Skhalta River, near the village of Tsalana.</i></p> <p>Tier 1 threshold for critical habitat is not triggered by this species because the habitats in the DMU do not sustain more than 10% of the global population of this species. The habitats in the DMU do not support nationally important concentrations of this endangered species in Georgia and Annex IV species because:</p> <ul style="list-style-type: none"> • The DMU 832.64 km² includes 2.45% of the brown bear range in Georgia (34,000 km²); • 72.08% (600.12 km²) of DMU is forested, representing only 1.76% of species range in Georgia; • The forest types in the DMU are widespread in Georgia; and • Bear records confirmed in the DMU are sporadic. <p>Therefore, this species <u>does not meet the Tier 2 threshold for critical habitat</u> in the DMU.</p>
<i>Lutra lutra</i>	Eurasian otter	Near Threatened	VU	Yes	<p><i>Evidence of otter (footprints, faeces and photos of animals) has been recorded along the Adjaristsqali and Shuakhevi Rivers between 2013 and 2016.</i></p> <p>Eurasian otter does not meet the criteria for critical habitat under IFC PS6 but it is assessed here using EBRD PR6 criteria (Annex IV species). It is assessed that the DMU does not support habitat of significant importance for this Annex IV species (EBRD, 2016) because:</p> <ul style="list-style-type: none"> • Eurasian otter has a vast global range covering Europe, Asia and North Africa (IUCN, 2016); • Eurasian otter is scarce in Georgia but is present along most rivers; and • Similar or better river habitat for otter is widely available elsewhere in Adjara and Georgia. <p>Therefore, this species <u>does not meet the EBRD PR6 critical habitat criteria</u> in the DMU.</p>
<i>Microchiroptera</i>	Microbats	Various	VU (4 species only)	Yes	<p><i>During the baseline surveys for the 35kV ESIA, field signs of bats were observed along survey transects.</i></p> <p>Microbats do not meet the criteria for critical habitat under IFC PS6 but they are assessed here using EBRD PR6 criteria (Annex IV species). It is assessed that the DMU does not support habitats of significant importance to microbats (Annex IV species) because:</p> <ul style="list-style-type: none"> • The DMU (832.64 km²) includes a high proportion of forest (72.08%), which is the preferred habitat of microbats; however, the forest types in the DMU are widespread in Georgia; and • Bat activity was generally low during recent surveys in the DMU. <p>Therefore, microbats <u>do not meet the EBRD PR6 critical habitat criteria</u> in the DMU.</p>

6.3.3.2 Endemic and Restricted-Range Animal Species

Caucasian Salamander (*Mertensiella caucasica*)

Caucasian salamander is a habitat specialist, found mainly in Oriental beech forest (*Fagus orientalis*), coniferous forest (*Abies nordmanniana* and *Picea orientalis*), box forest (*Buxus sp.*), in Mediterranean shrub forest, mixed forests, the sub-alpine belt and in alpine meadows. The species tends to avoid large streams and lives mainly in small streams with stony substrate. Oriental beech forest, coniferous forest and mixed coniferous/deciduous forest habitats represent 66.31% of the DMU, and all forest habitats cover 72.08% of the DMU.³⁵

In the DMU, this species was found breeding along a tributary near the Skhalta Dam. In Adjara, Caucasian salamander has been recorded in 19 sites, including Mtirala National Park, Machakhela National Park and Kintrishi Nature Reserve. The ESIA for the 35 kV OHL suggested that the Caucasian salamander could occur along a tributary on the left side of Skhalta River, downstream of Skhalta construction camp, between towers 8 and 9. However, the area was 'thoroughly searched for traces of activity (larva of the salamander) and no traces were found'.³⁶ The species was not recorded.

The Caucasian salamander is listed as vulnerable on the IUCN red-list because its area of occupancy is less than 2,000 km², its distribution is severely fragmented and confined to small streams free of fish, and there is continuing decline in the extent and quality of its habitat in Turkey and Georgia.³⁷ Its presence would generally trigger the *critical habitat* obligations. If Caucasian salamander is identified during pre-construction surveys (see Table 6.5) appropriate mitigation for the area of the OHL corridor will need to be developed and designed to meet the requirements of PS6, including to demonstrate that no other viable alternatives exist, that the Project does not lead to measurable adverse impacts on the species, and does not lead to a net reduction in the population over a reasonable period of time, and that the Project's mitigation strategy will be designed to achieve net gains.³⁸ The species meets the Tier 2 threshold³⁹ for critical habitat in the DMU for the overall scheme and details of the mitigation measures that are to be implemented to manage this impact are detailed in the Shuakhevi HPP BAP.

Other Georgian Endemics

Three additional species are listed in the 35kV OHL ESIA as being endemics in the region, although are not stated as meeting the IFC PS6 definition of endemic or listed as Critical Habitat triggers in the BAP. These are:

- the Banded newt (*Ommatotriton ophryticus*);
- the Caucasian toad (*Bufo verrucosissimus*) – also stated as near-threatened on the IUCN Red List; and
- the Long-legged wood frog (*Rana macrocnemis*).

Whilst the Caucasian toad is already included in the BAP for the Shuakhevi HPP scheme, the Banded newt and Long-legged wood frog will also need to be included.

³⁵ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

³⁶ As stated by the ecologist for the 35kV OHL ESIA during email communication in March 2017.

³⁷ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

³⁸ Net gains may be achieved through the development of a biodiversity offset and/or the Project should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity (as per IFC Guidance Note 6, GN97).

³⁹ Tier 1 threshold for critical habitat would not be triggered by this species because the habitats in the DMU do not sustain more than 95% of the global population of this restricted-range species.

Endemic and Restricted-Range Birds

Caucasian Chiffchaff (*Phylloscopus lorenzii*), which is found in the area seasonally, was identified as endemic during baseline surveys. However, it was not stated as qualifying as an endemic or restricted-range species that meets the IFC or EBRD definitions.

Endemic and Restricted-Range Fish

No fish surveys were undertaken as part of the ESIA for the 35kV OHL, so the results of ongoing monitoring being undertaken for the overall Shuakhevi HPP scheme were used to inform the assessment. Several endemic fish species are in the Study Area (see Table 4.18 and Section 4.5.4.2 of the BAP) but they are endemic to the Colchic, Colchic-Anatolian and Caucasus regions, rather than Georgia. None of the fish species listed in Table 4.18 of the BAP have more than 95% of their global ranges in Georgia and therefore they are not classified as endemic according to IFC Guidance Note 6.⁴⁰ These fish species are not classified as restricted-range species because their global ranges are much larger than 20,000 km². Therefore, no fish species in the Study Area trigger Criterion 2 for critical habitat because there are no endemic or restricted-range species that meet the IFC or EBRD definitions.⁴¹

6.3.4 Migratory and/or Congregatory Species

The eastern coast of the Black Sea, and in particular the Batumi area, is one of the most important bottlenecks for raptor migration (especially during autumn) in the Eurasian-African migration system. Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time are classified as congregatory species. However, the DMU is in a mountainous area more than 60 km from the Batumi bottleneck. Migratory bird surveys undertaken in autumn 2012 and spring 2013 recorded large numbers of birds (including threatened species) but they were preponderantly near the Batumi bottleneck and to the east of Goderzi Pass, outside of the DMU. It has therefore been assessed that the DMU does not include habitat supporting globally significant concentrations of migratory and/or congregatory species and therefore it does not meet the critical habitat Tier 1 or Tier 2 sub-criteria of IFC PS6.⁴²

6.3.5 Legally Protected and Internationally Recognised Area

The DMU (832.64 km²/ 83,264.16 ha) overlaps partly with two IBAs (Kintrishi IBA/KBA and Shavsheti Ridge IBA/KBA, which are also Key Biodiversity Areas), but neither the 35kV OHL, or the rest of the HPP scheme, is located within these areas and no direct or indirect impacts on these protected areas are assessed as likely. The location of the 35kV OHL corridor is currently marked on the Emerald Network Viewer.⁴³ This is a public on-line tool which shows the location of proposed/candidate and officially adopted Emerald Network sites.⁴⁴ However, it has subsequently been confirmed that this area is not an official Emerald Network Candidate Site.^{45, 46} Critical habitat has therefore not been triggered by the presence of internationally recognised or nationally protected areas.

⁴⁰ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

⁴¹ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

⁴² IFC (2012) Guidance Note 6: *Biodiversity Conservation and Sustainable Management of Living Natural Resources*, GN73-75.

⁴³ As part of the Goderdzi site. <http://www.coe.int/en/web/bern-convention/emerald-viewer>

⁴⁴ The Emerald Network is an ecological network made up of Areas of Special Conservation Interest. Its implementation was launched by the Council of Europe as part of its work under the Bern Convention.

⁴⁵ AGL have had confirmation from the Head of the Biodiversity Department of the Ministry of Environment of Georgia that Goderdzi is not an official Emerald Network Candidate Site and there is no intention to announce this as a candidate site in the future. Email communication with AGL, June 2017.

⁴⁶ The Goderdzi Standard Data form lists the following habitats: moist or wet eutrophic and mesotrophic grassland; moist or wet oligotrophic grassland; and spiny Mediterranean heaths (phrygana, hedgehog-heaths and related coastal cliff vegetation). The species listed are the Caucasus viper (*Vipera kaznakovi*), the butterflies *Agriades glandon*, *Agriades aquilo* and *Lycaena dispar*, and the beetles *Cerambyx cerdo*, *Rosalia alpine* and *Stephanopachys linearis*. Provided the mitigation measures identified for the Project are implemented as described, the assessments presented to date have determined that there are unlikely to be any residual adverse impacts on the species and habitats for which this site was originally shortlisted.

6.4 Critical Habitat Impacts and Project Requirements

In summary, the CHA undertaken for the main Shuakhevi scheme classified all natural forest in the DMU as critical habitat because of the presence of Caucasian salamander (*Mertensiella caucasica*), Greek strawberry tree (*Arbutus andrachne*) and Dwarf comfrey (*Symphytum grandiflorum*). Milk-vetch species (*Astragalus sommierl*) and Caucasian chamomille (*Tripleurospermum szovitsii*) were additional biodiversity features identified as meeting the threshold for critical habitat in the DMU. None of these species were recorded during ecology surveys for the 35 kV OHL, but a precautionary approach is to be taken. Pre-construction surveys are being undertaken to identify areas of high conservation value. Additionally, the following measures⁴⁶ need to be demonstrated, as the 35kV OHL sits within the same DMU as the main Shuakhevi scheme, for which critical habitat has been triggered.

- That no viable alternatives exist for development of the Project on non-critical habitats;
- That the Project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- That the Project does not lead to a net reduction in the global and/or national/regional population of any critically endangered or endangered species over a reasonable of time; and
- A robust and long-term biodiversity monitoring and evaluation programme is integrated into the Management Programme.

This will be achieved through the implementation of BAP actions B1.5 and B2.1 described in the Shuakhevi HPP BAP, and outlined in more detail in Section 6.5 of this Supplemental Assessment.

6.5 Impacts and Mitigation

6.5.1 Overview

The forest habitats in the 35kV OHL corridor support a high diversity of plant and animal species, of which some are protected and/or endemic to the region. The 35kV OHL project's impacts on habitats and species in the transmission line corridor will likely be significant in the absence of mitigation. A key objective of the mitigation outlined herein is to ensure that habitat losses can be avoided and minimised as far as possible and that there will be no net loss of natural habitat⁴⁷.

The main construction activities with the greatest potential to impact habitats, flora and fauna include clearance of the transmission line RoW and construction and installation of the towers and access roads. A 40m clearance area is required for the OHL RoW. Vegetation will need to be cleared in the areas where the towers are to be installed and then trees trimmed to ensure electrical clearance distances are maintained. It has been estimated that within the total 96 ha of land required for the 32kV OHL, 38 hectares of forest will need to be trimmed and 0.3 ha cleared.⁴⁸ It is expected that approximately 5,000 trees will be affected, 7% of which will be felled and the remaining trimmed. The main species to be affected have been identified as alder (*Alnus serrulata*), pine (*pinus*), Georgian oak (*Quercus iberica*), Fir (*Abies*).⁴⁹ There will be an additional 1,300 trees felled in plots owned by households along the route of the OHL. Species include hazelnut, walnuts, plum, cherry, apple (see Section 5.3.1). No estimates of

⁴⁶ These measures are in line with IFC (2012) Performance Standard 6: *Biodiversity and Sustainable Management of Living Natural Resources*.

⁴⁷ 'Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition'; IFC, (2012) Performance Standard 6: *Biodiversity and Sustainable Management of Living Natural Resources*, para. 13.

⁴⁸ This is based on the assumptions that each tower has an average footprint of 5m x 5m and a construction area of 7m x 7m. It is then assumed that 40% of the area required has forest cover, resulting in 0.3 ha needing to be cut. Stated in, New Metal Georgia (2016), *Skhalta- Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

⁴⁹ New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment (ESIA) Section. 5.4.6. (Annex F)*.

habitat loss have yet been made for the access roads. This will be done following detailed design and confirmation of the access road locations. It is estimated that 6 to 7 towers will require new access routes,⁵⁰ with an average route length of 50m. This is 300 to 350 meters in total.⁵¹ All access routes will be temporary, only used during construction. They will remain the property of the owner and reinstated after construction.

Potential impacts include the loss of habitats, including nesting, roosting, breeding and foraging areas for various animal species. There is also the potential for the loss of endemic or rare flora species and the introduction of non-native/invasive plant species. Additionally, flora and fauna may be destroyed or injured as a result of ground works, moving machinery or other construction equipment. They may also be disturbed by noise, light or dust impacts associated with construction. Additionally, indirect impacts may result from reduced water quality as a result of sedimentation. Sediment loads in the rivers may increase temporarily during construction, for example when machinery crosses the river to access tower locations, or during tower installation. There may also be accidental spills or hunting by construction workers.

During operation, the presence of the 35kV OHL infrastructure will mean permanent habitat loss within the footprint of the towers. There is also the risk of collision and electrocution to birds and bats, particularly where the transmission line crosses the rivers. Bat collision risk is usually low as they use echolocation to navigate, but electric and magnetic fields (EMF) emitted by power lines have the potential to interfere with this echolocation.⁵² The risk of collision is increased if the OHL crosses a bat migration corridor, but no such corridors (for bats or birds) have been identified during surveys to date.⁵³

The 35kV OHL corridor will pass through areas that have experience anthropogenic impact. The likelihood of invasion by alien species is higher in habitats that are altered and disturbed. Non-native (alien) invasive species (AIS) are the second greatest threat to global biodiversity after habitat destruction.⁵⁴

There is also the risk of fire if vegetation growth goes unchecked and trees are in contact with the live conductors. Cut vegetation (slash) can also accumulate to generate sufficient fuel for forest fires if not removed. Uncontrolled vegetation growth can also damage overhead power lines and transmission towers, leading to potential outages or degradation of equipment.

6.5.2 Project Impacts on Key Conservation Species

Specific areas have been identified along the route as being of high biodiversity value, due to the presence of natural habitat and key conservation species. Habitats and populations of protected species in the 35kV OHL corridor are not reported to be critical on a national, regional or international level. However, a number of species have been identified as needing specific attention, as detailed in Box 6.3.

⁵⁰ The new access routes will be roads and/or access walkways. Confirmed by AGL in email correspondence, May 2017.

⁵¹ Confirmed by AGL in email correspondence, May 2017.

⁵² DG Consulting Limited, (March 2014) *ESIA for the Construction of the Akhaltsikhe – Batumi 220kV Power Transmission Line*.

⁵³ This will be confirmed during the pre-construction surveys and ongoing monitoring.

⁵⁴ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

- The Caucasian Salamander (*Mertensiella caucasica*) is a restricted-range species and vulnerable on the IUCN Red List and on the Red List of Georgia. Its distribution is severely fragmented and confined to small streams free of fish, and there is a continuing decline in the extent and quality of its habitat in Turkey and Georgia.⁵⁵ It has been recorded in small streams in the lower part of Adjaristsqali River and focussed surveys have been undertaken in the creek flowing between Towers number 8 and 10 where it was identified the salamander may be present. However, its presence was not identified. If found, this species could be impacted directly by moving machinery across the streams or water turbidity increases. Careful pre-construction surveys are needed to ensure that this species and its habitat is not damaged as a result of the 35kV OHL project.
- The Eurasian Otter (*Lutra lutra*) is globally threatened and is scarce and decreasing in Georgia and Adjara, in particular because of the conflict with commercial fisheries.⁵⁶ It has been recorded in the Skhalta and Adjaristsqali River gorges and the ESIA for the 35kV OHL identified its presence in the river section between Towers number 9 to number 29 (see Section 5.4.13 and Figure 5-12 of the 35kV OHL ESIA in Annex F). River banks and floodplains are habitat of the otter and Eurasian Otters are closely connected to a linear living space; most of their activity is concentrated to a narrow strip on either side of the interface between water and land.⁵⁷ In most of its range the Eurasian Otter is predominantly nocturnal.⁵⁸ It could be impacted as a result of river crossing by heavy machinery, vegetation clearance, noise impacts, construction activities in the river acting as an ecological barrier, deterioration of water quality in the rivers and reduction of fish population as a result of project activities.
- Bats are of high conservation value and could be impacted during construction as a result of tree removal, noise and light disturbance, and temporary severance of flight paths. Whilst no known bat roosts were identified during surveys for the 35kV OHL, it is likely that some tree roosts will be disturbed. During operation, foraging bats may also be affected by electric and magnetic fields (EMF).⁵⁹
- The OHL could also pose a potentially fatal risk to birds through collisions and electrocutions. However, surveys undertaken for the OHL identified that the observed species tend to transit the OHL corridor, generally over 100 metres above the surface of the terrain; they were not identified as using the corridor for hunting, breeding or roosting.
- Other critically endangered or endangered fauna in Georgia that may be in the 35kV OHL corridor are the Brown bear (*Ursus arctos*), Boreal owl (*Aegolius funereus*) and the Caucasian squirrel (*Sciurus anomalus*). Surveys for the 35kV OHL identified that these species may be present in the river section between tower numbers 9 and 29; forest extends from the river bank to the slope ridges in this stretch and has been identified as of high biodiversity value.⁶⁰ These species may be impacted by habitat loss, noise impacts and the risk of hunting.
- The Caucasian toad ('near threatened'), the Caucasus viper and Clark's lizard may be affected during construction by habitat loss and construction of the OHL and access roads. The Caucasian toad may also be impacted by changes in hydrological conditions and changes in water quality during construction.
- There have been no fish species of high conservation value identified as present in the 35kV OHL corridor. However, disturbance to river bed habitats (including those suitable for spawning), temporary reductions in water quality and increased sediment loads could smother eggs, or disturb fish migration and movements.

6.5.3 Summary of Mitigation Measures

The measures outlined in Table 6.5 are to mitigate potential impacts of the 35kV OHL on ecology. They are presented within the framework of the Shuakhevi HPP BAP actions and the conservation objectives stated therein.⁶¹ The majority of the measures are described in the Shuakhevi HPP BAP, but for completeness are also captured here so that it is clear which measures apply specifically to the 32kV OHL. Where measures align with EIA permitting commitments made to the Government of Georgia, they are

⁵⁵ The IUCN Red List of Threatened Species 2016; <http://www.iucnredlist.org/details/13198/0>

⁵⁶ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP).

⁵⁷ Kruuk, H., (1995) *Wild otters - Predation and populations*. Oxford, Oxford University Press. ISBN 0 19 854070 1. See IUCN Red List of Threatened Species 2016; <http://www.iucnredlist.org/details/12419/0>

⁵⁸ Green, J., Green, R. & Jefferies, D.J., (1984) A radio-tracking survey of otters *Lutra lutra* on a Perthshire river system. *Lutra* 27, 85-145. Cited by IUCN Red List of Threatened Species 2016; <http://www.iucnredlist.org/details/full/12419/0>

⁵⁹ Bat Conservation Trust, (2011) *The potential impact of radio frequencies and microwaves on wildlife*; http://www.bats.org.uk/publications_download.php/1010/Radiowaves_and_bats_2011.pdf

⁶⁰ New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment* (ESIA) Section. 5.4.6. (Annex F).

⁶¹ Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan* (BAP) Table 7.1.

indicated; additional or differing commitments are also stated. The responsibilities for each measure are described in the BAP and not repeated here. Any new measures presented in the ESIA for the 35kV OHL (including the NTS and this Supplemental E&S Assessment) will be added to the BAP, as necessary.

In line with good practice, the mitigation measures committed to for the 35kV OHL, will need to be reviewed as construction progresses. Management measures will be adaptive, responding to any uncertainty and the results of further assessment and monitoring, to ensure that they achieve the desired outcomes. A key element is the pre-construction surveys, which will determine the extent to which natural habitat will be lost during construction (the surveys will include all access routes). It must be ensured that there is No Net Loss of natural habitat impacted by the 35kV OHL project. Biodiversity offsets will need to be identified to demonstrate Net Gain of critical habitats. These will be calculated according to the principles outlined in the 35kV OHL ESIA⁶², whereby a calculation is made of eco-system damage (using, for example, a habitat hectare approach), and then working in conjunction with the Ministry of Environment and Natural Resources to identify areas outside the 35kV OHL corridor where similar habitats may be developed or upgraded/projected.⁶³

A clear method statement(s) will be prepared by a qualified ecologist for the pre-construction surveys (botanical/habitat and faunal surveys) which will clearly detail the personnel to be involved, scope of work, specific methodologies and any target sites for the surveys. These method statements will be shared with AGL and the Lender group.

Provided the mitigation measures and biodiversity offsets identified are implemented as described, the assessments presented to date have determined that there are unlikely to be any residual adverse impacts on the species for which the Adjara River Basin as a whole is considered critical habitat. This will be verified following completion of the pre-construction surveys, when there will be a valuation of biodiversity loss and any amendments or additional site/species-specific requirements implemented as necessary. All amendments/additions will be agreed with AGL in advance of construction.

The measures detailed in Table 6.5 assume that the Contractor undertakes all construction work in line with the CEMPs (CEMP00 – CEMP12) for the Shuakhevi HPP and that measures contained therein are implemented effectively. Relevant sections of the CEMPs are presented in Annexes J to R. Any amendments/additions to these measures will be agreed with AGL in advance of construction.

⁶² See, New Metal Georgia, (October 2016) *Skhalta-Shuakhevi 35kV Overhead Transmission Line Environmental and Social Impact Assessment* (ESIA), Section. 5.4.6. (Annex F).

⁶³ Finding suitable sites for re-planting has been a challenge for the overall Shuakhevi HPP scheme and so potential options will need careful discussion with the relevant Ministries to ensure effective implementation of this commitment.

Table 6.5 Summary of Key Significant Impacts on Ecological Features during Construction (C) and Operation (O) of the 35kV Transmission Line

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
Valuable habitats				
<ul style="list-style-type: none"> • Oak forest (<i>Quercus petraea subsp. dschorochensis</i>) • Scrub with Pontic Rhododendron (<i>Rhododendron ponticum</i>) • Liana-rich mixed deciduous forest with mixed spruce trees (<i>Picea orientalis</i>, <i>Carpinus caucasica</i>, <i>Alnus barbata</i>, <i>Salix caprea</i>) • Degraded spruce forest with mixed species (<i>Quercus dschorochensis</i>, <i>Fagus orientalis</i>, <i>Ulmus glabra</i>, <i>Carpinus caucasica</i>) • Riparian woodland dominated by <i>Alnus barbata</i> 	<p>C = Habitat loss from vegetation clearance and earth moving works, establishment of non-native, invasive species, increased landslide risk.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads, risk of fire due to residue. Same commitment in Georgian EIA as forest slash, improper vegetation control in the RoW, or improper handling of flammable materials by workers.</p>	<ul style="list-style-type: none"> • A pre-construction botanical/habitat survey will be undertaken in conjunction with the engineering team for the vegetation clearance zone (including access roads), as the ESIA surveys did not cover the whole corridor of the 35kV OHL and did not spatially identify (map) the location of habitats within this zone. Modified and natural habitat will be assessed and areas of high conservation value identified. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. 	Action B1.4 - specific details for the 35kV OHL need to be added to the BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • An inventory of trees to be felled will be produced and the locations of any protected and threatened plant species identified and mapped so that the OHL siting can be optimised and areas of higher conservation value avoided. 	Action B1.2	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Micro-siting options will be considered for each tower to avoid or minimise any adverse effects on areas of valuable habitat. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Access road routes will be carefully assessed for valuable habitat prior to construction and alternative routes considered, should this be necessary. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • All access routes will be temporary, used only during construction. They will be rehabilitated following construction. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Biodiversity offsets needed to ensure No Net Loss of habitat impacted during construction will be calculated. The Ministry of Environment and Natural Resources will be consulted to identify suitable land and habitats to be preserved and/or upgraded/given additional protection. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Any protected trees in the OHL corridor will be grown in the Batumi Botanical Gardens and subsequently planted in the 35kV OHL corridor area or off-site compensation areas.⁶⁵ • Seeds of any protected and endemic species that are identified will be collected, where possible from the 35kV OHL corridor for use in habitat reinstatement. 	Action B1.4	Same commitment in Georgian EIA selected sites
		<ul style="list-style-type: none"> • Awareness raising amongst all Project workers will be undertaken so that they are aware of the importance of forest habitats. 	Action B1.1	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Areas to be cleared will be minimised (e.g. width of access roads and land requirements for permanent infrastructure) to minimise the loss/degradation of natural habitat during construction of the OHL. Hand cutting tools will be used where possible to avoid the use of large, heavy machinery, especially on steep slopes. Dust will be minimised through the use of light water sprays and the 	Action B1.3	Same commitment in Georgian EIA

⁶⁴ Provided by AGL. Email correspondence, April 2017.

⁶⁵ It was originally anticipated that tree saplings would be translocated, but subsequently established (on advice from local botanists) that this would not be possible because of the rocky substrate in the Project area. Stated in, Mott MacDonald, (December 2016) *Adjaristsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
		imposition of speed limits for vehicles, as per the Traffic Management Plan for the Project (CEMP07) – see relevant extracts in Annex N.		
		<ul style="list-style-type: none"> A Habitat Removal and Reinstatement Plan (HRRP)⁶⁶ will be produced and implemented in line with international good practice. The plan will set out the minimum requirements in relation to the clearance and re-instatement of natural forest habitats. 	Action B1.5	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Any natural forest areas not replanted on site with forest will be planted off-site.⁶⁷ 	Action B2.1	Not included in Georgian EIA
		<ul style="list-style-type: none"> Monitoring of re-instated habitats will be undertaken to ensure at least 75% establishment success. Monitoring will be undertaken by Batumi Botanic Gardens. 	Action B1.6	Not included in Georgian EIA
		<ul style="list-style-type: none"> The spread of alien invasive species will be prevented during construction. Known invasive species will be targeted during the pre-construction botanical surveys and all construction sites will be monitored for invasive species. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. Measures to prevent the accidental introduction of invasive species, as required under IFC PS6 and EBRD PR6 will be implemented. An invasive Species Management Plan will be produced if invasive species are identified as abundant within the footprint of the 35kV OHL. 	Action B1.7	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> A forest creation scheme is to be implemented for the overall Shuakhevi HPP scheme. This will incorporate details of the forest habitat to be lost as part of the 35kV OHL, to ensure No Net Loss (see BAP for details). 	Action B2.1- details of forest habitat loss associated with the 35kV OHL to be included in calculations for the forest creation scheme.	Not included in Georgian EIA
		<ul style="list-style-type: none"> Any species that are identified as threatened or endemic to Georgia will be protected and monitored. AGL will consult with relevant stakeholders regarding the specific measures to be implemented and appoint a botanical consultant to undertake annual monitoring of the species of concern. 	Action B2.3	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> To prevent the risk of fire, there will be regular maintenance in the RoW to avoid unchecked growth of tall trees. The maintenance schedule will be agreed prior to operation and detailed in the Operational Biodiversity Mitigation, Management and Monitoring Plan (OBMMMP). 	To be added to OBMMMP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Vegetation cut during construction and maintenance of the OHL will be removed so that its accumulation does not pose a fire risk. 	To be added to BAP and OBMMMP	Same commitment in Georgian EIA.
		<ul style="list-style-type: none"> Project workers will be trained so that appropriate measures are followed when handling flammable materials and fuels. 	To be added to BAP and OBMMMP	Same commitment in Georgian EIA

⁶⁶ Referred to as a Top Soil Removal and Reinstatement Plan in the Environmental Permit. Information provided by AGL. Email correspondence. July 2017.

⁶⁷ In some instances, stakeholders have requested that on-site reinstatement of habitats include grassland and arable land, rather than forest. Stated in, Mott MacDonald, (December 2016) *Adjariatsqali Hydropower Cascade Project Biodiversity Action Plan (BAP)*.

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
Protected and notable plant species				
<ul style="list-style-type: none"> • Cyclamen (<i>Cyclamen vernum</i> populations) and assemblages of notable plant species • Colchian barrenwort (<i>Epimedium colchicum</i>) • Helleborine (<i>Helleborus caucasicus</i>) 	<p>C = Habitat loss from vegetation clearance, earth moving works and vehicle movements in the RoW, establishment of non-native, invasive species, increased landslide risk.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads.</p>	<ul style="list-style-type: none"> • A pre-construction botanical/habitat survey will be undertaken in conjunction with the engineering team for the vegetation clearance zone (including access roads), as the ESIA surveys did not cover the whole corridor of the 35kV OHL and did not spatially identify (map) the location of habitats within this zone. Modified and natural habitat will be assessed and areas of high conservation value identified. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. 	Action B1.4 - specific details for the 35kV OHL need to be added to the BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • The locations of any protected and threatened plant species will be identified and mapped so that the tower micro-siting can be optimised and areas of higher conservation value avoided. 	Action B1.2 - specific details for the 35kV OHL need to be added to the BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Attention will be given to avoid or minimise impacts on the habitat areas identified as supporting protected, threatened or endemic species (this will be confirmed/supported by Action B1.4 with the preparation of habitat maps). 	Action B1.3	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Any species that are identified as threatened or endemic to Georgia will be protected and monitored. AGL will consultant with relevant stakeholders regarding the specific measures to be implemented and appoint a botanical consultant to undertake annual monitoring of the species of concern. 	Action B2.3	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • The spread of alien invasive species will be prevented during construction. Known invasive species will be targeted during the pre-construction botanical surveys and all construction sites will be monitored for invasive species. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. • Measures to prevent the accidental introduction of invasive species, as required under IFC PS6 and EBRD PR6 will be implemented. • An invasive Species Management Plan will be produced if invasive species are identified as abundant within the footprint of the OHL. 	Action B1.7	Same commitment in Georgian EIA
Protected and notable animal species				
<ul style="list-style-type: none"> • Bats (all species) 	<p>C = Habitat loss from vegetation clearance, earth moving works and vehicle movements in the RoW, light and noise disturbance.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads, reduced area for roosting, collision and electrocution risk.</p>	<ul style="list-style-type: none"> • Pre-construction surveys will be undertaken to identify bat activity and roost locations in the clearance zone, as this was not undertaken during the 35kV OHL ESIA surveys. Any bat roosts found will require consultation with the Directorate of Environmental and Natural Resources of Adjara and mitigation measures agreed. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. 	Action D1.6	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Bat boxes will be provided by AGL to offset any loss of suitable roosting sites for bats (if found during the survey). 	Action D2.1	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Activities will be undertaken in local communities to raise awareness about the importance of wild and threatened animals in the 35kV OHL corridor area. Such activities will be detailed in the SEP for the overall Shuakhevi HPP scheme. 	Action D2.3 To be added to SEP	Not included in Georgian EIA
		<ul style="list-style-type: none"> • Noise and artificial lighting will be minimised at night during construction. Any required lighting will be pointed down to minimise light spill. Noise levels will be 	Action E1.2	Same commitment in Georgian EIA

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
		monitored and not exceed the legislative thresholds (as per CEMP06 requirements) – see relevant extracts in Annex M.		
<ul style="list-style-type: none"> • Caucasian Squirrel (<i>Sciurus anomalus</i>) • Brown Bear (<i>Ursus arctos</i>) • Caucasian mole (<i>Talpa caucasica</i>) • Caucasian shrew (<i>Sorex satunini</i>) • Robert's snow vole (<i>Chionomys roberti</i>) • Daghestan pine vole (<i>Terricola daghestanicus</i>) • Spine-tailed lizard (<i>Darevskia rudis</i>) • Georgian (red-bellied) lizard (<i>Darevskia parvula</i>) • Derjugin's (Artvin) lizard (<i>Darevskia derjugini</i>) 	<p>C = Habitat loss from vegetation clearance, earth moving works and vehicle movements in the RoW, light and noise disturbance, risk of hunting.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads, risk of hunting.</p>	<ul style="list-style-type: none"> • Pre-construction fauna surveys will be undertaken in conjunction with the engineering team for the clearance zone (including access roads) to identify areas where species of high conservation value may be located. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. Micro-siting options will be considered for each tower to avoid or minimise any adverse effects on species of concern. Additional mitigation measures will be agreed, as required. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Awareness raising activities will be implemented with workers regarding the importance of threatened species in the OHL corridor area. 	Action D1.1 To be added to SEP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • The time that excavations and trenches are left open will be minimised to avoid animals being injured. 	Action D1.2	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Vehicle movements will be minimised in sensitive habitats and areas known for priority species. Dust levels will be maintained within regulatory legal limits (as per CEMP05 requirements) – see relevant extracts in Annex L. 	Action D1.3	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • No hunting, poaching or fishing will be allowed during construction and operation of the OHL. A Code of Conduct will be implemented, setting out the behaviour expected from employees and all contractors. Appropriate signage will be in place stating that hunting is prohibited. 	Action D1.4 – prohibited fishing by workers to be added to BAP and the Code of Conduct	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Noise and artificial lighting will be minimised at night during construction. Any required lighting will be pointed down to minimise light spill. Noise levels will be monitored and not exceed the legislative threshold (as per CEMP06 requirements) – see relevant extracts in Annex M. 	Action D1.5	Not included in Georgian EIA
<ul style="list-style-type: none"> • Eurasian Otter (<i>Lutra lutra</i>) • Caucasian salamander (<i>Mertensiella caucasica</i>) • Banded newt (<i>Ommatotriton ophryticus</i>) • Caucasian toad (<i>Bufo verrucosissimus</i>) • Long-legged wood frog (<i>Rana macrocnemis</i>) • Freshwater trout (<i>Salmo labrax fario</i>) • Colchic khramulya (<i>Capoeta sieboldii</i>) 	<p>C = Habitat loss from vegetation clearance, earth moving works and vehicle movements in the RoW, light and noise disturbance, sedimentation and reduced water quality.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads.</p>	<ul style="list-style-type: none"> • Pre-construction fauna surveys will be undertaken in conjunction with the engineering team for the clearance zone (including access roads) to identify areas where species of high conservation value may be located. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group. Micro-siting options will be considered for each tower to avoid or minimise any adverse effects on species of concern. Additional mitigation measures will be agreed, as required. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> • Fish monitoring will be undertaken in the Adjaristsqali and Skhalta Rivers or appropriate data extracted from the existing monitoring undertaken for the overall Skhalta HPP scheme. 	To be added to BAP	Not included in Georgian EIA
		<ul style="list-style-type: none"> • Erosion prevention, surface runoff management and sediment control measures (e.g. silt barriers, sediment traps, halting of soil works during heavy rains, etc.) will be ensured to avoid significant impact on receiving water bodies, especially during the spawning periods (April-August). Sediment control measures are detailed CEMP10. 	To be added to BAP	Same commitment in Georgian EIA

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
		<ul style="list-style-type: none"> All Project workers will be informed about the importance of river habitats and associated species within the OHL corridor, particularly those that are threatened species of high conservation value. 	Action C1.1 To be added to SEP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Any loss/degradation/pollution of river habitat will be minimised. Water quality will be monitored. 	Action C1.2	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Monitoring of the river habitat and biota will be undertaken during construction and operation. Monitoring regimes for Caucasian salamander and Eurasian otter on the Adjaristsqali and Skhalta Rivers will be agreed with the Ministry of Environment. 	Action C1.6 – specific locations relevant to the 35kV OHL to be added to the BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Awareness raising activities will be implemented with local communities on the importance of protecting riverine and associated species in the OHL corridor area. These will be reflected in the SEP for the overall Shuakhevi HPP scheme. 	Action C2.2 To be added to SEP	Not included in Georgian EIA
		<ul style="list-style-type: none"> River crossings will be minimised and only undertaken where other passage is not available. 	To be added to BAP	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Construction works will be scheduled outside the breeding season for priority species, where possible. 	To be added to BAP	Same commitment in Georgian EIA
<ul style="list-style-type: none"> Griffon Vulture (<i>Gyps fulvus</i>) Golden Eagle (<i>Aquila chrysaetus</i>) Eastern Imperial Eagle (<i>Aquila heliaca</i>) Spotted Eagle (<i>Aquila clanga</i>) (Boreal) Tengmalm's Owl (<i>Aegolius funereus</i>) Ringed Plover (<i>Charadrius dubius</i>) Common Sandpiper (<i>Actitis hypoleucos</i>) Caucasian Chiffchaff (<i>Phylloscopus lorenzii</i>) Bird assemblages 	<p>C = Habitat loss from vegetation clearance, light and noise disturbance.</p> <p>O = Permanent habitat loss from installation of OHL infrastructure and access roads, reduced area for roosting, collision and electrocution risk.</p>	<ul style="list-style-type: none"> Vegetation clearance will be scheduled for outside of the breeding season for priority species, where possible. Where this is not possible, construction sites will be surveyed prior to clearance to identify whether priority breeding species are present. 	Action E1.1	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Noise and artificial lighting will be minimised at night during construction. Any required lighting will be pointed down to minimise light spill. Noise levels will be monitored and not exceed the legislative thresholds (as per CEMP06 requirements) – see relevant extracts in Annex M. 	Action E1.2	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> AGL will implement a ban on bird hunting and raise awareness about the importance of threatened bird species in the OHL corridor area. A Code of Conduct will be implemented, setting out the behaviour expected from employees and all contractors. Appropriate signage will be in place stating that hunting is prohibited. 	Action E1.3 To be added to Code of Conduct	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> Bird deflector devices will be installed on pylons and conductors as recommended by international good practice to minimise bird collision and electrocution. The transmission line pole and insulator design will be in-line with good international practice for avian safety. Monthly monitoring of bird collision will be carried out during the first year after construction. Additional mitigation measures will be implemented as necessary on the basis of monitoring results. 	Action E1.4	Same commitment in Georgian EIA, but it was stated that bird deflector devices will be installed on the sections in open areas and where the line crosses the river. The EIA further states that additional mitigation measures will be implemented as necessary, based on (at

Ecological Features	Key Impacts	Mitigation Measures	BAP Action Ref. and Additions to other Management Plans	Georgian Permitting Requirements ⁶⁴
				least monthly) monitoring. ⁶⁸
		<ul style="list-style-type: none"> Bird boxes will be installed for the overall Shuakhevi HPP to compensate for the loss of habitat for birds. Some of these boxes may be installed in the 35kv OHL corridor area, but will be confirmed by the local ornithologist following the breeding bird survey being undertaken for the overall scheme. 	Action E2.1	Same commitment in Georgian EIA
		<ul style="list-style-type: none"> During final micro-siting, the number of times the OHL crosses the rivers will be minimised to reduce the risk of bird collisions. 	To be added to BAP	Same commitment in Georgian EIA

⁶⁸ The Project is currently committed to the more stringent mitigation measures for bird deflectors, but this may be reviewed following the pre-construction surveys and further analysis by an ornithologist. Any changes will be discussed and agreed with the Ministry of Environment and Natural Resources Protection of Georgia and the Lenders, prior to construction.

6.6 Management and Monitoring

6.6.1 Introduction

To verify that the proposed mitigation and management measures are successful and meet the objective of reducing the ecological impacts of the 35kV OHL, a series of monitoring activities will be undertaken during and after construction. Details of these are provided in the Shuakhevi HPP BAP. Where additional measures were identified in the OHL ESIA (and reflected in this Supplemental E&S Assessment), they need to be added to the BAP.

A summary of the monitoring measures particularly relevant to the OHL Project is provided in Table 6.6. However, this is not exhaustive, and the BAP (once updated with the actions identified for the 35kV OHL) should be referred to.

Table 6.6 Management and Monitoring Measures for the 35kV Overhead Transmission Line

Monitoring Activities	Relevant Management Plans	Responsibility	Comments	Georgian Permitting Requirements ⁶⁹
Pre-Construction Monitoring				
A pre-construction botanical/habitat survey will be undertaken for the vegetation clearance zone (including access roads) as the ESIA surveys did not cover the whole corridor of the 35kV OHL and did not spatially identify the location of habitats within this zone. Modified and natural habitat will be assessed and areas of high conservation value identified.	To be added to BAP	Botanical consultant and Ecologist appointed by Contractor; Contractor; AGL Environmental Manager; AGL CWO.	Habitat maps and a tree inventory will be prepared during this survey for the clearance zone (including access roads) and main construction areas. The survey will identify the requirements for monitoring during construction and operation. The methodologies for the ecology pre-construction surveys will be shared with AGL and the Lender group.	Same commitment in Georgian EIA
Monitoring During Construction				
Monthly review of BAP implementation and reporting, in accordance with the measures detailed therein.	BAP	AGL Environmental Manager; AGL CWO;	Based on these monthly reviews, AGL will review the suitability of the mitigation and management measures and amend as needed in order to achieve the overall conservation objectives of the Shuakhevi HPP scheme (as stated in Table 7.1 of the BAP).	Not included in Georgian EIA
Construction areas will be inspected weekly. It will be identified whether there is any variance from the pre-determined areas and whether working areas have been successfully minimised.	BAP	Contractor; AGL Environmental Manager; AGL CWO.	Construction areas will move along the OHL corridor as towers are installed. If monitoring identifies the need for additional measures, these will be implemented for all subsequent construction areas along the corridor.	Not included in Georgian EIA
Daily monitoring and weekly inspections of construction areas to monitor noise and dust levels and their compliance with regulatory and international requirements.	Noise Management Plan (CEMP06); Air Quality Management Plan (CEMP05); Traffic Management Plan (CEMP07); Community Grievance Mechanism.	Contractor; AGL Environmental Manager; AGL CWO.	Any exceedance of Georgian legislative thresholds, those detailed in the World Bank Group's General EHS Guidelines, or feedback about disturbance from the community grievance mechanism will be reviewed and additional measures employed where necessary. Exceedances will be logged, along with complaints and corrective actions.	Same commitment in Georgian EIA
Daily monitoring and weekly inspections of construction areas to monitor whether light pollution is being minimised with low light directional lighting.	Community Grievance Mechanism.	Contractor; AGL Environmental Manager; AGL CWO.	Reports of light disturbance through the community grievance mechanism will be reviewed and additional measures employed where necessary. Complaints and corrective actions will all be logged.	Same commitment in Georgian EIA
Daily monitoring and weekly inspections of construction areas to monitor water quality, pollution prevention measures, sediment	Spill Prevention and Chemicals Storage Plan (CEMP04); Erosion and Sediment Control Plan	Contractor; AGL Environmental Manager; AGL CWO.	Any exceedance of Georgian legislative thresholds, those detailed in the World Bank Group's General EHS Guidelines, or feedback from local communities will be reviewed and additional measures employed where necessary. Corrective actions will be logged.	Same commitment in Georgian EIA

⁶⁹ Provided by AGL. Email correspondence, April 2017.

Monitoring Activities	Relevant Management Plans	Responsibility	Comments	Georgian Permitting Requirements ⁶⁹
control, any infringements of the fishing ban for workers etc.	(CEMP10); Water quality water discharge plan (CEMP11).			
Daily observations to monitor any hunting activity.	BAP	Contractor; AGL Environmental Manager; AGL CWO.	Any observations of hunting activity will be logged and additional action taken as needed. This may include disciplinary action for workers or additional signage regarding the banning of hunting in all Project areas.	Same commitment in Georgian EIA
All working areas will be monitored for invasive species. Checks by a qualified ecologist will be undertaken around all major working areas and site compounds every other month.	BAP	Ecologist appointed by Contractor; Contractor; AGL Environmental Manager; AGL CWO.	Checks will be undertaken for the accidental introduction or spread of alien, invasive species, especially plant species which may be brought into the areas from construction activities (on vehicles, in any imported materials). Results of the monitoring will determine any additional mitigation needed. Measures to remove/eradicate any species introduced, if found, will be discussed with the Ministry of Environmental Protection prior to execution.	Same commitment in Georgian EIA
Any species identified as priorities for conservation ⁷⁰ will be monitored. The condition of species identified as priorities for conservation, will be assessed. The monitoring protocol will be agreed with the botanical consultant and Ministry of Environmental Protection prior to construction.	BAP	Ecologist appointed by Contractor; Contractor; AGL Environmental Manager; AGL CWO.	AGL will consultant with relevant stakeholders regarding the specific measures to be implemented.	Not included in Georgian EIA
Monitoring of the river habitat and biota will be undertaken. Monitoring regimes for species identified as priorities for conservation (including the Caucasian salamander and Eurasian otter) on the Adjaristsqali and Skhalta Rivers will be agreed with the Ministry of Environment.	BAP	Ecologist appointed by Contractor; Contractor; AGL Environmental Manager; AGL CWO.	AGL will consultant with relevant stakeholders regarding the specific measures to be implemented.	Not included in Georgian EIA
Monitoring of ecology related environmental incidences or non-conformance.	BAP	Contractor – all staff; AGL Environmental Manager.	All incidents will be recorded with any necessary corrective action implemented in a timely manner.	Same commitment in Georgian EIA
Monitor implementation of SEP training for workers and awareness amongst local communities.	SEP	Contractor; AGL CLO.	All training will be logged.	Not included in Georgian EIA
Post Construction Monitoring				
Development and ongoing monitoring of the Operational Biodiversity Mitigation, Management and Monitoring Plan (OBMMMP)	OBMMMP	O&M Contractor; AGL Environmental Manager.	Based on the findings of monitoring activities, AGL will review the suitability of the mitigation and management measures implemented and take into consideration requirements for additional mitigation or offsetting measures.	Same commitment in Georgian EIA

⁷⁰ To include species threatened globally/nationally, protected species in Georgia, endemic/restricted range species, migratory/congregatory species, or invasive species.

Monitoring Activities	Relevant Management Plans	Responsibility	Comments	Georgian Permitting Requirements ⁶⁹
Monitoring of the biodiversity offsets established as part of the Project's avoidance of No Net Loss of natural habitats, based on calculations done following pre-construction baseline habitat surveys, and post-construction habitat impact survey.	OBMMMP	Batumi Botanic Gardens; AGL Environmental Manager.	Based on the findings of monitoring activities, AGL will review the suitability of the measures implemented and take into consideration any requirements for additional offsetting measures.	Same commitment in Georgian EIA
The success of habitat reinstatement will be monitored, with the condition of all habitat areas reinstated checked annually, measuring the health and mortality of replanted trees.	OBMMMP	Batumi Botanic Gardens; AGL Environmental Manager.	Details to be agreed with the Forestry Department and details provided as part of the Habitat Removal and Reinstatement Plan (HRRP).	Same commitment in Georgian EIA
Any species identified as priorities for conservation ⁷¹ will be monitored annually, during the optimum time of year for the specific species, for 3 years' post construction.	OBMMMP	Ecologist appointed by AGL; AGL Environmental Manager.	Additional mitigation measures will be implemented as necessary on the basis of monitoring results.	Same commitment in Georgian EIA
Monitoring of the river habitat and biota will be undertaken during operation. Monitoring regimes for species identified as priorities for conservation (including the Caucasian salamander and Eurasian otter) on the Adjaristsqali and Skhalta Rivers will be agreed with the Ministry of Environment.	OBMMMP	Ecologist appointed by AGL; AGL Environmental Manager.	Additional mitigation measures will be implemented as necessary on the basis of monitoring results.	Same commitment in Georgian EIA
Monthly monitoring of bird or bat collision will be carried out during the first year after construction to check for evidence of bird deaths due to electrocution and collisions.	OBMMMP	Ecologist appointed by AGL; AGL Environmental Manager.	If evidence is found of bird deaths resulting from electrocution or collision then appropriate remediation measures will be put in place; this may mean replacing the type or location of bird deflector devices.	Same commitment in Georgian EIA
Annual monitoring will be carried out to check the conditions of the faunal diversity. Monitoring shall be continued for 3 years after completion of construction. The condition of any species identified as priorities for conservation will be assessed.	OBMMMP	Ecologist appointed by AGL; AGL Environmental Manager.	If species are regarded to be in decline and their decline attributed to the operation activities of the Project then further offsetting measures may be needed.	Same commitment in Georgian EIA

⁷¹ To include species threatened globally/nationally, protected species in Georgia, endemic/restricted range species, migratory/congregatory species, or invasive species.

7. The Project and the Environment

7.1 Introduction

This section focusses on the impacts of the 35kV OHL on the Environment, focusing on the biophysical receptors likely to be affected by the 35kV OHL. It draws on existing assessments undertaken for the Shuakhevi HPP scheme (as detailed in Section 5.1.1). All primary data collection is detailed in the subsequent sections. Potential impacts resulting from the 35kV OHL are presented, along with required mitigation and management measures.

7.2 Geology, Landslides and Seismic Risks

An assessment of geology, landslides and seismic risks was based on a combination of desk-based research and survey work in the 35kV OHL corridor area (full details are presented in Annex G). The Adjara region is known to historically experience landslides.¹ The area is also known to have seismic potential, albeit low (as detailed in Annex E of the Shuakhevi HPP ESIA).² Such risks are therefore a source of concern for local people in relation to the Project and raised during stakeholder engagement meetings (see summary in Appendix B of the 35kV OHL SEP).³

Activities, such as earth works and tree removal have the potential to increase the risk of landslides during construction. Geological risk assessments were undertaken during the feasibility stage and tower locations were established with a consideration of landscape risk. Additionally, five foundation types have been selected for the towers, which are suitable for the local conditions. Detailed technical investigations will be undertaken at each tower to determine the most suitable foundation type for each tower.⁴ Good engineering practice will also be implemented by the Contractor to further mitigate any risk. Specific details of the relevant construction work processes (method statements) will be developed by the Contractor for the Project. The ESIA for the 35kV OHL determined that the OHL is unlikely to result in a significant additional landslide risk. However, tree felling undertaken by local communities and realigning of surface streams for crop drainage, if of sufficient scale and on vulnerable slopes, may increase the cumulative risk of landslides. Such risks will be discussed with local communities during the stakeholder engagement meetings.

Based on the results of assessments for the Shuakhevi HPP it can be inferred that the hazard of a tectonic fault breaking the ground surface at the location of the scheme is not great. There will also be no change in seismic risk as a result of the Project's construction. Observations of micro seismicity will, however, continue until the end of the detailed design stage. The Contractor is required to develop a plan of mitigation for geodynamic processes for submission to the Ministry of Environment of Georgia, prior to construction. Any ground disturbed during construction will be reinstated, to avoid erosion and possible instabilities. During operation, any significant movement of the towers (that lead to an electrical fault) will be monitored. Such land slippage will therefore be detected and appropriate measures implemented.

7.3 Water Resources Management

Impacts of the 35kV OHL on water resources have been minimised through design, by situating all towers at least 30m from the river bed. Impacts of the 35kV OHL on water resources during operation are therefore not expected to be significant; the movement of vehicles across the river during maintenance

¹ In the 1980s there was a landslide in Tsablana (Skhalta River valley) which killed approximately 20 families.

² Mott MacDonald, (September 2013) *Adjaristsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*.

³ AGL, (December 2016) *Stakeholder Engagement Plan for the 35kV Skhalta-Shuakhevi Overhead Transmission Line*.

⁴ Information provided by AGL. Email communication, May 2017.

are likely to be the only impact. Potential risks and impacts during construction include sediment release as a result of near channel work and accidental spills.

Impacts on water resources will be mitigated by undertaking construction activities in accordance with good practice and in line with the CEMPs for the Project, in particular the Erosion and Sediment Control Plan (CEMP10) and Water Quality and Water Resources Management Plan (CEMP11). The Contractor has also prepared a draft Environmental, Health and Safety (EHS) Plan, which once finalised will contain details of the Contractor's emergency preparedness and response planning for the 35kV OHL. Relevant elements of CEMP10 and CEMP11 are presented in Annexes Q and R. Control measures include ensuring that accumulation of material on vehicles used to transport spoil, earth, etc. is avoided. Additionally, sediment fences and silt traps will be installed, as necessary, to remove sediment from runoff. Construction areas will also be stabilized and revegetated following the completion of works. Any environmental incidents affecting water resources will be reported, recorded and managed. Any grievances related to water resources will be carefully reviewed and action taken as needed. Considering the short-term nature of the construction work, and with effective implementation of the control measures detailed, impacts on water resources have not been considered significant.⁵

7.4 Materials and Waste Management

Waste types and volumes to be generated by the 35kV OHL project have been identified and assessed as part of the 35kV OHL ESIA (see Annex H) where it was determined that solid, liquid, hazardous, non-hazardous and inert wastes produced will be low in volume. The most significant waste stream (in terms of volume) generated during construction has been identified as spoil. The construction of each tower is expected to produce approximately 16m³ of excavated material; 2,128m³ in total for the 35kV OHL.⁶ There will be a small amount (up to 400m³) of spoil generated from construction of the temporary access routes. It has been estimated that this will equate to about 16 m³ per land owner and is planned to be stored on site and used to restore the routes following construction. It is not anticipated that spoil from the access routes will require off-site disposal.⁷

The methods employed to manage wastes and mitigate their impacts are presented in the Project's Waste Management Plan (CEMP09), relevant extracts of which are presented in Annex P. Details regarding site handling, storage (including facilities and locations)⁸ and transportation arrangements,⁹ will also be included in the Contractor's Environment, Health and Safety Plan,¹⁰ prior to construction. Spoil Disposal Areas (SDAs) are currently being evaluated and the option of using excavated material on nearby fields to improve soil fertility being considered.¹¹ Landfill sites to be used by the OHL project will be carefully selected.¹² Waste management procedures during operation of the 35kV OHL project will be detailed in the Project's Operation and Maintenance (O&M) Plan.¹³

⁵ As determined in the 35kV OHL ESIA.

⁶ Volumes confirmed by AGL. Email communication, May 2017.

⁷ Volumes of spoil have been calculated by AGL. Establishment of the access routes will mostly require clearing, trimming and levelling. Information provided by AGL. Email communication, May and June 2017.

⁸ It is planned that hazardous wastes will be stored, in clearly marked containers in a suitably secure area, at the construction camps belonging to AGL. New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

⁹ A clear waste tracking mechanism to track waste consignments from the originating location to the final waste treatment and disposal location is to be implemented, in line with GIIP.

¹⁰ This HSE plan is currently in draft form, May 2017.

¹¹ Information provided by AGL. Email communication, May 2017.

¹² Not all the landfill sites are compliant with national permitting requirements and are poorly managed. Stated in Mott MacDonald, (September 2013) *Adjariatsqali Hydropower Project Environmental and Social Impact Assessment (ESIA)*. Section 12.3.

¹³ Waste volumes during operation will be low, related to maintenance works and any required replacement infrastructure.

Potential impacts associated with waste include contamination of the receiving environment due to leaks or spills associated with poor waste handling and storage arrangements, fugitive emissions (such as dust), visual amenity impacts associated with poor storage of waste, and increased landfill.¹⁴

Key measures to minimise impacts associated with waste include the re-use of materials, wherever possible. The significant opportunity in the construction phase is with respect to excavated spoil, which will be used in the construction of embankments and river bank reinstatement works. Top soil storage will also be carefully managed at pre-selected sites, with soil embankments no more than 2 meters high.¹⁵ Following the implementation of the prescribed mitigation and management measures, significant risks and impacts associated with materials and wastes, are not expected.

Cumulative impacts in relation to waste may arise as a result of other construction projects (see Section 4.4). There may be extra demand on local re-use, recycling and landfill facilities, that will need to be reviewed. However, a recent assessment of landfill capacity has determined that Batumi landfill will be utilised for the 35kV OHL and is adequate to accommodate the wastes generated from the 35kV OHL.¹⁶ Additionally, it is not anticipated that construction of the main Shuakhevi HPP scheme will be undertaken in the same area as the 35kV OHL, at the same time. As such, no significant cumulative impacts associated with materials and waste management have been identified in the assessments.

7.5 Noise and Vibration

There are no significant sources of man-made noise in the 35kV OHL corridor area, other than traffic which is irregular and relatively light. Noise surveys undertaken as part of the ESIA for the main Shuakhevi HPP recorded background noise levels of between 32 – 58.6 dBA during spot measurements.¹⁷ In some village locations traffic flow was low (1-2 cars/hour during the daytime) and consequently only natural noise was measured (river, wind, wildlife etc.).

Construction activities for the 35kV OHL Project will result in elevated noise levels, due to excavation work, the installation of foundations, masts and wires, and the movement of heavy machinery and vehicles. The ESIA for the 35kV OHL determined that local communities will have a low tolerance for increased noise, as background levels are low. However, impacts have been assessed as limited to within 200 m of the source (see Section 14.4.1, Shuakhevi HPP ESIA) and short-term in nature; the construction of each tower is expected to take approximately 6 to 10 days and the entire construction period up to 6 months. It has been identified that there are 10km (of the total 22.3km OHL) where residential dwellings are within 200 meters of construction sites.¹⁸ Villages along the access roads (once confirmed) will also experience more significant noise elevations, for the extent of the construction period.

Noise impacts will be mitigated by undertaking construction activities in accordance with legislative requirements and good practice, as detailed in the Noise Management Plan (CEMP06) for the overall Shuakhevi HPP scheme, relevant extracts of which are presented in Annex M. This will include, selecting equipment with low sound power levels and maintaining it in good working order, restricting work hours to avoid sensitive periods, and engaging with local stakeholders so that they have notice of noise-generating activities. Any grievances raised related to noise impacts will be carefully considered and additional mitigation, management or monitoring measures implemented as necessary. Following implementation of the prescribed measures it has been assessed that effects on local residents from site based construction works will not be significant.¹⁹ Assessments undertaken as part of the ESIA for the 35kV considered that there would be no significant elevations in noise levels during operation of the OHL

¹⁴ As identified in the AGL Waste Management Plan (CEMP09).

¹⁵ New Metal Georgia, (October 2016) *Skhalta- Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

¹⁶ Information provided by AGL. Email communication, May 2017.

¹⁷ Villages along the route of the OHL corridor were not part of this survey but the results provide a good point of reference.

¹⁸ New Metal Georgia, (October 2016) *Skhalta- Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

¹⁹ As determined in the 35kV OHL ESIA.

(see discussion in Section 5.4.3 of this Supplemental E&S Assessment). Additionally, no significant vibration impacts were identified during construction or operation. No significant cumulative noise impacts have been identified, but depending on the timing of other construction projects (see Section 4.4) and the access routes selected, there could be cumulative impacts arising from additional construction traffic.

7.6 Air Quality

There are very few sources of air pollution in the Project area and air quality, in general, is considered good.²⁰ Air quality impacts which may arise during the construction of the 35kV OHL project include emissions and particulate matter arising from on-site construction activities (such as the movement of vehicles, digging foundations and transporting/storing spoil) and construction related traffic. Possible air emissions include sulphur dioxide (SO₂), oxides of nitrogen (NO_x), carbon monoxide (CO), dust/particulate matter, greenhouse gases²¹ and volatile organic compounds (VOCs). Box 7.1 presents an overview of the impact on greenhouse gas emissions. In the absence of mitigation, it has been assessed that significant impacts associated with dust could be experienced at properties within 200 meters of the 35kV OHL tower construction sites.²² However, impacts will be short-term in nature, with construction of each tower expected to take approximately 6 to 10 days and the entire construction up to 6 months. Villages along the access routes (once confirmed) will also experience air quality impacts associated with construction traffic for the extent of the construction period.

Impacts on air quality will be mitigated by undertaking construction activities in accordance with legislative requirements and good practice, as detailed in the Air Quality Management Plan (CEMP05) for the overall Shuakhevi HPP scheme, relevant extract of which are presented in Annex L. These include dust suppression using water or other suppressants, screens around sources of dust, regular vehicle maintenance, restricted speed limits and appropriate materials storage, amongst others. The Air Quality Management Plan also sets out requirements to protect workers on site from the effects of dust and includes the provision of appropriate PPE and training. Any grievances raised related to air quality impacts will be carefully considered and additional mitigation, management or monitoring measures implemented as necessary. Following implementation of the prescribed measures, impacts on air quality have not been assessed as significant.²³ No significant emission sources have been identified for the operation and maintenance of the 35kV OHL. There are no cumulative impacts associated with construction dust predicted as there are no other known schemes being developed within 200m of the 35kV OHL. Cumulative impacts from traffic emissions are uncertain due to the limited information available about the timing of other schemes in development. However, significant impacts are considered unlikely.

²⁰ New Metal Georgia, (October 2016) *Skhalta- Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

²¹ For example, carbon dioxide, methane, nitrous oxide.

²² See Section 15.2.3 Shuakhevi HPP ESIA and stated in New Metal Georgia, (October 2016) *Skhalta- Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

²³ New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

The Non-Technical Summary for the ESIA for the 35kV OHL²⁴ presented the assessment of GHG emissions for the overall Shuakhevi HPP, where the impact of the Project in terms of GHG emissions was determined by calculating the carbon payback period.²⁵ The payback time for the HPP scheme when compared to a conventional Combined Cycle Gas Turbine plant (CCGT) generating plant (typically the most efficient type of fossil fuel plant) was calculated as 44 months. It has therefore been concluded that over the lifetime of the Project, it will provide enough renewable electricity to offset the emissions incurred during the construction of the project, as compared to a thermal power plant. In this context, the Shuakhevi HPP has been considered to have a minimal negative impact on GHG emissions. GHG emissions during operation and maintenance of the scheme are expected to be negligible and so no quantitative assessments have been undertaken. Mitigation and enhancement measures associated with GHG emissions are presented in the Shuakhevi ESIA and focus on the careful sourcing of materials, optimising the use of resources to avoid potential wastage procurement and implementing toolbox talks that promote turning off engines when not in use, amongst others.

7.7 Landscape and Visual Amenity

An appraisal of the landscape character and visual amenity of the area surrounding the 35kV OHL was undertaken and landscape considered to be of medium value.²⁶ The route of the OHL has been carefully selected to minimise impacts on natural habitat and as such the towers are mostly located along the bottom of the river gorge, close to the existing Energopro 35kV overhead line, mostly running on the alternate bank. The 'Batumi-Akhaltzikhe 220kV line' is also under development in the area and visible at various points along the 35kV OHL route. Both new lines are composed of towers with a lattice structure which helps to minimise visual impacts. Much of the area has seen anthropogenic change, with some areas deforested and land converted to farmland. People living in local communities are likely to be of medium sensitivity to the changes in visual amenity²⁷ as their livelihood activities involve significant time outdoors. The main visual change resulting from the 35kV OHL Project will be the presence of the transmission line and its towers. Access routes are not expected to result in a significant change; 80% of towers are expected to be accessed from existing roads, 10% along existing paths and tracks (although they may need some widening/reinforcement), 5% are expected to be accessed via existing roads and river crossings, with the remaining 5% likely to require new access routes.²⁸ This equates to approximately 6-7 towers requiring the construction of new access routes, averaging about 50m in length; 300 to 350 metres in total. The magnitude of the impact has been assessed as minor, as there is some loss or damage to existing character or views, but the additional features and elements already exist in the landscape. Mitigation measures will include minimising vegetation clearance around construction sites and landscape restoration in the areas close to the towers and vegetation planting, with the aim of also reducing soil erosion in the area. Following mitigation, impacts have not been assessed as significant.²⁹ Whilst measures have been taken to minimise landscape and visual impacts, there will be two new power lines within the Adjaristsqali and Skhalta river valleys (the 35kV OHL and the Batumi-Akhaltzikhe 200kV line). No significant cumulative impacts have been identified within the ESIA for the 35kV OHL, but the methodology applied uses a mixture of subjective and objective criteria. As such, there may be significant cumulative impacts for some local receptors, following mitigation.

²⁴ New Metal Georgia, (October 2016) *Skhalta - Shuakhevi 35 kV Overhead Power Line. Non-Technical Summary (NTS)*.

²⁵ The length of time required for the Project to become a net avoider of GHG emissions rather than a net emitter, when compared to a fossil fuel plant producing the same electrical output (10 MW).

²⁶ As per the criteria for assessing landscape value included in the Shuakhevi HPP ESIA. Section 18.

²⁷ As per the criteria for assessing visual sensitivity included in the Shuakhevi HPP ESIA. Section 18.

²⁸ Information provided by AGL's Transmission Planning Engineer. Telephone communication. March 2017.

²⁹ As determined in the 35kV OHL ESIA.

8. Environmental and Social Management Plan (ESMP)

8.1 Introduction

This section presents the Environmental and Social Management Plan (ESMP) for the 35kV OHL Project. It outlines how environmental and social mitigation will be implemented, managed and monitored to meet both Georgian and Lender requirements, during the construction and operation of the OHL.¹

Please note that the mitigation and management measures for impacts on ecology were presented in detail in Section 7. They are therefore not repeated here, but **Tables 6.5 and 6.6 are considered part of the ESMP for the 35KV OHL Project.**

The measures prescribed for the 35KV OHL align with those for the overall Shuakhevi HPP scheme, as far as possible, focussing on those areas where potential environmental and social risks and impacts are most likely. In implementing this ESMP, it is assumed that all overarching commitments for the Shuakhevi HPP are effectively implemented and all legislative requirements met. The Contractor is contractually bound to comply with the ESMP² and will undertake all construction work in line with the Construction Environmental Management Plans (CEMP00 to CEMP12) for the Shuakhevi HPP; the key, relevant elements of which are presented in Annexes J to R. Any changes or updates to the measures in Table 8.1 (and the associated annexes) will be agreed with AGL in advance of implementation.

An implementation framework for the ESMP is provided and describes the interfaces between AGL and the construction Contractor, including key personnel, methods of communication and meeting frequencies (see Section 8.2).

In line with good practice, the mitigation measures committed to for the 35kV OHL, will need to be reviewed as the project progresses. Management measures will be adaptive, responding to any uncertainty and the results of further assessment and monitoring, to ensure that they achieve the desired outcomes.

8.2 Implementation Framework

AGL is a joint venture between Clean Energy Invest AS, Tata Power and the IFC. It is a special purpose vehicle with development rights for the Shuakhevi HPP. As such, AGL has overall responsibility for management of the Shuakhevi HPP and its 35kV OHL. For the construction phase, AGL has developed a project management structure with distinct roles, to effectively manage the Project. A Contractor, New Metal Georgia (NMG) has been appointed to construct the 35kV OHL. AGL will provide overall supervision to NMG, ensuring that all project commitments are being appropriately and effectively implemented.

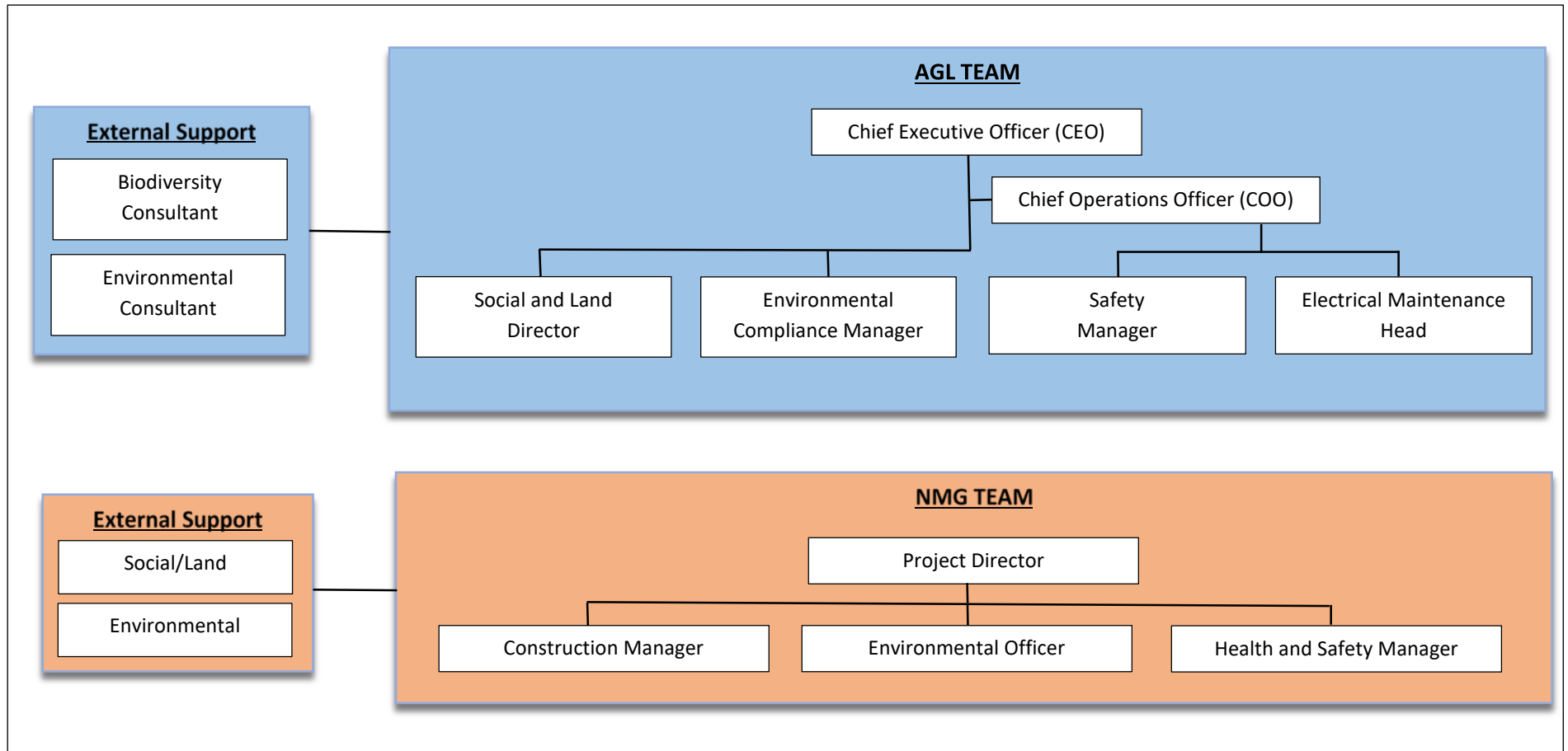
8.2.1 Construction Phase Environmental and Social Management

Figure 8.1 provides an overview of the key personnel involved during the construction phase of the 35kV OHL project. Their roles are further described in Tables 8.1 and 8.2. It is expected that this overall structure will remain through to operation, but operational roles and responsibilities will be refined during the construction phase, with modifications implemented as required.

¹ As detailed in the introduction to this Supplemental E&S Assessment an assessment of impacts (and associated mitigation and management measures) associated with decommissioning of the 35kV OHL has not been undertaken. Such works would be a long time in the future and impacts would be minimised and managed through the implementation of a decommissioning environmental management plan.

² Confirmed by AGL. Email correspondence. July, 2017.

Figure 8.1 Organogram for Construction of the 35kV OHL



Source: AGL

Ultimate responsibility for delivering the environmental and social commitments of the 35kV OHL (as detailed in this ESMP) sits with AGL’s Chief Executive Officer (CEO). The CEO is then supported by the AGL team and external consultants, who all have distinct roles and responsibilities, as detailed in Table 8.1.

NMG, as the Construction Contractor, is required to implement all the ESMP commitments associated with the construction phase of the 35kV OHL. This requirement also cascades down to any contractors that they hire to support the work. Currently, NMG has hired consultants and NGOs to support them with the delivery of their environmental and social commitments. The roles and responsibilities of the NMG team are described in Table 8.2.

Table 8.1 AGL Personnel

Role/Title	Responsibilities
CEO	<ul style="list-style-type: none"> Overall responsibility for delivery of the 35kV OHL project, ensuring adherence to all Georgian legislative (permitting) requirements. Overall responsibility for ensuring that the 35kV OHL project is implemented in line with the requirements of the Project’s Lenders. Management of the company’s resources to support effective implementation of the Project’s environmental and social commitments.
COO	<ul style="list-style-type: none"> Overall responsibility for day-to-day management of the 35kV OHL implementation, reporting to the CEO. Day-to-day management of the Construction Contractor and monitoring of their activities to ensure effective delivery of their environmental and social obligations.
Environmental Compliance Manager	<ul style="list-style-type: none"> Responsible for ensuring adherence to all Georgian legislative (permitting) requirements. Responsible for ensuring all environmental commitments of the Project are being implemented effectively. Review and approval of all environmental documentation developed by the Construction Contractor, ensuring alignment with Lender and legislative requirements. Accountable to the CEO for ensuring effective implementation of all environmental requirements (legislative and lender requirements) by the Construction Contractor. Accountable to the CEO for ensuring effective implementation of the BAP for the 35kV OHL.
Social and Land Director	<ul style="list-style-type: none"> Responsible for ensuring all social commitments of the Project are being implemented effectively. Review and approval of all social documentation developed by the Construction Contractor, ensuring alignment with Lender and legislative requirements. Accountable to the CEO for ensuring effective implementation of all social requirements (legislative and lender requirements) by the Construction Contractor. Accountable to the CEO for ensuring effective stakeholder engagement through implementation of the Project’s Stakeholder Engagement Plan (SEP) for the 35kV OHL. Accountable to the CEO for ensuring effective implementation of the Land Acquisition and Livelihood Restoration Plan (LALRP) for the 35kV OHL.
Safety Manager	<ul style="list-style-type: none"> Responsible for ensuring all health and safety related commitments of the Project are being implemented effectively. Review and approval of all health and safety documentation developed by the Construction Contractor, ensuring alignment with Lender and legislative requirements. Accountable to the COO for ensuring effective implementation of all health and safety requirements (legislative and lender requirements) by the Construction Contractor. Accountable to the COO for ensuring effective implementation of the Project’s HSE Plan for the 35kV OHL. Day-to-day oversight of all health and safety monitoring and reporting for the 35kV OHL.
Electrical Maintenance Head	<ul style="list-style-type: none"> Key point of contact for technical matters associated with the 35kV OHL, for the Construction Contractor, government authorities and other stakeholders. Responsible for daily site supervision and monitoring of the Construction Contractor. Accountable to the COO for day to day management of the Construction Contractor and ensuring effective implementation of the Project’s environmental and social commitments.

External Support: Biodiversity Consultant	<ul style="list-style-type: none"> • Provides guidance and support to AGL in delivering the Project’s biodiversity commitments (both legislative and Lender requirements). • Responsible for reviewing the Construction Contractor’s pre-construction ecology survey methodologies and results. • Provides guidance regarding any necessary amendments/additions to mitigation measures, following the surveys.
External Support: Environmental Consultant	<ul style="list-style-type: none"> • Provide guidance to AGL regarding the Project’s environmental commitments (both legislative and Lender requirements).

Source: AGL

Table 8.2 *New Metal Georgia Personnel*

Role/Title	Responsibilities
Project Director	<ul style="list-style-type: none"> • Overall responsibility for the effective implementation of NMG’s contractual responsibilities on the Project. • Overall responsibility for effective implementation of NMG’s environmental and social commitments during construction (both legislative and Lender requirements).
Construction Manager	<ul style="list-style-type: none"> • Overall responsibility for Health, Safety, and Environmental aspects on site, daily.
Environmental Officer	<ul style="list-style-type: none"> • Overall responsibility for ensuring NMG’s environmental responsibilities during construction are being implemented effectively (both legislative and Lender requirements).
Health and Safety Manager	<ul style="list-style-type: none"> • Overall responsibility for ensuring NMG’s health and safety responsibilities during construction are being implemented effectively (both legislative and Lender requirements).
External Support: Environmental and Social Consultants and NGOs	<ul style="list-style-type: none"> • Provide support to NMG in delivering their environmental and social commitments (both legislative and Lender requirements).

Source: AGL

8.2.2 Implementation Schedule and Support

Table 8.1 describes how the AGL team will manage the Contractor’s construction and environmental and social management and monitoring responsibilities. They will be delivered through a combination of regular inspections and audits, formal reviews and reporting. AGL’s team have been managing contractors working on the broader Shuakhevi HPP scheme for the past 4 years and have access to external independent support from experienced environmental and social consultants, as required.³

AGL and New Metal Georgia (NMG) will have daily interaction through:

- Construction supervision: Daily;
- Health and Safety discussions: Daily; and
- Progress meetings (including E&S review): Weekly (minimum).

Communication methods will primarily be face to face and via the telephone, with formal letters raised (sent by email) for any more substantive issues, such as contractual matters. The implementation schedule for the 35kV OHL is presented in Figure 8.2.⁴ AGL will review this schedule quarterly during construction and six monthly during operation, with amendments made as necessary.

³ CVs of personnel are not annexed to this Supplemental Assessment but are available to the Lender group, on request.

⁴ The implementation schedule highlights key activities during pre-construction, construction and post-construction. It does not provide a comprehensive list of all mitigation and management measures. Reference should be made to tables 6.5, 6.6, 8.3 and 8.4.

8.2.3 Training

NMG will lead all training for its staff, but AGL will provide continual training support on environmental, health and safety aspects. As is being implemented on the broader Shuakhevi HPP scheme, AGL personnel will be present during formal training sessions, providing support and input. Details of planned training are captured within Table 8.3 and include induction, driver safety, OHS, E&S and security training. NMG will share its training plan with AGL in advance of construction.

8.3 Mitigation, Management, Monitoring and Reporting Measures for the 35kV OHL

Table 8.3 The Project, Community and Cultural Heritage

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
Energy Provision, Infrastructural Improvements and Employment Opportunities							
Employment generation	<ul style="list-style-type: none"> Maximise recruitment of local people, where possible. 	AGL CLO	Before and during construction	<ul style="list-style-type: none"> 35KV OHL SEP AGL Recruitment Policy 	Not included in Georgian EIA	<ul style="list-style-type: none"> The Contractor will provide AGL with data regarding the number of local people hired. 	<ul style="list-style-type: none"> Hiring and training data to be recorded by the Contractor monthly and reported to AGL bi-monthly (every two months).
	<ul style="list-style-type: none"> Disclosure of Recruitment Policy. 					<ul style="list-style-type: none"> The Contractor will provide details of any skills development training provided to workers. 	
	<ul style="list-style-type: none"> Staffing requirements will be disclosed locally in advance of opportunities arising. 					<ul style="list-style-type: none"> AGL to monitor all grievances related to employment generation. 	<ul style="list-style-type: none"> Ongoing.
	<ul style="list-style-type: none"> Any work opportunities for the broader HPP scheme will also be disclosed. 					<ul style="list-style-type: none"> Monitoring results to be presented in the quarterly report to the Lenders. 	<ul style="list-style-type: none"> Quarterly.
					Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor the appropriate disclosure of recruitment policies within PACs. 	<ul style="list-style-type: none"> Once at the start of construction or monthly until policies have been disclosed.
					Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor the appropriate disclosure of staffing requirements within PACs. 	<ul style="list-style-type: none"> Once at the start of construction or monthly until staffing requirements have been disclosed.
					Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor the number of local people hired for the broader Shuakhevi HPP scheme. 	<ul style="list-style-type: none"> Hiring data to be captured under reporting for the broader Shuakhevi HPP scheme.

⁵ Provided by AGL. Email correspondence, April 2017.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
Land Acquisition and Involuntary Resettlement							
Land acquisition	<ul style="list-style-type: none"> Implementation of the LALRP Addendum. 	AGL Land and Social Director	Prior to construction (with ongoing monitoring)	<ul style="list-style-type: none"> LALRP Addendum 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL will undertake LALRP Addendum compliance audits to ensure effective implementation and that overall objectives are met of improving, but at a minimum restoring, the livelihoods and standards of living of economically displaced persons to pre-project levels. 	<ul style="list-style-type: none"> As per LALRP monitoring schedule.
	<ul style="list-style-type: none"> AGL to monitor all land-related grievances. 					<ul style="list-style-type: none"> AGL to monitor the level of awareness regarding the Community Grievance Mechanism. 	<ul style="list-style-type: none"> Ongoing
	<ul style="list-style-type: none"> Implementation of the Community Grievance Mechanism and awareness raising in the PACs. 	AGL CLO	Ongoing	<ul style="list-style-type: none"> Community Grievance Mechanism (35kV OHL SEP) 	Same commitment in Georgian EIA		<ul style="list-style-type: none"> Prior to construction and monitored during stakeholder meetings with the local communities (undertaken at least monthly).
	<ul style="list-style-type: none"> AGL to monitor grievances. 						<ul style="list-style-type: none"> Ongoing
	<ul style="list-style-type: none"> Preparation of a database that details social receptors within 10 m of the clearance zone/SPZ (residential houses, active land plots, any social infrastructure (e.g. cemeteries), cultural heritage sites) with their GPS coordinates and distance in relation to the 35kV OHL and SPZ. These will be mapped along with the lands that are to be permanently and partially impacted by the construction of the 35kV OHL – as defined in the LALRP. 	Contractor	During detailed design	<ul style="list-style-type: none"> LALRP Addendum 	Not included in Georgian EIA	<ul style="list-style-type: none"> Database and mapping to be reviewed by AGL. 	<ul style="list-style-type: none"> Once at the start of construction or monthly until the database and mapping have been suitably prepared.
	<ul style="list-style-type: none"> Realignment of towers 112–113 and 130–132 to maintain the SPZ around the 35kV OHL. 	Contractor and AGL Land and Social Director	Prior to construction	<ul style="list-style-type: none"> Updated routing 	Not included in Georgian EIA	<ul style="list-style-type: none"> Maintenance of a 40m SPZ along the length of the 35kV OHL. 	<ul style="list-style-type: none"> Once prior to construction and until all parties are agreed on the re-routing.
<ul style="list-style-type: none"> Engagement will be undertaken with the residents of the households located closest 	Contractor and AGL CLO	Prior to construction	<ul style="list-style-type: none"> 35KV OHL SEP LALRP Addendum 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL will prepare minutes of all meeting which will be summarised in 	<ul style="list-style-type: none"> Quarterly updates to the SEP. 	

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
	to the 35kV OHL (at a minimum those within 10m of the SPZ) to discuss potential impacts and mitigation and identify their vulnerability status. Additional assessments will be undertaken as required and appropriate mitigation measures defined.					the 35kV OHL SEP and in the quarterly report to the Lenders.	• Quarterly reporting to Lenders.
Land take associated with access route construction/widening	<ul style="list-style-type: none"> Detailed design and appropriate assessment of the access route requirements. 	Contractor, AGL CLO and AGL Land and Social Director	During detailed design	<ul style="list-style-type: none"> LALRP Addendum 35KV OHL SEP 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to review access route alternatives analysis for adequacy. 	• Prior to construction.
	<ul style="list-style-type: none"> Engagement with owners of land that will be affected. 				Not included in Georgian EIA	<ul style="list-style-type: none"> Contractor and AGL to prepare minutes of all meetings. AGL to update the 35KV OHL SEP and issue log, as required. 	<ul style="list-style-type: none"> AGL to review meeting minutes monthly. Quarterly.
	<ul style="list-style-type: none"> All temporary land required for access routes to be secured in accordance with the principles, methodology and entitlement framework established in the Project's LALRP. 				Not included in Georgian EIA	<ul style="list-style-type: none"> The process followed to secure access routes will be reviewed and approved by AGL. 	<ul style="list-style-type: none"> Prior to construction, spot checks during construction, and following completion of the construction works (all access routes will be visited as part of monitoring).
	<ul style="list-style-type: none"> Clean-up and full reinstatement of access routes following construction activities (including appropriate re-vegetation using native plant species) to the pre-existing topography and drainage contours. 	Contractor	End of construction	<ul style="list-style-type: none"> Shuakhevi HPP BAP 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> The success of habitat reinstatement will be monitored by AGL. 	• As per the requirements of the BAP.
Risks to Community Health and Safety							
General risk management	<ul style="list-style-type: none"> Preparation of an Environmental, Health and Safety Plan(s) for the 35kV OHL Project (currently in draft form). This plan will align 	Contractor and AGL CLO	Prior to construction	<ul style="list-style-type: none"> Contractor EHS Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor EHS Plan to be reviewed and approved by AGL prior to construction. 	• Prior to construction.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
	<p>with the H&S plans prepared by AGL for the overall scheme. It will include details regarding community health and safety (focusing on the management of vehicle traffic, worker conduct, security arrangements, awareness raising and stakeholder engagement), Occupational Health and Safety and emergency preparedness and response procedures, which will align with those developed for the overall Shuakhevi HPP scheme. Specifically, the emergency preparedness and response procedures will, at a minimum, cover:</p> <ul style="list-style-type: none"> ○ Road traffic accidents; ○ Natural disasters (e.g. landslides); ○ Spill response; ○ Medical services; ○ Communication systems; and ○ Roles and responsibilities. <ul style="list-style-type: none"> ● Relevant details of the EHS plan will be shared with PACs and workers will be appropriately trained on its implementation. 					<ul style="list-style-type: none"> ● Audit of Contactors EHS Plan and effectiveness of implementation measures. 	<ul style="list-style-type: none"> ● As per the agreed auditing requirements of the EHS plan.
					Not included in Georgian EIA	<ul style="list-style-type: none"> ● AGL to monitor awareness of PACs regarding EHS Plan 	<ul style="list-style-type: none"> ● Prior to construction and monitored during stakeholder engagement meetings with the local communities (undertaken at least monthly).
					Same commitment in Georgian EIA	<ul style="list-style-type: none"> ● The Contractor will provide AGL with details of EHS training undertaken with workers. 	<ul style="list-style-type: none"> ● Training data to be recorded by the Contractor monthly and reported to AGL bi-monthly (every two months).
	<ul style="list-style-type: none"> ● Effective implementation of the measures outlined in the Traffic Management Plan (CEMP07), relevant details of which are contained in Annex N. 	Contractor	During construction	<ul style="list-style-type: none"> ● Traffic Management Plan (CEMP07) [see Annex N] 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> ● The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> ● Daily visual inspections. ● Weekly walkover inspections.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
						<ul style="list-style-type: none"> Records of driver safety training will be provided to AGL. Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS report. EHS Report to AGL. 	<ul style="list-style-type: none"> Prior to construction. As required, but at a minimum monthly. Monthly.
	<ul style="list-style-type: none"> Ongoing engagement with project stakeholders to share information regarding potential H&S risks, inform them about the community grievance mechanism and discuss the effectiveness of mitigation measures. AGL to maintain an effective issues tracker, capturing key issues raised during engagement meetings. 	AGL CLO	Ongoing	<ul style="list-style-type: none"> 35kV OHL SEP AGL Community Grievance Mechanism (35kV OHL SEP) 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor the awareness of PACs regarding potential H&S risks. AGL to monitor the awareness of PACs regarding the community grievance mechanism. AGL to monitoring all grievances related to community health and safety. 	<ul style="list-style-type: none"> Prior to construction and monitored during stakeholder meetings with the local communities (undertaken at least monthly). Ongoing.
	<ul style="list-style-type: none"> Operation and Maintenance (O&M) Plan will be drawn up by the O&M engineers and safety specialists and define safety requirements. Risks of electrocution and tower or cable failure/fall will be included. 	O&M Contractor	Prior to operation	<ul style="list-style-type: none"> Operation and Maintenance (O&M) Plan 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to audit the O&M Plan and effectiveness of implementation. 	<ul style="list-style-type: none"> As per the monitoring requirements of the O&M Plan.
Disturbance Impacts (dust, noise, vibration)	<ul style="list-style-type: none"> Effective implementation of the Project's Construction Management Plan (CEMP00) and sub-plans, particularly CEMP05 (Air Quality Management Plan) and CEMP06 (Noise Management Plan) – the relevant details of which are included in Annexes L and M. 	Contractor	During construction	<ul style="list-style-type: none"> Air Quality Management Plan (CEMP06) [see Annex L]; and Noise Management Plan (CEMP05) [see Annex M] 	Not included in Georgian EIA	The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution.	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
						<ul style="list-style-type: none"> Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS report. AGL to monitor all grievances associated with dust, noise and vibration. EHS Report to AGL. 	<ul style="list-style-type: none"> As required, but at a minimum monthly. Ongoing. Monthly.
	<ul style="list-style-type: none"> Compliance with all regulatory requirements for noise, dust and vibration and alignment with GIIP. 				Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor to undertake monitoring in line with the Environmental Permit received from the Ministry of Environment and Natural Resources Protection of Georgia. 	<ul style="list-style-type: none"> As per the requirements of the Environmental Permit.
Risk of accidents	<ul style="list-style-type: none"> Access to construction sites will be restricted, for example with fences. 	Contractor	During construction	<ul style="list-style-type: none"> Construction Environmental Management Plan (CEMP00) 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
	<ul style="list-style-type: none"> Assessment of access road conditions will be undertaken prior to route finalisation (e.g. to identify baseline traffic flows, distance to social receptors, road conditions [lighting, pavements etc.]) 	Contractor	During construction	<ul style="list-style-type: none"> Construction Environmental Management Plan (CEMP00) 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> The Contractor will consider the quality of the road surface, and construction traffic volumes during final route selection. 	<ul style="list-style-type: none"> Route selection to be agreed with AGL prior to construction.
	<ul style="list-style-type: none"> Maintenance and restoration of road surfaces as necessary. 	Contractor	During and at end of construction	<ul style="list-style-type: none"> Construction Environmental Management Plan (CEMP00) 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL will compare the road surface quality as compared with pre-construction state. AGL to monitor that maintenance and restoration measures have been undertaken sufficiently. 	<ul style="list-style-type: none"> At the start and end of construction. Following maintenance and restoration work.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
				<ul style="list-style-type: none"> Traffic Management Plan (CEMP07) [see Annex N] 			
	<ul style="list-style-type: none"> Effective implementation of the Contractor' Environment, Health and Safety (EHS) Plan (currently in draft form) which includes measures related to road safety. 	Contractor	During construction	<ul style="list-style-type: none"> Contractor's EHS Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to audit the Audit of the H&S Plan(s) and effectiveness of implementation. Any major traffic incidents to be reported to AGL immediately. All incidents to be recorded and reported to AGL in the monthly EHS report. AGL to monitor all grievances associated with risk of accidents. EHS Report to AGL. 	<ul style="list-style-type: none"> As per the auditing requirements of the EHS Plan. As required, but at a minimum monthly. Ongoing. Monthly.
Electric and magnetic field (EMF) impacts	<ul style="list-style-type: none"> Confirmation of EMF levels associated with a 35kV OHL and specifically for those houses closest to the SPZ. 	Contractor	Prior to construction	<ul style="list-style-type: none"> AGL H&S Plans Contractor EHS Plans 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor to review expected EMF levels against ICNIRP guidelines and report to AGL. 	<ul style="list-style-type: none"> Prior to operation.
	<ul style="list-style-type: none"> Average and peak exposures will remain below ICNIRP recommendation for general public exposure. 	Contractor	During operation	<ul style="list-style-type: none"> Operation and Maintenance (O&M) Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor to measure EMF levels at properties within 10m of the SPZ for the 35kV OHL. Based on the results, AGL may continue to undertake spot checks throughout operation, or on receipt of any grievances regarding EMF. 	<ul style="list-style-type: none"> Prior to operation (Contractor). Spot checks during operation (AGL) and as detailed in the O&M plan.
Electrocution risk	<ul style="list-style-type: none"> Appropriate signage will be installed on all towers to warn of the risk. 	Contractor	During operation	<ul style="list-style-type: none"> Operation and Maintenance (O&M) Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor the presence of appropriate signage on each tower. 	<ul style="list-style-type: none"> Prior to operation and then as detailed in the O&M plan.
Tension with local community members	<ul style="list-style-type: none"> All workers will be made aware and trained on the Project's Code of Conduct for workers. 	Contractor	At the start of construction	<ul style="list-style-type: none"> Contractor training and induction planning AGL Code of Conduct 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor to keep records of all training for submission to AGL on request. Contractor to keep records of all disciplinary action reports for submission to AGL on request. 	<ul style="list-style-type: none"> As requested, with a summary of training and any disciplinary actions detailed in the monthly EHS report to AGL.
					Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to review all grievances related to tension with workers. 	<ul style="list-style-type: none"> Ongoing.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
	<ul style="list-style-type: none"> PACs will be informed about the Project's Code of Conduct for workers. 	AGL CLO	Prior to and during construction	<ul style="list-style-type: none"> 35kV OHL SEP 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL will monitor PACs awareness of the Code of Conduct. AGL will monitor that it's information disclosure mechanisms are appropriate (through interviews with PACs), amending as necessary. 	<ul style="list-style-type: none"> Prior to construction and monitored during stakeholder meetings with the local communities (undertaken at least monthly).
	<ul style="list-style-type: none"> Security arrangements will be detailed in the EHS Plan being developed by the Contractor (currently in draft form). Security will be proportionate to the needs. All security personnel will be carefully selected and managed in line with GIIP. Security arrangements will comply with all applicable legal requirements. 	Contractor	Prior to and during construction	<ul style="list-style-type: none"> Contractor EHS Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL will keep records of those at disclosure meetings. These will be captured in the 35kV OHL SEP. 	<ul style="list-style-type: none"> Quarterly updates of the SEP.
						<ul style="list-style-type: none"> Contractor EHS Plan to be reviewed and approved by AGL prior to construction. 	<ul style="list-style-type: none"> Prior to construction.
						<ul style="list-style-type: none"> Security arrangements and protocols to be included in the Contractor EHS Manager's daily visual inspections and weekly walkover inspections (using appropriate checklists). Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
						<ul style="list-style-type: none"> AGL to audit the implementation and effectiveness of the EHS Plan. 	<ul style="list-style-type: none"> As per the auditing requirements of the EHS Plan.
						<ul style="list-style-type: none"> Records of security training will be provided to AGL. 	<ul style="list-style-type: none"> Following delivery of training.
						<ul style="list-style-type: none"> AGL will monitor all grievances related to security arrangements. 	<ul style="list-style-type: none"> Ongoing.
						<ul style="list-style-type: none"> Contractor to keep records of all disciplinary action reports for submission to AGL on request. 	<ul style="list-style-type: none"> As requested, with a summary of any disciplinary actions detailed in the monthly EHS report to AGL.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
Risks to Wellbeing of Workers							
Employment working conditions	Labour policies and procedures will be implemented in accordance with the Project requirements, Georgian law, ILO core standards and Good International Industry Practice (GIIP)	Contractor (construction) AGL (operation)	Throughout construction and operation	<ul style="list-style-type: none"> AGL human resources requirements Labour Grievance Plan (CEMP08) [see Annex O] Worker Code of Conduct Contractor EHS Plan 	Not included in Georgian EIA	<ul style="list-style-type: none"> The Contractor will report on the working conditions for workers and their rights to AGL. This report will include examples of job descriptions, contracts of employment, payments, hours worked, training plans/logs etc.). 	<ul style="list-style-type: none"> At the start of construction and then quarterly.
						<ul style="list-style-type: none"> The Contractor will monitor all grievances related to employment and working conditions. These will be summarised in an issues log, which will be submitted to AGL monthly. Any urgent issues will be discussed immediately. 	<ul style="list-style-type: none"> Ongoing. Monthly issues log.
						<ul style="list-style-type: none"> During operation AGL will report on working conditions of workers for the 35kV OHL in its quarterly report to the Lenders. 	<ul style="list-style-type: none"> Quarterly reporting to Lenders.
Occupational Health and Safety (OHS)	The Contractor will identify all hazards related to the works prior to construction and produce HAZOPs as part of its EHS Plan (currently in draft form). This plan will also detail measures to protect Occupational, Health and Safety (OHS). Key topics covered will include: working at height, manual handling, driving risk, contact with hazardous material, PPE, electrocution risk, dust, noise and vibration. Any OHS training required for workers will be detailed in the plan, along with relevant monitoring and reporting requirements.	Contractor	Prior to construction	<ul style="list-style-type: none"> Contractor HAZOPs Contractor EHS Plan; Labour Grievance Plan (CEMP08) [see Annex O]; Noise Management Plan (CEMP05) [see Annex M]; Air Quality Management Plan (CEMP06) [see Annex L]. 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Contractor EHS Plan to be reviewed and approved by AGL prior to construction. 	<ul style="list-style-type: none"> Prior to construction.
						<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
						<ul style="list-style-type: none"> The Contractor (construction) and AGL (operation) will monitor occupational health and safety performance against 	<ul style="list-style-type: none"> Details of this monitoring will be provided in the

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
	These will be reviewed by AGL to confirm alignment with GIIP ⁶ and the Project's EHS requirements.					internationally published exposure guidelines such as the Indicative Occupational Exposure Limit Values published by European Union member states ⁷ and the ICNIRP exposure limits for occupational exposure to electric and magnetic fields. ⁸ This will include noise and air quality exposure limits.	Contractors monthly EHS report to AGL.
						<ul style="list-style-type: none"> AGL to audit the implementation and effectiveness of the EHS Plan. This will include spot checks on the awareness of emergency response processes amongst workers. 	<ul style="list-style-type: none"> As per the auditing requirements of the EHS Plan.
						<ul style="list-style-type: none"> Any major OHS incidents or accidents to be reported to AGL immediately. All incidents and accidents to be logged and reported to AGL in the monthly EHS report. 	<ul style="list-style-type: none"> As required, but at a minimum monthly.
						<ul style="list-style-type: none"> The Contractor will monitor all grievances related to OHS, as per the requirements of CEMP08 [see Annex O]. These will be summarised in an issues log, which will be submitted to AGL monthly. Any urgent issues will be discussed immediately. 	<ul style="list-style-type: none"> Ongoing. Monthly issues log.
						<ul style="list-style-type: none"> Contractor to undertake OHS monitoring in line with the Environmental Permit received from the Ministry of Environment and Natural Resources Protection of Georgia. 	<ul style="list-style-type: none"> As per the requirements of the Environmental Permit.

⁶ Such as those outlined in the World Bank Group (2007) *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*.

⁷ Available at: http://europe.osha.eu.int/good_practice/risks/ds/oel/ Cited in, World Bank Group (2007) *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*.

⁸ ICNIRP (1998) Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). Cited in, World Bank Group (2007) *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*.

Potential Impacts	Mitigation/ Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
Cultural Heritage							
Damage to cultural monuments	During detailed design, stakeholder engagement will be undertaken to establish whether there are any unique natural features or tangible objects that embody cultural values for PACs. Micro-siting or slight route realignment may be required should such features be identified.	AGL CLO	Prior to construction	<ul style="list-style-type: none"> Community Grievance Mechanism (35kV OHL SEP) 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to prepare minutes of all meetings and report on any cultural heritage resources that need careful consideration during construction. These will be discussed with the Contractor with the plan for construction adjusted, should it be necessary. Any such changes will be discussed with the Lenders and captured in AGL's quarterly report. 	<ul style="list-style-type: none"> Quarterly reporting to Lenders.
						<ul style="list-style-type: none"> AGL to monitoring all grievances related to cultural heritage. 	<ul style="list-style-type: none"> Ongoing.
	A memo will be produced detailing all above ground archaeological and historical remains within 250m of construction activities, detailing required mitigation.	Contractor	Prior to construction	<ul style="list-style-type: none"> Chance Finds Procedure (CEMP01) [see Annex J]. 	Not included in Georgian EIA	<ul style="list-style-type: none"> Memos to be reviewed and approved by AGL. 	<ul style="list-style-type: none"> Prior to construction.
						<ul style="list-style-type: none"> The Contractor will monitor all identified assets weekly to ensure implementation of agreed mitigation. Cultural heritage monitoring reports will be sent to AGL monthly. 	<ul style="list-style-type: none"> Weekly monitoring and monthly reporting to AGL.
	An archaeological watching brief will be in place for any previously undiscovered, buried cultural remains. This will be carried out by a suitably qualified person who will oversee all excavation or earthworks during the construction phase. They will: <ul style="list-style-type: none"> look out for burned or blackened material, brick or tile fragments, coins, pottery or bone fragments, skeletons, timber joists or post holes, brick or stone foundations or in-filled ditches during excavations; inform Contractor Supervisor and/or Environmental Officer of any archaeological chance find; and 	Archaeologist contracted by Contractor	Throughout construction	<ul style="list-style-type: none"> Chance Finds Procedure (CEMP01) [see Annex J]. 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Weekly site walkover by the Contractor's archaeologist to check no chance finds have been discovered but not reported. 	<ul style="list-style-type: none"> Weekly.
						<ul style="list-style-type: none"> Checks by the Contractor's archaeologist to confirm that chance finds have been delivered to AGL and to external institutes, as required. 	<ul style="list-style-type: none"> Following a find.
						<ul style="list-style-type: none"> Contractor's archaeologist to submit Chance Finds report to AGL and copy held on site. 	<ul style="list-style-type: none"> To be submitted within a day of discovery of find.
						<ul style="list-style-type: none"> AGL to submit Chance Finds report to Archaeology Authority and file a copy at the Project Office. 	<ul style="list-style-type: none"> To be submitted immediately on receipt of chance finds report from Contractor.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁵	Performance Indicators, Monitoring and Reporting	Timing or Frequency of Monitoring
	<ul style="list-style-type: none"> call on the guidance of an archaeologist where there is any uncertainty. <p>If in the event that an archaeological find is found, the chance finds procedure outlined in Annex J will be followed.</p>						

8.4 The Project and the Environment

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
Geology, Landslides and Seismic Risks							
Landslide Risk	Works to be implemented in line with the Project CEMPs.	Contractor	Throughout construction	<ul style="list-style-type: none"> Contractor method statements. Construction Environmental Management Plan (CEMP00) Erosion and Sediment Control Plan (CEMP10) [see Annex Q]. 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to review the Contractor's construction method statements to confirm good engineering practices and the principles of CEMP00 are included. AGL to monitor that good engineering practice and the principles of CEMP00 are being demonstrated Monitoring results to be presented in the quarterly report for the Lenders. 	<ul style="list-style-type: none"> Prior to construction. Monthly Quarterly.
	Landslide risks will be discussed with local communities during engagement meetings to raise awareness.	AGL CLO	During construction	<ul style="list-style-type: none"> 35kV OHL SEP AGL H&S Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to record all discussions in meeting minutes, which will include lists of attendees, the dates and locations of meetings. A summary of the discussions will be included in the quarterly report to the Lenders. AGL to monitoring all grievances related to landslide risk. 	<ul style="list-style-type: none"> Quarterly reporting to Lenders. Ongoing.

⁹ Provided by AGL. Email correspondence, April 2017.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
	Observations of micro seismicity	Contractor	Until end of detailed design	• Construction Management Plan (CEMP00)	Same commitment in Georgian EIA plus a requirement to develop a plan of mitigation for geodynamic processes for submission to the Ministry of Environment of Georgia.	<ul style="list-style-type: none"> Contractor to provide an analysis report of any seismic events impacting the OHL corridor to AGL. Contractor to develop a plan of mitigation for geodynamic processes for submission to the Ministry of Environment of Georgia. 	<ul style="list-style-type: none"> Directly following any seismic events. Prior to construction.
	Landscape restoration in the areas close to the towers and as required along new/widened access routes.	Contractor	End of construction	• Shuakhevi HPP BAP	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL to monitor that restoration measures have been undertaken sufficiently, as detailed in the BAP. 	<ul style="list-style-type: none"> As per BAP requirements (see Table 6.6).
	Water Resources Management						
Decreased water quality (e.g. due to sediment release or accidental spills)	Effective implementation of the measures detailed in CEMP10 (see Annex Q) and CEMP11 (see Annex R). All staff will be appropriately trained in spill prevention and response measures.	Contractor	Prior to and during construction	<ul style="list-style-type: none"> Contractor method statements Erosion and Sediment Control Plan (CEMP10) – see Annex Q Water Quality and Water Resources Management Plan (CEMP11) – see Annex R Contractor EHS Plan 	Not included in Georgian EIA	<ul style="list-style-type: none"> AGL to review the Contractor’s construction method statements to confirm good engineering practices and the principles of CEMP00 are included. 	<ul style="list-style-type: none"> Prior to construction.
						<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
						<ul style="list-style-type: none"> Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS report. 	<ul style="list-style-type: none"> As required, but at a minimum monthly.
						<ul style="list-style-type: none"> AGL to monitor all grievances related to water resources. 	<ul style="list-style-type: none"> Ongoing.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
	The Contractor's EHS Plan will include details regarding emergency preparedness and response procedures, which will align with those developed for the overall Shuakhevi HPP scheme.	Contractor	During construction		Not included in Georgian EIA	<ul style="list-style-type: none"> The Contractor will provide details of training provided to workers. 	<ul style="list-style-type: none"> Training data to be recorded by the Contractor monthly and reported to AGL bi-monthly (every two months).
						<ul style="list-style-type: none"> Monitoring results to be presented in the quarterly report to the Lenders. 	<ul style="list-style-type: none"> Quarterly.
						<ul style="list-style-type: none"> Contractor EHS Plan to be reviewed and approved by AGL prior to construction. 	<ul style="list-style-type: none"> Prior to construction.
						<ul style="list-style-type: none"> Audit of Contractors EHS Plan and effectiveness of implementation measures. EHS Report to AGL. 	<ul style="list-style-type: none"> As per audit requirements of OHS Plan. Monthly.
Decreased water quality	Water quality management procedures during operation will be detailed in the Operation and Maintenance (O&M) Plan.	O&M Contractor	Prior to operation	<ul style="list-style-type: none"> O&M Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> AGL responsible for auditing water quality management practices and effectiveness of the O&M Plan. 	<ul style="list-style-type: none"> As per audit requirements of O&M Plan.
Materials and Waste Management							
Contamination, fugitive emissions or visual amenity impacts due to poor waste handling and storage arrangements. Increased landfill.	Effective implementation of the measures detailed in the Waste Management Plan (CEMP09) [see Annex P]; the Traffic Management Plan (CEMP07) [see Annex N]; and the Spill Prevention and Chemicals Storage Plan (CEMP04) [see Annex K].	Contractor	Prior to and during construction	<ul style="list-style-type: none"> Contractor method statements Waste Management Plan (CEMP09) [see Annex P] Traffic Management Plan (CEMP07) [see Annex N] Spill Prevention and Chemicals 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
					Same commitment in Georgian EIA	The Contractor will monitor that there:	<ul style="list-style-type: none"> Ongoing throughout

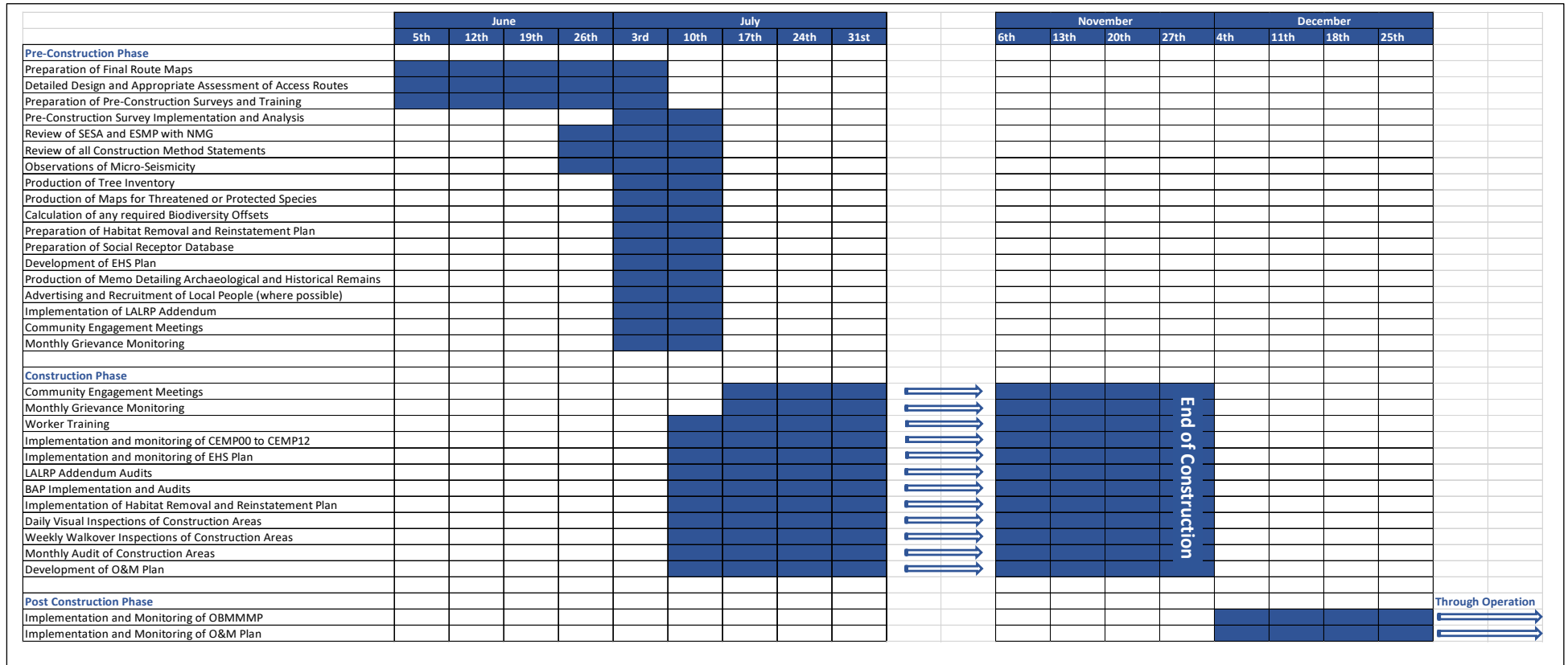
Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
				Storage Plan (CEMP04) [see Annex K]		<ul style="list-style-type: none"> ▪ is a clear waste tracking mechanism to track waste consignments from the originating location to the final waste treatment and disposal location; ▪ are inspections of the waste disposal sites used by the Project to confirm they meet applicable national and international requirements; ▪ is a review of waste management practices so that any identified improvements can be made; ▪ is a register of waste volumes generated and an indication of the final disposal option for each waste type, by volume; ▪ is effective re-use of materials (such as spoil) wherever possible. <p>Top soil storage will also be carefully monitored at pre-selected sites, with soil embankments no more than 2 meters high.</p>	construction and reported in monthly EHS report.
						<ul style="list-style-type: none"> • Monthly monitoring of site waste records, including waste registers and waste transfer notes will be undertaken by the Contractor and AGL to confirm all appropriate documentation is in place. 	• Monthly.
						<ul style="list-style-type: none"> • Sites for permanent spoil disposal will be assessed by AGL for their appropriateness. The assessment results will be detailed in a short memo, which will detail how the project's E&S requirements (and those of the lenders) are to be met. 	• Prior to construction.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
						<ul style="list-style-type: none"> Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS report. 	As required, but at a minimum monthly.
						<ul style="list-style-type: none"> AGL to monitor all grievances related to materials and waste management. 	Ongoing.
						<ul style="list-style-type: none"> Contractor's EHS Report to AGL. 	Monthly.
						<ul style="list-style-type: none"> Monitoring results to be presented in the quarterly report to the Lenders. 	Quarterly.
	Waste management procedures during operation will be detailed in the Operation and Maintenance (O&M) Plan.	O&M Contractor	Prior to operation	<ul style="list-style-type: none"> O&M Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Audit of waste management practices and effectiveness of the O&M Plan. 	As per audit requirements of the O&M Plan.
Noise and Vibration							
Noise impacts	Effective implementation of the measures detailed in the Noise Management Plan (CEMP06) [see Annex M].	Contractor	Prior to and during construction	<ul style="list-style-type: none"> Noise Management Plan (CEMP06) [see Annex M]. Traffic Management Plan (CEMP07) [see Annex N]. 	Not specifically included in Georgian EIA, but there is a requirement to monitor against the threshold values prescribed in the sanitary norms of national legislation (as listed in Annex M). It is required that noise measurements are taken in residential areas the week before construction and in response to any complaints.	<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively. Any non-compliances will be recorded and escalated as necessary for resolution. AGL to conduct noise monitoring at the nearest residential receptors (for comparison against the required standards) and in response to any complaints. Details to be included in Contractor's EHS report to AGL. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections. At the start of construction to confirm that required noise levels are being achieved. Subsequently, as required, in response to any complaints.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
						<ul style="list-style-type: none"> Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS report. 	<ul style="list-style-type: none"> As required but at a minimum, monthly.
						<ul style="list-style-type: none"> AGL to monitor all grievances related to noise and vibration 	<ul style="list-style-type: none"> Ongoing.
						<ul style="list-style-type: none"> Contractor's EHS Report to AGL. 	<ul style="list-style-type: none"> Monthly.
						<ul style="list-style-type: none"> Monitoring results to be presented in the quarterly report to the Lenders. 	<ul style="list-style-type: none"> Quarterly.
	Noise management procedures during operation will be detailed in the Operation and Maintenance (O&M) Plan.	O&M Contractor	Prior to operation	<ul style="list-style-type: none"> O&M Plan 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> Audit of noise management practices and effectiveness of the O&M Plan. 	<ul style="list-style-type: none"> As per requirements of O&M Plan.
Air Quality							
Decreased air quality	Effective implementation of the measures detailed in the Air Quality Management Plan (CEMP05) [see Annex L].	Contractor	Prior to construction	<ul style="list-style-type: none"> Air Quality Management Plan (CEMP05) [see Annex L] Traffic Management Plan (CEMP07) [see Annex N] 	Not included in Georgian EIA	<ul style="list-style-type: none"> The Contractor EHS Manager will undertake daily visual inspections of the construction sites, which will be recorded in a diary. Weekly walkover inspections will also be undertaken of the construction activities. Inspection checklists will be used to assess whether the relevant measures in the CEMPs are being implemented effectively (e.g. visual checks of construction vehicles). Any non-compliances will be recorded and escalated as necessary for resolution. 	<ul style="list-style-type: none"> Daily visual inspections. Weekly walkover inspections.
						<ul style="list-style-type: none"> Any major incidents will be reported to AGL immediately. All incidents to be recorded and reported in the monthly EHS Report. 	<ul style="list-style-type: none"> As required, but at a minimum monthly.
						<ul style="list-style-type: none"> AGL to monitor all grievances related to air quality. 	<ul style="list-style-type: none"> Ongoing.
						<ul style="list-style-type: none"> Contractor's EHS Report to AGL. 	<ul style="list-style-type: none"> Monthly.
						<ul style="list-style-type: none"> Monitoring results to be presented in the quarterly report to the Lenders. 	<ul style="list-style-type: none"> Quarterly.

Potential Impacts	Mitigation/Enhancement	Responsibility	Timescales	Implementation Route/Plan	Georgian Permitting Requirements ⁹	Monitoring and Reporting	Timing or Frequency of Monitoring
Greenhouse Gas Emissions	Effective implementation of the Air Quality Management Plan (CEMP05) [see Annex L], Waste Management Plan (CEMP09) [see Annex P] and Traffic Management Plan (CEMP07) [see Annex N].	Contractor	During construction	<ul style="list-style-type: none"> • Air Quality Management Plan (CEMP05) [see Annex L] • Waste Management Plan (CEMP09) [see Annex P] • Traffic Management Plan (CEMP07) [see Annex N] 	Not included in Georgian EIA	<ul style="list-style-type: none"> • The Contractor will monitor/report the following with regards to GHG emissions and provide details in the monthly EHS Report to AGL: <ul style="list-style-type: none"> ▪ The source of materials listed in the materials inventory; ▪ Records of plant maintenance and fuel consumption; and ▪ Staff vehicle movements. 	• Monthly.
	Reinstatement of forest to replace that lost during construction.	Contractor	Construction and Operation	<ul style="list-style-type: none"> • Shuakhevi HPP BAP • Operational Biodiversity Mitigation, Management and Monitoring Plan (OBMMMP) 	Not included in Georgian EIA	<ul style="list-style-type: none"> • Monitoring in line with the requirements of the BAP (see Table 6.6) and OBMMMP. 	• As per the requirements of the BAP (see Table 6.6) and OBMMMP.
Decreased air quality	Air quality management procedures during operation will be detailed in the Operation and Maintenance (O&M) Plan.	O&M Contractor	Prior to operation	<ul style="list-style-type: none"> • O&M Plan 	Not included in Georgian EIA	<ul style="list-style-type: none"> • Audit of air quality management practices and effectiveness of the O&M Plan. 	• As per the requirements of the O&M Plan.
Landscape and Visual Amenity							
Decreased landscape and visual amenity	Clearing of vegetation around construction sites and new access roads to be minimised	Contractor	During construction	<ul style="list-style-type: none"> • Shuakhevi HPP BAP 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> • AGL to undertake visual checks of construction areas. 	• As per the requirements of the BAP (see Table 6.6).
	Landscape restoration in the areas close to the towers and new/widened access roads.	Contractor	End of construction	<ul style="list-style-type: none"> • Operational Biodiversity Mitigation, Management and Monitoring Plan (OBMMMP) 	Same commitment in Georgian EIA	<ul style="list-style-type: none"> • Annual survey of re-forestation and re-vegetation. 	• As per the requirements of the O&M Plan.

Figure 8.2 Implementation Schedule



Source: AGL

8.5 Summary of Key Monitoring and Reporting Requirements

Table 8.6 provides an overview of the main monitoring and reporting requirements for the 35kV OHL, along with associated responsibilities.

Table 8.6 Key Reporting Requirements

Aspect	Frequency	Responsibility	Reporting
Daily site walkover inspection of construction activities.	Daily	Contractor	Record in diary, complete environmental register or incident report in the event of non-compliance and implement appropriate actions that need to be undertaken.
Weekly site walkover inspection of construction activities.	Weekly	Contractor	Completed site inspection checklist(s), any non-compliance issues elevated to AGL. Complete incident report in the event of non-compliance and implement appropriate actions that need to be undertaken.
Topic specific monitoring.	As per Table 8.1		Summarised in the Contractor's monthly report to AGL and AGL's quarterly report to the Lenders.
Contractor EHS reporting to AGL.	Monthly	Contractor	Monthly EHS Report to AGL's COO.
Contractor/AGL EHS reporting to the Ministry of Environment, Georgia	As per the requirements of the Environmental Permit.		
AGL EHS reporting requirements to Lenders.	Quarterly	AGL	Submission of quarterly reports.

8.6 Indicative Monitoring Budget

The indicative budget for construction and post-construction monitoring (up to two years) has been estimated by AGL as approximately US\$130,000. The budget items are largely AGL direct costs and summarised in Table 8.7. The majority of the Contractor's ESMP commitments are accounted for in the existing construction budget for the 35kV OHL and therefore not included here.

The indicative monitoring budget has been prepared based on the current information available to AGL. It is expected that the costs associated with some measures may change, with it possible that budgets allocated may be either under or over-estimated. AGL will review the budget quarterly during construction and six-monthly during operation. Any significant budget amendments will be discussed and agreed internally, and with the Lender group, as required.

Table 8.7 Indicative Monitoring Budget

Item N ^o	Activities	Budget Calculation	Cost (US\$)	Sub-Totals
1	Pre-Construction Phase			
1a	ESMP/SESA Preparation		21,000	
1b	Pre-construction ecological survey supervision and training		20,000	
1c	Pre-construction ecological survey		15,000	
1d	AGL staff support time		19,000	
				75,000
2	Construction Phase (6 months)			
2a	Monitoring	5 working days per month @ average \$100/day	3,000	
2b	Additional specialist support	2 working days per month @ average \$1000/day	12,000	
2c	Additional mitigation (if necessary)		25,000	
				40,000
3	Post-Construction (up to 2 years)			
3a	Monitoring	2 working days per month @ average \$100/day	4,800	
3b	Additional mitigation (if necessary)		10,000	
				14,800
			TOTAL	129,800

Source: AGL

9. Conclusion

As an associated facility of the Shuakhevi HPP, the 35kV OHL is an important element in supporting increased renewable energy development in Georgia. Benefits of the overall HPP scheme include energy provision, the improvement of regional infrastructure and some employment. Such impacts would be positive for communities affected by the 35kV OHL, but likely to be marginal considering the small-scale nature of the OHL's construction, relative to the overall scheme.

Environmental and social impacts arising as a result of the 35kV OHL Project will be managed within the framework developed for the main Shuakhevi HPP scheme, which has been designed to meet Georgian regulatory requirements and align with Good International Industry Practice (GIIP).¹ The Contractor will implement the Project's CEMPs (CEMP00 to CEMP12) and finalise the Environmental, Health and Safety (EHS) Plan (currently in draft) prior to construction. The EHS Plan will incorporate relevant measures regarding Emergency Preparedness and Response, and Health and Safety,² in line with the measures outlined in this ESMP (Section 8). It has been assessed that effective implementation of the measures described will largely manage the environmental and social impacts resulting from the 35kV OHL, so that they are not significant. However, there are some potential impacts requiring specific focus and careful management, to ensure residual impacts are reduced to an appropriate level.

Land acquisition and the loss of assets are key social impacts associated with the 35kV OHL. They are being managed through the addendum to the LALRP for the Project, which has the objectives of improving, but at a minimum restoring, the livelihoods and standards of living of economically displaced persons to pre-project levels. The E&S assessments for the 35kV OHL determined that following effective implementation of the LALRP, impacts associated with land acquisition will be reduced to an appropriate level. It will be important that effective engagement continues with PAPs, particularly those closest to the 35kV OHL corridor, so that they are kept informed about project progress and any issues/queries are appropriately managed. There continues to be some slight realignment of the 35kV OHL to ensure that there are no properties within the SPZ for the OHL.

Overall, the selected route has been assessed as having less ecological impact than the others considered, because less vegetation clearance is required. The forest habitats in the 35kV OHL corridor do, however, support a high diversity of plant and animal species, of which some are protected and/or endemic to the region. Critical habitat criteria were triggered during assessment of the overall Shuakhevi HPP scheme and whilst the biodiversity features identified as meeting the threshold for critical habitat were not identified within the 35kV OHL corridor, a precautionary approach needs to be taken. Pre-construction botanical/habitat surveys will be undertaken in the vegetation clearance zone³ of the 35kV OHL to identify and map any areas of high conservation value that will be impacted and to ensure habitat losses are avoided or minimised as far as possible (through micro-siting), with no net loss of natural habitat.⁴ The habitat maps and tree inventories produced from these surveys will support the calculations of habitat loss and subsequent monitoring of habitat reinstatement that are required by the Project. The BAP for the overall scheme will be updated to include relevant information for the 35kV OHL. The E&S assessments for the 35kV OHL determined that following effective implementation of the (updated) BAP, impacts on biodiversity will be reduced to an appropriate level.

An Operation and Maintenance (O&M) Plan will be developed for the 35KV OHL Project to manage impacts during operation. The E&S assessments for the OHL determined that operational impacts can be adequately managed with the effective development and implementation of this Plan. There will be a

¹ Specifically, the IFC Performance Standards (2012), European Bank of Reconstruction and Development (EBRD) Performance Requirements (2014) and Asian Development Bank (ADB) Safeguard Requirements (2009).

² This will include the development of a Security Plan.

³ This will include the areas cleared for access route construction/widening.

⁴ The ESIA surveys for the 35kV OHL did not cover the whole corridor of the OHL and did not spatially identify the location of habitats within this zone.

focus on the health and safety aspects of the operating line (e.g. risks of electrocution) and monitoring of ecological impacts (such as bird and bat collisions) to measure the effectiveness of design and mitigation measures.

In line with good practice, the mitigation and management measures committed to for the 35kV OHL, will need to be reviewed as the project progresses. Management measures will be adaptive, responding to any uncertainty and the results of further assessment and monitoring, to ensure that they achieve the desired outcomes.