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1 INTRODUCTION

This Environmental and Social Impact Assessment (ESIA) is for the Amulsar Gold Project (the Project), which is located in the Republic of Armenia (RA). This version (ESIAv10) is an update to the ESIA completed in April 2015 and subsequently publicly disclosed in Armenia and made available for consultation on the Lydian and Geoteam websites. The ESIA contains the detailed reporting of the studies completed for the proposed mining of gold reserves, in three ore resources known as Artavazdes, Tigranes and Erato located on Amulsar Mountain. The ESIAv10 also provides a detailed assessment of operations associated with gold mining, including mine waste management, mineral handling, heap leaching, precious metal extraction and ancillary activities that are required to produce gold-silver doré. These combined activities comprise the Project and correspond to those defined in the Technical Report Amulsar Value Engineering and Optimization[1] (TR), prepared by Lydian International (Lydian), published November 2015. This ESIA(v10) should be read in conjunction with the TR[1] for a full and detailed appreciation of the technical, engineering and processing operations that comprise the Project. Chapter 20 of the TR (Environmental & Social Review) was based on ESIAv9f, plus a summary of the predicted potential impacts and mitigation measures, which were considered at the time of publication (of the TR), to be the main outcomes of the VE design.

Subsequent to the publication of the TR, the ESIA, v9f, has also been subject to review by independent engineers (Knight Piésold)[2], together with comments received following a review of the ESIA by specialist advisors from the International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD). The updated ESIA prepared as ESIAv10draft (January, 2016) has also been independently reviewed by Knight Piésold (IESC), together with analysis by specialist advisors on behalf of IFC and EBRD. The review process included a design workshop during which the VE design changes were discussed in the context of environmental and social impacts. The combined assessment that includes the outcome of the VE, combined with comments, review and requests for additional information are now reported in this ESIAv10.

[1] NI 43-101 Technical Report - Amulsar Value Engineering and Optimization, November 2015
[2] Independent review of the Amulsar Project environmental and social impact assessment, Knight Piésold and Co., October 2014.

Subsequent to the review and in accordance with terms of reference developed by Project sponsors, an assessment of the socio-economic impacts resulting from influx of workers during the two year period required for construction of the mine has been undertaken. This assessment has been prepared as an additional chapter to the ESIAv10 (Chapter 6.21) and augments the analysis in the previous chapters of the ESIA (see Chapters 6.14 to 6.18).

A parallel process of review has been undertaken with respect to the in country EIA and permitting requirements for the development of the mine and ancillary processes. Consultation responses have been reviewed and additional information has been included in ESIAv10.

As a consequence of the foregoing, it should be noted that Chapter 20 of the TR no longer accurately documents of the Environmental and Social Impacts reported in ESIAv10, and updated summary of this Chapter has been included in Appendix 1.4 and should be referred to in the context of the scope of the TR.

The ESIA conforms to the requirements of both the IFC Performance Standards and the EBRD Performance Requirements, together with the requirements identified in the Equator Principles (see Chapter 2). In addition, Lydian has prepared Environmental Impact Assessments (EIAs) for relevant aspects of the development to comply with legislation in the RA and as noted in previous paragraphs consultation obtained during this process have been considered in the ESIAv10.

The ESIA is compliant with the abovementioned international standards and comprises the following documents:

- **Non-Technical Summary**
  This is a separate report that provides a summary of information on the Project and the salient outcomes of the ESIA process, written in a non-technical style.
- **Environmental and Social Impact Assessment**
  - Chapter 1: Introduction to the ESIA.
  - Chapter 2: An analysis of the national and international policy, legal and administrative framework applicable to the Project. This includes project compliance targets as applicable.
  - Chapter 3: The Project description, which considers the components of

construction, operation, closure and post closure which are the subject of this ESIA.

- Chapter 4: An analysis of the baseline data, describing the environmental, socio-economic and human factors against which the Project plans (summarised in Chapter 3) have been assessed (in Chapter 6). The baseline topics also include an analysis of the climate, geology, seismicity and the approach to stakeholder engagement.
- Chapter 5: A review of alternatives for both the location of various Project facilities and options for mining and processing of the ore, taking into account regulatory, environmental, biodiversity, cultural heritage, social, economic, and community health and safety issues.
- Chapter 6: Identification and assessment of the potential environmental and social impacts associated with Project construction, operation, mine closure and reclamation. The assessment considers the geographical, ecological, environmental, social and temporal aspects of the Project. Mitigation measures, incorporated into the detailed design of the Project, are defined and explained. The impact assessment has considered the following aspects:
  - *Environmental:*
    - Greenhouse gas emissions and climate change;
    - Landscape and visual resources;
    - Air quality;
    - Noise and vibration;
    - Soils and landcover;
    - Groundwater resources
    - Surface water resources; and
    - Biodiversity.
  - *Social:*
    - Demographics;
    - Economics;
    - Labour and working conditions;
    - Land use, agriculture and natural resources;

- Livelihoods;
- Cultural heritage
- Community Health, Safety and Security;
- Transport;
- Ecosystems Services;
- Workers Accommodation Assessment

▪ *Summary*

- Summary of potential impacts, mitigation and residual effects.

o Chapter 7: Analysis of the potential cumulative impacts (both environmental and social) over the life of the Project.

Note: All appendices are contained on CD. The figures for each Chapter are contained within the body of the text with the exception of Chapter 6.5 (Landscape and visual resources). It is necessary for these figures to be viewed on flat unfolded paper, therefore they are contained within a separate A3 folder together with a copy of all the A3 figures presented in the ESIA.

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

Chapter 8 contains the ESMP and identifies the policies and procedures that will be adhered to by Lydian, Geoteam and all contractors engaged for the Project. The ESMP contains the methods and management required to deliver the environmental and social mitigation measures that have been defined in the ESIA.

The ESMP contains the management plans that apply to the life cycle of the Project. The management plans incorporate and define the implementation of mitigation measures required during the construction, operation and mine closure phases of the Project. The plans articulate the management systems and procedures to address health, safety, environmental and social risks.

The ESMP includes an ESIA Commitments Register (CR), which form the basis of developing performance related conditions and the overall management document adhered to throughout the Project.

A Stakeholder Engagement Plan (SEP) and Community Development Plan (CDP) have been in operation throughout the preparation of the ESIA and will continue to be

maintained and monitored through the construction, operation closure and post closure phases of the Project. These plans will continue to form an integral component of the ESMP, which is a live document designed to be responsive to the requirements of each phase of the Project.

The principal organisations and individuals responsible for writing and compiling the ESIA are listed in Appendix 1.1.

1.1 Project Location and Setting

The Project is located in central south-east Armenia approximately 170km from Yerevan (see Figure 1.1). The proven resources of precious metals have been officially registered in the Vayots Dzor Marz of Armenia, in the South Caucasus. The Project footprint is located within the rectangle bounded by the coordinates: 39.7824° North, 45.6108° East and 39.7210° North, 45.7416° East (Figure 1.2). Although the gold-silver resource is registered in Vayots Dzor Marz, some infrastructure will be located within Syunik Marz, including parts of Artavazdes, Tigranes and Erato open pits and the Barren Rock Storage Facility (BRSF).

The proven gold ore deposits have been defined on the ridge peaks in the region of Amulsar Mountain, within the Northern Zangezur mountain chain at an altitude of between 2,500 and 2,988 metres above sea level (masl). The TR, in summary, reports that measured gold reserves are 1.9M toz combined with a silver reserve of 8.8M toz, which would be extracted using open pit mining techniques over a period of 10 years, following a 2 year construction period[3]. The wider area is characterised by mountains, undulating hills, river valleys and gently inclined plateaus at lower elevations. Surface water run-off from the slopes of the Project-affected area contributes to the catchments of the Arpa, Darb and Vorotan rivers. The Vorotan River flows to the east of the Project and the Darb River flows to the south of the Project, and joins the Arpa River flowing west. The land within the Project-affected area is characterised by sub-alpine and mountain meadow landscape which typically supports grasslands used for summer grazing. At lower elevations agricultural use is more diverse and supports a range of crops.

Regional climate variation within RA is pronounced, with the foothills at lower altitudes

[3] Ibid. 1

having longer and hotter summers, averaging around 25°C, and winter temperatures at an average of -5°C compared to the average of -12°C which can be recorded in the mountains. Annual rainfall is also influenced by the mountains and more rainfall is experienced at higher elevations; an average of approximately 800mm of rainfall per year would be typical for Amulsar (elevation of up to 3000 masl). Snow cover is present on the mountain in the period November to April and can exceed a depth of 3m, depending on weather conditions.

The Project-affected area straddles Vayots Dzor Marz (the capital of which is Yeghegnadzor) and Syunik Marz (the capital of which is Kapan). The closest town to the Project is Jermuk, which is situated approximately 10 km northwest from the gold-silver ore deposit and 7 km from the closest piece of Project infrastructure (Figure 1.2). There are four rural communities in proximity to the Project, namely: Kechut (a rural community associated with the town of Jermuk), Saravan (including Saralanj and Ughedzor) and Gndevaz in Vayots Dzor Marz; and Gorayk, located in Syunik Marz. Gndevaz is the community closest to the footprint of infrastructure associated with the Project, which is the Heap Leach Facility (HLF) located at a distance of > 1 km from the outer edge of the village (see Figure 1.2).

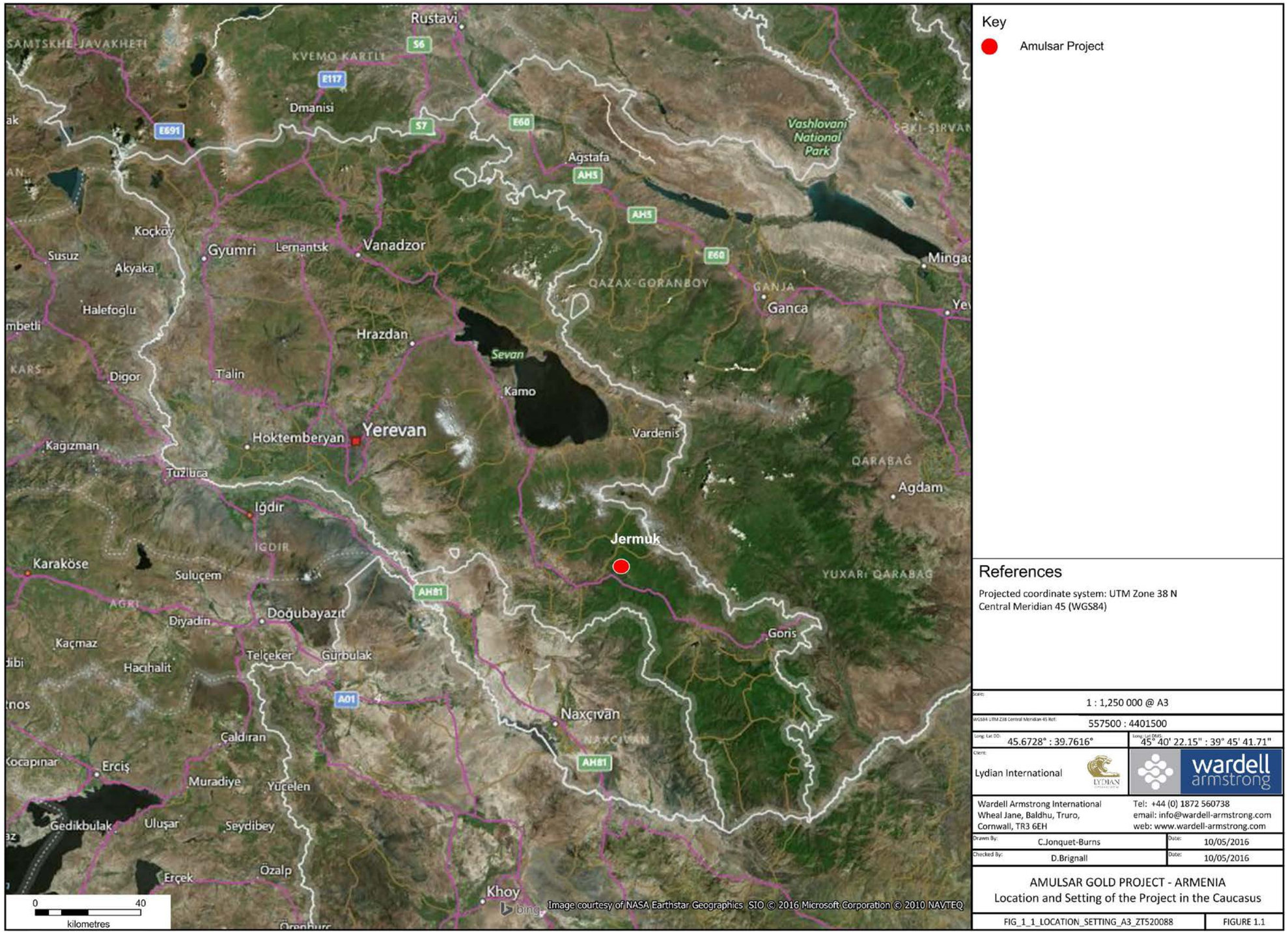

Figure 1.1: Location and Setting of the Project in the Caucasus

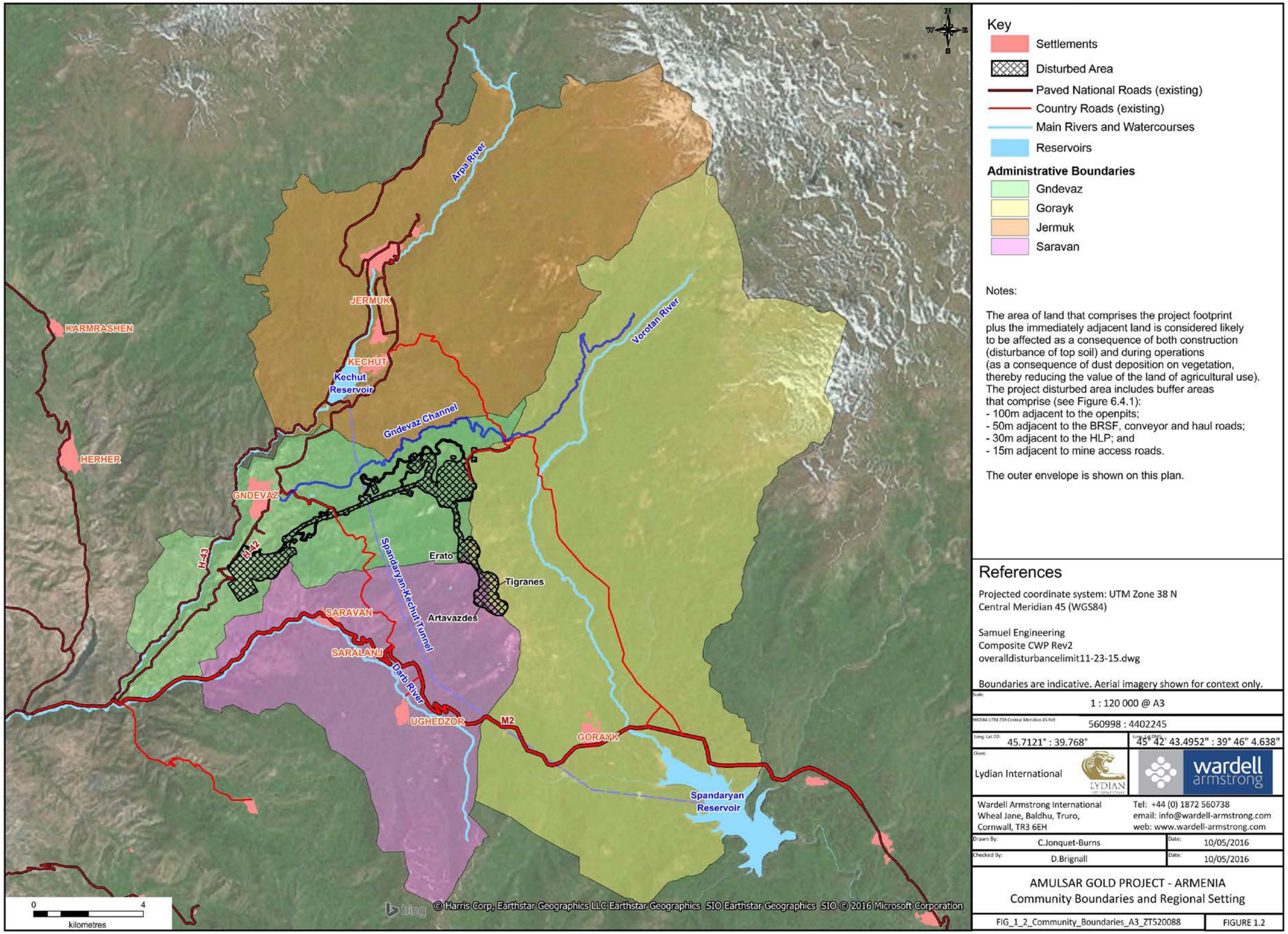

Figure 1.2: Community Boundaries and Regional Setting

1.2 Scope and Objectives of the ESIA

1.2.1 Overview of the Project

The details of the geology, the extent and characteristics of the Artavazdes, Tigranes and Erato ore bodies, together with the mining methods proposed for the extraction of ore are described in Chapter 3 of the ESIA. More details of the Project are contained in the TR[4].

The Amulsar deposits will be extracted using conventional open pit mining methods using a phased sequence of extraction commencing with Artavazdes, progressing to Tigranes and in a separate open pit, the Erato ore body (Figure 3.1 illustrates the layout of the open pits, in the context of the infrastructure required to extract and process the ore deposit). The extracted ore will be crushed and transported using a combination of conveyor and dump truck haulage to the HLF where a dilute sodium cyanide solution will be applied to leach out the gold and silver. Gold and silver dissolved in the cyanide solution will be recovered from the solution at an Adsorption Desorption Recovery (ADR) plant. The recovered precious metals will be smelted to produce doré and exported from the Project for refining. Barren rock will be hauled to the Barren Rock Storage Facility (BRSF), which will be designed for permanent storage of this material and will include a comprehensive drainage scheme and water treatment. The duration of the Project comprises two years of construction followed by a further 10 years of operation.

The programme of geological resource exploration continues to investigate the full extent of the resource at Amulsar. While certain areas of the resource are unlikely to be exploited for technical and/or environmental reasons until the relevant issues have been resolved. In addition, there is the potential that, should further viable resources be found, the life of the Project could be extended. However, at this stage of the Project development, the ESIA has considered the exploitation of the ore deposit that has been proven through the programme of exploration to date (see also Chapter 4.6 that provides the details of the geology baseline for the Project).

[4] Ibid. 1

1.2.2 Screening and Scoping

The ESIA process commenced with a screening and scoping study and progressed to the collection of baseline data to develop a detailed understanding of the social and environmental aspects that have the potential to be affected by the Project. The impact assessment and mitigation design together with the social and environmental management plans are based on the baseline conditions and take account of the releases and effects associated with the Project.

The Project was initially screened against applicable environmental laws, regulations and standards to determine the requirement for an ESIA, a process which was initiated in June 2010. Subsequently, a scoping study was undertaken to identify the environmental and social aspects that required studying in the ESIA. During the scoping stage, Lydian commenced an ESIA consultation process with the local communities (see Table 1.1). Feedback from the scoping study[5] and the consultation process helped to define the Terms of Reference for baseline data collection and informed the techniques and methodologies adopted for the ESIA process.

The purpose of the ESIA is to identify and assess potential environmental and social impacts that could be a consequence of the Project. Through such identification, potentially significant adverse impacts can be avoided, reduced, offset or managed to the extent feasible, as part of the Project design. This is an iterative process that has taken place during the Project design phase and has required close collaboration between the engineering, mining, environmental and social specialists involved in the Project. Throughout the preparation of the ESIA, the layout of the mining operations has undergone review and refinement. The process of revision has been maintained during the ESIA preparation, up to January 2016. This has been managed in parallel to the TR[6] completion in November 2015.

1.3 Project Design Process

The collection and interpretation of environmental and social baseline data commenced during the early exploration period, and from 2010 the programme was specifically tailored to concentrate on baseline surveying within the Project-affected area. The Project-affected

[5] Amulsar Open Pit Gold Project, Scoping Report' – Armenia (February 2011), prepared by WAI, Report No. EO 52-0088-1
[6] Ibid. 1.

area varies according to different elements of the baseline and has been defined within each of the relevant baseline sections.

The Project design has undergone several stages of evolution since 2010. The HLF and ADR plant locations proposed in 2011-12 were moved as the location of the original footprint had the potential for significant effects on aspects of society and the environment, specifically biodiversity, water resources, and cultural heritage. Initially, the potential environmental and social impacts were identified in the ESIA (V7r) prepared in September 2012. With a new Project footprint together with associated design changes, further environmental and social studies were completed during 2013. These studies informed ESIA (V8f) which was completed in August 2013 and released for discussion with Government, their advisors and international lending institutions. As a consequence of these discussions, and the establishment of a Working Group, further changes were made to the Project design relating to the location and design of the HLF. This revised Project design was the subject of the ESIA (V9f) disclosed in early 2015 which has required additional baseline data collection and updated impact assessment.

In mid-2015 Lydian commissioned Samuel Engineering Inc. ("Samuel") to perform Value Engineering (VE) and Optimisation concepts. The objective was to reduce capital expenditure without increasing operating cost while not adversely affecting the environmental and social effects, evaluated for the Project, prior to the VE optimisation. The TR[7] presents the results from this optimization exercise. The economic results of the Amulsar Gold project were maintained despite the lower gold price used through the reduction of capital and operational costs. The financing potential of the project was improved as a result of the lower up front capex and opex. While the basic mine and processing facilities are substantially similar to those contemplated in ESIA v9f, the site layout and certain other elements of the TR were revised. In consequence, this ESIA (V10) is an amendment to the ESIA v9f to reflect the new mine layout and includes all relevant available environmental and social analysis up to the time of completion of the TR in November 2015.

[7] Ibid, 1

To define the full scope of studies required, WAI has worked closely with Lydian and Geoteam staff and managers (see Appendix 1.1), together with the in-house environmental and social management team based at Lydian (also see Appendix 1.1). Geoteam staff were responsible for coordinated field surveys within the Project-affected area and have been responsible for routine monitoring and data collection.

1.4 The ESIA and the Armenian Environmental Impact Assessment (EIA)

In Armenia, environmental, health and safety management and the impact assessment process are regulated by a number of national laws, resolutions and decrees, which are considered in Chapter 2 of the ESIA. The process is governed by the new Armenian Law on EIA enacted in August 2014 as well as the Mining Code enacted in 2012, with revisions in 2014 and 2015.

To make a clear distinction in this ESIA, the term EIA is used to define the Armenian EIA process, and the term ESIA is used when referring to the internationally compliant environmental and social studies.

1.4.1 Armenian EIA

The Armenian Law on EIA, 2014, regulates the legal, economic and institutional basis for the studies that require consideration of proposed activities and concepts, including mining operations (see Chapter 2).

In October and November 2014 respectively, Lydian obtain consent on the EIA and the mining permit for the operation of Amulsar Gold Mine. A revision to the EIA mining permit, which included a revised EIA was approved on 28 April 2016, which fully aligns with the TR[8].

The EIA process in Armenia requires separate reports for each element of the Project and depends upon specific procedures, methods and approaches to public consultation. The approach for this international ESIA requires a holistic analysis of the Project in relation to both social and environmental considerations to assess all aspects of the Project footprint, construction, operation and closure phases. The two processes have been undertaken independently.

[8] Ibid, 1

1.4.2 The International ESIA

In addition to compliance with national mining and environmental legislation, the Project is committed to meeting international best practice. This ESIA has been prepared by WAI in accordance with the following internationally recognised methodologies, standards, guidelines and principles: The IFC Performance Standards (PS)[9] on Environmental and Social Sustainability; the World Bank Group Environmental, Health & Safety (EHS) Guidelines; EBRD Environmental and Social Performance Requirements[10]; and the Equator Principles[11]. Leading industry standards and codes of good practice, such as the International Cyanide Management Code (ICMC)[12], European Union Mining Waste Directive (Directive 2006/21/EC), and the Voluntary Principles on Security and Human Rights (VPSHR)[13], have also been considered during the ESIA and have been taken into account in the preparation of management plans. Further details on these standards and their requirements with respect to the Project have been considered in Chapter 2.

The IFC PS generally forms the basis for internationally funded projects and are considered to be an international benchmark for industry best practice for environmental and social management. The IFC PS also form the basis for the Equator Principles (Version III, June 2013[5]), an internationally recognised credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions, to which many commercial lending banks are signatories. EBRD have separate and complimentary PRs that address the requirements for environmental and social impact assessment of major projects. The methodology developed for the impact assessment (see Chapter 6.1 to 6.4) conforms to the requirements and standards to accord with industry best practice.

This internationally compliant ESIA addresses the impacts of the entire Project lifecycle, with due consideration for cumulative impacts which may be generated. The assessment considers the social and environmental issues, and includes the assessment of ecosystem

[9] IFC Performance Standards on Environmental and Social Sustainability, 2012. http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publications_handbook_pps

[10] EBRD Performance Requirements and Guidance for Clients, 2012. http://www.ebrd.com/pages/about/principles/sustainability/requirements.shtml

[11] Equator Principles III, 2013. http://www.equator-principles.com/index.php/ep3

[12] International Cyanide Management Code for the Gold Mining Industry. http://www.cyanidecode.org/

[13] Voluntary Principles on Security and Human Rights. www.voluntaryprinciples.org/files/voluntary_principles_english.pdf

services as a bridging tool between the two aspects. The ESIA has drawn on a consultative, participative process and includes the development of management plans to manage impacts generated by the Project as it is developed.

1.5 Stakeholder Engagement

A critical component of the impact assessment process is consultation with all stakeholders; principally the local communities and interested parties (e.g. Non-governmental Organizations (NGOs)), to ensure that the ESIA takes account of issues identified as priorities by those affected as a consequence of the Project and people living nearby. Discussions are also held regularly with relevant statutory authorities.

Stakeholder engagement for the Amulsar Project commenced in 2006 and has been ongoing as the Project has developed. Formal stakeholder consultation and public disclosure have taken place since the beginning of the ESIA process in 2010, in order to explain the Project, to interact with all key stakeholders and gain their feedback on the Project design change and updated ESIAs. A Stakeholder Engagement Plan (SEP) was prepared originally in 2010, updated and released to the public in 2013, June 2014 and again in May 2015. Given the recent evolution of the Project, the SEP was updated again in December 2015 (see Appendix 8.6) and disclosed locally and internationally in February 2016. The SEP provides the details of the approach to public consultation on this ESIA.

A summary of the main stakeholder engagement meetings for the Armenian EIA process, together with the scoping and public consultation for the ESIA have been summarised in Table 1.1. During formal scheduled events communities have been able to discuss the progress and outcomes of the Armenian permitting process, together with those of the ESIA, data from baseline studies, the mine design, and concerns or questions they may have over the Project.

Table 1.1: Public meetings and consultations held with Amulsar Project Stakeholders by end Dec 2015

Consultation	Number	Locations	Comments
Official Public Hearings per the EIA Law	15 in total between November 2009 and May 2016	Yeghegnadzor, Saravan, Gndevaz - Vayots Dzor, Gorayk – Syunik and at MNP in Yerevan	Present EIAs for various components of the mine for exploration, development and exploitation stages

Table 1.1: Public meetings and consultations held with Amulsar Project Stakeholders by end Dec 2015

Consultation	Number	Locations	Comments
Government Consultation	12 meetings on presentation, discussion and introduction to the Project, mine design and concept for operations	Yerevan	Presentations on EIA progress and the ore extraction and processing methods
Community Consultation and Disclosure	Over 180 meetings since 2009 in villages by Geoteam Community Liaison Officer (CLO) and social development team	Gndevaz, Gorayk, Ughedzor, Saravan, Jermuk	Monthly meetings with CLCs (134 to date) in four communities and regular engagement with host communities
Initial Informal Scoping	5 in total between June and July 2010	Gndevaz, Gorayk, Ughedzor, Saravan, Jermuk	FS/ESIA process and progress together with the initial findings
Formal ESIA Consultation	14 in total between May 2012 and December 2015, more to come during construction	Gorayk, Gndevaz, Saravan, Jermuk, Syunik, Vayots Dzor, Yerevan	Project and ESIA progress updates and spreading information on the Project
Land acquisition meetings	At least 25 formal meetings from March 2013 to May 2016. In addition, meetings have been held with Village Mayor & land owners.	Gndevaz	Meetings were held with village Mayor, landowners to provide updates; share project maps; present compensation rates & collect feedback.

Lydian has established Community Liaison Committees (CLCs), which are organised by Geoteam, as a means of ensuring consistent and on-going communication with communities, NGOs and other interested organisations and individuals. CLCs have been structured to include representatives from different sectors of the community such as education, health and local government. In addition, each CLC includes both women and men, to ensure everybody's interests are represented through gender equality. CLCs were first formed in early 2010 in the rural communities of Gndevaz, Gorayk and Saravan. In February 2011, a CLC was established in Jermuk.

Lydian has established a stakeholder engagement log (see Table 7.2 of the SEP in Appendix 8.6). The log is used to keep a record of all meetings with stakeholders, including information on Project meetings, public hearings and CLC meetings. The log forms part of a broader stakeholder management system, which maintains a record of all meetings, demonstrating frequency of interaction with stakeholders, and providing a database of the participants involved in the engagement process together with questions or issues raised by

specific people.

In May 2013, Lydian established the Amulsar Information Centre (AIC), to support the dissemination of relevant information to stakeholders located near to the Project. The AIC is based in Gndevaz and provides a central and easily accessible place to provide a variety of information, videos, posters, electronic and other hard copy data on the Project and free internet access that is available for all stakeholders in nearby communities.

A Community Newsletter, published by Geoteam, has been distributed monthly since July 2010 and originally to three communities (Gorayk, Saravan and Gndevaz). From early 2012 the community of Jermuk was added to the distribution that now includes approximately 1000 addresses. The newsletter is also available on the Geoteam website (see Appendix 1.2 for an example of the newsletter from November 2015, together with an example of a social update published December 2014). A Media Newsletter is also published regularly.