Centred on Latitude 11°24’57.6’’N and Longitude 3°31’51.6”W

Effective date: 31 December 2019

Prepared by:

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Table of Contents: Main Section

List of Tables: Main Section

List of Figures: Main Section

TECHNICAL REPORT ON THE HOUNDE GOLD MINE, REPUBLIC OF BURKINA FASO

1 SUMMARY

1.1 Property Description and Location

Endeavour's equity interest in the Houndé Gold Mine is held through a wholly owned subsidiary Houndé Holdings Limited ("**HHL**") which in turn has a 90% equity interest (balance of 10% held by the Government of Burkina Faso – "**GoBF**") in two separate operating companies, Houndé Gold Operations SA ("**HGO**") and Bouéré Dohoun Gold Operation SA ("**BDGO**"). The mineral assets situated in the south-western region of Burkina Faso and held by these companies comprise:

- The "**Houndé Exploitation Permit**" which was granted to HGO on February 5, 2015 covering 23.20km^2 and is valid until February 5, 2035 and may be renewed for consecutive five-year periods until deposits are depleted; and
- The "**Bouéré Dohoun Exploitation Permit**" was granted to BDGO on January 23, 2017 covering 5.37km^2 and is valid until January 23, 2022. It may be renewed for consecutive five-year periods until deposits are depleted.

In addition, Endeavour owns a further 11 Exploration Permits situated in the south-western region of Burkina Faso. One of these Exploration Permits, "**Kari Nord**" comprises the "**Kari Deposits**" of Kari Pump, Kari Centre and Kari West. As the primary focus of this Technical Report is the Houndé Gold Mine, the 11 Exploration Permits are not included in this Technical Report.

Property Description

The Houndé Exploitation permit was granted to HGO on February 5, 2015 covering 23.20km^2 and is valid until February 5, 2035 and may be renewed for consecutive five-year periods until deposits are depleted. The nearby Bouéré Dohoun exploitation permit was granted to Bouéré Dohoun Gold Operation SA ("**BDGO**") on January 23, 2017 covering 5.37km^2 and is valid until January 23, 2022. It may be renewed for consecutive five-year periods until deposits are depleted. BDGO has the same ownership as HGO - held 90% by Endeavour and 10% by the Government of Burkina Faso. A royalty on both exploitation permits is owed to the Government of Burkina Faso based on a 3% to 5% sliding scale linked to prevailing gold prices. There is also a 2% NSR royalty in favour of Barrick.

Location

Houndé is located approximately 250km southwest of Ouagadougou, the capital city of Burkina Faso. It is approximately 2.7km from a paved highway and less than 1km away from a 225kV power line that extends from Côte d'Ivoire through to Ouagadougou. The nearby town of Houndé is the centre of the Houndé municipality, which has a population of approximately 50,000. A rail line that extends to the port of Abidjan, Côte d'Ivoire, lies approximately 25km west of the deposit area.

History

Mineral exploration in the Houndé area began in 1939 by the Bureau de Recherches Géologiques et Minières and Bureau des Mines et de la Géologie du Burkina Faso and continued by various companies until 1982. Exploration was resumed in the 1990's by a number of companies that conducted regional geochemical surveys, which were then followed up by more detailed geochemistry, prospecting, mapping and RAB to RC drilling. Several gold targets were identified during this work.

As a result of Endeavour's acquisition of Avion on October 18, 2012, Endeavour acquired Houndé. Endeavour initiated an in-fill drill program, which consisted of 358 holes (40,534m), over the Vindaloo and Madras NW zones in late October 2012, with the goal to upgrade the mineral resources. Including this most recent drill program, 751 core and RC holes (103,677m) along the trend of the Vindaloo and Madras NW zones were completed by Endeavour (or predecessor companies) by 2013. All of this data was incorporated into section sets, interpreted and used in the updated mineral resource estimate. This new resource estimate was used as the basis for a feasibility study NI 43-101 technical report to assess the economic viability of the project. The report was finalized in October 2013 with a positive conclusion concerning a development decision for the project given the favourable economics.

Construction was completed in October 2017 ahead of schedule and US$15m below the initial capital budget of US$328m. As construction was tracking ahead of schedule and below budget, Endeavour decided to spend approximately US$21m in addition to the initially planned works (mainly for a 26MW back-up power station and fuel farm and to build Cell 2 of the tailings storage facility), bringing the total investment to US$334m.

Houndé achieved the first gold pour on October 18, 2017 and nameplate capacity was reached by the end of October 2017, within weeks following the introduction of ore. Following the rapid ramp-up period, commercial production was declared on November 1, 2017.

In 2019, Houndé produced 223kozAu at an AISC of US$862/oz. Houndé is expected to produce 230kozAu to 250kozAu in 2020 at an AISC of US$865/oz to U$895/oz. Mining is expected to be focused on the Vindaloo and Bouéré pits. The top end of the production guidance and low end of AISC guidance incorporates the potential to start mining the higher-grade Kari Pump deposit in the latter part of the year. The overall strip ratio is expected to remain high in the first half of the year. The plant is expected to continue to perform above nameplate capacity with the overall ore blend expected to be predominantly fresh ore. Low grade stockpiles are planned to supplement the mill feed in the first half of the year, while mining focuses on waste extraction, resulting in a higher processed grade in the second half.

An exploration programme of up to US$11m totalling approximately 94,000 meters has been planned for 2020, with the aim of delineating additional resources in the Kari area and at the Vindaloo South and Vindaloo North targets. In addition, other targets such as Dohoun and Sia/Sianikoui are expected to be tested.

To date Houndé Gold Mine has mined a total of 10.0Mt of ore grading 2.2g/tAu and produced 0.6Moz of gold at an average Cash Cost and All in Sustaining Cost ("**AISC**") of US$519/oz and US$692/oz respectively. The salient operating results for the 12-month period ended 31 December 2019 are:

- Material mined of 38.2Mt comprising waste of 35.2Mt and ore mined of 3.0Mt grading 2.3g/tAu for an overall stripping ratio of 11.9t_{waste}:t_{ore};
- Processed ore of 4.1Mt grading 1.8g/tAu for total recovered gold of 226koz and reflecting metallurgical recovery of 92.7%;
- Gold sales of 227kozAu at a gold price of US$1,391/oz for total sales revenue of US$316.1m;
- Operating expenditure of US$159.3m and capital expenditures of US$27.8m with additional lease re-payments of US$12.0m;

- Unit operating expenditures of:
  - US$2.23/$t_{mined}$ (US$5.22/BCM) for mining activities,
  - US$12.48/t for processing activities,
  - US$3.62/t for site-based G&A and US$36.4/oz sold for allocated corporate expenditures; and
- Cash Costs and AISC per ounce sold of US$666/oz and US$887/oz respectively.

1.2 Geology, Exploration, Drilling and Sampling

Geology

On the Houndé land package, six deposits have been discovered with Vindaloo being the main and historical one leading to the construction of the mine. The six deposits are Vindaloo, Bouéré, Dohoun, Kari Pump, Kari West and Kari Centre. Bouéré, Dohoun, and Kari Centre are small satellite deposits while Vindaloo, Kari Pump and Kari West host most of the current resources and are summarized in this section.

The Vindaloo zones are hosted by Proterozoic-age, Birimian Group, intensely sericite- and silica-altered mafic intrusions, similarly altered, strongly foliated and altered intermediate to mafic volcaniclastics and occasionally sediments. The mineralization is often quartz stockwork-style and is weakly to moderately pyritic. The Vindaloo trend has been drill tested for a distance of approximately 7.7km along strike and up to 350m depth. The intrusion-hosted zones range up to 70m in true thickness and average close to 20m true thickness along a 1.2km section of the zone called Vindaloo Main. Volcanic and sediment-hosted zones are generally less than 5m wide. The entire mineralized package strikes north-northeast and dips steeply to the west to vertical. The mineralization remains open both along strike and to depth.

Geologically, Kari Pump is underlain by andesite flows with minor volcano-sediment and sediments that are locally intruded by few diorite sills. Gold mineralization occurs within a sheared reverse fault (D2) that appears to be folded and dipping from 0° to 40° to the west-northwest and northwest. Observed clear alteration consists of pervasive creamy sericite, intermittent rhodochrosite, chlorite seams and pyritized quartz/carbonate veining. The laterite and saprolite are relatively thick at Kari Pump with an average thickness ranging from 50m to 85m.

At Kari West the weathered bedrock and saprolite thickness vary between 25m and 75m with thicker zones noted to the south. Laterite up to 20m thick covers most of the area. The Kari West deposit is located in the hanging wall of a N240 trending and steep northwest-dipping lithological contact zone between dominantly meta-volcanic units (hanging wall) and a dominant metasedimentary unit (footwall). The deposit was formed under purely brittle conditions. The mineralization of Kari West remains open down dip along the low angle structures and steeper and deeply rooted structures and open along the central extend of the deposit on the east (100m wide) and on the west/southwest.

Exploration

Endeavour completed 40,534m of drilling in 358 holes with a specific goal of upgrading the inferred in-pit mineral resources to indicated mineral resources and indicated mineral resources to measured mineral resources during the fourth quarter of 2012 and the first quarter of 2013.

Sterilization drilling led to the recognition of several parallel zones of gold enrichment, one of which, the Koho East zone, returned a drill intercept of 1.22g/tAu over 21.0m. Several of these zones have added resources to the project.

An extensive drill programme was undertaken between June and November 2014. The programme included 57,978m of drilling, comprised of 110 DD holes (22,780m) and 358 RC holes (35,198m). The drill programme successfully completed a number of objectives, including:

- testing the extents of the Vindaloo Main mineralization at depth and on strike;
- converting inferred mineral resources to indicated category along the Vindaloo trend;
- testing mineralization at Bouéré, located 12km west of the Houndé process plant site; and
- testing mineralization at Dohoun, located approximately 14km northwest of the Houndé process plant site.

No exploration or additional drilling was completed in 2015-2016. In 2017, a US$4m exploration programme totalling 69,700m and 805 holes was completed. The 2017 exploration leveraged the 2016 data analysis, structural geology and ground geophysical analytical work. The focus was aimed at delineating high-grade targets at Bouéré and Kari Pump, and to perform reconnaissance drilling.

The 2017 campaign yielded positive results with the discovery of high-grade intercepts at both the Kari Pump target and the Sia/Sianikoui targets. Kari Pump is located approximately 7km west-northwest of the Houndé process plant, within 1km of the Bouéré deposit and the Houndé process plant haul road. The Sia/Sianikoui target is located further north, 1.5km northeast of the Dohoun deposit.

Houndé was the primary focus of exploration work for Endeavour in 2018. A total of 165,700m of drilling focused on the Kari anomaly. The programs enabled the estimation of a maiden mineral resource estimate at Kari Pump. The estimate comprises Indicated category of 11.3Mt at 2.71g/tAu for 987kozAu and Inferred category of 0.2Mt at 2.21g/tAu for 20kozAu. The Corporation initiated geotechnical studies (internal) and metallurgical test work (ALS Metallurgy Perth) on Kari Pump as part of pre- feasibility studies.

Houndé was Endeavour’s largest exploration focus in 2019 with a total of 174,710 meters drilled. The drill programs focused on extending the mineralization of the Kari Pump resource and delineating maiden mineral resource estimates for both the Kari West and Kari Centre deposits, each located 3km west and 1.8km southwest, respectively, from the Kari Pump Deposit. As with Kari Pump, the two new deposits are all within 1km of the active haul road linking Bouéré and the process plant. The Kari West estimate comprises Indicated category of 15.7Mt at 1.71g/tAu for 861kozAu and Inferred category of 3.4Mt at 1.65g/tAu for 179kozAu. The Kari Centre estimate comprises Indicated category of 3.7Mt at 1.18g/t Au for 140kozAu and Inferred category of 0.4Mt at 1.21g/tAu for 16kozAu.

Completion of Kari Pump geotechnical studies and metallurgical test work contributed to a mineral reserve estimate for the deposit, which comprises probable reserve category of 7.3Mt at 3.01g/tAu for 710kozAu (US$1,250/oz gold price, cut-off grade 0.6g/tAu). The results flag an 89% conversion rate from Indicated to Mineral Reserve category.

An exploration programme of up to US$11m totalling approximately 94,000 meters has been planned for 2020, with the aim of delineating additional resources in the Kari area and at the Vindaloo South and Vindaloo North targets. In addition, other targets such as Dohoun and Sia/Sianikoui are expected to be tested.

The company engaged the consulting services of SOCREGE (Société de Conseil et de Réalisation pour la Gestion de l’Environnement), a Burkina Faso company to plan and execute studies on Environmental and Social Impact Assessment (“**ESIA**”) and Relocation Action Plan (“**RAP**”) for the Kari mining area. The study area covers about 38km^2 encompassing the three Kari project deposits and likely exploitation infrastructure sites. An application for an exploitation permit for the Kari project has been submitted to the Burkina Faso Government and approval is expected by the end of H1 2020.

Sampling and Data Verification

Reverse Circulation ("**RC**") drill samples were collected at one-meter intervals using dual tube, percussion hammer with drop centre bit. This same configuration was used on modified Aircore drills for regional drill programs. RC and Aircore samples were split at the drill site using one tier or three tier riffle splitters based on bulk sample weight collected at the cyclone. The target was a two to three kilograms sample for Au analysis in addition to an equivalent backup reference sample. Bulk weights, analysis sample weights and reference sample weights were all recorded. All measures were employed to avoid collecting wet samples. However, if wet samples were generated the entire sample was dried and split using 1 tier and 3 tier splitting equipment. Representative samples for each interval were collected with a spear from the bulk sample bag and sieved into chip trays for geological logging and stored in a secure location.

Drill core (PQ, HQ and NQ size) samples were selected by geologists and cut in half with a diamond blade saw at the project site. Half of the core was retained in the core trays at the site for reference purposes. The average sample interval was approximately one meter in length and two to three kilograms in weight.

All aspects of sampling at the Kari area were monitored with a quality assurance–quality control (QA-QC) program, compliant with NI 43-101 standards. This to ensure there are adequate internal quality control samples in each analytical batch: coarse blanks, field duplicates and certified reference material (CRM) were inserted by geologists into the sample stream for verification of the analysis at the laboratory.

1.3 Mineral Resource and Mineral Reserves

Mineral Resources

The Mineral Resource estimate for the Houndé Gold Mine as at 31 December 2019 is reported for each of the individual deposits in Table 1-1 below and includes:

- Measured Mineral Resources totalling 1.7Mt grading 1.75g/tAu for contained metal of 96kozAu;
- Indicated Mineral Resources totalling 58.6Mt grading 2.07g/tAu for contained metal of 3,797kozAu; and
- Inferred Mineral Resources totalling 6.9Mt grading 2.07g/tAu for contained metal of 456kozAu.

Furthermore, in reviewing the Mineral Resource statements as reported herein the following notes should also be considered:

- The Mineral Resources are reported in accordance with the guidelines and terminology provided in the CIM Standard;
- The Mineral Resources have an effective date of 31 December 2019;
- The Qualified Persons responsible for the reporting of the Mineral Resources as at 31 December 2019 are:
  - Kevin Harris (CPG), Vice President Resources, Endeavour Mining Corporation who was responsible for the following deposits, Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit,
  - Mark Zammit (MAIG), Principal Consultant, Cube Consulting Pty Ltd who was responsible for the Vindaloo-Madras Deposits;

- All Mineral Resources are reported within an optimised shell generated assuming a long-term gold price of US$1,500/oz and an in-situ cut-off grade of 0.5g/tAu with the exception of Vindaloo-Madras which ranges from 0.35g/tAu to 0.50g/tAu;
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability; and
- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves.

Table 1-1: Mineral Resource Statement for Houndé Gold Mine, as of 31 December 2019

Classification & Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured			
Vindaloo	761	2.43	60
Stockpiles	950	1.20	37
Subtotal	**1,712**	**1.75**	**96**
Indicated			
Vindaloo	26,002	1.91	1,594
Bouéré	802	4.94	127
Dohoun	1,152	2.35	87
Kari Pump	11,330	2.71	987
Kari West	15,652	1.71	861
Kari Centre	3,705	1.18	140
Subtotal	**58,644**	**2.01**	**3,797**
Measured + Indicated			
Vindaloo	26,763	1.92	1,654
Bouéré	802	4.94	127
Dohoun	1,152	2.35	87
Kari Pump	11,330	2.71	987
Kari West	15,652	1.71	861
Kari Centre	3,705	1.18	140
Stockpiles	950	1.20	37
Total	**60,355**	**2.01**	**3,893**
Inferred			
Vindaloo	2,568	2.63	217
Bouéré	154	3.60	18
Dohoun	68	2.91	6
Kari Pump	282	2.21	20
Kari West	3,370	1.65	179
Kari Centre	412	1.21	16
Total	**6,855**	**2.07**	**456**

The mineral resource estimates for Dohoun and Kari Pump remain unchanged from 2018. The Vindaloo and Bouéré resources have been depleted due to mining in 2019. Kari West and Kari Centre are new resources established in 2019. The Kari West and Kari Centre Mineral Resource Estimates were developed in Geovia's Surpac software. Ninety-four (94) mineralized zones, grouped into eight domains, were defined from the current drilling data as of September 1, 2019 and geological interpretations at Kari West. Sixteen mineralized zones were defined at Kari Centre. The gold assays from the drill holes were composited to one metre intervals within the mineralized wireframes and capped at 6.0g/tAu and 15g/tAu by domain at Kari West and at 6.0g/tAu at Kari Centre. Spatial analysis of the gold distribution within the mineralized zones using variograms indicated a good continuity of the grade along strike and down-dip and were used to establish ordinary kriging ("**OK**") parameters.

Kari West density was measured in 1,307 core samples within the various rock types and averaged within the model by weathering: the laterite density was 2.04t/m^3, the saprolite was 1.76t/m^3, the transition was 2.40t/m^3 and the fresh rock was 2.72t/m^3. Kari Centre density was measured in 934 core samples with an average laterite density of 2.12t/m^3, saprolite of 1.77t/m^3, transition of 2.27t/m^3 and fresh rock of 2.70t/m^3.

The gold grade was estimated by the OK method, constrained within the mineralized wireframes. The grade was estimated in multiple passes to define the higher confidence areas and to extend the grade into areas of extrapolated mineralization.

The grade estimation was validated by visually comparing drilling data and block grades, comparing inverse distance squared and OK estimated grades and by swath plots comparing block grades and composite grades.

The mineralization was classified as Indicated and Inferred Mineral Resources depending on the sample spacing, number samples, confidence in mineralized zone continuity and geostatistical analysis. Indicated Mineral Resource classification was generally applied to blocks within the mineralized zone defined by a minimum of five samples from at least three drill holes with a 55m search at Kari West and 60m search at Kari Centre. Inferred Mineral Resource classification was defined by a minimum of three samples within a 75m search at Kari West and 80m at Kari Centre.

The Mineral Resources were constrained by US$1,500/oz pit shells and a 0.50g/tAu cut-off grade. The Whittle pit shell optimizations assumed a base mining cost of $2.00/t and an adjusted ore mining cost of US$2.60/t for oxide, US$3.00/t for transition and US$3.50/t for fresh rock, a mining recovery of 95%, mining dilution of 20%, a pit slope of 40°, gold recovery of 90% in oxide, transition and fresh rock, and a processing and G&A cost of US$16.20/t for oxide, US$18.00/t for transition and US$20.50/t for fresh rock.

Mineral Reserves

Table 1-2 below provides the audited Mineral Reserve Statement for the Houndé Gold Mine as at 31 December 2019 which are reported in accordance with the guidelines and terminology provided in the CIM Standards. The total Mineral Reserves reports a total of 32.6Mt grading 2.06g/tAu for total contained metal of 2,164kozAu comprising:

- Proven Mineral Reserves of 1.8Mt grading 1.57g/tAu with contained metal of 89kozAu; and
- Probable Mineral Reserves of 30.9Mt grading 2.09g/tAu with contained metal of 2,075kozAu.

Furthermore, in reviewing the Mineral Reserve statements as reported herein the following notes should also be considered:

- The Mineral Reserves have an effective date of 31 December 2019;
- The Qualified Person responsible for the reporting of the Mineral Reserves as at 31 December 2019 is Salih Ramazan (FAusIMM), Vice President Mine Planning, Endeavour Mining Corporation who was responsible for the estimation and reporting of all Mineral Reserves reported for the Houndé Gold Mine;
- All Mineral Reserves are reported assuming a long-term gold price assumption of US$1,300/oz; and
- Details relating to the various modifying factors and deposit specific cut-off grades are reported in Section 15.3 of this Technical Report.

Table 1-2: Mineral Reserve statement for the Houndé Gold Mine (by deposit) as at 31 December 2019

Classification & Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven			
Vindaloo	812	2.01	52
Stockpiles	950	1.20	37
Subtotal	**1,762**	**1.57**	**89**
Probable			
Vindaloo	21,579	1.71	1,189
Bouéré	814	4.30	113
Dohoun	1,160	1.85	69
Kari Pump	7,308	3.00	704
Subtotal	**30,861**	**2.09**	**2,075**
Ore Reserves			
Vindaloo	22,391	1.72	1,242
Bouéré	814	4.30	113
Dohoun	1,160	1.85	69
Kari Pump	7,308	3.00	704
Stockpiles	950	1.20	37
Total	**32,623**	**2.06**	**2,164**

1.4 Mining Method

The mining method at Houndé is conventional open pit mining including drilling, blasting, loading and hauling. Load and haul activities are owner operated. Contract service providers, SFTP Mining and African Explosive Limited ("**AEL**"), carry out drilling and blasting activities.

Mining and processing of transition/fresh ore began in Q4 2017. Mining activities transitioned from mainly oxides in early 2018 to mainly fresh ore by the end of 2019. Ore was mined from the Vindaloo Main Pit Stages 1, 2 and 3 and Vindaloo Central and Bouéré pits to feed the process plant in 2019. Additional oxide will be mined in 2020 and 2021 as Kari Pump comes into production.

The capacity of the mining fleet owned by Houndé and other service providers meets the earthmoving requirements of the mining schedule as per the LoM and budget plans for 2020. The in-pit material excavation is conducted by a fleet of eight Komatsu excavators consisting of one PC3000-8R, three PC 2000-8R and four PC 1250-8R. Material haulage is done by thirty-one Komatsu HD785-7 rear dump trucks. Key items of the ancillary fleet are nine dozers and four motor graders. Ore mined is hauled to the RoM pad and near RoM stockpiles. Waste mined from the pit is hauled to the waste dumps and other projects requiring waste material for construction (i.e. tailing storage facility, haul roads etc.).

The ore control strategy targeting delineation of ore and waste uses RC holes piercing multiple benches. The geological and assay information, obtained from 32m deep inclined holes are sampled and assayed every 1m to generate wireframes from sectional interpretation, for grade control block modelling and ore outlines generation. The ore outlines are then used by geologists and surveyors for final ore/waste discrimination and in-pit mark-up. In 2018 Houndé introduced blast movement simulation technology ("**BMT**") to better predict movement of ore resulting from blasting as a key measure in reducing ore loss and dilution.

Production drilling and blasting is performed on contract by SFTP with Sandvik DP1500s drill rigs on 9m benches with one-meter sub-drill using 115mm diameter drill bits. Blasted material is excavated in 3m high flitches.

African Explosives Limited ("**AEL**") provides in-the-hole blasting services. The AEL plant on site consists of an ammonium nitrate mixing shed for the manufacturing of bulk explosives and four 30 tonne capacity iso-tank containers for storage. The supply of detonators, boosters, bulk explosives, initiating systems and other explosives material into the site-based magazines for storage is the responsibility of AEL.

Waste rock dumps associated with mining operations are constructed to meet the stipulated guidelines of the Burkina Faso Mining and Explosive and Environmental Regulations. All areas earmarked for waste dumps are sterilized before dumping commences.

In 2019, the total material mined was 38.2Mt including 3Mt of ore at an average gold grade of 2.2g/t containing 206koz of gold. As per the water management plan, eight boreholes are planned in 2020 in the vicinity of Vindaloo Main pit and 14 boreholes are planned in 2020 and 2021 in the vicinity of Kari Pump pit. The plan also includes a proposal to purchase an assortment of medium to large submersible pit dewatering pumps in 2020 and 2021.

1.5 Metallurgy and Mineral Processing

The processing plant at Houndé consists of a CIL plant with a nameplate capacity of 3.0Mt per annum with SABC milling circuit to produce an 80% passing 90-micron grind size. Ground fresh ore is fed to continuous centrifugal gravity concentrators to recover free and occluded gold in heavy particles (pyrite) to a low mass gravity concentrate. This gravity concentrate is processed through an intensive Cyanide leach reactor followed by electrowinning to recover the gold. CIL feed is thickened and fed into a standard CIL circuit, with leach tails passing into a cyanide destruction process before being pumped to the Tailing Storage Facility ("TSF").

Crushing: The run of mine ore is delivered to a jaw crusher which reduces the ore to less than 200mm. The crushed ore is then transferred to a surge bin with a 1-hour capacity, or, when needed, to an emergency stockpile. During normal operation, the crushed ore from the surge bin is transported to the grinding circuit via a conveyor. In case of a breakdown or maintenance of the crushing circuit, crushed ore is recovered from the emergency stockpile by a loader and directed to the surge bin.

- **Crushing:** The run of mine ore is delivered to a jaw crusher which reduces the ore to less than 200mm. The crushed ore is then transferred to a surge bin with a 1-hour capacity, or, when needed, to an emergency stockpile. During normal operation, the crushed ore from the surge bin is transported to the grinding circuit via a conveyor. In case of a breakdown or maintenance of the crushing circuit, crushed ore is recovered from the emergency stockpile by a loader and directed to the surge bin;
- **Grinding:** The primary grinding circuit consist of a standard SAG/Ball and Scats Crushing (SABC) circuit consisting originally designed treat 3.0Mtpa to produce a ground ore where 80% is sub 90µm in size. A portion of freshly ground ore is directed to the gravity circuit where course liberated gold is recovered and leached via an intensive leach reactor, followed by electrowinning and eventual gold recovery;
- **Leaching:** Ore that is not recovered via the gravity circuit is screened to remove any extraneous trash (wood, plastic, etc.) then can either be sent to a thickener to increase the percentage solids in the leach slurry, or pumped directly to a conventional carbon in leach circuit ("**CIL**"). The CIL circuit consists of a series of six agitated tanks where gold is dissolved in the presence of cyanide and oxygen as the slurry flows sequentially from Tank 1 to 6. The dissolved gold adsorbs on the coarse activated carbon particles which are pumped in a counter-current direction from Tank 6 to 1, becoming progressively more loaded with gold in the process;
- **Carbon Recovery:** Once sufficiently loaded by the time the carbon reaches Tank 1, the carbon granules are pumped from the primary tank over a screen to remove the slurry. The clean carbon is then washed with hydrochloric acid to remove any acid soluble base metals and impurities, before being transferred to the elution circuit;
- **Elution and Gold Production:** Concentrated cyanide solution is circulated in the elution column and heated to 120 degrees Celsius. After sufficient time to enable the gold to be released from the carbon, the gold bearing solution is sent for electrowinning and eventual gold bullion production; and
- **Tailing Detoxification and Disposal:** The leached slurry, devoid of leachable gold exits the CIL where the free and weak acid dissociable cyanide ("**WAD**") are destroyed through the INCO cyanide detoxification process. In this process Sulphur dioxide, oxygen and copper sulphate are agitated in the tailings stream to destroy the remaining cyanide complexes. The detoxified tailing is pumped to a plastic lined TSF, where the solid and liquid phases separate. The liquid phase is recycled back to the process plant and the solids allowed to dry and compact in the TSF.

1.6 Infrastructure

The TSF storage consists of a two-cell, paddock storage formed by multi-zoned earth-fill embankments (surrounded by waste rock on all four sides). It comprises a cleared and grubbed basin, a composite soil/HDPE liner, a basin underdrainage system and a pump out decant system. It is located adjacent to the Vindaloo pit and processing facility and forms part of the original project design and capital budget. The facility is designed to be raised in stages (every 1-2 years) over the mine life using downstream embankment construction techniques. The Houndé TSF was designed and is audited by Knight Piésold. The original impact assessment carried out by Knight Piésold, including a dam break scenario, indicated a high consequence in the event of a wall failure and the tailings embankments were designed to reduce this risk. Closure at the end of the mine life will require covering the surface with 0.5m of broken rock.

The stage three raise construction was successfully completed in 2019. The stage four wall raise is underway under the supervision of Knight Piésold and is expected to be completed by the end of Q2 2020. All stages of construction conform to American, Australian and local guidelines. Inspections are done on a regular basis and include an annual audit by Knight Piésold. The latest audit of the TSF was conducted by Knight Piésold in August 2019 and no points of material concern were noted.

Power for the processing plant is supplied from the grid via a 38km long, 225kv overhead power line where the nearest substation is located near the town of Po. A power supply agreement has been entered into with SONABEL, the state power company. A Caterpillar high speed diesel back-up power station has been installed to provide 100% redundancy

1.7 Environmental

In July 2014, an Environmental and Social Management Plan was developed prior to the construction and operation of the mine. Environmental permits have been granted covering the open pit mining operations, the process plant and surface infrastructure.

In 2018 a resettlement action plan ("**RAP**") for the resettlement of the Bouéré village was completed and successful implemented. A total of 31 concessions were built, relocating about 130 people. The new village opened in June 2019 and has solar powered boreholes for water supply as well as two water wells.

Livelihood restoration programs for project affected households and villages have also been created. In 2019, local women and youth associations received funding and support for the creation of income-generating activities such as beekeeping, soya bean cultivation and chicken/goat breeding.

A RAP is underway for the Kari Pump project and is planned for completion in 2020 in accordance with the mining plan.

1.8 Life of Mine plan

The current Life-of-Mine plan which underpins the current Mineral Reserves indicates the following key salient statistics:

- Total gold production and gold sales of 1,960koz and 1,959koz respectively;
- Total sales revenue of US$2,546.6m derived assuming a constant real (1 January 2020) money terms gold price of US$1,300/oz;
- Total operating expenditure (post capitalisation) of US$1,368.4m (real money terms 1 January 2020);
- Total capital expenditure of US$346.2m comprising sustaining capital, capitalised operating expenditures, and mine closure (real money terms 1 January 2020). In addition to this the lease repayments and other outflows amount to US$47.1m which are assumed to be expended from 2020 through 2023 inclusive;
- LoM weighted average unit mining, processing and G&A related operating expenditures (pre capitalisation) of US$1.97/tmined, US$14.89/t_{milled} and US$5.93/$t_{milled}$ respectively; and

- LoM weighted average unit cash costs and AISC of US$734/oz and US$844/oz reported on a sales basis.

1.9 Recommendations

Section 26 includes several recommendations relating to the 31 December Mineral Resource and Mineral Reserve statements as reported herein. These recommendations are drawn from the underlying technical sections and reproduced in Section 26, accordingly these are not reproduced in this Summary.

2 INTRODUCTION

2.1 Terms of Reference

The focus of this Technical Report is limited to the two Exploitation Permits (see Section 2.3) which comprise the Houndé Gold Mine and expressly excludes all other Exploration Permits held by Endeavour Mining Corporation's other operating subsidiaries.

This Technical Report has been prepared in accordance with the Regulatory Technical Report Standards and Reporting Standard (together the "**Requirements**") by the following Qualified Persons:

- Salih Ramazan, who is a Fellow of the Australian Institute of Mining Metallurgy ("**AusIMM**") and responsible for the overall report and the Mineral Reserves for Houndé Gold Mine reported with effective date of 31 December 2019 as reported herein. Salih Ramazan is the Vice President Mine Planning and is an employee of Endeavour Mining Corporation. Furthermore, Salih Ramazan is the Qualified Person responsible for authoring Section 15 and 16 of this Technical Report and has also relied on various other experts for input to Section 1, 2, 3, 13, 17, 18, 19, 20, 21, 22, 24, 25, 26 and 27. Salih Ramazan has been working for Endeavour on a 6 weeks work and 3 weeks off rotation since April 15, 2019. During his work he has visited Houndé Gold Mine in September (September 13 to September 27) to support the site in mine planning work. In early 2020, he has visited the site in February to attend the company's internal operational strategy workshop and to review the site's mining plans;
- Gérard de Hert, who is a European Geologist (EurGeol – European Federation of Geologists) is responsible as the Qualified Person for the following sections in this Technical Report, 4, 5, 6, 7, 8, 9 and 23. Gérard de Hert is the Senior Vice President Exploration and is an employee of Endeavour Mining Corporation. Gérard de Hert undertook site visits to Houndé Gold Mine on 21 to 23 January 2020;
- Kevin Harris, who is a Chartered Professional Geologist ("**CPG**") is responsible for all aspects relating to the declaration of Mineral Resources for the Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit with effective date of 31 December 2019. Kevin Harris is the Qualified Person responsible for the following Sections: 10, 11, 12 in relation all deposits at Houndé Gold Mine as reported in the Technical Report and for Section 14 in respect of the declaration of Mineral Resources for the Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit with effective date of 31 December 2019. Kevin Harris is the Vice President Resources and is an employee of Endeavour Mining Corporation. Kevin Harris undertook site visits to Houndé Gold Mine on the following dates: 13-16 February 2018; 12-15 November 2018; 11-14 February 2019; 12-15 July 2019; and 20-24 February 2020; and
- Mark Zammit is a member of the Australian Institute of Geoscientists ("**MAIG**") and responsible for all aspects relating to the declaration of Mineral Resources for the Vindaloo-Madras deposits with effective date of 31 December 2019. Mark Zammit is the Qualified Person responsible for the following Sections: 12 and 14 in relation to the aforementioned deposits. Mark Zammit is a Principal Consultant and is an employee of Cube Consulting Pty Ltd. Mark Zammit undertook site visits to Houndé Gold Mine on 9-13 February 2013; and 23-31 January 2019.

Regulatory Technical Report Standard

This Technical Report has been prepared in accordance with the following:

- "*National Instrument 43-101 Standards of Disclosure for Mineral Projects*" ("**NI 43-101**");
- "*Companion Policy 43-101CP to National Instrument 43-101 Standards of Disclosure for Mineral Projects*", (the "**Companion Policy**");
- "Form 43-101F1 Technical Report Table of Contents" ("**Form 43-101F1**"); and
- "*National Instrument 14-101 Definitions*" ("**14-101 Definitions**").

Reporting Standard

The Reporting Standard adopted for the reporting of Mineral Resources and Mineral Reserves as reported in this Technical Report is the "*CIM Definition Standards on Mineral Resources and Reserves*" prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council on May 10, 2014 (the "**CIM Definition Standards**") which are incorporated by reference into National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("**NI-43-101**".

Furthermore, the Mineral Resource and Mineral Reserves as reported herein have also been prepared in accordance with the "*CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*" prepared by the CIM Mineral Resource and Mineral Reserve Committee and adopted by the CIM Council on November 29, 2019 (the "**CIM Best Practice Guidelines**").

In accordance with the exemptions afforded to producing issuers as stipulated in Form-101F1,"***the information required under Item 22 for technical reports on properties currently in production***" is excluded as Endeavour believes that the Technical Report does not include "**a material expansion of current production**".

Table 2-1 provides a direct cross reference between the specific 'Items' referenced in Form 43-101F1 and this Technical Report.

Table 2-1: Technical Report and Form 43-101F1 cross reference

Form 43-101F1	Section Title	Technical Report Section	Responsible QP
Item 1	Summary	1	Salih Ramazan
Item 2	Introduction	2	Salih Ramazan
Item 3	Reliance on Other Experts	3	Salih Ramazan
Item 4	Property, Description and Location	4	Gérard de Hert
Item 5	Accessibility, Climate, Local Resources, Infrastructure and Physiography	5	Gérard de Hert
Item 6	History	6	Gérard de Hert
Item 7	Geological Setting and Mineralisation	7	Gérard de Hert
Item 8	Deposit Types	8	Gérard de Hert
Item 9	Exploration	9	Gérard de Hert
Item 10	Drilling	10	Kevin Harris
Item 11	Sample Preparation and Security	11	Kevin Harris
Item 12	Data Verification	12	Kevin Harris/Mark Zammit
Item 13	Mineral Processing and Metallurgical testing	13	Salih Ramazan
Item 14	Mineral Resources	14	Kevin Harris/Mark Zammit(1, 2)
Item 15	Mineral Reserves	15	Salih Ramazan
Item 16	Mining Methods	16	Salih Ramazan
Item 17	Recovery Methods	17	Salih Ramazan
Item 18	Infrastructure	18	Salih Ramazan
Item 19	Market Studies and Contracts	19	Salih Ramazan
Item 20	Environmental Studies, Permitting and Social or Community Impact	20	Salih Ramazan
Item 21	Capital and Operating Expenditure	21	Salih Ramazan
Item 22	Economic Analysis	22(3)	Salih Ramazan
Item 23	Adjacent Properties	23	Gérard de Hert
Item 24	Other Relevant data and Information	24	Salih Ramazan
Item 25	Interpretation and Conclusions	25	Salih Ramazan
Item 26	Recommendations	26	Salih Ramazan
Item 27	References	27	Salih Ramazan

(1) Kevin Harris is the responsible Qualified Person for the referenced Items in relation to the Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit.

(2) Mark Zammit is the responsible Qualified Person for the referenced Items in relation to the Vindaloo-madras Deposits.

(3) In accordance with the exemptions afforded to producing issuers as stipulated in Form-101F1,"the information required under Item 22 for technical reports on properties currently in production" is excluded as Endeavour believes that Technical Report does not include "a material expansion of current production".

The Qualified Persons believe that the opinion as expressed herein must be considered as a whole and that selecting portions of the analysis or factors considered by it, without considering all factors and analyses together, could create a misleading view of the process underlying the opinions presented in this Technical Report.

The Qualified Persons opinions given in this document with respect to the 31 December 2019 Mineral Resource and Mineral Reserve statements (the "**2019 Statements**"), the Life-of-Mine plans ("**LoMps**") and accompanying technical-economic parameters ("**TEPs"**), the Environmental and Social Liabilities are effective as at the date of publication and are based on information generated as part of Endeavour's annual resource and mine planning process, which in turn reflects various technical-economic conditions prevailing at the date of this report and expectations regarding the gold price and exchange rates prevailing as at the date of declaration of the 2019 Statements. These and the underlying TEPs, comprising projections of production, sales, sales revenue, operating and capital expenditures can change significantly over relatively short periods of time. Should these change materially the 2019 Statements, the LoMps and accompanying TEPs and the Environmental and Social Liabilities could be materially different in these changed circumstances.

This Technical Report includes technical information, which requires subsequent calculations to derive subtotals, totals and weighted averages. Such calculations may involve a degree of rounding and consequently introduce an error. Where such errors occur, the Qualified Persons do not consider them to be material.

Assistance in sourcing information

The following individuals have assisted the QPs through the provision of information and assistance. For the avoidance of doubt, the QPs acknowledge and accept sole responsibility for this Technical Report and expressly do not place reliance on any other individuals named below:

- **Mining Equipment and Asset Replacement:** Spencer Osborne is an employee of Endeavour and is also the Vice President for Mining. Spencer has 19 years' experience and holds the following qualifications: B.Eng. Civil Engineering; M.Sc. Engineering Geology and is also a Chartered Civil Engineer;
- **Mining Geotechnics and Mining Hydrogeology:** Charles Mkandawire is an employee of Endeavour and is also the Group Senior Geotechnical Engineer. Charles has 28 years' experience and holds the following qualifications: MSc (Geotech Engineering) (1996); BSc Geology (1989) and Chamber of Mines Certificate in Rock Mechanics (1989) and Mining Geotechnics (2018);
- **Mineral Processing:** Clinton Bennett is an employee of Endeavour and is also the Vice President for Metallurgy. Clinton Bennett has 21 years' experience and holds the following qualifications: BSc (Hons) (1999); PhD (Extractive Met - 2003); MSc (Mineral Economics-2010);
- **Tailings Management and Infrastructure (on-mine and off-mine):** Matthew Berden is an employee of Endeavour and is the Director of the Project Services Group and has 16 years' experience. Mathew holds a Bachelor of Engineering Degree (2005);
- **Environmental and Social:** Frederic Some who is an employee of Endeavour and is the Environmental Superintendent for Houndé Gold Mine. Frederic is directly responsible for Environmental permitting, ISO 14001 and ISO 45001 systems implementation and audits, World Bank Safeguard policies, progressive rehabilitation; waste management, biodiversity management, environmental monitoring; and preventive safety activities. Frederic has 12 years' experience and holds the following qualifications: Degree in Water & Forestry Engineering; and a Masters Degree in Integrated Water Resource Management;
- **Environmental and Social:** Moustapha Coulibaly is an employee of Endeavour and is the Group Corporate Social Responsibility Manager. Moustapha has 10 years' experience and

holds the following qualifications: Masters Degree in Economics (2005);

- **Environmental and Social, Occupational Health and Safety:** Lee Bouckaert is an employee of Endeavour and is the Vice President - Health, Safety and Environment. Lee has 30 years' experience in the mining industry and holds the following qualifications: Trade Cert (Metal – 1990); Post Grad (Heath & Safety 2007); Cert IV (Environmental Management 2009); and RABQSA (Lead Auditor 2010);
- **Occupational Health and Safety:** Alli Konseiga is an employee of Endeavour and is the HSE Manager for Houndé Gold Mine. Alli is directly responsible for all Health, Safety and Environment for following key areas: health, safety and environment management; training, emergency management, waste management, environmental monitoring, first aid and firefighting, medical centre management. Alli has 12 years of experience and holds the following qualifications: Master Degree in Occupational Health Safety and Emergency Management (University of Stellenbosch); Bachelor Degree in Occupational Health, Safety and Environment; a National Examination Board in Occupational Safety and Health International General Certificate; Australian Certificate IV in Occupational Health and Safety Management; and American OSH Academy for Situational Leadership;
- **Legal and Permitting:** Julie Blot is an employee of Endeavour and is the Group's West Africa Legal and Public Affairs Counsel. Julie has 6 years' experience and is qualified as a lawyer (bar exam); and
- **Economic Analysis:** Christopher Dollman who is an employee of Endeavour and is the Corporate Finance Manager for Endeavour. Christopher Dollman is responsible for corporate finance activities at Endeavour and has 8 years' experience and is a Member of the Institute of Chartered Accountants for England and Wales ("**ICAEW**").

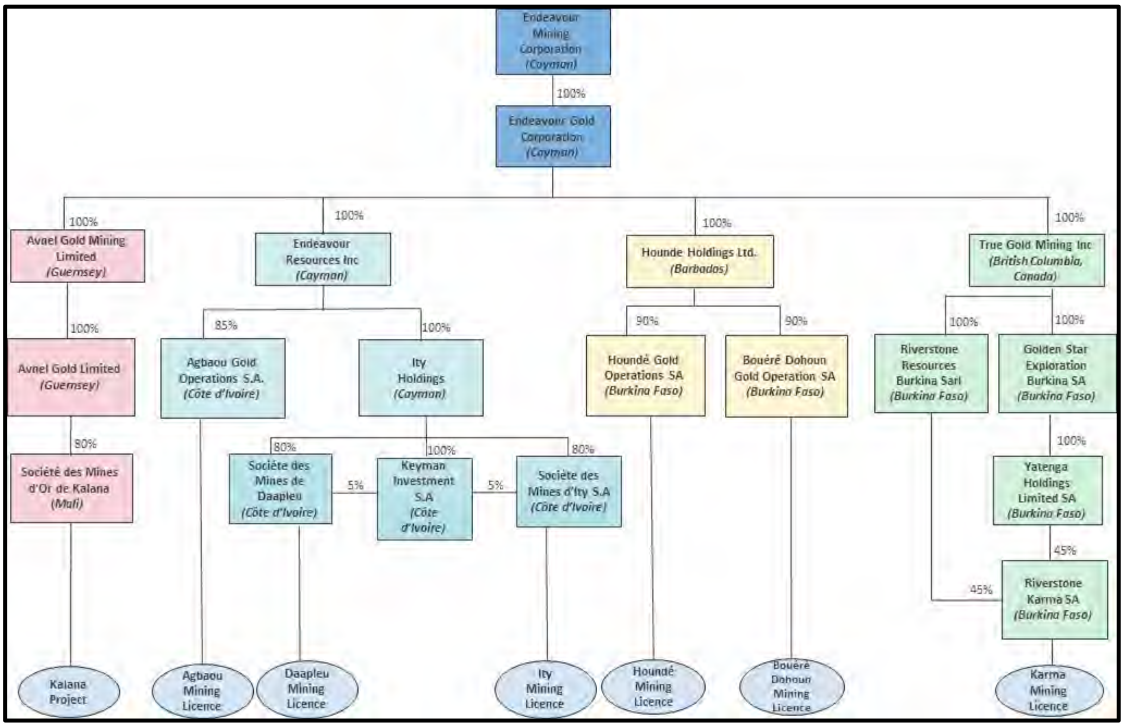
In addition to the above, SRK Consulting (UK) Limited ("**SRK**") has assisted Endeavour and the Qualified Persons in collating certain information as included in this Technical Report as part of a wider review of all of the mineral assets of Endeavour. The individuals from SRK involved in assisting Endeavour in this regard are:

- Dr Iestyn Humphreys a Corporate Consultant and Practice Leader with SRK, who is a Fellow of the Institute of Materials, Minerals & Mining ("**FIMMM**") and has 30 years' experience in the mining and metals industry; and
- Dr Lucy Roberts a Chartered Professional Member of the Australian Institute of Mining and Metallurgy ("**AusIMM**") and has 21 years' experience in the mining and metals industry.

2.2 Endeavour Mining Corporation

Endeavour Mining Corporation was incorporated on July 25, 2002 under the laws of the Cayman Islands under the name Endeavour Mining Capital Corp. On July 16, 2008 it changed its name to Endeavour Financial Corporation and then on September 14, 2010 it changed its name to Endeavour Mining Corporation (hereinafter "**Endeavour**" or the "**Company**" or the "**Group**"). Endeavour's registered office is located at 27 Hospital Road, George Town, Grand Cayman, Cayman Islands. Its corporate office is located at 5 Young Street, London, United Kingdom and its executive office is located at 7 Boulevard des Moulins, Monaco. Endeavour's ordinary shares are listed on the Toronto Stock Exchange ("**TSX**") under the symbol "**EDV**" and quoted in the United States on OTCQX International under the symbol "**EDVMF**". As at March 1, 2020, the intercorporate relationships between Endeavour and its material subsidiaries, the percentage ownership of the voting securities of each material subsidiary and their respective jurisdictions of incorporation are set out below in Figure 2-1.

Figure 2-1: Endeavour Corporate Structure (source: Endeavour)



Endeavour is an intermediate gold producer focused on developing and operating a portfolio of high quality low-cost, long-life mines in West Africa. With its technical teams based in proximity to its mines, Endeavour has established a solid track record of successful exploration, project development and operational management in the highly prospective Birimian greenstone belt. Endeavour's strategy is premised on four strategic levers which serve as a blueprint for creating sustainable value over the long term: operational excellence; project development; unlocking exploration value; portfolio and balance sheet management.

As of March 1, 2020, Endeavour's mining operations comprised the Ity Gold Mine and the Agbaou Gold Mine located in Côte d'Ivoire, the "**Houndé Gold Mine**" and the Karma Gold Mine located in the Republic of Burkina Faso ("**Burkina Faso**"). Endeavour also has an extensive exploration portfolio (totalling approximately 6,000km^2) in Côte d'Ivoire, Burkina Faso, the Republic of Mali and the Republic of Guinea. Endeavour considers the Ity Gold Mine and the Houndé Gold Mine to be its material properties.

2.3 Houndé Gold Mine

Endeavour's equity interest in the Houndé Gold Mine is held through a wholly owned subsidiary Houndé Holdings Limited ("**HHL**") which in turn has a 90% equity interest (balance of 10% held by the Government of Burkina Faso – "**GoBF**") in two separate operating companies, Houndé Gold Operations SA ("**HGO**") and Bouéré Dohoun Gold Operation SA ("**BDGO**"). The mineral assets held by these companies comprise:

- The "**Houndé Exploitation Permit**" which was granted to HGO on February 5, 2015 covering 23.20km^2 and is valid until February 5, 2035 and may be renewed for consecutive five-year periods until deposits are depleted; and
- The "**Bouéré Dohoun Exploitation Permit**" was granted to BDGO on January 23, 2017 covering 5.37km^2 and is valid until January 23, 2022. It may be renewed for consecutive five-year periods until deposits are depleted.

A royalty on both exploitation permits is owed to the Government of Burkina Faso based on a

3% to 5% sliding scale linked to prevailing gold prices. There is also a 2% NSR royalty in favour of Sandstorm Gold Ltd ("**Sandstorm**").

In addition, Endeavour owns a further 11 Exploration Permits situated in the south-western region of Burkina Faso. One of these Exploration Permits, "**Kari Nord**" comprises the "**Kari Deposits**" of Kari Pump, Kari Centre and Kari West. The Kari Pump Open Pit is presently the subject of an extension application for a total of 61.8km^2 such that the Kari Pump deposit will be transferred into the extended Houndé Exploitation Permit. The extension application is being processed by the Burkina Faso Mining Administration and is scheduled for completion by July 2020. The Kari Pump deposit is on the Kari Nord exploration concession and the exploration permit (Decree 2014-000244/MME/SG/DGMG) is held by Burkina Faso Gold SARL (100.00% held by EDV).

The Houndé Gold Mine is located approximately 250km southwest of Ouagadougou, the capital city of Burkina Faso. It is approximately 2.7km from a paved highway and less than 1km away from a 225kV power line that extends from Côte d'Ivoire through to Ouagadougou. The nearby town of Houndé is the centre of the Houndé municipality, which has a population of approximately 50,000. A rail line that extends to the port of Abidjan, Côte d'Ivoire, lies approximately 25km west of the deposit area.

As a result of Endeavour's acquisition of Avion on October 18, 2012, Endeavour acquired the Houndé Gold Mine. Endeavour initiated an in-fill drill program, which consisted of 358 holes (40,534m), over the Vindaloo and Madras NW zones in late October 2012, with the goal to upgrade the mineral resources. Including this most recent drill program, 751 core and RC holes (103,677m) along the trend of the Vindaloo and Madras NW zones were completed by Endeavour (or predecessor companies) by 2013. All of this data was incorporated into section sets, interpreted and used in the updated mineral resource estimate. This new resource estimate was used as the basis for a feasibility study NI 43-101 technical report to assess the economic viability of the project. The report was finalized in October 2013 with a positive conclusion concerning a development decision for the project given the favourable economics.

Construction was completed in October 2017 ahead of schedule and US$15m below the initial capital budget of US$328m. As construction was tracking ahead of schedule and below budget, Endeavour decided to spend approximately US$21m in addition to the initially planned works (mainly for a 26MW back-up power station and fuel farm and to build Cell 2 of the tailings storage facility), bringing the total investment to US$334m.

Houndé achieved first gold pour on October 18, 2017 and nameplate capacity was achieved by the end of October 2017, within weeks following the introduction of ore. Following the rapid ramp-up period, commercial production was declared on November 1, 2017.

Table 2-2 and Table 2-3 present the historical operating statistics and unit operating expenditures for Houndé Gold Mine for the 12-month periods ended 31 December for 2017 through 2019 inclusive. To date Houndé Gold Mine has mined a total of 10.0Mt of ore grading 2.2g/tAu and produced 0.6Moz of gold at an average Cash Cost and All in Sustaining Cost ("**AISC**") of US$519/oz and US$692/oz respectively. The salient operating results for the 12-month period ended 31 December 2019 are:

- Material mined of 38.2Mt comprising waste of 35.2Mt and ore mined of 3.0Mt grading 2.3g/tAu for an overall stripping ratio of 11.9t_{waste}:t_{ore};
- Processed ore of 4.1Mt grading 1.8g/tAu for total recovered gold of 226koz and reflecting metallurgical recovery of 92.7%;
- Gold sales of 227kozAu at a gold price of US$1,391/oz for total sales revenue of

US$316.1m;

- Operating expenditure of US$159.3m and capital expenditures of US$27.8m with additional lease re-payments of US$12.0m;
- Unit operating expenditures of:
  - US$2.23/$t_{mined}$ (US$5.22/BCM) for mining activities,
  - US$12.48/t for processing activities,
  - US$3.62/t for site-based G&A and US$36.4/oz sold for allocated corporate expenditures; and
- Cash Costs and AISC per ounce sold of US$666/oz and US$887/oz respectively.

The Technical Economic Parameters ("**TEPs**) as included in the LoMps as reported herein include production, sales, sales revenue, operating expenditures, capital expenditures including working capital movements and other expenditures. The unit costs as derived from the LoMp include:

- **"Cash Costs"** reported per ounce gold sold and reported on a by-product basis, where expenditures are determined net of silver and copper sales where relevant. Cash Costs comprise mining (excluding capitalised waste development), processing, G&A, and non-cash items including stockpile adjustments, gold-in-circuit adjustments ("**GIC**") and finished goods adjustments but excluding royalty payments; and
- All in Sustaining Costs ("**AISC**") which incorporate the Cash Costs and the following items: royalties, sustaining capital, capitalised was development (sustaining) but excluding working-capital movements, retrenchment and mine closure.

All Cash Costs and AISC as reported herein are comparable to that historically reported in other public-domain disclosures. Furthermore, all TEPs are presented as real terms 1 January 2020 and specifically exclude any assumptions for consumer price inflation ("**CPI**") or purchase price inflation.

Table 2-2: Hound Gold Mine: historical operating statistics

Statistic	Units	Total	2017	2018	2019
Production					
Stripping Ratio	(t_{waste}:t_{ore})	8.7	13.1	6.1	11.9
Mined	(Mt)	97.0	17.3	41.5	38.2
Waste	(Mt)	86.9	16.0	35.7	35.2
Ore	(Mt)	10.0	1.2	5.8	3.0
	(g/tAu)	2.2	2.9	1.9	2.3
	(kozAu)	681	116	359	206
Milled	(Mt)	8.9	0.8	3.9	4.1
	(g/tAu)	2.1	2.9	2.3	1.8
	(kozAu)	610	76	291	243
Metallurgical Recovery	(%)	93.7	95.4	94.1	92.7
Recovered	(kozAu)	572	73	274	226
Sales					
Sold	(kozAu)	564	61	276	227
	(US$/oz)	1,319	1,265	1,272	1,391
	(US$m)	744.5	77.2	351.1	316.1
Operating Expenditure					
Mining	**(US$m)**	**(173.6)**	**(9.3)**	**(79.0)**	**(85.3)**
direct	(US$m)	(152.1)	(9.3)	(79.3)	(63.5)
fleet maintenance	(US$m)	(21.5)	-	0.2	(21.8)
Processing	**(US$m)**	**(103.6)**	**(5.5)**	**(46.4)**	**(51.7)**
Direct	(US$m)	(98.7)	(5.5)	(46.0)	(47.1)
Maintenance	(US$m)	(5.0)	-	(0.4)	(4.6)
G&A	**(US$m)**	**(52.6)**	**(2.7)**	**(26.7)**	**(23.3)**
Site	(US$m)	(37.3)	(2.2)	(20.0)	(15.0)
Regional	(US$m)	(15.4)	(0.4)	(6.7)	(8.3)
Realisation and By-product Credit	(US$m)	(3.2)	(0.1)	(1.1)	(2.0)
Royalty	**(US$m)**	**(47.9)**	(4.6)	(21.8)	(21.5)
Capitalised	**(US$m)**	**39.1**	**4.0**	**10.6**	**24.5**
Total	**(US$m)**	**(341.8)**	**(18.2)**	**(164.4)**	**(159.3)**
Capital Exp.					
Growth	(US$m)	(263.3)	(234.5)	(28.8)	-
Sustaining	(US$m)	(30.2)	-	(7.2)	(23.1)
Capitalisation	(US$m)	(51.4)	(4.0)	(30.1)	(17.3)
Working Capital	(US$m)	16.8	3.0	1.2	12.6
Exploration	(US$m)	(0.8)	-	(0.8)	-
Total	**(US$m)**	**(328.9)**	**(235.4)**	**(65.7)**	**(27.8)**
Other					
Lease Re-Payments	(US$m)	(28.5)	-	(16.5)	(12.0)

Statistic	Units	Total	2017	2018	2019
Total	**(US$m)**	**(28.5)**	**-**	**(16.5)**	**(12.0)**

Table 2-3: Hound Gold Mine: historical unit operating expenditures

Statistic	Units	Total	2017	2018	2019
Cash Cost	(US$/oz)	519	239	459	666
AISC	(US$/oz)	692	382	601	887
Royalty	(%)	6.43	5.95	6.21	6.80
Mining	(US$/BCM)	3.93	1.14	4.13	5.22
	(US$/$t_{mined}$)	1.79	0.54	1.91	2.23
Processing	(US$/$t_{proc}$)	11.63	6.81	11.74	12.48
G&A - site	(US$/$t_{proc}$)	4.19	2.74	5.07	3.62
G&A- regional	(US$/oz)	27.2	7.1	24.1	36.4
Sustaining	(US$/$t_{proc}$)	3.39	-	1.81	5.57

The Mineral Resource estimate for the Houndé Gold Mine as at 31 December 2019 reports:

- Measured Mineral Resources totalling 1.7Mt grading 1.75g/tAu for contained metal of 96koz;
- Indicated Mineral Resources totalling 58.6Mt grading 2.07g/tAu for contained metal of 3,797kozAu; and
- Inferred Mineral Resources totalling 6.9Mt grading 2.07g/tAu for contained metal of 456kozAu.

Furthermore, the Mineral Resource statements as reported above are accompanied by the following notes:

- The Mineral Resources are reported in accordance with the guidelines and terminology provided in the CIM Standard;
- The Mineral Resources have an effective date of 31 December 2019;
- The Qualified Persons responsible for the reporting of the Mineral Resources as at 31 December 2019 are:
  - Kevin Harris (CPG), Vice President Resources, Endeavour Mining Corporation who was responsible for the following deposits, Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit,
  - Mark Zammit (MAIG), Principal Consultant, Cube Consulting Pty Ltd who was responsible for the Vindaloo-Madras Deposits;
- All Mineral Resources are reported within an optimised shell generated assuming a long-term gold price of US$1,500/oz and an in-situ cut-off grade of 0.5g/tAu with the exception of Vindaloo-Madras which ranges from 0.35g/tAu to 0.50g/tAu;
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability; and
- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves.

The total Mineral Reserves reports a total of 32.6Mt grading 2.06g/tAu for total contained metal of 2,164kozAu comprising:

- Proven Mineral Reserves of 1.8Mt grading 1.57g/tAu with contained metal of 89kozAu; and
- Probable Mineral Reserves of 30.9Mt grading 2.09g/tAu with contained metal of 2,075kozAu.

Furthermore, the Mineral Reserve statements as reported above are accompanied by the following notes:

- The Mineral Reserves have an effective date of 31 December 2019;
- The Mineral Reserves are reported in accordance with the guidelines and terminology provided in the CIM Standard;
- The Qualified Person responsible for the reporting of the Mineral Reserves as at 31

December 2019 is Salih Ramazan (FAusIMM), Vice President Mine Planning, Endeavour Mining Corporation who was responsible for the estimation and reporting of all Mineral Reserves reported for the Houndé Gold Mine;

- All Mineral Reserves are reported assuming a long-term gold price assumption of US$1,300/oz; and
- Details relating to the various modifying factors and deposit specific cut-off grades are reported in Section 15.3 of this Technical Report.

The current Life-of-Mine plan which underpins the current Mineral Reserves indicates the following key salient statistics:

- Total gold production and gold sales of 1,960koz and 1,959koz respectively;
- Total sales revenue of US$2,546.6m derived assuming a constant real (1 January 2020) money terms gold price of US$1,300/oz;
- Total operating expenditure (post capitalisation) of US$1,368.4m (real money terms 1 January 2020);
- Total capital expenditure of US$355.7m comprising sustaining capital, capitalised operating expenditures, working capital movement and mine closure (real money terms 1 January 2020). In addition to this the lease repayments and other outflows amount to US$47.1m which are assumed to be expended from 2020 through 2023 inclusive;
- LoM weighted average unit mining, processing and G&A related operating expenditures (pre capitalisation) of US$1.97/tmined, US$14.89/tmilled and US$5.93/tmilled respectively; and
- LoM weighted average unit cash costs and AISC of US$628/oz and US$875/oz reported on a sales basis.

3 RELIANCE ON OTHER EXPERTS

This Technical Report has been authored by the Qualified Persons. Whilst certain individuals have provided information to the Qualified Persons, the Qualified Persons are not placing reliance on any other experts as defined in accordance with the Requirements.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Introduction

The following section includes details relating to the following items in respect of the Houndé Gold Mine: property location; royalties and other revenue related payments; environmental and social liabilities; mineral rights and agreements; and surface rights.

4.2 Property Location

Houndé is located approximately 250km southwest of Ouagadougou (Figure 4-1), the capital city of Burkina Faso. It is approximately 2.7km from a paved highway and less than 1km away from a 225kV power line that extends from Côte d'Ivoire through to Ouagadougou. The nearby town of Houndé has a population of approximately 50,000. A rail line that extends to the port of Abidjan, Côte d'Ivoire, lies approximately 25km west of the deposit area.

Figure 4-1: Houndé Gold Mine location map (source: Endeavour)

4.3 Royalties and other revenue related payments

Royalty arrangements relating to the Houndé Gold Mine comprise:

- Government royalty based on banded rates: ≤US$1,000/oz of 3.00%; >US$1,000/oz and ≤US$1,300/oz of 4.00%; and >US$1,300/oz of 5.00%;
- Social Development Fund of 1.00% of payable metal; and
- Sandstorm Gold Ltd ("**Sandstorm**") royalty of 2.00% of payable metal.

4.4 Environmental and Social Liabilities

In July 2014, an Environmental and Social Management Plan was developed prior to the construction and operation of the mine. Environmental permits have been granted covering the open pit mining operations, the process plant and surface infrastructure.

In 2018 a resettlement action plan ("RAP") for the resettlement of the Bouéré village was completed and successful implemented. A total of 31 concessions were built, relocating about

130 people. The new village opened in June 2019 and has solar powered boreholes for water supply as well as two water wells.

Livelihood restoration programs for project affected households and villages have also been created. In 2019, local women and youth associations received funding and support for the creation of income-generating activities such as beekeeping, soya bean cultivation and chicken/goat breeding. A RAP is underway for the Kari Pump project and is planned for completion in 2020 in accordance with the mining plan.

A closure estimate for the Houndé mine was prepared in 2019. It does not cover the Bouéré and Dohoun and the Kari Pump open pits. The Houndé Gold Mine's plan has been reviewed as part of the Endeavour closure plan review. The findings of the review are applicable to the Houndé plan and cost estimate, which will be updated to align with the new closure standard and guidance that is being drafted.

A new 2020 closure cost estimate has been prepared for the Houndé mine site. It is referred to as an asset-retirement-obligation ("**ARO**") estimate, though includes a LoM estimate of US$12.8m, however this does not currently include the Bouéré, Dohoun and Kari Pump open pits.

Closure plans for Bouéré, Dohoun and Kari Pump open pits and corresponding cost estimate still have to be prepared. These will be developed in 2020 and will align with the new closure standard and guidance that is being drafted. The ESIA reports for Bouéré, Dohoun and Kari Pump include cost estimates for rehabilitation and closure of these satellite mine sites of approximately US$0.94m, US$0.67m and US$0.56m, respectively. These are preliminary estimates based simply on a cost of US$0.05 per tonne of mineral and waste produced at each site (18.9Mt at Bouéré, 13.4Mt at Dohoun and 11.3Mt at Kari Pump). The current LoMp reflects a new total of 141.8Mt (Bouéré – 9.8Mt; Dohoun – 13.5Mt; Kari Pump – 118.5Mt) which on a similar basis would result in an additional closure cost of US$7.1m. None of the above estimates provide for environmental monitoring and water management costs post closure.

4.5 Mineral Rights and Agreements

Houndé Gold Operation SA holds an exploitation permit for the Houndé Gold Mine granted by means of Decree 2015–090/PRES-TRANS/PM/MME/MEF/MERH. It was granted on 5 February 2015 and expires on 5 February 2035. This is complemented with an order (Arrêté Conjoint No 2018-003-MMC-MINEFID- Phase de Production HGO) fixing the date of first production at Houndé Gold Mine (6 November 2017) and marking the end of the construction period and start of production phase.

The Kari Pump Open Pit will fall under the exploitation permit for the Houndé Gold Mine. The extension application is being processed by the Burkina Faso Mining Administration and is scheduled for completion by July 2020. The Kari Pump deposit is on the Kari Nord exploration concession and the exploration permit (Decree 2014-000244/MME/SG/DGMG) is held by Burkina Faso Gold SARL (100.00% held by EDV).

Bouéré Dohoun Gold Operation SA has an exploitation permit for the Bouéré and Dohoun open pits by means of Decree 2017-027/ PRES/PM/MEMC/MINEFID/MEEVCC, which was granted on 23 January 2017 and expires on 23 January 2022.

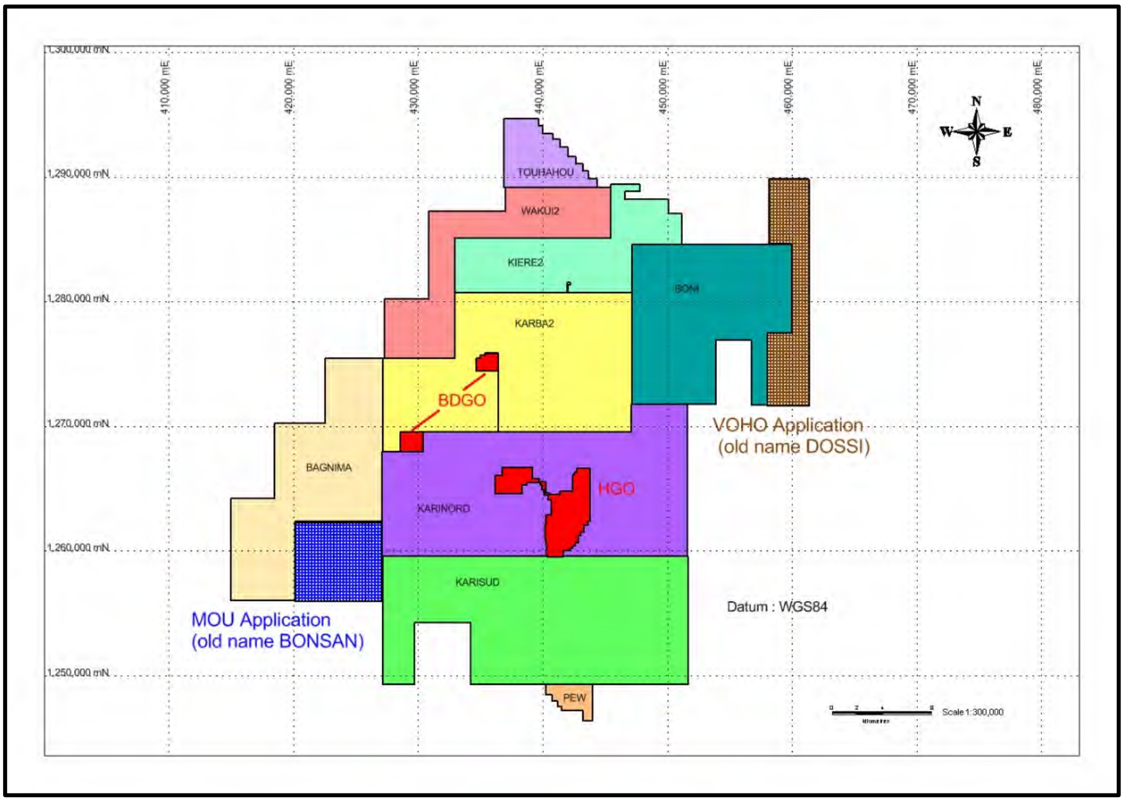
The Houndé and the Bouéré-Dohoun exploitation permits have conditions attached. Both permits have conditions requiring quarterly reporting to government on production statistics, benefits to the communities, jobs, stakeholder feedback and conflict management, the implementation of the ESMP and progressive rehabilitation of the site.

Mining conventions are also in place for the Houndé Gold Mine and the Bouéré-Dohoun satellite mines. These are agreements between government (represented by the Ministry of Mines and Energy) and the operating companies; Houndé Gold Operation SA (Houndé Mining Convention, signed 20 November 2015) and Bouéré Dohoun Gold Operation SA (Bouéré-Dohoun Mining Convention, signed 22 February 2018). The terms in both mining conventions are similar (in wording and numbering). Obligations pertaining to environmental, social and governance include:

- Preferential use of national services and materials wherever possible (Article 6);
- Preferential employment of local people, respecting human rights and employment law and replacing expatriates with locals who have acquired the same experience (Article 7);
- From the date of first commercial production, contribution to the improvement of hospitals schools and other community infrastructure;
- Protection of the environment (Article 11);
- Maintenance of bank account within Burkina Faso for a restoration fund for the mine site as defined by the mining regulations – the cost must cover the implementation of an environmental preservation and rehabilitation programme and is exempt from corporation tax (Article 11); and
- Payment of other taxes and fees (Article 18 and 19).

Exploration permits are held by either Avion Gold Burkina SARL and Burkina Faso Gold SARL for the Bagnima, Karba 2, Kari North, Kari South, Boni, Wakui 2, Kiéré 2, Touhahou and Pew concession. Applications have been made for permits for exploration on the Mou and Voho concessions.

Figure 4-2: Current mineral tenure positions (source: Endeavour)



4.6 Surface Rights

The Constitution of Burkina Faso (Act 023-2012) establishes the right of property and compensation in the event of expropriation. The 2015 Mining Code covers the relationship between mineral rights holders and owners and users of land in Articles 122 to 129. The Mining Code requires land tenure legislation is observed and that owners and users of land are compensated where occupation of land for mining necessitates their displacement.

Land on the Houndé and Bouéré-Dohoun concessions is subject to customary land tenure systems. Prior to 2009, land tenure legislation did not recognise customary land tenure. Reformation of this legislation was initiated by the 2007 National Rural Land Security Policy and 2009 Rural Land Tenure Law (Law 034-2009), which decentralizes land governance and seeks to harmonize statutory and customary law, and the 2012 (Law 034-2012). Despite the reforms, relatively few land rights have been formalized across the country to date. Most rural land is governed according to customary, informal rules, which differ between communities.

Laws 034-2009 and 034-2012 made provisions for procedures and documents that recognise local practices and land rights and introduced rural land certificates that provide security of tenure. The certificates are issued based on a process involving consultation between the land holders, traditional and municipal authorities and the public. Disputes are taken to village land conciliation commissions and can only go to court if the relevant commission was unable to resolve the dispute.

Resettlement has been required at all four mine sites and Resettlement Action Plans ("**RAPs**") have been developed for this. Resettlement has been completed at the Houndé and Bouéré sites and is still to be completed at Dohoun and Kari Pump sites (Section 20.5). The resettlement processes provide for the securing of tenure rights for the resettled parties at the resettlement sites.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Location and Access

Ouagadougou, the capital city of Burkina Faso, is connected to Europe with daily flights by Air France and twice weekly by Air Burkina to Paris, three times per week to Brussels by Brussels Airlines. To East Africa it is connected twice weekly by Kenya Airways to Nairobi and to Addis Ababa by Ethiopian Airways. There are also frequent flights within the West African region to Mali, Ghana, Cote d'Ivoire, Senegal and Niger.

The Houndé and Bouéré-Dohoun exploitation permit areas are located in the south-western part of Burkina Faso, in the municipality of Houndé and near the urban centre of the municipality, which is the town of Houndé. The mine sites are accessible from Ouagadougou via the paved Route National 1 (N1), for around 260km. Driving the distance between Ouagadougou and the site takes approximately three hours.

Alternatively, access to the mine sites can be gained from Burkina Faso's second largest city of Bobo-Dioulasso near the border with Mali via the Route National 1 (N1) over a distance of 90km. Access to the various parts of the concessions from the paved road is provided by a network of roads and trails that were locally upgraded or built by Endeavour. A 12.5km haul road has been constructed by Endeavour between the Houndé and Bouéré-Dohoun concessions which extends from the Bouéré Open Pit, past the Kari Pump open Pit, to the Houndé mine site.

Endeavour owns and operates an air service through a fully owned subsidiary, Endeavour Aviation (EDVA) which has a total of four aircraft – 2 x Pilatus PC12 and 2 x Pilatus PC6 – of which, one each of the PC12 and PC6 are housed at Houndé and at Ity Gold Mine in Côte d'Ivoire. These aircraft fly 5 days per week between Ouagadougou, Houndé and Karma Gold Mine, and also link up with the PC12 from Côte d'Ivoire which is registered to transfer people to and from Abidjan to Burkina Faso, predominantly to Bobo-Dioulasso due to proximity to Houndé.

5.2 Local Resources and Infrastructure

The main railway line between Abidjan, the chief port in Cote d'Ivoire, and Ouagadougou passes approximately 28km to the north of the site along the D40 main road heading north west from Houndé town. There is a major station at Bobo-Dioulasso that is in active use for freight, plus a minor station at Béréba (26km from Houndé) which services the local cotton producers, and with minor modifications would be suitable as a terminal to receive construction materials and equipment and ongoing operational supplies, especially those that can be containerized for security of shipment and ease of handling.

The main ports serving project are Abidjan, in Cote d'Ivoire and Tema in Ghana. Both ports are connected to Burkina Faso by main roads and provide the prime entry point for importation of equipment and fabrications. Both ports can to handle all types of cargo required for the mine. Freight from Abidjan can be sent via rail through to Bobo-Dioulasso, which is around 20% less expensive than road, though takes longer due to scheduling constraints.

In 2019, there were 434 container deliveries to Houndé coming from all ports, of which 328 came from Abidjan. Of this number, 122 arrived by rail. In the first quarter of 2020, 85 containers have been received, of which 52 came from Abidjan. 49 of these containers came via rail, which is be the preferred route provided delivery times can be achieved.

The Route National 1 (N1) passes through the Houndé concession, between the Houndé mine site and the Kari Pump Open Pit area. The N1 is the country's major paved highway linking the capital with the second largest city. It is also part of the main international highway in the Sahel region linking Dakar (Senegal) with Niamey (Niger) passing through Mali and Burkina Faso.

The paved highway from the region's main port Abidjan (Côte d'Ivoire) joins the Trans-Sahel road at Bobo-Dioulasso, which is located approximately 100km southwest of the project area. The paved highway to the Ghanaian border and onwards to Accra and the Takoradi port is currently being upgraded.

The national electric grid main power line runs parallel to the main highway and passes through the property. Burkina Faso's power generation capacity is being upgraded with the installation of new power stations and feed in from new power stations in Ghana.

An abundance of unskilled local workforce is available. Skilled workers, and general services and equipment can be found in Bobo-Dioulasso or in the capital city, Ouagadougou

5.3 Physiography and Climate

The Houndé and Bouéré-Dohoun concessions lie approximately 320m above sea level and are characterized by gently rolling to flat topography with occasional round to steep laterite ridges to 20m high that are bisected with shallow northeast- to east-trending seasonal streams. A thin cover of soil, over laterite, covers most areas, with alluvium cover proximal to streams and drainages. Basement volcanic rocks and sediments outcrop locally with the most prominent being a large northeast-trending ridge of metavolcanic rock located approximately 5km west of the deposit area.

The natural vegetation is shrub savanna, with some tree savanna. Trees and brushes are spaced from 1m to 100m apart with higher densities in drainage areas. During the wet season, grass covers the non-farm area and is often burned off after the dry season

The Houndé and Bouéré-Dohoun concessions are near the top of a watershed and hence there are no large permanent rivers in the vicinity. The mine sites are drained by tributaries of the Tuy River (also called the "**Grand Bale**" River) and the Bougouriba River. The nearest large surface body of water is the barrage at Pa, approximately 35km to the northeast of the Houndé mine site area. With the short-wet season and long dry season, surface water sources are intermittent; coupled with the flat topography, surface water storages are relatively inefficient, requiring a large area to store appreciable volumes. The high evaporation rates can cause appreciable water loss from such storages. .

The Houndé permit area lies in the savannah of the is Sudano-Sahelian climatic zone and is influenced by the West African monsoon, which can bring torrential rain, and Harmattan, which blows in the dry season. The wet season extends from April to October and brings most of the annual rainfall, which averages about 900mm and ranges between 470mm and 1,200mm annum. There is high interannual variability in rainfall and August is generally the wettest month, with rainfall of up to 250mm over the month and some downpours producing 90mm to 130mm in 24 hours.

Maximum temperatures generally range from 22°C to 35°C, with the coolest months being the dry months and the wettest months (around August). The weather station of Bobo-Dioulasso, 90km to the west, has recorded an average temperature of 27°C over a period of 22 years, with a maximum of 43°C reached in April and a minimum of 9°C in December.

Monthly and daily historic hydrologic data for two climate stations in the vicinity of the Houndé concession were used to derive baseline design climatology. These stations are:

- Houndé climate station, located 6.3km north of the Houndé Mine Area; and
- Boromo climate station, located 74.7km northeast of the Houndé Mine Area.

6 HISTORY

Mineral exploration in the Houndé area began in the 1990's. Previously, the Bureau de Recherches Géologiques et Minières ("**BRGM**") and Bureau de Mines et de la Géologie du Burkina Faso ("**BUMIGEB**") worked in the area intermittently from 1939 to 1982.

Following positive results from the UNDP regional geochemical surveys, Oxford Resources Inc. optioned the Kari Nord permit in 1998 and began an exploration programme which, from 1998 to 2000, gained financial support from Avgold Ltd. of South Africa. Their programme consisted of regional soil sampling (1,000 m by 250 m) and geophysical interpretation. Apparently, the soil survey indicated low gold values in the Vindaloo and Kari areas. A lack of funds stopped work in 2000.

The Kari Nord and Kari Sud permits were granted to Pyramide-M in 2004. Barrick Africa Exploration Ltd. Burkina (Barrick) acquired them in 2005. Then the permits passed into the hands of Goldbelt Resources West Africa SARL ("**Goldbelt**") at the end of 2007. The Karba permit was initially held by Resolute West Africa (Resolute) from 2003 to 2006. In 2006, Goldbelt acquired the permit.

Wakui, Kopoi and Bouhaoun permits were initially held by Resolute in 2004, then by Goldbelt in 2006.

In late 2007 Goldbelt was purchased by Wega Mining ("**Wega**"), which was in turn purchased by Avocet Mining (Avocet) in June 2009. In October 2010, Avion Gold Corporation acquired Avion Gold (Burkina Faso) SARL, the subsidiary that was created to hold the Houndé permits (Kari Nord, Kari Sud, Karba, Wakui, Kopoi and Bouhaoun), from Avocet Mining. In October 2012, Endeavour Mining Corporation acquired Avion Gold Corporation and now owns a 100% interest in the Houndé Property through its 100% ownership of Avion Gold (Burkina Faso) SARL. Note that the original size of the permits has changed over time to reflect the permit renewal process and that the current map displays the current permit outlines.

As a result of Endeavour's acquisition of Avion on October 18, 2012, Endeavour acquired Houndé. Endeavour initiated an in-fill drill program, which consisted of 358 holes (40,534m), over the Vindaloo and Madras NW zones in late October 2012, with the goal to upgrade the mineral resources. Including this most recent drill program, 751 core and RC holes (103,677m) along the trend of the Vindaloo and Madras NW zones were completed by Endeavour (or predecessor companies) by 2013. All of this data was incorporated into section sets, interpreted and used in the updated mineral resource estimate. This new resource estimate was used as the basis for a feasibility study NI 43-101 technical report to assess the economic viability of the project. The report was finalized in October 2013 with a positive conclusion concerning a development decision for the project given the favourable economics.

Construction was completed in October 2017 ahead of schedule and US$15m below the initial capital budget of US$328m. As construction was tracking ahead of schedule and below budget, Endeavour decided to spend approximately US$21m in addition to the initially planned works (mainly for a 26MW back-up power station and fuel farm and to build Cell 2 of the tailings storage facility), bringing the total investment to US$334m.

Houndé achieved first gold pour on October 18, 2017 and nameplate capacity was reached by the end of October 2017, within weeks following the introduction of ore. Following the rapid ramp-up period, commercial production was declared on November 1, 2017.

In 2019, Houndé produced 223,304oz at an AISC of US$862/oz. Houndé is expected to produce 230,000-250,000oz in 2020 at an AISC of US$865/oz to US$895/oz. Mining is expected to be focused on the Vindaloo and Bouéré Open Pits. The top end of the production guidance and low end of AISC guidance incorporates the potential to start mining the higher-grade Kari Pump deposit in the latter part of the year. The overall strip ratio is expected to remain high in the first half of the year. The plant is expected to continue to perform above nameplate capacity with the overall ore blend expected to be predominantly fresh ore. Low grade stockpiles are planned to supplement the mill feed in the first half of the year, while mining focuses on waste extraction, resulting in a higher processed grade in the second half.

An exploration programme of up to US$11m totalling approximately 94,000m has been planned for 2020, with the aim of delineating additional resources in the Kari area and at the Vindaloo South and Vindaloo North targets. In addition, other targets such as Dohoun and Sia/Sianikoui are expected to be tested in the near future.

The text and tables below summarise the prior Mineral Resource and Mineral Reserve declarations as reported by Endeavour in various public documents including Annual Information Forms which are also lodged on SEDAR. These prior declarations are provided solely for historical context and comparative purposes and have been superseded by the 'Current' Mineral Resources and Mineral Reserves dated 31 December 2019 and reported in this Technical Report.

Prior Mineral Resource Declarations

Since 2010, the Company has published various Mineral Resources statements for the deposits of Houndé Gold Mine and these are all included in its Annual Information Forms ("**AIF**") for the calendar years ending 31 December for 2010 through 2018 inclusive (Table 6-1; Table 6-2). All prior Mineral Resources were reported in accordance with the guidelines and terminology provided in the CIM Standards and the relevant Qualifying Persons for each statement is included in each of the relevant published AIF. In certain instances, these declarations are supported by published 43-101 Technical Reports as noted below.

P&E Consultants ("**P&E"**) completed three Mineral Resource estimates for the Vindaloo-Madras deposit in 2010, 2011 and 2012 all of which were reported in accordance with CIM Standards.

The 2013 Vindaloo-Madras Mineral Resource estimate was completed by Mark Zammit (BSc(Hons), MAIG)) of Cube Consulting on behalf of the Company and used as the basis of a Preliminary Economic Assessment ("**PEA**"). It was reported in accordance with CIM Standards, using a gold price of US$1,600/oz, and constrained by a pit shell at a cut-off grade ("**COG**") of 0.35g/tAu. The June 2013 Vindaloo-Madras Mineral Resource Estimate was also authored by Mark Zammit of Cube Consulting and used as the basis of the 2013 Lycopodium-led Feasibility Study. It was reported in accordance with CIM Standards, assuming a gold price of US$1,600/oz gold price and constrained by a pit shell at a COG of 0.35g/tAu.

The 2014 Mineral Resource Estimate for the Bouéré deposit was authored by Kevin Harris (CPG). The estimate was reported in accordance with CIM Standards, assumed a gold price of US$1,500/oz and constrained by a pit shell and a cut-off grade ("**COG**") of 0.5g/tAu.

Table 6-1: Houndé Gold Mine: Prior Mineral Resource Statements (2010-2015)

Classification & Deposit	Measured Tonnage (kt)	Measured Grade (g/tAu)	Measured Content (kozAu)	Indicated Tonnage (kt)	Indicated Grade (g/tAu)	Indicated Content (kozAu)	Measured + Indicated Tonnage (kt)	Measured + Indicated Grade (g/tAu)	Measured + Indicated Content (kozAu)	Inferred Tonnage (kt)	Inferred Grade (g/tAu)	Inferred Content (kozAu)
Vindaloo-Madras												
12-2010	-	-	-	883	2.22	63	883	2.22	63	5,725	2.97	547
12-2011	-	-	-	13,410	2.07	893	13,410	2.07	893	23,708	1.91	1,456
12-2012	-	-	-	23,708	1.91	1,456	23,708	1.91	1,456	12,210	1.92	752
12-2013	-	-	-	23,708	1.91	1,456	23,708	1.91	1,456	12,210	3.72	1,459
12-2014	3,690	2.57	305	31,830	1.92	1,966	35,520	1.99	2,271	2,980	2.58	247
12-2015	3,690	2.57	305	31,830	1.92	1,966	35,520	1.99	2,271	2,980	2.58	247
Bouéré												
12-2014	-	-	-	1,090	5.39	189	1,090	5.39	189	180	3.46	20
12-2015	-	-	-	1,090	5.39	189	1,090	5.39	189	180	3.46	20
Dohoun												
12-2014		-		1,150	2.35	87	1,150	2.35	87	70	2.67	6

Classification & Deposit	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
12-2015		-		1,150	2.35	87	1,150	2.35	87	70	2.67	6

For the Mineral Resources reported in the past three years prior to the current 2019 Mineral Resource statements the key supporting economic assumptions were as follows:

- For 2016 the Mineral Resources were constrained within an optimised shell derived using a long-term gold price assumption of US$1,500/oz and in-situ cut-off grade of 0.5g/tAu. The Qualified Persons as reported in the 2017 AIF were:
  - Kevin Harris, CPG (Group Resource Manager for the Company) for the Bouéré Deposit and the Dohoun Deposit,
  - Mark Zammit, MAIG (Principal Consultant, Cube Consulting Pty Ltd) for the Vindaloo-Madras Deposits;
- For 2017 the Mineral Resources were constrained within an optimised shell derived using a long-term gold price assumption of US$1,500/oz and in-situ cut-off grade of 0.5g/tAu. The Qualified Persons as reported in the 2017 AIF were:
  - Kevin Harris, CPG (Group Resource Manager for the Company) for the Bouéré Deposit and the Dohoun Deposit,
  - Mark Zammit, MAIG (Principal Consultant, Cube Consulting Pty Ltd) for the Vindaloo-Madras Deposits; and
- For 2018 the Mineral Resources were constrained within an optimised shell derived using a long-term gold price assumption of US$1,500/oz and in-situ cut-off grade of 0.5g/tAu. The Qualified Persons as reported in the 2018 AIF were:
  - Kevin Harris, CPG (Group Resource Manager for the Company) for the Bouéré Deposit the Dohoun Deposit, the Kari Pump Deposits (Kari Pump, Kari Centre and Kari West),
  - Mark Zammit, MAIG (Principal Consultant, Cube Consulting Pty Ltd) for the Vindaloo-Madras Deposits.

Table 6-2: Houndé Gold Mine: Prior Mineral Resource Statements (2016-2018)

Classification & Deposit	2016			2017			2018		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured									
Vindaloo	3,693	2.56	305	3,296	2.44	259	1,477	2.31	110
Stockpiles	-	-	-	346	1.98	22	2,110	1.04	71
Subtotal	**3,693**	**2.56**	**305**	**3,642**	**2.40**	**281**	**3,587**	**1.56**	**180**
Indicated									
Vindaloo	31,979	1.92	1,971	31,475	1.91	1,931	27,617	1.94	1,719
Bouéré	1,087	5.18	181	1,052	4.75	161	1,052	4.75	161
Dohoun	1,152	2.35	87	1,152	2.35	87	1,152	2.35	87
Kari Pump		-			-		11,330	2.71	987
Subtotal	**34,218**	**2.04**	**2,239**	**33,679**	**2.01**	**2,178**	**41,151**	**2.23**	**2,954**
Measured + Indicated									
Vindaloo	35,672	1.98	2,276	34,771	1.96	2,189	29,094	1.95	1,829
Bouéré	1,087	5.18	181	1,052	4.75	161	1,052	4.75	161
Dohoun	1,152	2.35	87	1,152	2.35	87	1,152	2.35	87
Kari Pump	-	-	-	-	-	-	11,330	2.71	987
Stockpiles	-	-	-	346	1.98	22	2,110	1.04	71
Total	**37,911**	**2.09**	**2,544**	**37,320**	**2.05**	**2,459**	**44,738**	**2.18**	**3,134**
Inferred									
Vindaloo	2,994	2.57	247	2,971	2.58	246	2,599	2.62	219
Bouéré	-	-	-	205	3.44	23	205	3.44	23
Dohoun	68	2.91	6	68	2.91	6	68	2.91	6
Kari Pump		-			-		282	2.21	20
Total	**3,062**	**2.58**	**254**	**3,243**	**2.64**	**275**	**3,154**	**2.64**	**268**

Prior Mineral Reserve Declarations

A selection of the prior Mineral Reserve statements for Houndé Gold Mine are provided in Table 6-3 below as reported in the Group's public domain statements (Annual Information Form – "**AIF**") for 31 December 2016, 2017 and 2018. All prior Mineral Reserves were reported in accordance with the guidelines and terminology provided in the CIM Standards and the relevant Qualifying Persons for each statement is included in each AIF. The principal assumptions relied upon for the prior declarations as reported in 2017 and 2018 are:

- For 2018:
  - a long-term gold price of US$1,250/oz,
  - for the Houndé group of open pits, ore loss assumptions of 5.6% and dilution of 7%,
  - for the Bouéré and Dohoun open pits, ore loss assumptions of 2.0% and dilution ranging from 29% to 34%,
  - mill feed cut off grades ranging from 0.36g/tAu to 0.78g/tAu; and
- For 2017:
  - a long-term gold price of US$1,300/oz,
  - for the Houndé group of open pits, ore loss assumptions of 6.0% and dilution of 7%,
  - for the Bouéré and Dohoun open pits, ore loss assumptions of 2.0% and dilution ranging from 29% to 34%,
  - mill feed cut off grades ranging from 0.36g/tAu to 0.78g/tAu.

Table 6-3: Prior Mineral Reserve statement for the Houndé Gold Mine (by deposit)

Classification/ Deposit	2016			2017			2018		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven									
Vindaloo	3,703	2.48	296	3,295	2.28	242	1,488	2.17	104
Stockpiles	-	-	-	342	1.98	22	2,054	1.06	70
Subtotal	**3,703**	**2.48**	**296**	**3,637**	**2.25**	**263**	**3,542**	**1.53**	**174**
Probable									
Vindaloo	24,597	1.93	1,526	24,212	1.89	1,474	21,772	1.92	1,347
Bouéré	1,087	5.18	181	1,130	4.08	148	1,119	4.15	149
Dohoun	1,214	1.84	72	1,202	1.84	71	1,095	1.98	70
Subtotal	**26,898**	**2.06**	**1,779**	**26,543**	**1.98**	**1,693**	**23,986**	**2.03**	**1,566**
Ore Reserves									
Vindaloo	28,300	2.00	1,822	27,506	1.94	1,716	23,260	1.94	1,451
Bouéré	1,087	5.18	181	1,130	4.08	148	1,119	4.15	149
Dohoun	1,214	1.84	72	1,202	1.84	71	1,095	1.98	70
Stockpiles	-	-	-	342	1.98	22	2,054	1.06	70
Total	**30,601**	**2.11**	**2,075**	**30,181**	**2.02**	**1,957**	**27,528**	**1.97**	**1,740**

7 GEOLOGICAL SETTING AND MINERALISATION

7.1 Introduction

The following section includes discussion and comment on the geological setting and mineralisation aspects of the deposits reflected at the Houndé Gold Mine in Burkina Faso, West Africa. The principal topics covered comprise regional geology; local geology; deposit geology with additional focus on deposit descriptions, structure, mineralisation and alteration and weathering.

7.2 Regional Geology

The area is underlain by the Houndé greenstone belt, which comprises andesites, basalts with acidic volcanic intercalations, gabbros, greywacke to argillaceous sediments and banded chert. Gold mineralisation is typically hosted by varying size and orientation, quartz-albite-carbonate-pyrite veins, with associated disseminated pyrite. The following sections outline the regional and local-scale geology and structures that control mineralisation. Further detail is provided in the 2013 FS.

West Africa is underlain by Precambrian cratons of Archaean and Lower Proterozoic age (Figure 7-1), Pan-African mobile zones, dating from the Upper Proterozoic, and intracratonic sedimentary basins, ranging from the Proterozoic to the Quaternary in age (Figure 7-2). During the Precambrian, this part of Africa experienced progressive accretion of a series of successively younger mobile or orogenic zones or belts to the Archaean crust. Occasionally, subsequent orogenic belts developed inside existing cratons, but more commonly they were accreted to the crust along the margins.

Within Burkina Faso, there are three major litho-tectonic domains, namely the Paleoproterozoic basement (termed the Birimian), Neoproterozoic sediments along the western, northern, and south-eastern borders, and a Cenozoic mobile belt, forming inliers in the north-western and eastern areas.

Gold mineralisation is typically associated with the Birimian Paleoproterozoic basement. The craton lithologies typically comprise (from bottom to top):

- a thick sequence of mafic rocks, including basalt, dolerite and gabbro, all of which are tholeiitic in composition, locally inter layered with immature detrital sediments and limestones,
- detrital sediments, comprising volcanics, turbidite, mudstone, and carbonate, including inter bedded calc-alkaline volcanics; and
- coarse clastic sediments belonging to the Tarkwaian Group.

The Proterozoic Birimian greenstone rocks were subjected to orogeny during the Eburnean (1.99Ga to 2.19Ga). During this orogeny, there was crustal shortening associated with greenschist facies regional metamorphism. In some areas, amphibolite metamorphic facies are reached, but these occurrences are interpreted as resulting from contact metamorphism. The last orogenic event in West and Central Africa was the Pan-African of Upper Proterozoic to Lower Paleozoic age (600Ma to 450Ma). This event completed the addition of new crustal material to the older shield areas composed of Archaean cratons and Proterozoic mobile belts.

Figure 7-1: Regional Geology of West Africa – summary (source: Endeavour)

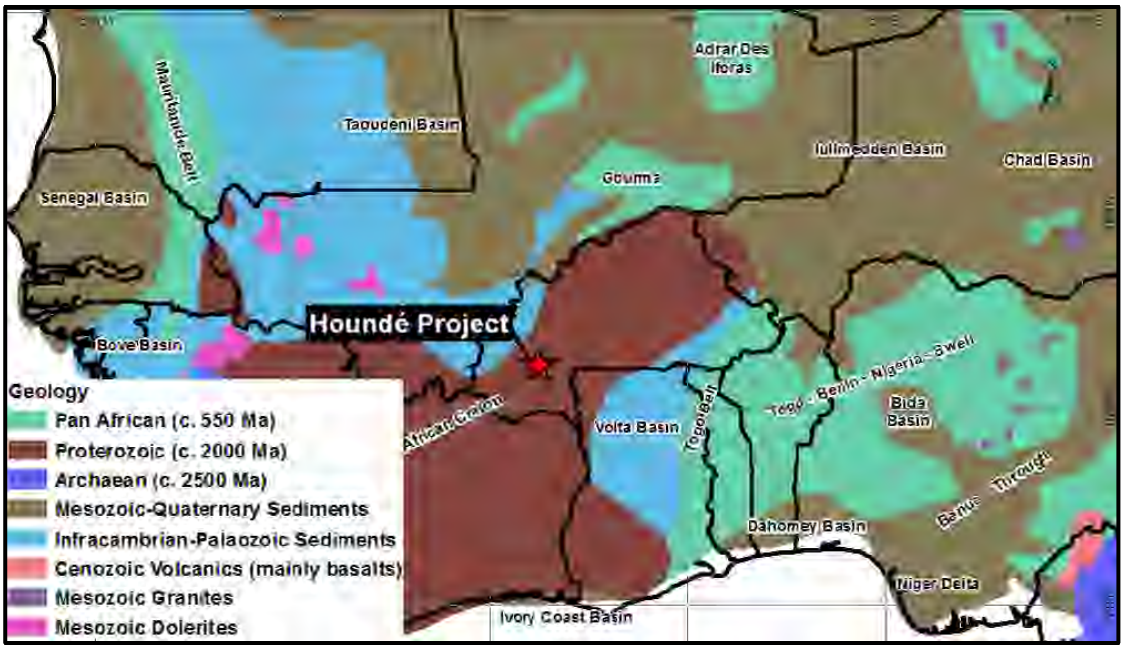
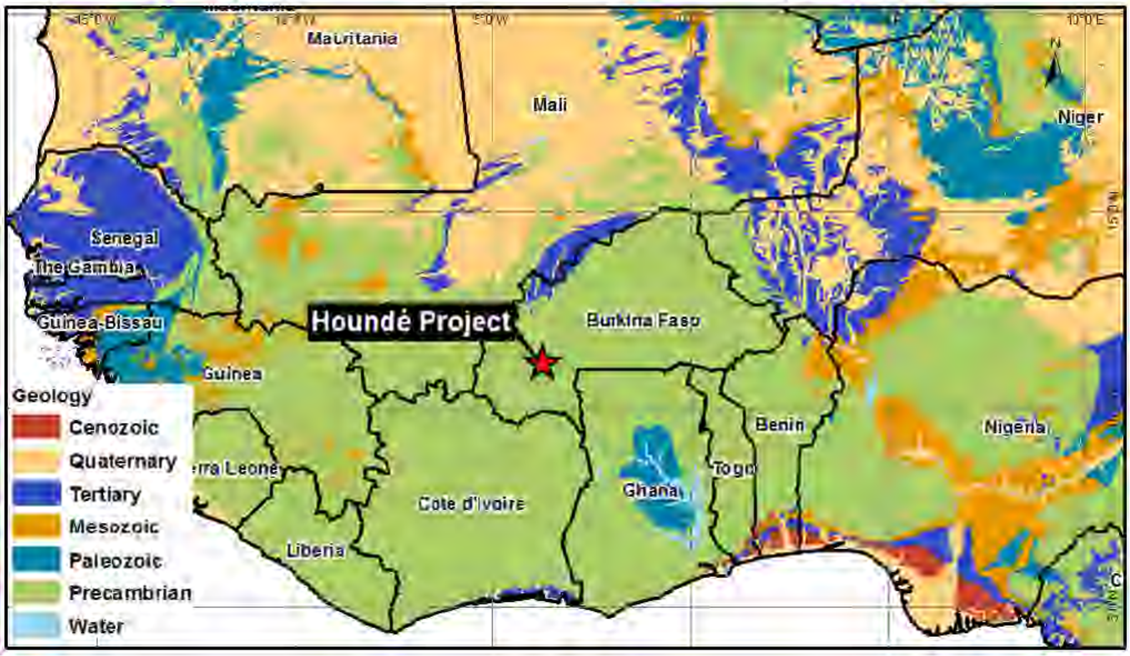


Figure 7-2: Kari Centre Cross-Section (source: Endeavour)



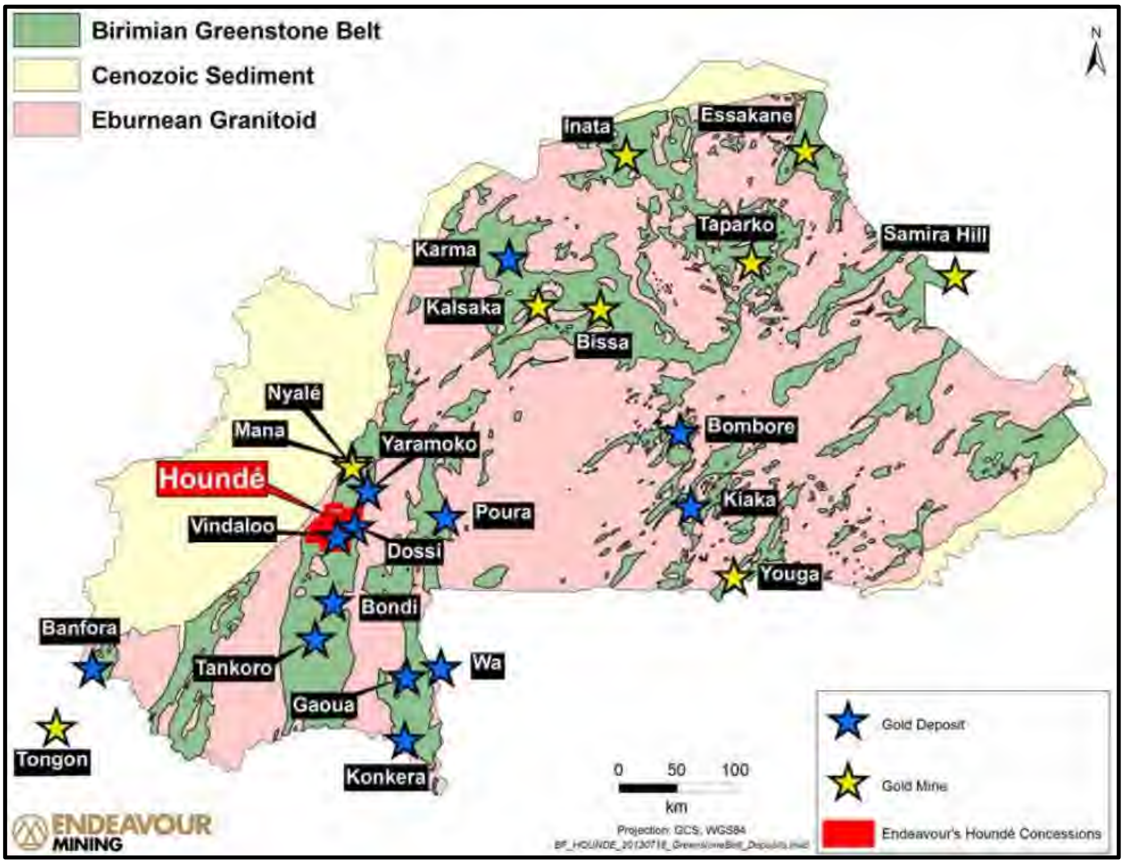
7.3 Local Geology

Houndé is located within the Houndé greenstone belt (Figure 7-3). The belt is located in the western region of Burkina Faso. The belt extends approximately 330km along strike and is up to 60km wide. The belt is orientated north-northeast to south-southwest.

Burkina Faso can be geologically subdivided into three major litho-tectonic domains:

- Paleoproterozoic (Birimian) basement underlying most of the country;
- Neoproterozoic sedimentary cover developed along the western, northern and south-eastern portions of the country; and
- Cenozoic mobile belt forming small inliers in the north-western and extreme eastern regions of the country.

Figure 7-3: Greenstone Belts within Burkina Faso (source: Endeavour)



The Houndé Greenstone Belt (Figure 7 4) consists of north northeast-south southwest oriented volcano-sedimentary Birimian rocks (ca. 2,200 - 2,120 Ma) underlying an area approximately 330 km long by 60 km wide. The Belt is made up of andesites, subordinate amphibolitised basalts with intercalations of minor acidic volcanic, gabbroic bodies, greywacke to argillaceous sediments and banded chert. The tholeiitic to calcalkaline volcanic rocks and sedimentary rocks are geochemically similar to modern island arc environments.

The volcano-sediments are intruded by plutonic bodies consisting of granodiorite, tonalite and quartz diorite batholiths, then by granitic, granodioritic and tonalitic stocks and some small leucogranite intrusions. The Birimian volcano-sediments are unconformably overlain by a younger (ca. 2,115 – 2,110 Ma) "Tarkwaian-type" sequence of clastic sediments occurring in a narrow north-trending band near the eastern margin of the belt, The clastic sediments likely formed in an elongate intramontane basin controlled by pre-existing structures (Baratoux et al., 2011). Many late, magnetic, dolerite dykes intrude the Greenstone Belt at different trends with northwest trending dykes being the most common. Other dyke trends observed are east-southeast and northeast.

The deformational history of the greenstone-granite terrain of southwestern Burkina Faso involves a two-stage Eburnean event that corresponds to initial belt compression (D1) and subsequent transpression (D2), followed by a late Eburnean to possibly Pan-African third event (D3) that reflects belt-parallel shortening (Baratoux et al., 2011 and Metelka et al. 2011). The succession of deformational style from D1 to D3 portrays an overall incremental clockwise rotation of the principal compressive stress direction from roughly E-W (D1) to WNW-ESE (D2) and ultimately N-S (D3) (Thivierge, 2016).

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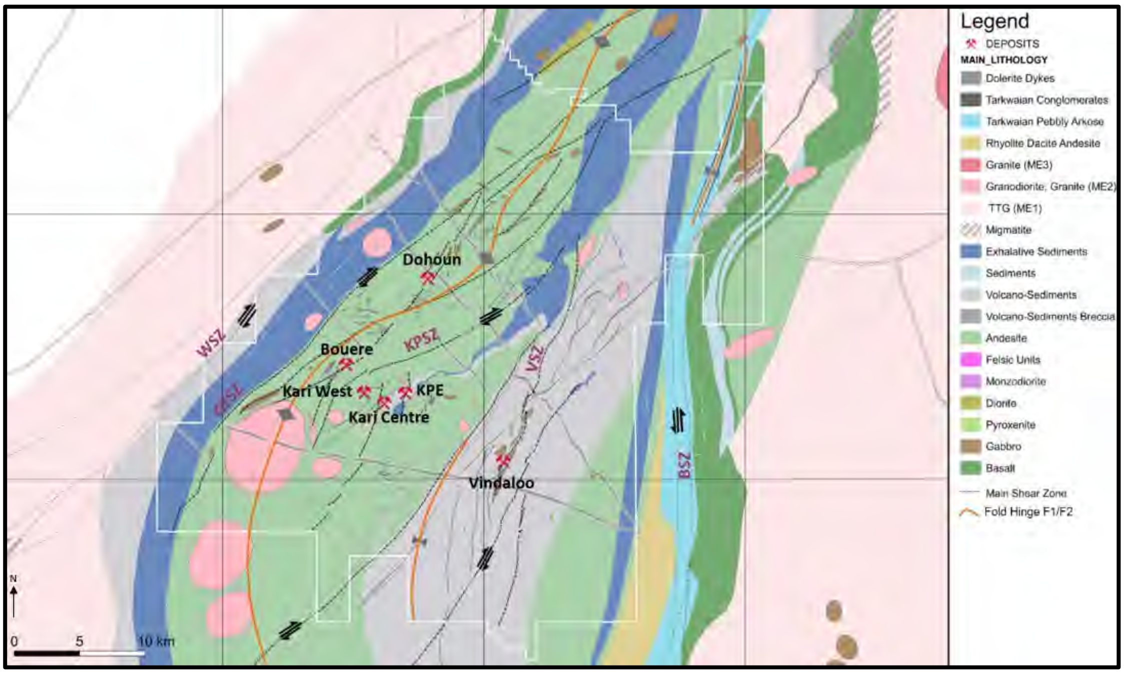
Figure 7-4: Geology of area around Houndé (source: Endeavour)



7.4 Deposit Geology

7.4.1 Deposit Description

Vindaloo-Madras

The Vindaloo - Madras Zone comprises a group of closely spaced and sub-parallel mineralised deposits that extend over a strike length of 7km (Figure 7-5). It is composed of a series of north-northeast trending and steeply-dipping to subvertical mineralised deposits hosted by intermediate volcanic rocks (coarse andesitic polymictic debris flows, massive flows, and pyroclastic and lapilli tuff), sedimentary rocks (interlayered greywacke and graphitic argillite) intruded by concordant (sill-like) bodies of monzodiorite.

The Vindaloo-Madras trend has been drill tested for a distance of nearly 8km along strike and up to 350m depth. The intrusion-hosted zones range up to 70m in true thickness and average close to 20m true thickness along a 1.2km section of the zone called Vindaloo Main. Volcanic- and sediment-hosted zones are generally less than five metres wide. The entire mineralised package strikes north-northeast and dips steeply to the west to vertical. The mineralisation remains open both along strike and to depth. The Vindaloo deposit comprises a group of closely spaced gold-mineralised structures that currently represent an approximate 4.8km section of the Vindaloo Zone and a 0.9km long section of the Madras NW Zone. A typical cross section through the deposit is shown in Figure 7-6.

Ductile shearing took place in the volcanic and sedimentary packages, whereas the monzodiorites were subject to brittle deformation that led to the formation of a stockwork of weak to moderate quartz veinlets. Gold mineralisation primarily occurs in the competent monzodiorite, sometimes across the whole intrusion.

Alteration minerals include iron carbonate, epidote, sericite and silica. Volcanic rocks around the monzodiorite are strongly altered into epidote and sericite. The monzodiorite is pervasively bleached, iron carbonatized, sericitized and locally silicified. Gold is related to the pyritic quartz veins. High grade gold occurs in narrow silica bands which were the focus of quartz veining and disseminated pyrite.

The Vindaloo deposit is directly associated with retrograde metasomatic fluid overprint of a monzonite dyke along a shear zone (Monthel, 2018a, b). Gold mineralisation probably formed during cooling processes. The emplacement of the dyke(s) took place in a trans-tensional jog that formed as a natural irregularity along the length of the shear zone.

Bouéré

Bouéré is hosted in a mafic to intermediate volcanic sequence, comprised of fine-grained tuffs and pyroclastic andesitic flows and breccia interlayered with more massive basaltic and andesitic flows (Figure 7-7). Bouéré is structurally complex with two main phases of deformation and associated hydrothermal alteration. It is characterised by lenticular-shaped and fold-shaped mineralised zones trending east - west to northeast – southwest, steeply dipping to the north.

Dohoun

Dohoun (Figure 7-8) is underlain by a package of variably deformed fine-grained volcanic rocks including lava flows, volcanic tuffs, volcanic breccia and sediments. The Birimian Greenstones are intruded by a massive granodiorite and the overall lithologies are cut by a quartz-feldspar porphyry dyke trending north-northeast. A shear zone trends north-northeast and affects the western margin of the granodiorite intrusive and hosts gold mineralisation. It is one to several metres wide comprised of quartz-carbonate veins associated with strong pervasive sericite and sulphides. Two other mineralized vein orientations are observed at Dohoun; north - south veins (interpreted to be associated with early deformational events) and east-northeast oriented fractures within the competent granodiorite intrusion.

Kari Deposits

The Kari deposits (Figure 7-9) including Kari Pump , Kari West and Kari Centre are hosted in Birimian Greenstone lithologies comprising dominantly intermediate calc-alkaline volcanic sequences and related chemical sediments and various facies of clastic sedimentary and volcano-clastic lithologies. The Greenstone lithologies are intruded by Eburnean-age dykes and porphyries of variable compositions. Granulite facies basement is interpreted Eburnean to unconformably underlie the Birimian Greenstone lithologies of the Houndé Belt (Thivierge, 2016).

Kari Centre (Figure 7-10) is hosted within a volcanic-sediment package trending northeast – southwest and dip of 45° to the northwest. The northwest portion of the area is underlain by volcanics (predominately tuff) and south-eastern portion by sediments. The volcanics proximal to the sediments appear to be preferentially mineralised (possibly due to a rheological difference). The fresh volcanics in the hangingwall below the oxidisation weathering boundary are strongly altered and are generally well mineralised. The up-dip continuity of the altered volcanics is typically poorly mineralised, possibly due to the oxidation process. The mineralisation in the saprolite correlates reasonably well to quartz-rich zones.

The mineralisation is lithologically constrained, having developed at the contact between a mafic volcanic unit to the northwest and a volcano-sedimentary unit (greywacke and locally black shales) to the southeast. During a trans-compressive episode following the major regional directions N20°, thrusts faults have developed and at a more local scale, sediments have concentrated the deformation (due to the rheological contrast).

The Kari Centre assemblage has been subjected to strong and extensive alteration, preferentially within the volcanics near the contact with the sediments. The sediments do not show strong alteration. The alteration is late stage and masks a significant amount of detail. One principal alteration style has been identified, referred to as “**SEAL**”(strong sericite alteration zone with +/- silica and +/- sulphides). There is also a minor amount of "**SASE**" alteration (Strong albite – silica alteration zone with moderate sericite and +/- sulphides) which appears to be less associated with gold mineralisation. The laterite and saprolite are relatively thick with an average depth of approximately 100m.

Kari Pump (Figure 7-11 and Figure 7-12) is underlain by andesite flows with minor volcano-sediment and sediments that are locally intruded by few diorite sills. Gold mineralisation occurs within a sheared reverse fault (D2) that appears to be folded; the mineralised structure dips shallowly (0º to 40º) to the west-northwest and northwest. Minor graphitic shears are locally observed associated with the sediments. Drilling has defined the Kari Pump deposit to be 1,900m long by about 600m large. The deposit occurs below surface from nine metres to the maximum vertical depth of 149m in the drilled area.

Alteration consists of pervasive creamy sericite, silica flooding, chlorite seams and pyritized quartz/carbonate veining. The laterite and saprolite are relatively thick at Kari Pump with an average thickness ranging from 50m to 85m.

Kari West is hosted within a volcanic-sediment package, predominately composed of tuff and undifferentiated mafic volcanics with a minor amount of sediments and argillites (Figure 7-13 and Figure 7-14). There is a significant lithological (concordant) boundary trending east-northeast to west-southwest across the area of interest, with volcanics to the north and volcano sediments to the south. The lithological units have an overall dip of 60° to 70° to the northwest (parallel to foliation). The laterite and saprolite are relatively thick with top of fresh rock approximately 50m to 60m below surface. Kari West covers an area of approximately one kilometre along strike and 500m wide.

The Kari West assemblage has been subjected to strong and extensive alteration, preferentially within the volcanics. The sediments do not show strong alteration and mineralisation is rare. The alteration is late stage and masks a significant amount of detail. Two principal alteration styles have been identified, SEAL (Strong sericite alteration zone with +/- silica and +/- sulphides, and SASE (Strong albite – silica alteration zone with moderate sericite and +/- sulphides). There appears to be a correlation between gold mineralisation and SASE, where gold is often associated with SEAL, but it is not definitive; the SEAL can be used as a useful exploration tool.

Other Deposits

Approximately thirty-nine areas of interest regarding gold mineralisation ("**gold showings**") have been identified across the Permit. The areas of interest range in maturity from very early stage exploration with minimal empirical data to potential targets with drilling results and geological hypotheses (Figure 7-15)

Sixteen lower order gold showings have been identified which are conceptual in nature and based on low levels of data support. The data includes remote sensing linears, trends and anomalies in geophysical data sets, artisanal workings, geochemical results (soil samples, rock chip samples) and occasional broad spaced reconnaissance RAB or AC drill line results. These targets can be several hundred metres to thousands of metres in dimension.

Twenty gold showings are classified as follow-up due to moderate levels of data support and their interpreted potential to host significant gold mineralisation. Most of these projects are clustered in either the Kari area or south of Vindaloo. These projects host anomalous geochemistry plus numerous anomalous intercepts from reconnaissance RAB or AC drill lines, follow-up and infill RC and DD holes.

Three advanced targets have been defined and are the focus of current exploration; Kari Gap and Kari South are the southward continuation of the shear and associated mineralisation at Kari Centre. Reconnaissance AC lines and scout RC and DD holes have confirmed the mineralisation over a three-kilometre strike, with at least two zones along the trend having higher grade and thicker mineralised intercepts. Further infill RC, AC and DD holes are planned for both areas. Sianikoui is three kilometres north of Dohoun and has two mineralised structures both north-northeast trending and associated with quartz veined shear zones. The shears are proximal to the contact between volcanites and gabbroic and felsic intrusives and extend over one kilometre along trend.

Figure 7-5: Vindaloo – Madras Trend Geology (source: Endeavour)

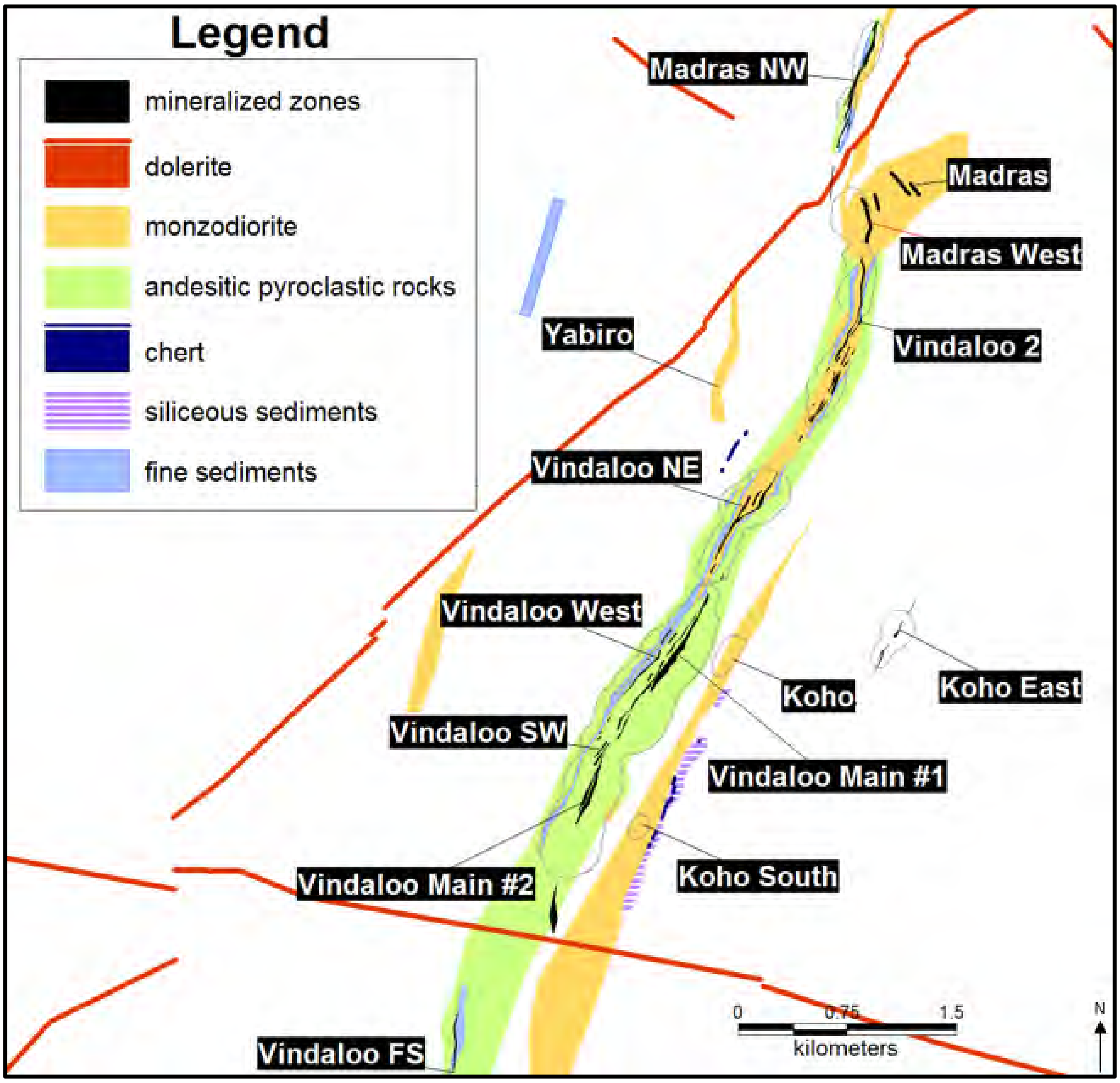


Figure 7-6: Typical Vindaloo - Madras Cross-Section (source: Endeavour)

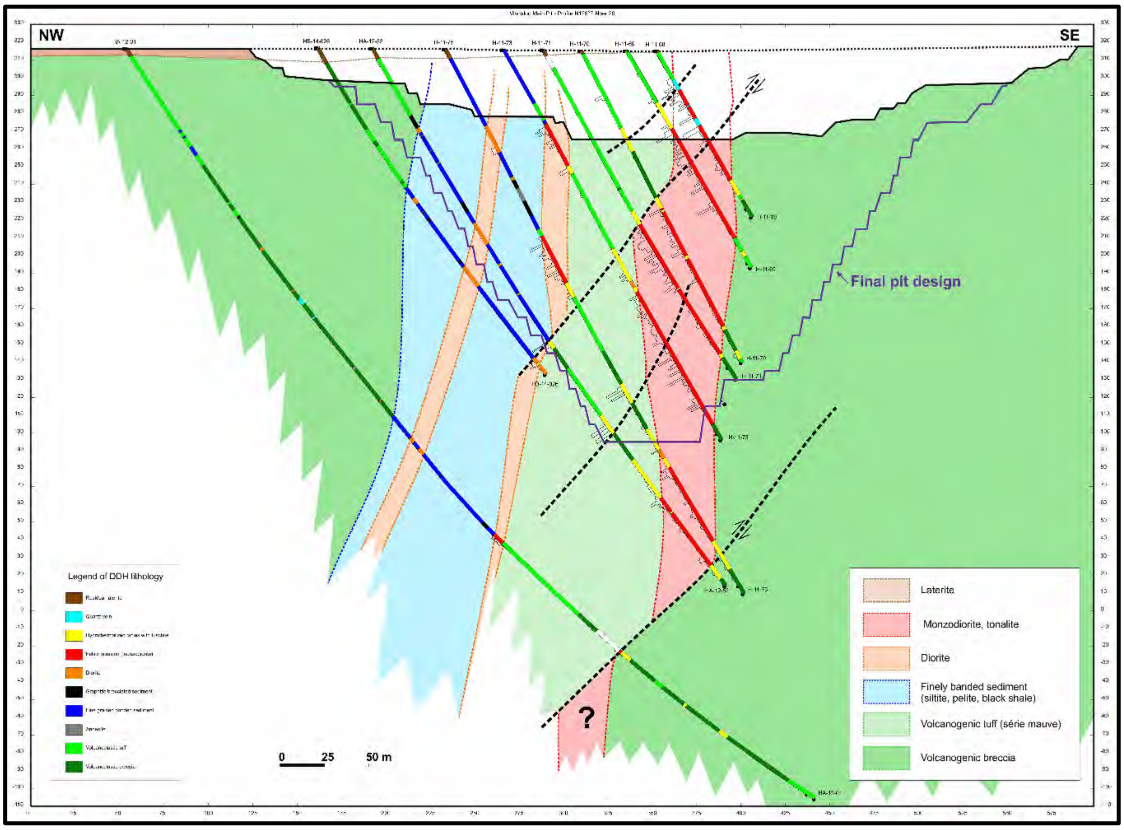


Figure 7-7: Bouéré Geological Map at 345mRL (source: Endeavour)

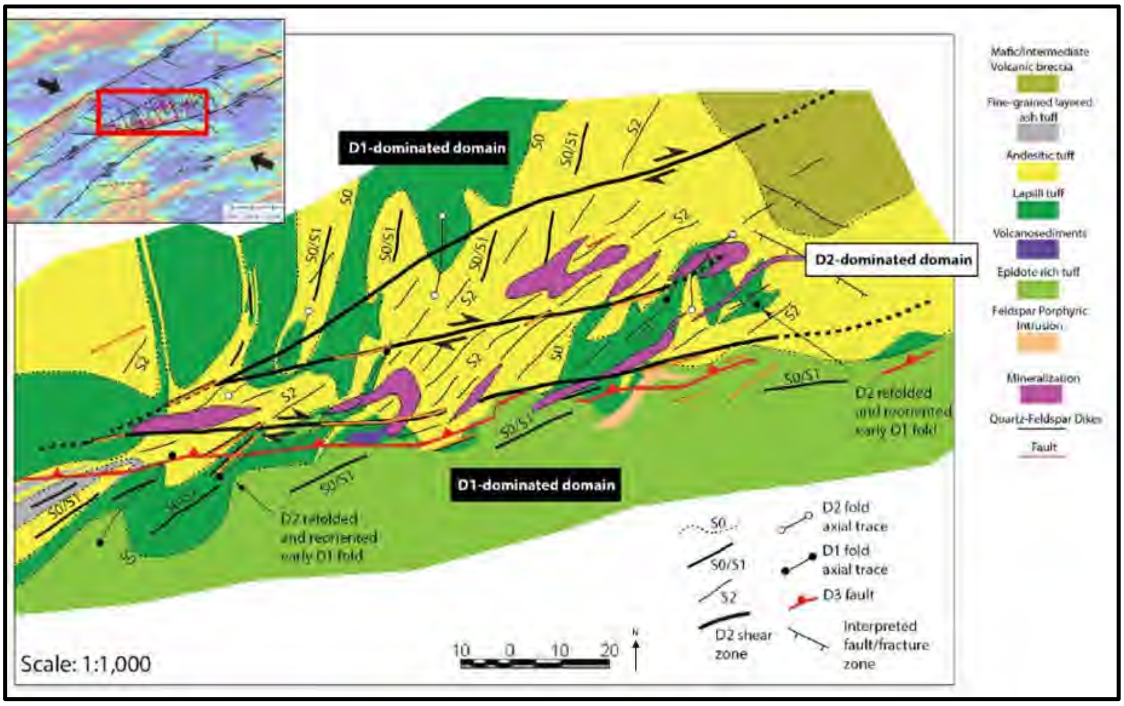


Figure 7-8: Dohoun Geological Map (source: Endeavour)

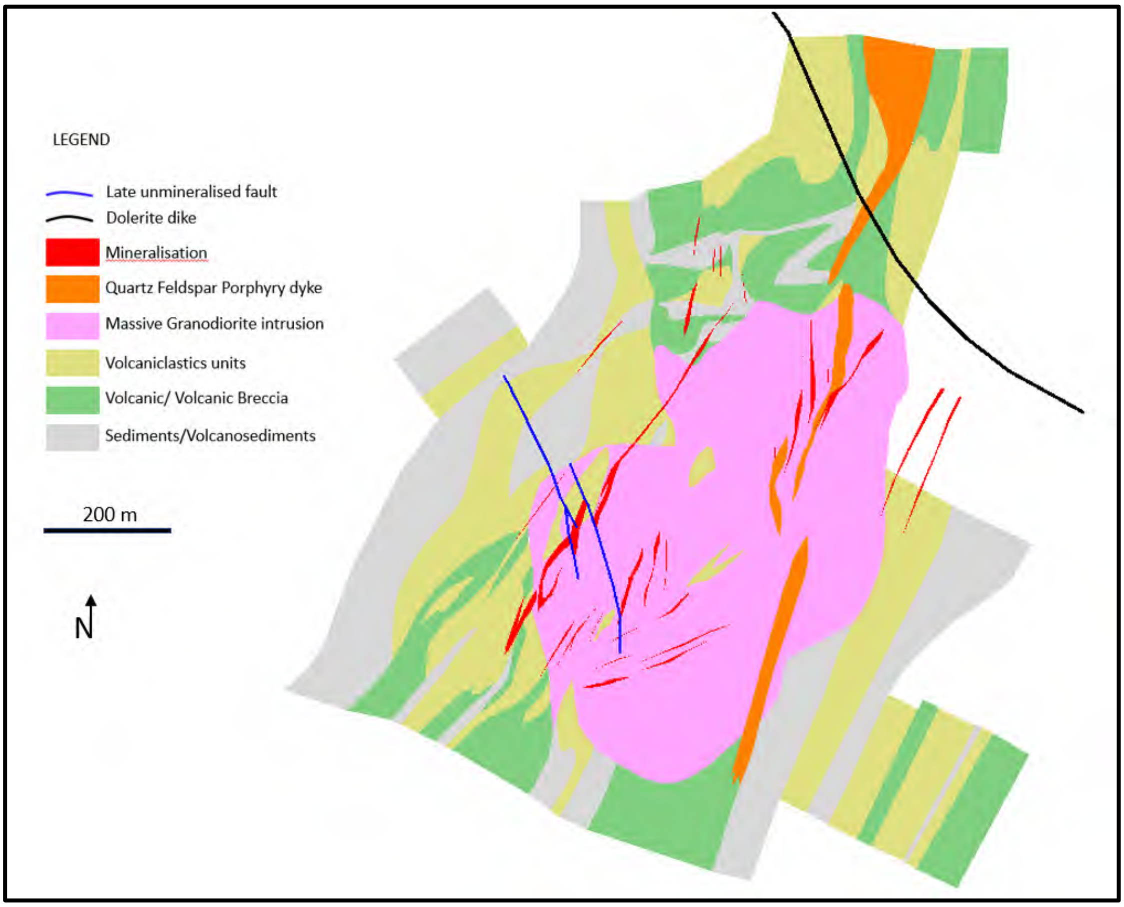


Figure 7-9: Kari Geological Map (source: Endeavour)

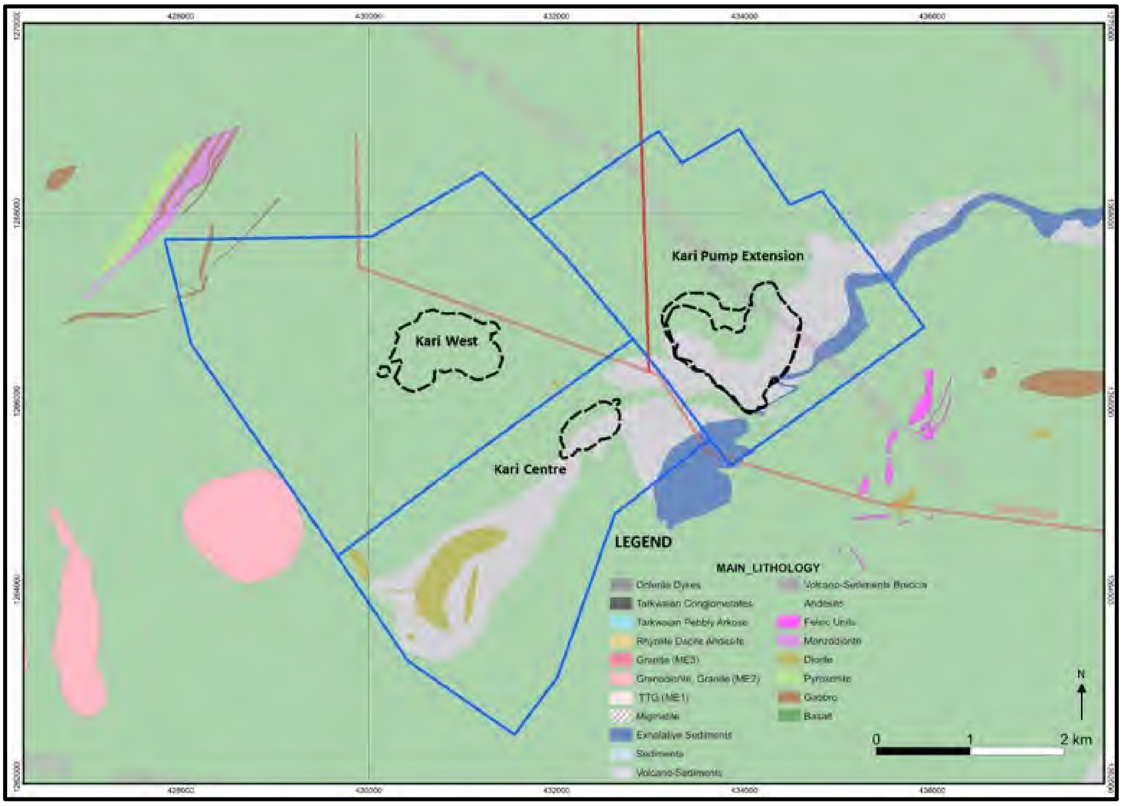


Figure 7-10: Kari Centre Cross-Section (source: Endeavour)

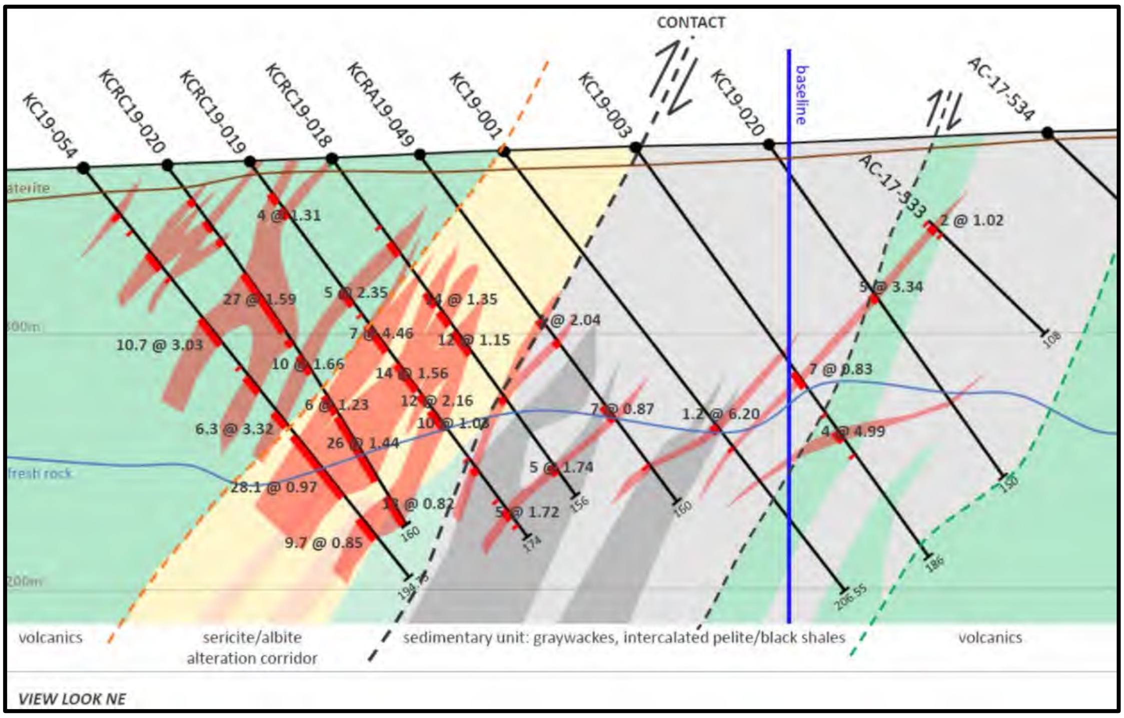


Figure 7-11: Kari Pump Simplified Map (source: Endeavour)

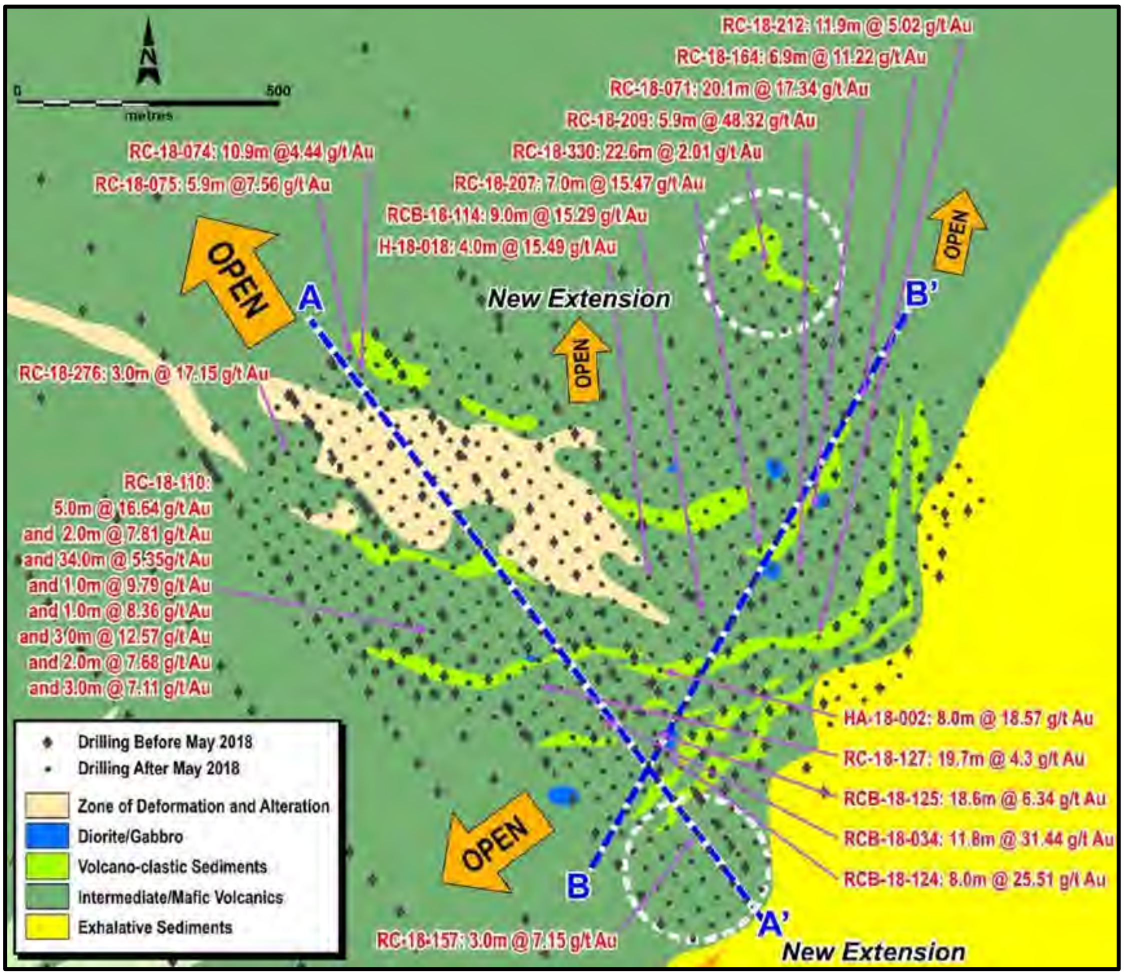


Figure 7-12: Kari Pump Cross Section (source: Endeavour)

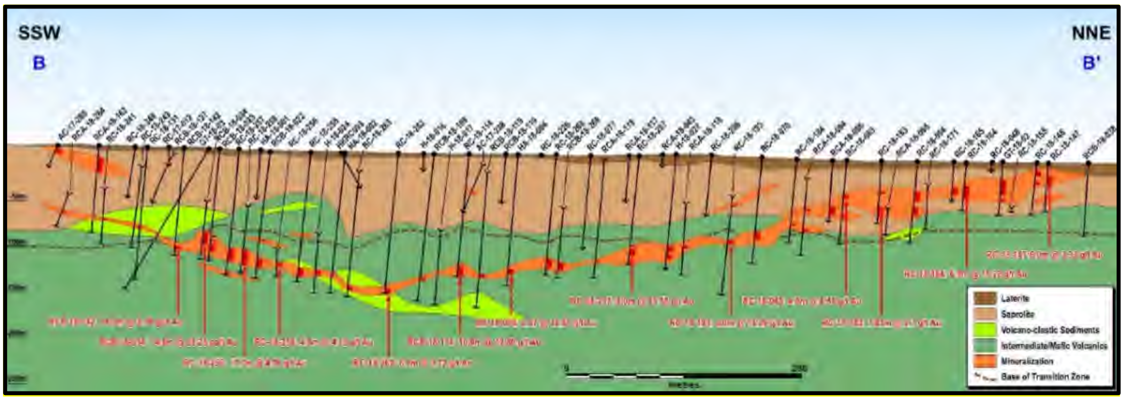


Figure 7-13: Kari West Plan (source: Endeavour)

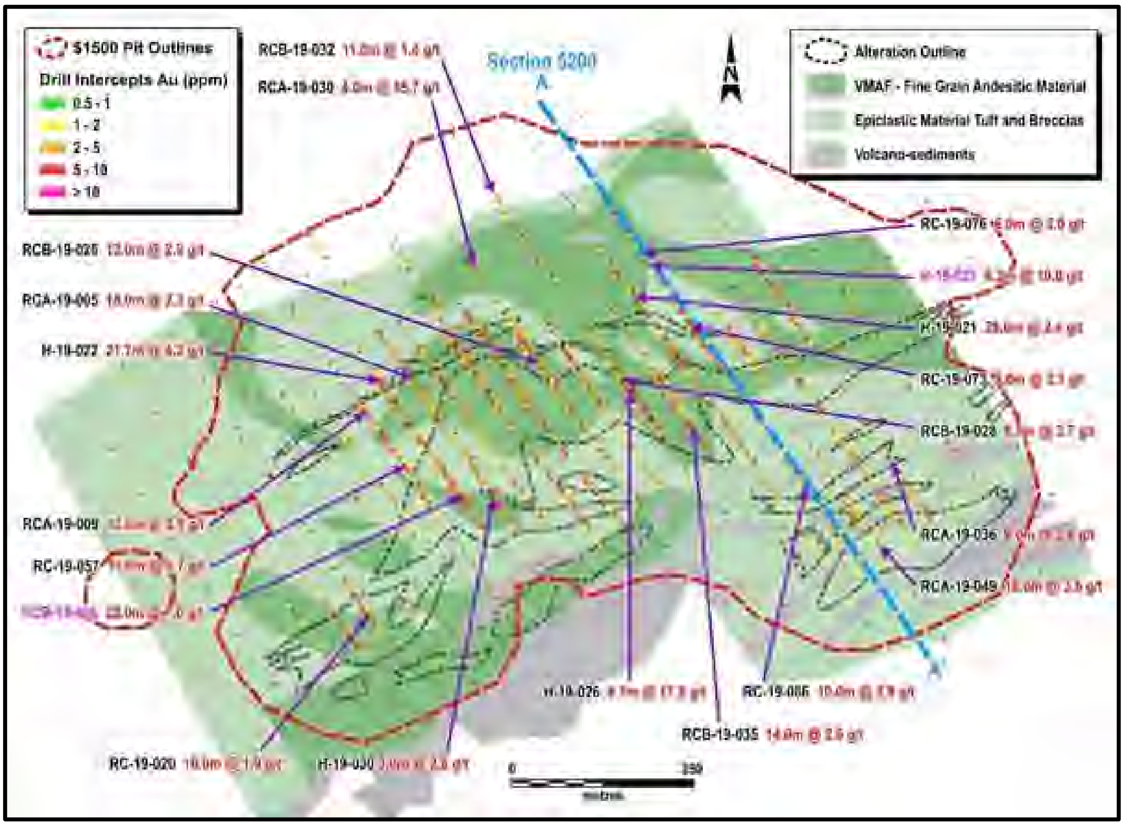


Figure 7-14: Kari West Cross Section (source: Endeavour)

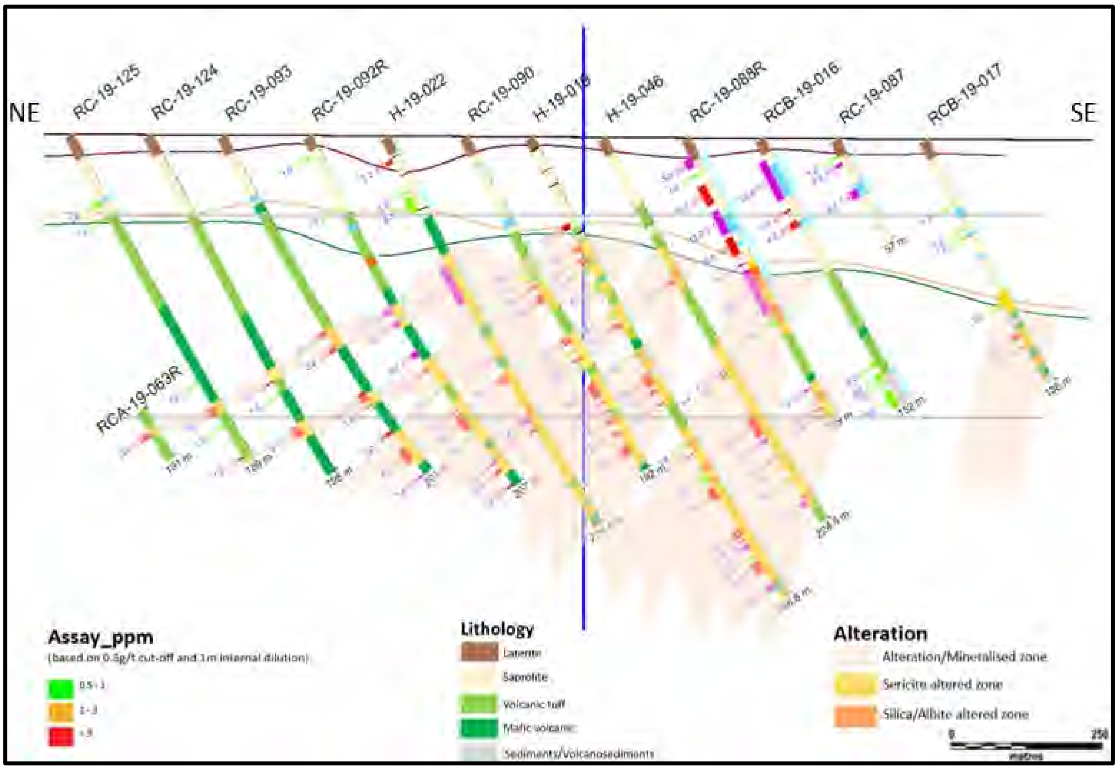
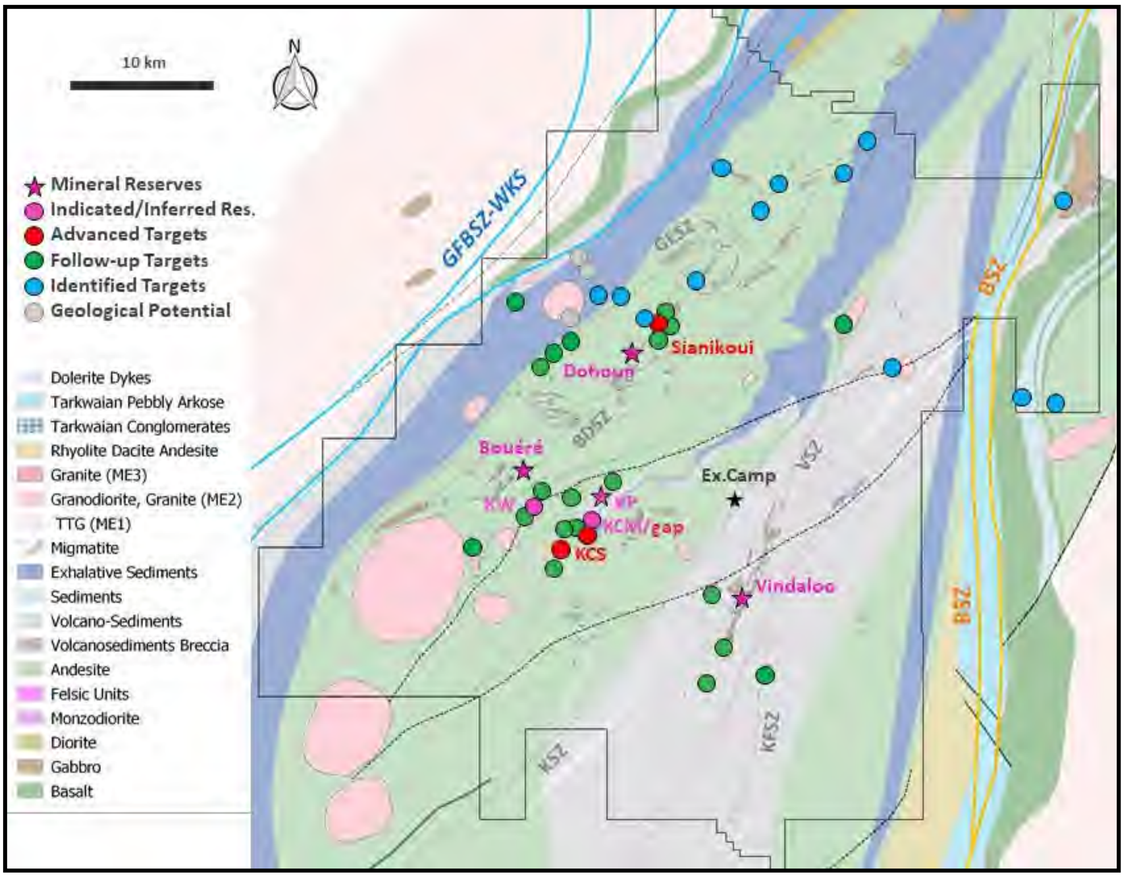


Figure 7-15: Gold Showings and targets (source: Endeavour)



7.4.2 Structure

Vindaloo-Madras

A strong, northeast-trending, dextral shear zone cuts through the Houndé area. This shear zone lies approximately three kilometres west of the Vindaloo Zone and has a very sharp western edge, as defined by the magnetic data. The eastern edge of the structure is not well defined; however, magnetic data suggests that the shear zone may be four to six kilometres wide. To the east of this strong structure, shearing is focused along unit contacts with preference along the sediment volcanic, volcanic-gabbro and sediment-gabbro contacts. Sediment units are often strongly deformed and display local graphitic shear zones, gouge and healed breccias.

Rocks in the Vindaloo-Madras area generally dip steeply west and occasionally steeply to the east. There is also a suggestion that local z-folds create shallow to flat dipping sections. Plunge directions are not clear; however, the mineralisation appears to plunge both shallowly to the south and steeply to the northeast. Gabbro units appear to be boudined both along strike and to depth. The gold zones usually weaken or die out where the gabbro is absent.

Bouéré

Two main phases of deformation are identified in the Bouéré area, representing a continuum of deformation and associated hydrothermal alteration from earlier D1 deformation to later D2 deformation.

- D1 is a compressive phase producing a composite S0/S1 schistosity bearing a steep mineral lineation. S0/S1 strike varies from about north - south to nearly east - west due to D2 folding around subvertical northeast - southwest fold axial planes; and
- D2 is a transgressive strike-slip dominated phase, which produced isoclinal folding and transposition of the earlier structures along a prevailing steep northwest-dipping and northeast-trending S2 crenulation/transposition fabric.
  - The composite S0/S1/S2 schistosity varies in strike from northeast - southwest to east - west and bears a dominant sub-horizontal to gently northeast and southwest dipping mineral/stretching lineation associated with dextral to dextral reverse kinematics.
  - The S2 pattern is interpreted to be due to N060° directed dextral shearing (C/S relationship) with the northeast - southwest striking S2 turning into parallelism with N060° to N090° oriented shear zones. The high-strain zones guided the intrusion of syn-D2 granodioritic dikes striking subparallel to the shear zones.

The late-D2 brittle deformation is represented by a complex network of barren and relayed fracture-filling quartz-carbonate veins striking mainly northwest to southeast and east to west with a large variability in dip angles. Such a variation is explained by permutations of the principal stress axes during the fracturing events, the maximum principal stress axis (S1) remaining sub-horizontal and roughly east - west oriented.

A later D3 phase can be observed at the deposit scale by the late reverse brittle reactivation of the east - west trending shear zone limiting the Bouéré deposit to the south.

Dohoun

The gold mineralisation at Dohoun is structurally controlled, hosted within a brittle-ductile shear of one metre to 10m wide, associated with quartz-carbonate veins with strong pervasive sericite and sulphides. The main shear zone trends north-northeast and dips steeply to near vertical and affects the western margin of the granodiorite intrusive.

Locally other mineralised fractures are observed with two main orientations; the north - south veins are interpreted to be associated to early deformation (D1) and the east-northeast oriented fractures within the competent granodiorite intrusion are probably syn-mineralisation.

Kari Deposits

In the Kari Group, the first major deformation (D1) (Tangean) produced steep NW-NNE regional structures, where quartz veins, breccias and numerous cataclasite veins formed, which are generally barren (Hein, 2019). The second major deformation (D2) (Eburnean) in the Houndé region resulted in progressive, generally northeast trending splay shears with low dip angles (Ciancelioni, 2019) leading to the development of auriferous extensional and stockwork veining that overprints/crosscuts the earlier steeper Tangean structures.

It can be concluded that progressive mechanical failure on the shears and splays, leading to decompression and fluid migration through the rock pile, incorporating its metal content and focusing fluids along a number of secondary and tertiary brittle-ductile structures led to the formation of the gold deposits at Kari (Hein, 2019).

Current evidence indicates that all three deposits formed due to the same lithotectonic events and that the distinct character of each deposit is due to local variations of the lithologic framework and resulting response to regional tectonic deformation. The Kari deposits formed due to progressive, transpression-transtension crustal convergence from the southeast (Hein, 2019). Due to great, local contrast in rheology, deformation is not pervasive but rather intensely focused at the lithologic competency contrasts (Ciancelioni 2019, Hein 2019).

Petrography work by D. Mason on select samples from Kari Pump, Kari West and Kari Centre indicate that all lithologies associated with mineralisation have been metamorphosed to greenschist grade and metasomatised dominantly by silica, CO2-S-K alteration that is focused by a progressive and directed stress regime (Mason, 2018). The source for the potassium and silica-rich fluid for the pervasive alteration systems associated with gold deposition is the granulite basement. In conclusion, the results of the petrography work support the interpreted structural regime and that all three projects are shear-zone hosted orogenic gold deposits as supported by occurrence of sulphide-gold mineralisation in deformed, quartz-carbonate-sulphide(-gold) veins, and strongly CO2-S-K-metasomatised greenstone wall rocks (Mason, 2018).

The sequence of events leading to the formation of Kari Pump, Kari West and Kari Centre deposits is regarded as (Hein, 2019):

- Granulite basement (source of fluid and ideal fluid geochemistry - Si, CO_2, S, K);
- Back arc basin litho-tectonic setting; deposition of lavas/tuff with calc-alkaline composition, hyaloclastites, pyroclastites, and tuff, with volcanic breccias, agglomerate and a range of volcanogenic and chemical sediments unconformably in contact with shallow marine clastic sediments;
- D1: Deformation during the Tangean Event to produce steeply north plunging folds and transposed units in incompetent strata (such as graphitic shales and chert) and non-mineralised quartz veining + breccias;
- D2: Progressive formation of brittle-ductile northwest to northeast shears and splays caused by a transpression-transtension regime;
- Emplacement of porphyries and dykes of variable composition;
- Mechanical failure leading to decompression and fluid migration through the rock pile, consequently incorporating the metal content and focusing fluids along a number of secondary and tertiary structures; and

- Development of pervasive alteration systems associated with metamorphic-metasomatic dewatering of the granulite basement and Houndé Belt sequences.

7.4.3 Mineralisation and Alteration

Vindaloo-Madras

The Vindaloo and Madras mineralised zones are predominantly hosted by altered magnetite-bearing gabbro and to a lesser extent, andesitic volcanic rocks and sediments. The gabbro-hosted zones range up to 70m in true thickness and average close to 20m true thickness in a section of the zone called Vindaloo Main. Volcanic- and sediment-hosted zones are generally less than five metres wide.

The mineralised system is zoned with initial propylitic-style alteration along the outer edges of the system with the addition of chlorite and calcite stringers concurrent with the destruction of pyroxene, amphibole and plagioclase. In a poorly defined area, located to the west of the Vindaloo Main zone, the propylitic alteration is overprinted by a reddish hematitic alteration comprising disseminated hematite and hematite veinlets. As the mineralised zones are approached, propylitic alteration gives way to increasingly intense, yellowish-coloured, sericite-epidote-ankerite+/-fuchsite alteration of the fragmental andesites. In the strongly altered sections, especially near the gabbro contacts, the fragments are flattened with stretching ratios to 20:1. Occasional quartz-veined zones, with associated trace to 5% finely disseminated locally crystalline pyrite, occurs in the altered andesites, especially in the hanging wall to the Vindaloo Main zone and in areas along strike of the gabbro-hosted zones where the gabbro is absent. These quartz veins are generally oriented parallel to foliation and shearing.

The gabbro units display a similar alteration pattern as the andesite units with widespread propyltic alteration of ferro-magnesium minerals to complete destruction of the ferro-magnesium minerals at the expense of a medium grey mixture of sericite, ankeritic carbonate and quartz. Locally the sericite carbonate alteration gives way to stockwork-type quartz veining with local silica-enriched rims to the quartz veins and selective silica replacement of feldspar grains, with a focus near unit contacts. At least three directions of quartz veins have been noted.

Fine grained to millimetre-size pyrite crystals are associated with:

- Trace to 10%, up to 2cm wide, quartz veins (trace to 2% overall in mineralised zones);
- Pyrite-enriched haloes to the quartz veins; and
- Occasionally as disseminations within the host gabbro.

Locally fine pyrite crystals are aligned to form poorly defined veinlets. Generally, disseminated sulphide mineralisation, returns low gold grades; however, in the Vindaloo NE area, good gold grades are associated with both pyritic quartz veined areas and in areas with disseminated pyrite. Trace amounts to 1% arsenopyrite occurs as finely disseminated grains in some of the well mineralised areas. As well, trace amounts of chalcopyrite, sphalerite and rare native gold, tetrahedrite, electrum, altaite (PbTe), galena and scheelite were observed. Native gold and electrum occur along grain boundaries and locally within pyrite grains.

Quartz+-albite+-carbonate+-pyrite veins, associated with the Vindaloo and Madras zones, range from 0.5cm to 2cm thick with the rare vein extending to a metre wide. During the period from 2011 to 2013, oriented core quartz vein data and other structural data was collected to support the interpretation of the geology and mineralised zones. This data indicates that there are three main vein trends in the Vindaloo Main zone area, in order of importance, trending:

- **Dominant:** 030° to 045°;

- **Secondary:** 060° to 070°; and
- **Tertiary:** 130° to 149°.

Veins that trend these three dominant directions vary significantly in dip, supporting the interpretation that most of the veining is stockwork-type in character.

Bouéré

Gold mineralisation at Bouéré is associated with hydrothermal alteration zones and related quartz-carbonate veining, that appear to have occurred in protracted fashion throughout D1 and D2 deformations. The hydrothermal alteration at Bouéré evolved through D1 carbonatization (associated with no or very low-grade mineralisation) towards sericitization and silicification which occurred in pulsative fashion at a transitory late-D1 to syn-D2 stage of deformation (associated with significant mineralisation). Gold mineralisation is coeval with a progressive increase in the D2 deformation and a variably intense sericite – silica - carbonate (ankerite + calcite) ± albite alteration and zones of quartz – carbonate veining, both associated with sulphides dissemination in the altered rocks and in quartz veins. Gold veins were emplaced during a continuum of deformation between late D1 and syn-D2.

High to very high gold grades are systematically associated with massive and/or laminated milky quartz (± carbonate ± albite) veins from one metre to multiple metres thick occurring in the silica-sericite-carbonate-sulphide alteration zones. Visible gold is nearly exclusively seen in theses quartz veins. Bouéré is characterised with low continuity of mineralisation over short along-strike distances and relay-type patterns of mineralisation resulting in fragmented/discontinuous lenses of mineralisation.

The alteration styles are interpreted to reflect circulation of different hydrothermal fluids along similar conduits.

Dohoun

Gold mineralisation at Dohoun is intimately related to the shear zone along the western edge of the granodioritic intrusive. The gold is hosted in a brittle-ductile context with mainly pyritic-type sulphides. The pyrite grain geometry is highly variable, though gold is generally associated with fine- to medium-grained pyrite in a hydrothermal alteration halo of sericite and quartz-carbonate veins.

Richer and thicker mineralisation have been observed in volcanic rocks in direct contact with the intrusive where the shear zone thickens; however, the portion of the shear zone crossing the intrusive is low to medium grade (<2g/t Au).

Kari Centre

Kari Centre gold mineralisation is developed mainly within the volcanics, associated with whitish sulphide-sericite-albite alteration and fine disseminated pyrite at the hanging wall of the volcanic/sediments contact (N60° strike, dipping 45° to the northwest). The mineralisation is diffuse, locally high grade (>2g/tAu) but generally lower grade when hosted in the oxide horizon.

In brittle sedimentary units, gold grades are structurally controlled, and locally can be high grade (>5g/tAu). These mineralised zones tend to occur in narrow, tension gash type structures. To date, neither visible gold nor arsenopyrite have been observed in drill cuttings.

Kari Pump

Gold mineralisation occurs at Kari Pump within a sheared reverse fault (D2) that appears to be folded and dipping from zero to 40 degrees to the west-northwest and northwest. The mineralisation exhibits good continuity over 1.3km along section and displays typical pinch and swell characteristics. The highest-grade areas of the quartz veins are typically thicker, and alternate with thinner vein areas which are typically lower in grade.

Kari Pump gold mineralisation is associated with the pyrite occurring as veinlets and disseminated grains within the silica altered and quartz vein bearing host shear.

Kari West

Kari West hosts multiple stacked mineralised lenses that are sub-parallel to the lithological foliation, reflecting both strong structural and lithological control. The mineralised lenses trend in a general west to west-southwest direction with shallow and moderate dips to the north. the lenses vary in thickness from a few metres to locally tens of metres, displaying pinch and swell characteristics both along strike and down dip; structural observations suggest that the thicker zones may represent the intersection of two mineralised lenses with varying dip and strike characteristics. The gold mineralisation in Kari West is associated with pyrite occurring as veinlets and disseminated grains within the quartz veins and SASE and SEAL alteration.

7.4.4 Weathering

As is common in West Africa, the mineralisation has been weathered significantly. As such, four weathering domains are noted, namely overburden, saprolite, transition, and fresh. These are recorded in the drill hole database by the degree of oxidation. The degree of weathering was also used as an input to the density values assigned.

7.5 Risks and Opportunities

To date no significant risks have been identified relating to the geological setting and mineralisation aspects of the deposits identified at Houndé Gold Mine. The key opportunities relate to advancing the various exploration targets currently under investigation by Endeavour and extensional drilling at the deposits supporting the Mineral Resources as reported herein.

7.6 Interpretation, Conclusions and Recommendations

The geological setting and mineralisation for the deposits investigated to date at Houndé Gold Mine are well informed by and geological data gathered through extensive exploration programmes conducted to date. As such, the focus of current activities is directly related to the broader exploration programmes currently conducted by Endeavour, pending advancement to sufficient level to transfer to the operating entities managed by Houndé Holdings Limited, Houndé Gold Operations SA and Bouéré Dohoun Gold Operation SA.

Further work is planned to refine the geological models and upgrade the lower levels of resource categories through infill drilling and where appropriate extensional drilling to the currently defined wireframes. This is specifically so in those deposits for which grade-based domains predominate as noted for Kari Centre and Kari West.

Accordingly, the principal recommendations are to continue with the proposed drilling programmes and address the key areas identified with respect to Section 14.15 of this Technical Report.

8 DEPOSIT TYPES

West African gold deposits can be classified into the following types:

- Structurally controlled, epigenetic lode or stockwork mineralization related to major shear zones with native gold (e.g. Poura, Burkina Faso and Kalana, Mali);
- Structurally controlled, epigenetic lode or stockwork mineralisation related to major shear zones and characterised by the inclusion of gold in the crystal structure of the sulphides, often locked in arsenopyrite (e.g. Ashanti type - Obuasi, Ghana);
- Stratiform deposits hosted in tourmalinised turbidites (e.g. Gara Deposit (Loulo), Mali);
- Disseminated sulphides hosted in volcanic or plutonic rocks (e.g. Syama in Mali or Yaoure in Ivory Coast and granitoid-hosted Ayanfuri, Ghana); and
- Palaeo-placer deposits/auriferous quartz-pebble conglomerates (e.g. Tarkwa, Ghana); and
- Modern placers (eluvial, alluvial).

The Houndé deposits are shear-zone hosted orogenic gold deposits (Type 1) as supported by occurrence of sulphide-gold mineralisation in deformed, quartz carbonate-sulphide(-gold) veined and strongly metasomatised greenstone wall rocks.

9 EXPLORATION

9.1 Introduction

The following section includes discussion and comment on the exploration activities completed to date in respect of the deposits identified to date at the Houndé Gold Mine. The key areas covered herein comprise auger drilling programmes; induced polarization sterilisation surveys; geological mapping; geochemical sampling; geophysical surveying; exploration areas of interest; risks and opportunities; and interpretation, conclusions and recommendations.

Endeavour acquired Avion Gold Corporation in late October 2012, which included the wholly owned subsidiary, Avion Gold (Burkina Faso) SARL, which owned the rights to the Houndé Exploration Permits. Immediately after Endeavour acquired the right to the property, drilling continued with a goal to improve confidence in the Mineral Resources.

Exploration completed between the completion of the PEA and Feasibility Study included production of a 1m contour map from a satellite image collected in January 2013, additional metallurgical samples were collected and sent to SGS Perth for processing, additional thin section work was contracted, an auger drilling programme as part of a sterilization program, was completed, additional IP surveys were carried out, a sterilization drilling programme was carried out, and feasibility, ESIA and Resettlement Action Plan ("**RAP**") studies were initiated.

Between 2014 and 2019 Endeavour conducted various exploration programs over the exploitation permits (Vindaloo, Bouéré, Dohoun) and exploration permits. The programs included phases of geological mapping, geochemical sampling, and ground geophysical surveys.

9.2 Auger Drilling Programme

An auger drilling programme was initiated over those areas likely to be impacted by mine infrastructure, including the potential tailings pond sites, mine and camp sites, waste dump sites and water dam site (Figure 9-1). Auger holes were designed to drill through the overlying laterite and alluvium so that the upper part of saprolite could be sampled and sent to the laboratory for analysis. Auger holes were drilled 25m apart on lines spaced every 200m. In total 1,977 auger holes totalling 13,760m of drilling, were completed as summarized below in Table 9-1.

Samples, 1m in length, were collected in rice bags under the supervision of a geologist. Prior to splitting (to reduce sample size), the contents of the rice sack were stirred to produce a uniform mixture. The sample was then reduced to 2kg using a coning and quartering procedure with the sample transferred into a numbered plastic sample bag with a corresponding sample tag, sealed and dispatched twice a day to the Houndé exploration camp. Note that all sample equipment (sample bowls and scoops) were bristle brush cleaned before collecting the assay sample and that the drill rods were metal brushed to remove any material sticking to the rods.

Table 9-1: Auger Drilling Results

Area	Planned Samples (No)	Planned Meters (m)	Actual Samples (No)	Actual Meters (m)	Mean Depth (m)
Waste Piles	816	4,080	569	3,785	6.7
Mill	486	2,471	490	3,217	6.6
Tailings Facilities	381	1,905	313	2,016	6.4
Dam	485	5,145	460	3,504	7.6
Camp Site	145	899	145	1,238	8.5
Total	**2,168**	**13,560**	**1,977**	**13,760**	**7.0**

All assay samples were sent to SGS Laboratories in Ouagadougou where they were first crushed to 75% passing 2mm, then passed over a riffle splitter, with up to 1.5kg of 2mm material pulverized to 85% passing 75 microns with a ring and puck pulveriser to create a pulp. The pulp was then analysed for gold by fire assay method FAE505 with aqua regia digestion extracted into a DIBK (336-diisobutylketone) solution with AAS (atomic absorption spectroscopy) finish and a gold detection limit of 2 ppb. SGS operates a Quality System, which accords to ISO 17025 standards. The Quality Control systems in place are such that analysis of blanks, standard reference material, repeats and re-splits account for up to 25% of all determinations conducted. As part of the international group of SGS laboratories, the laboratory takes part in a regular Round Robin sample analysis to check for bias or systematic error. All the above include 5% random repeats for all routine mineral analysis, as well as confirmation of anomalous results.

Basic geological information, including laterite thickness and type and depth to saprolite, was collected for each hole. The auger programme was successful in defining several gold enriched trends that were either obscured by younger cover or not covered by previous soil sample surveys. Only the mine site and waste pile areas returned significant anomalous gold values from the auger drill programme which aided in the definition of 11 anomalous zones that are indicated in Figure 9-2. As well, the auger drill data supports the northern extension of the Nema and Koho zones with the strongest Au anomaly identified near the likely northern extensions of the Koho zone.

Figure 9-1: Auger Drilling Results (source: Endeavour)

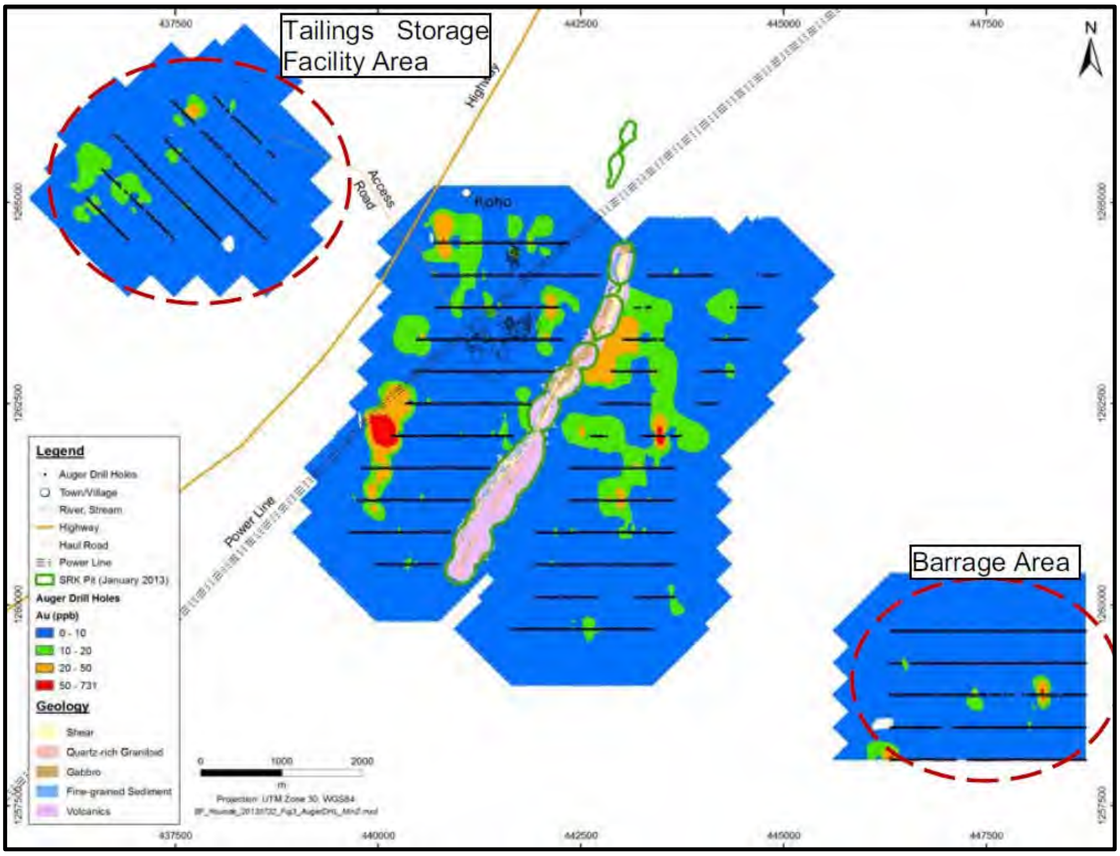
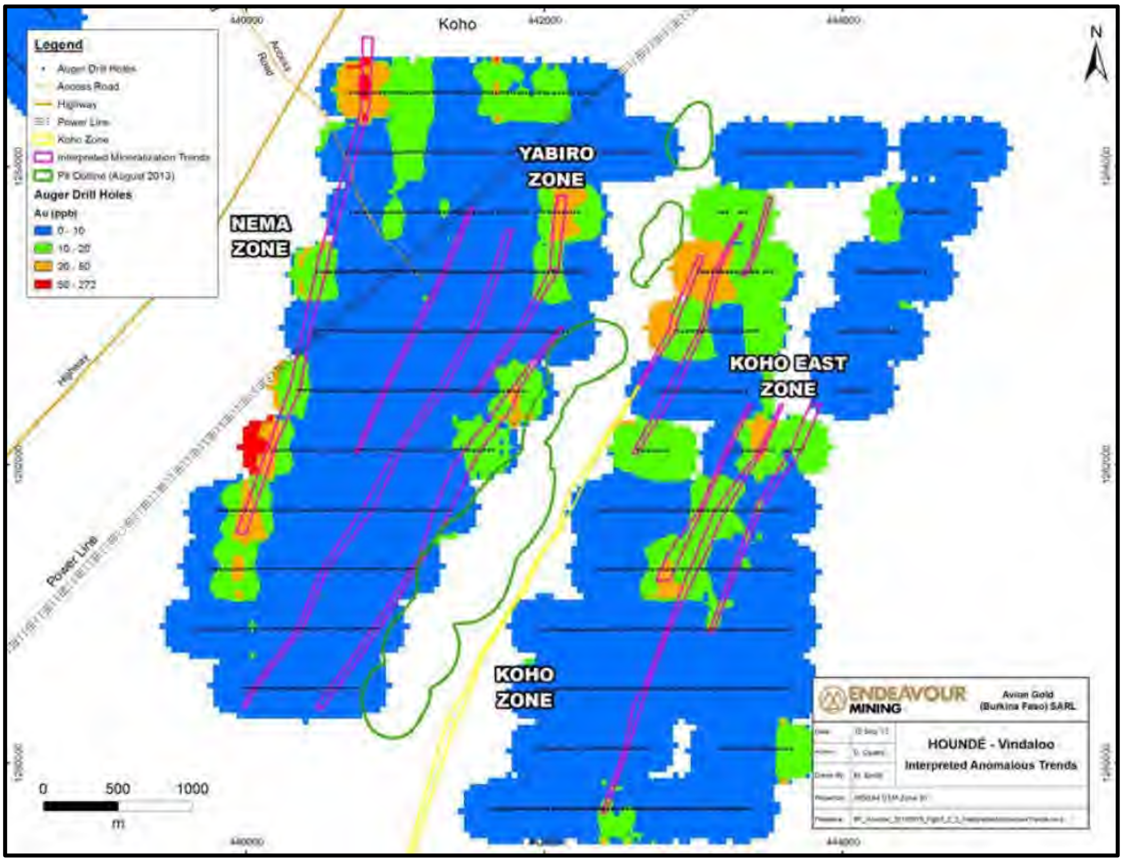


Figure 9-2: Interpreted Anomalous Trends on Colour-Contoured Au ppb from Auger Drilling for Mine and Waste Pile Site Areas (source: Endeavour)



9.3 Induced Polarization Sterilisation Survey

Induced polarization ("**IP**") gradient surveys were completed over three areas that might have been covered by mine infrastructure including the tailings pond, water dam and waste pile areas. The survey was completed in February 2013 by Sagax Afrique based in Ouagadougou. A total of 57km line of IP survey was completed on lines spaced 400m apart (Figure 9-3) over the water dam and tailings sites and 200m apart over the waste dump site. IP gradient readings were taken every 25m. The IP data trends in conjunction with the auger survey Au results and geological information allowed for the development of targets and subsequent drill testing. Follow-up targets were only identified in the waste pile area. The results of the IP surveys are presented in Figure 9-4 to Figure 9-6. A summary of the surveys over each area is presented in Table 9-2.

Table 9-2: Statistics of the IP Surveyed Grid Measured Parameters

Grid Location	Parameters	Characteristics	
		Minimum	Maximum
Dam Zone	Injected current (mA)	1,000	3,200
	Measured voltage (mV)	0.07	30.54
	Apparent resistivity (ohm.m)	32.57	926.28
	Apparent chargeability (mV/V)	2.92	22.19
	Standard Deviation	0.10	34.20
	Contact Resistance	0.00	900.06
Waste Zone	Injected current (mA)	1,000	3,000
	Measured voltage (mV)	1.53	30.08
	Apparent resistivity (ohm.m)	69.26	1,072.38
	Apparent chargeability (mV/V)	2.35	12.66
	Standard Deviation	0.10	7.70
	Contact Resistance	1.33	717.96
Tailings Zone	Injected current (mA)	2,000	3000
	Measured voltage (mV)	6.49	122.08
	Apparent resistivity (ohm.m)	162.38	3,778.87
	Apparent chargeability (mV/V)	1.88	5.16
	Standard Deviation	0.10	2.30
	Contact Resistance	0.99	818.76

Figure 9-3: Sterilization IP Survey Grid Locations (source: Endeavour)

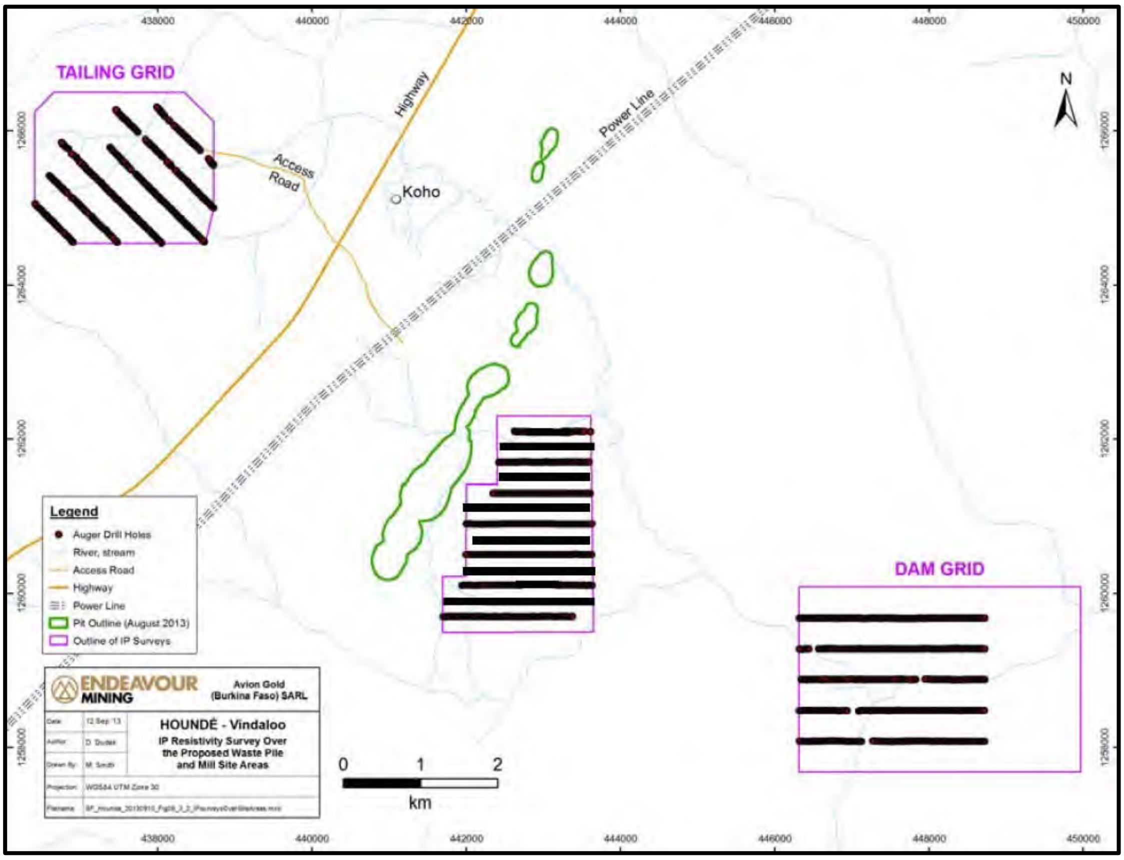


Figure 9-4: Interpreted Anomalous Mineralization Trends on Compiled Colour Contoured IP Resistivity for Mine Site and Waste Pile Areas (source: Endeavour)

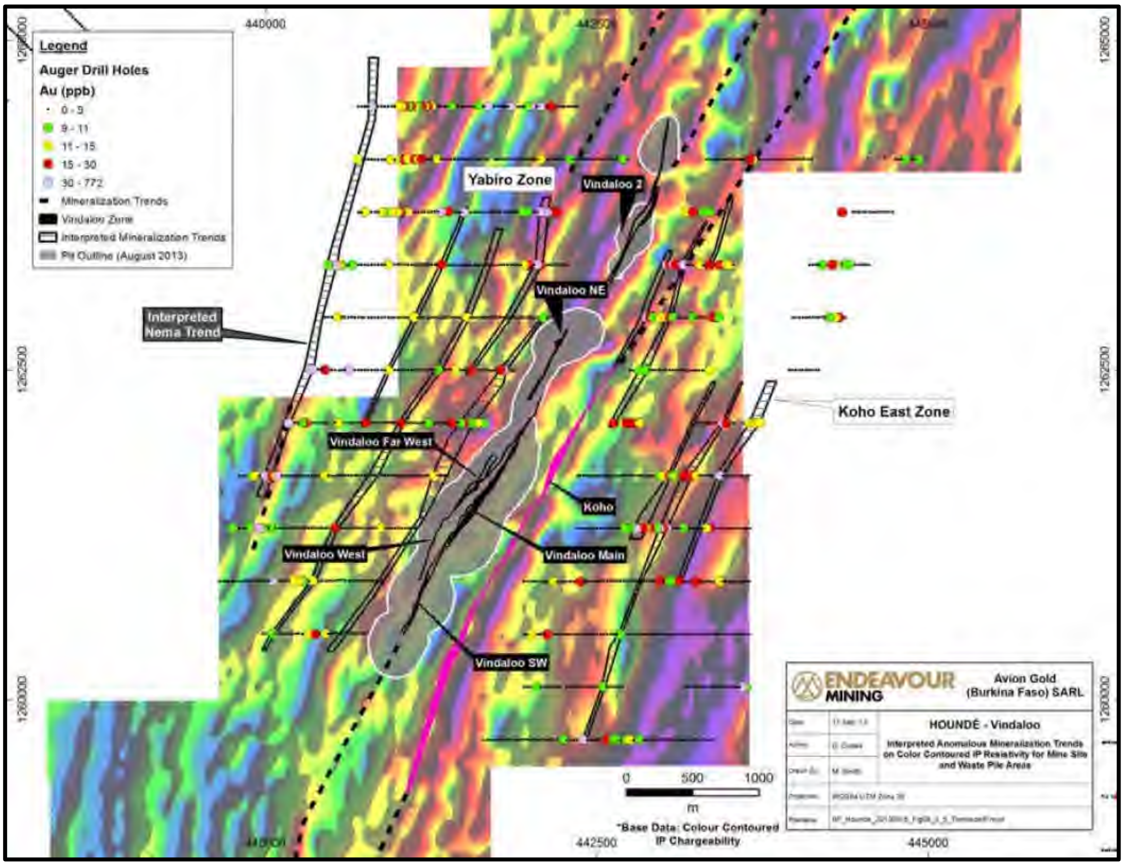


Figure 9-5: IP Colour-Contoured IP Resistivity Over Dam Site (source: Endeavour)

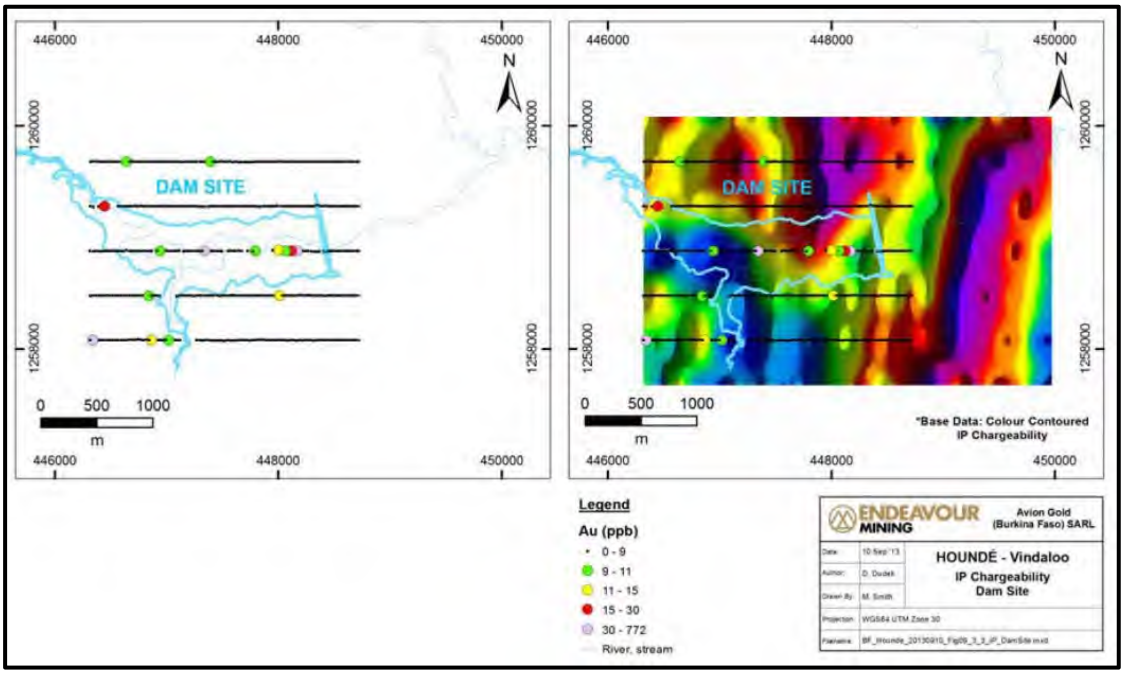
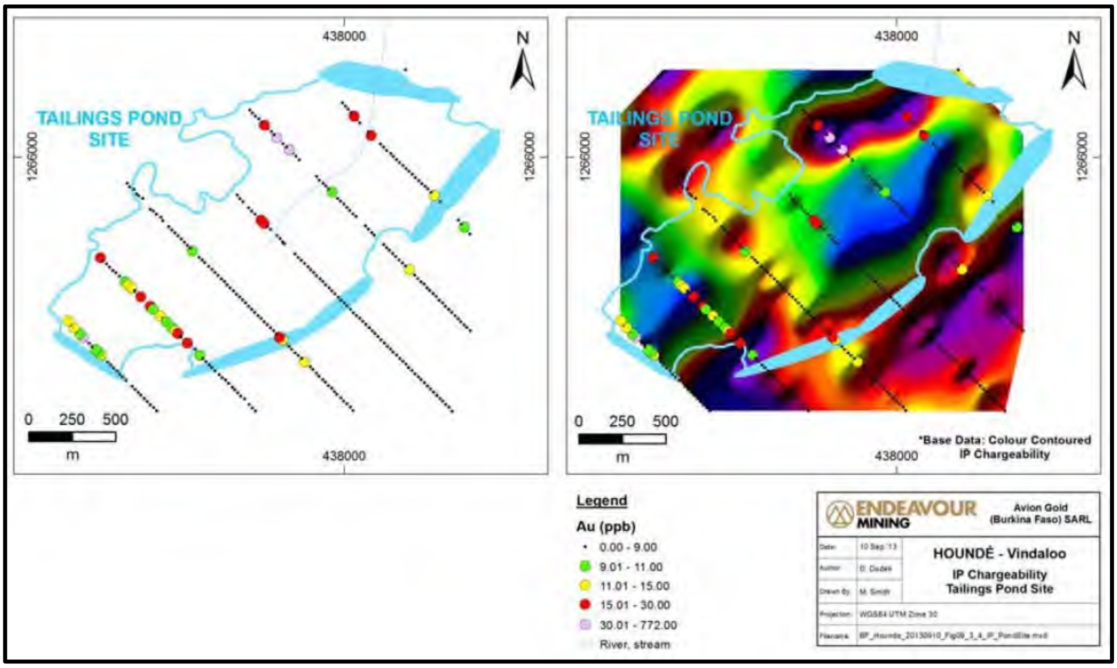


Figure 9-6: IP Colour-Contoured IP Resistivity Over Tailings Pond Site (source: Endeavour)



9.4 Geological Mapping

Reconnaissance geological mapping was conducted over the permit areas with two aims; namely to construct an interpreted geology map, and a regolith map. Both maps are used in collaboration with other data sets including geochemical assay surveys and results, geophysical survey data and drill information, as part of an overarching strategy of target identification and ranking based on data integration and validation.

The regolith and geological mapping used satellite imagery, government geological and topographic maps, satellite and Lidar contours, hand-held Garmin GPS units and geological tools (hammer, compass, hand lens) to evaluate the land surfaces, lithotypes, outcrop boundaries, weathering and geomorphology. Measurements were collected from structural observations such as foliation parallel to bedding planes, facing directions (pillow structures, graded bedding), cleavage, fold axial planes and hinges, and intersection lineations. Observations and measurements were recorded into the company relational database, which integrates with GIS software (MapInfo, QGIS and ArcGIS). For the geological mapping exercise, outcrops or clusters of outcrops were located using a GPS and recoded using polygons built and stored in the GIS database as “fact outcrops”.

Figure 9-7 shows the locations of outcrops identified during mapping and Figure 9-8 shows the interpreted regolith map. The schemes used for the regolith map are a hybrid of the RED (Residual, Erosional, Depositional) scheme produced by Dr Simon Bolster and his research in regolith classification in West Africa.

Figure 9-7: Outcrop location map (source: Endeavour)

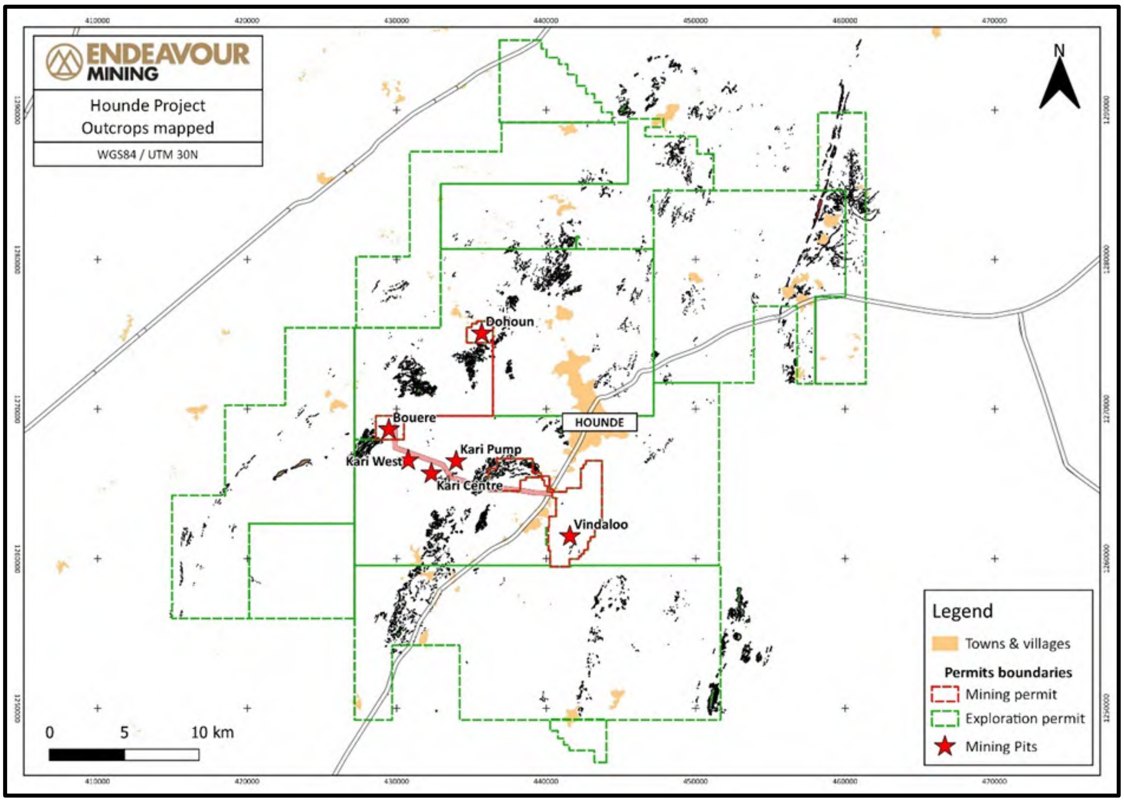
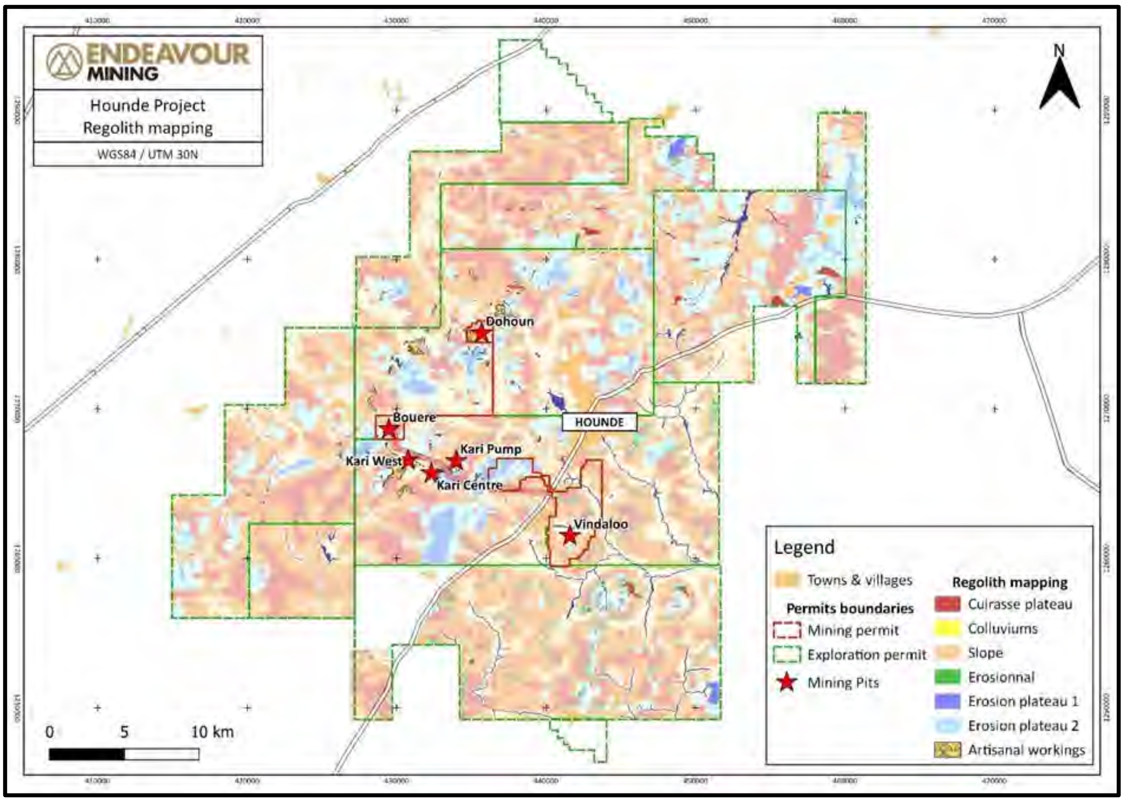


Figure 9-8: Interpreted regolith map (source: Endeavour)



9.5 Geochemical Sampling

Several types of geochemical sampling have been conducted at the Houndé project over time. These include rock chip, grab sample, soil, spoil, channel and trench sampling. For all sampling programmes, the collection methods for sample material are typically consistent. The samples were collected with a geological hammer and/or rock chisel and stored in calico cloth bags labelled with unique sample identification tag. The tag was inserted inside the bag, with a duplicate being secured on the outside, and the sample number written on the bag. Sample weights typically range between 2to 3kg. Variations to the process include substituting a plastic bag for the cloth bag when significant fine material is expected, such as when sampling trenches.

Rock chip samples typically consist of approximately equal sized chips of outcropping or sub-cropping ‘in situ’ rock, or pieces of transported material, termed “float”. Data recorded at the time of sampling included the percentage of ‘in situ’ material, outcrop dimensions, and approximate sampling intervals. Material collected included mineralized, brecciated, altered, gossanous, sulphide bearing (example pyrite) and quartz-veined samples.

Channel samples are typically taken using a power tool, except in very soft material. The channel is cut as either a U or rectangular shape. If an irregular groove is cut, the pieces are collected as a continuous chip sample. When channel samples were taken for reconnaissance purposes, these were typically continuous chip samples, with chips being taken over a specified length (e.g. 1m or 2m). Channel samples were typically taken at outcrops, road cuttings, riverbanks, artisanal mine waste dumps or spoil heaps.

Trench samples were also taken using a geological hammer or chisel, in the form of continuous chip samples. Chips were taken over a specified length (e.g. 1m or 2m). To maintain sample continuity and standardise the volume of material collected, a block of wood of set dimension was used as a guide to keep the chipping locations consistent. The block of wood was able to fit inside and all along the sample groove. All trench samples were collected at approximately knee height from the floor, along the wall of the trench.

Sampling of spoil heaps was in the form of semi-continuous chip samples, collected by geological hammer and chisel. The chips were collected along a traverse line at regular spacing, e.g. every 1m for 20m, or every 5th metre for 1m. Endeavour also collected semi-continuous chip samples across artisanal mine dumps to develop empirical information on the grade of material that the artisanal miners had been extracting.

Soil sampling was typically used as a regional exploration tool, in conjunction with other methods. The aim being to delineate areas of interest for further investigation. Soil sampling is typically a rapid and low-cost method. Soil sampling locations were selected by handheld Garmin GPS. A pit was excavated, measuring approximately 20cm in diameter, and approximately 30cm deep. In areas with transported material, holes were excavated to 50cm depth. Sample sites located on or near drainage tracts were not sampled unless saprolite was exposed. A geological hammer and chisel were used to break up the bottom of the pit, from which approximately 2kg to 3kg of material was extracted. Up to 2017, the excavated material was passed through a double metal screen (8mm mesh and 2mm mesh), with the sub 2mm fraction being captured in a plastic pan, before being transferred to the sample bag. After 2017, the screening of material was stopped, and excavated material was placed directly into the sample bag. The geology of the pit profile was recorded in field books, as well as comments on the surrounding surface geology and geomorphology. The pit was backfilled upon completion of logging and sampling. The sample was sent to either SGS or ALS Ouagadougou where it was treated as a rock chip sample.

The locations of the various geochemical samples, as collected between 2014 and 2019, are summarised in Table 9-3 and shown in Figure 9-9. Soil samples were typically collected on lines spaced 200m to 400m apart, with samples collected at 100m spacing along each line. Infill lines were then either 200m or 100m spacing with samples collected 100m apart along each line. Positive results led to three target areas being sampled along lines spaced 50m apart, with samples taken either 50m or 25m along each line. These targets were Sianikoui, located northeast of the Dohoun mine permit, Dossi on the eastern permit boundary, and Bombi in the southwest permit area.

All geochemical samples between 2014 and early 2017 were sent to SGS in Ouagadougou, where they were processed and analysed for Au content by 50g fire assay. In 2017, Endeavour engaged ALS Ouagadougou to become the primary assayer of exploration samples and the majority of 2017 samples were sent to ALS in Ouagadougou. All post 2017 samples were processed and analysed for Au content by 50g fire assay. In 2018 and 2019, high grade samples were assayed using a gravimetric finish.

Samples were submitted with control samples at an average rate of 5.2% except in 2019, which had a 9.3% insertion rate. In 2014, controls were CRMs only; in 2015 to 2018 field duplicates and blanks were included, but no CRM. In 2019, the control samples comprised laboratory duplicates and blanks only. This is detailed in Table 9-4.

There were no CRM failures in 2014, defined as three standard deviations above or below the mean. The blank control sample failure criteria were defined as five times the detection limit. One error was reported in 2015 and 2016, and 2 errors were reported in 2018. In all three circumstances the margin of error was low and surrounding samples reported very low in contained gold value, and as such, no repeat assays were performed. Duplicate samples that reported a difference larger than the accepted tolerance were considered to have failed and were flagged internally. Repeat assays were not performed on failed duplicates.

Table 9-3: Geochemical data collected between 2014 to 2019

Year / Permit	Rock Chip	Soil	Spoil	Channel	Trench	Total
2014	**51**	**0**	**614**	**0**	**0**	**665**
Bouahoun			18			18
Karba	42		134			176
Kari Nord			344			344
Kari Sud			84			84
Kopoi	8		10			18
Wakui	1		24			25
2015	**157**	**19,106**	**0**	**82**	**110**	**19,455**
Bagnima				100		100
Bonsan	4					4
Bouahoun	3	5,538				5,541
Dossi	27					27
Karba	12	45			110	167
Kari Nord	35	2,812		82		2,929
Kari Sud	35	4,319				4,354
Kopoi	40	5,353				5,393
Vindaloo Mine		1,039				1,039
Wakui	1					1
2016	**90**	**10,106**	**0**	**0**	**0**	**10,196**
Bonsan		1,281				1,281
Bouahoun		660				660
Dossi	29	970				999
Karba	5	3,354				3,359
Kari Nord	1	2,325				2,326
Kari Sud		1,516				1,516
Kiere	38					38
Kopoi	17					17
2017	**19**	**3,922**	**0**	**1,113**	**112**	**5,166**
Bonsan		1,498				1,498
Dossi		1,391				1,391
Karba	7				112	119
Kari Nord				560		560
Kari Nord				20		20
Kiere	6	1,033		355		1,394
Kopoi	3					3
Wakui	3			178		181
2018	**0**	**8,033**	**0**	**0**	**0**	**8,033**
Bonsan		1,659				1,659
Dossi		2,665				2,665
Kiere		420				420
Wakui		3,289				3,289
2019	**264**	**0**	**0**	**0**	**0**	**264**
Bagnima	111					111
Karba2	107					107
Kari Nord	6					6
Wakui2	40					40
Total	**581**	**41,167**	**614**	**1,195**	**222**	**43,779**

Figure 9-9: Location of geochemical sampling programs (2014 to 2019), with anomalous results marked (source: Endeavour)

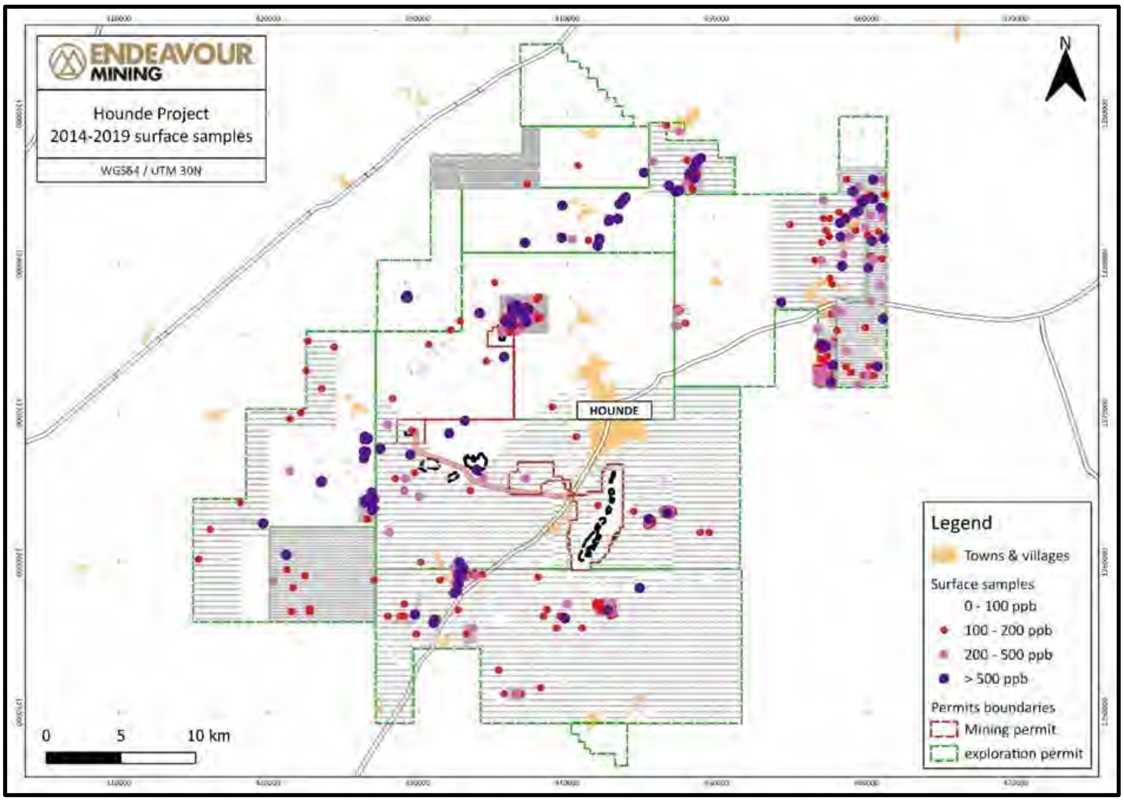


Table 9-4: Control samples submitted with geochemical samples 2014 – 2019

Control	2014	%	2015	%	2016	%	2017	%	2018	%	2019	%
Field Duplicate	0	0	502	2.6	261	2.6	100	2.5	212	2.6	0	0
Lab. Duplicate	0	0	0	0	0	0	0	0	0	0	9	3.2
Blank	0	0	512	2.7	267	2.6	106	2.7	214	2.7	17	6.1
CRM	32	4.8	0	0	0	0	0	0	0	0	0	0
Field Duplicate	0	0	502	2.6	261	2.6	100	2.5	212	2.6	0	0
Total Samples	**665**		**19,270**		**10,196**		**3,492**		**8,033**		**280**	
Overall Rate		**4.8**		**5.3**		**5.2**		**5.2**		**5.3**		**9.3**

9.6 Geophysical Surveying

9.6.1 Surveys

Sagax Afrique SA ("**Sagax**"), geophysics consultants in Ouagadougou, were engaged to design, carryout, process and interpret various ground geophysics programmes between 2014 and 2019. The surveys are summarised in Table 9-5, and their locations are shown in Figure 9-6. The statistics of the IP survey measured parameters are summarised in Table 9-6. The surveys conducted were both variations on Induced Polarization ("**IP**"), namely Gradient Array Induced Polarization, and Pole-Dipole Induced Polarization.

Figure 9-10: Location of ground-based geophysics surveys conducted between 2014 and 2019 (source: Endeavour)

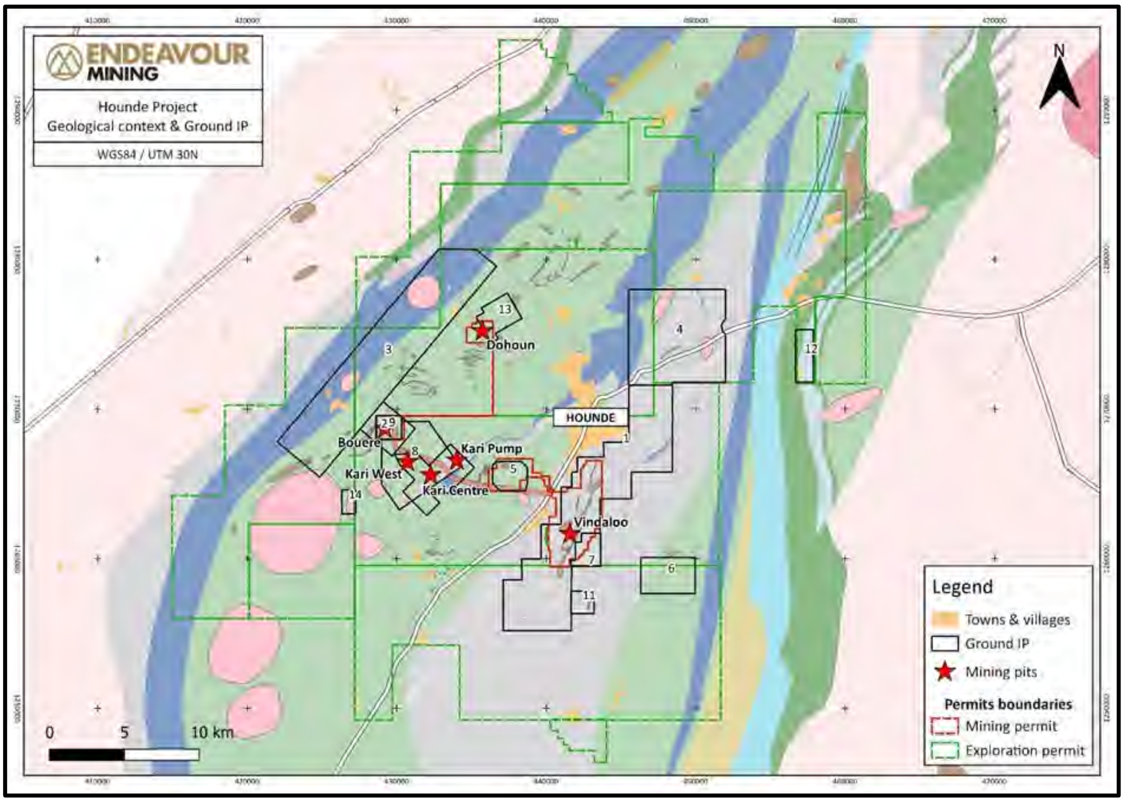


Table 9-5: Ground geophysics surveys completed (2014 to 2019)

Map Reference	Date	Sector	Permit	Method	Array	Quantity	Company
1	Mar-08	Vindaloo	Kari North	IP/Resistivity	Gradient	119km	Goldbelt Resources West Africa
1	Dec-10	Vindaloo	Kari North/ Kari South	IP/Resistivity	Gradient	110.4km	Avion Gold Burkina
2	Mar-11	Bouéré	Kari North/Karba	IP/Resistivity	Gradient	36.4km	Avion Gold Burkina
3	May-11	Grand Espoir	Karba/Wakui/ Bouhouan/ Kari North	IP/Resistivity	Gradient	169km	Avion Gold Burkina
1	Dec-11	Vindaloo	Kari North/ Kari South	IP/Resistivity	Gradient	234.7km	Avion Gold Burkina
4	Aug-12	Kopoi	Kopoi	IP/Resistivity	Gradient	210km	Avion Gold Burkina
5	Mar-13	Tailings Zone	Kari North	IP/Resistivity	Gradient	11.3km	Avion Gold Burkina
6	Mar-13	Dam Zone	Kari South	IP/Resistivity	Gradient	43.9km	Avion Gold Burkina
7	Mar-13	Waste Zone	Kari North	IP/Resistivity	Gradient	22.1km	Avion Gold Burkina
8	Jun-16	Bouéré	Kari North / Karba	IP/Resistivity	Gradient	90km	Avion Gold Burkina
9	Jun-16	Bouéré	Kari North / Karba	IP/Resistivity	Pole-Dipole	2km	Avion Gold Burkina
10	Mar/Nov-16	Kari North / Karba	Kari North / Karba	IP/Resistivity	Gradient	390km	Burkina Faso Gold
11	Mar-16	Kari Fault	Kari South	IP/Resistivity	Gradient	48km	Burkina Faso Gold
12	Jun-17	Dossi	Boni	IP/Resistivity	Gradient	83.35km	Burkina Faso Gold
13	Jul-17	Sia	Karba 2	IP/Resistivity	Gradient	104km	Burkina Faso Gold
14	Jul-17	Bombi	Bagmani	IP/Resistivity	Gradient	29.7km	Burkina Faso Gold

Table 9-6: Statistics of the IP Surveyed Grid Measured Parameters (Exploration Surveys)

Map Reference	Grid Location	Parameters	Characteristics	
			Minimum	Maximum
1	Vindaloo 2008	Injected current (mA)	2,000	3,000
		Measured voltage (mV)	0.18	68.63
		Apparent resistivity (ohm.m)	2.36	1645.49
		Apparent chargeability (mV/V)	-4.33	76.93
		Standard Deviation	0.1	35.8
		Contact Resistance	0.77	356.33
	Vindaloo 2010	Injected current (mA)	1,600	3,000
		Measured voltage (mV)	0.96	43.15
		Apparent resistivity (ohm.m)	54.75	2258.75
		Apparent chargeability (mV/V)	-1.84	22.7
		Standard Deviation	0.1	56.4
		Contact Resistance	0.05	262.92
	Vindaloo	Injected current (mA)	1,000	3,000
		Measured voltage (mV)	0.04	183.8
		Apparent resistivity (ohm.m)	0.12	4,186.81
		Apparent chargeability (mV/V)	-57.34	148.49
		Standard Deviation	0.1	69.2
		Contact Resistance	0.08	717.96
2, 8	Bouéré	Injected current (mA)	1,800	2,000
		Measured voltage (mV)	0.04	57.95
		Apparent resistivity (ohm.m)	3.1	4,439.99
		Apparent chargeability (mV/V)	-0.77	10.61
		Standard Deviation	0.1	6.4
		Contact Resistance	0.04	173.82
3	Grand Espoir	Injected current (mA)	1,300	2,100
		Measured voltage (mV)	0.02	56.1
		Apparent resistivity (ohm.m)	2.81	7,041.77
		Apparent chargeability (mV/V)	-2.02	25.9
		Standard Deviation	0.1	21.9
		Contact Resistance	0.05	276.9
4	Kopoi	Injected current (mA)	1,500	2,500
		Measured voltage (mV)	0.07	465.51
		Apparent resistivity (ohm.m)	2.59	4,441.07
		Apparent chargeability (mV/V)	-57.34	148.49
		Standard Deviation	0.1	59.5
		Contact Resistance	0.04	141.84
5	Tailings Zone	Injected current (mA)	2,000	3,000
		Measured voltage (mV)	6.49	122.08
		Apparent resistivity (ohm.m)	162.38	3,778.87
		Apparent chargeability (mV/V)	1.88	5.16
		Standard Deviation	0.1	2.3
		Contact Resistance	0.99	818.76
6	Dam Zone	Injected current (mA)	1,000	3,200
		Measured voltage (mV)	0.07	30.54
		Apparent resistivity (ohm.m)	32.57	926.28
		Apparent chargeability (mV/V)	2.92	22.19
		Standard Deviation	0.1	34.2
		Contact Resistance	0	900.06
7	Waste Zone	Injected current (mA)	1,000	3,000
		Measured voltage (mV)	1.53	30.08
		Apparent resistivity (ohm.m)	69.26	1072.38
		Apparent chargeability (mV/V)	2.35	12.66
		Standard Deviation	0.1	7.7
		Contact Resistance	1.33	717.96
9	Bouéré Pole-Dipole	Injected current (mA)	900	3,600
		Measured voltage (mV)	8.2	2161.6
		Apparent resistivity (ohm.m)	16.59	339.88
		Apparent chargeability (mV/V)	-1.79	10.3
		Standard Deviation	0.01	2.11
		Contact Resistance	0.5	62.66
10	Kari North	Injected current (mA)	2,100	3,900
		Measured voltage (mV)	1.2	87.6
		Apparent resistivity (ohm.m)	15.22	2879.74
		Apparent chargeability (mV/V)	-10.11	29.28

Map Reference	Grid Location	Parameters	Characteristics	
			Minimum	Maximum
		Standard Deviation	0.1	36
		Contact Resistance	0.35	314.14
11	Kari Fault	Injected current (mA)	2,200	4,400
		Measured voltage (mV)	1.1	16.2
		Apparent resistivity (ohm.m)	46.44	674.31
		Apparent chargeability (mV/V)	2.08	19.8
		Standard Deviation	0.2	7
		Contact Resistance	1.97	290.73
12	Dossi	Injected current (mA)	1,800	2,800
		Measured voltage (mV)	0.7	104.5
		Apparent resistivity (ohm.m)	34.87	4,466.6
		Apparent chargeability (mV/V)	-1.64	8.54
		Standard Deviation	0.1	6.1
		Contact Resistance	0.16	131.98
13	Sia	Injected current (mA)	1,700	3,500
		Measured voltage (mV)	4	147.1
		Apparent resistivity (ohm.m)	122.18	6,413.01
		Apparent chargeability (mV/V)	-12.76	49.28
		Standard Deviation	0.1	5.8
		Contact Resistance	0.46	308.69
14	Bombi	Injected current (mA)	3,200	3,300
		Measured voltage (mV)	4.9	133.2
		Apparent resistivity (ohm.m)	181.18	5,264.41
		Apparent chargeability (mV/V)	-2.21	12.11
		Standard Deviation	0.1	2.1
		Contact Resistance	2.99	229.13

9.6.2 Results

Gradient Array is an application array of the Induced Polarization ("**IP**") / Resistivity method. It is frequently used in West Africa as a geological and structural mapping technique as it is particularly useful in areas covered by laterite or transported material, where it can track sub-surface lithologies that are receptive to the electrical charge being induced into the ground. The technique allows rapid data collection from lines spaced 25m, 50m, 100m, 200m or 400m apart depending on the requested resolution. The implementation of this methodology is done using a transmitter (coupled with a motor generator), used to inject an electric current into the ground through fixed electrodes located at great distances from each other (2km to 3km); of a receiver that is moved along lines (profiles) within the area between the current electrodes. Resistivity and Chargeability are measured every 12.5m, 25m or 50m along these lines. The raw data are transferred from the receiver to a computer and are then processed. The greater the density of measurements, the greater the sharpness of the interpretation. Geological and structural information available, from surface or in boreholes, may serve as a guide for interpretation.

Two petro-physical properties are mapped, namely resistivity and chargeability. The resistivity reflects the porosity and water content of the underlying rocks. Rocks with low porosity, such as altered or weathered rocks, or intrusions will be more resistive than more porous rocks such as sediments, shales, and clays. Chargeability which can highlight lithologies that generate secondary electrical fields either due to natural organic variations such as grey siltstones and black shales, or the presence of sulphides (e.g. pyrite, chalcopyrite, arsenopyrite, etc.). In general, the response in chargeability will be proportional to the surface area of contact between the sulphide grains contained in the rocks and the water content. At Houndé, gold mineralisation is typically associated with silica and carbonate altered lithologies, and with the presence of sulphides. Two types of pseudo-images are commonly produced from the IP surveys, an apparent resistivity image (Figure 9-11), and an apparent chargeability image (Figure 9-12).

The surveys conducted between 2014 and 2019 typically demonstrate a good correlation between mineralised trends as defined by drill results, and co-incident resistive high and chargeability high geophysical trends (Figure 9-13). In 2016, Gradient Array IP surveys focused on the areas with high potential for hosting significant mineralisation, namely the Kari to Bouéré area (Areas 8, 9, and 10 in Figure 9-10) and Kari Fault Target (Area 11 in Figure 9-10). In 2017, focus was on advancing understanding and delineating potential horizons at three moderately advanced regional target areas, namely Dossi, Sianikoui, and Bombi.

Pole-Dipole Induced Polarization surveys use similar equipment as Gradient Array IP surveys. For Pole-Dipole, the survey lines are set as a perpendicular grid. The result is survey data can be interpreted and viewed as a 3D data set with higher confidence in trend and location of features at depth, which results in more accurate and cost-effective drill testing of targets. The surveys are higher in terms of cost and time consumption and so are limited to areas where there is more confidence in the mineralised potential. In 2016, Endeavour conducted a broad line spacing pole-dipole IP survey in the Kari West – Bouéré - Grand Espoir area (Area 9 in Figure 9-10). The results were inconclusive.

Figure 9-11: Gradient Array IP surveys from 2014 to 2019 – Apparent Resistivity pseudo-image (source: Endeavour)

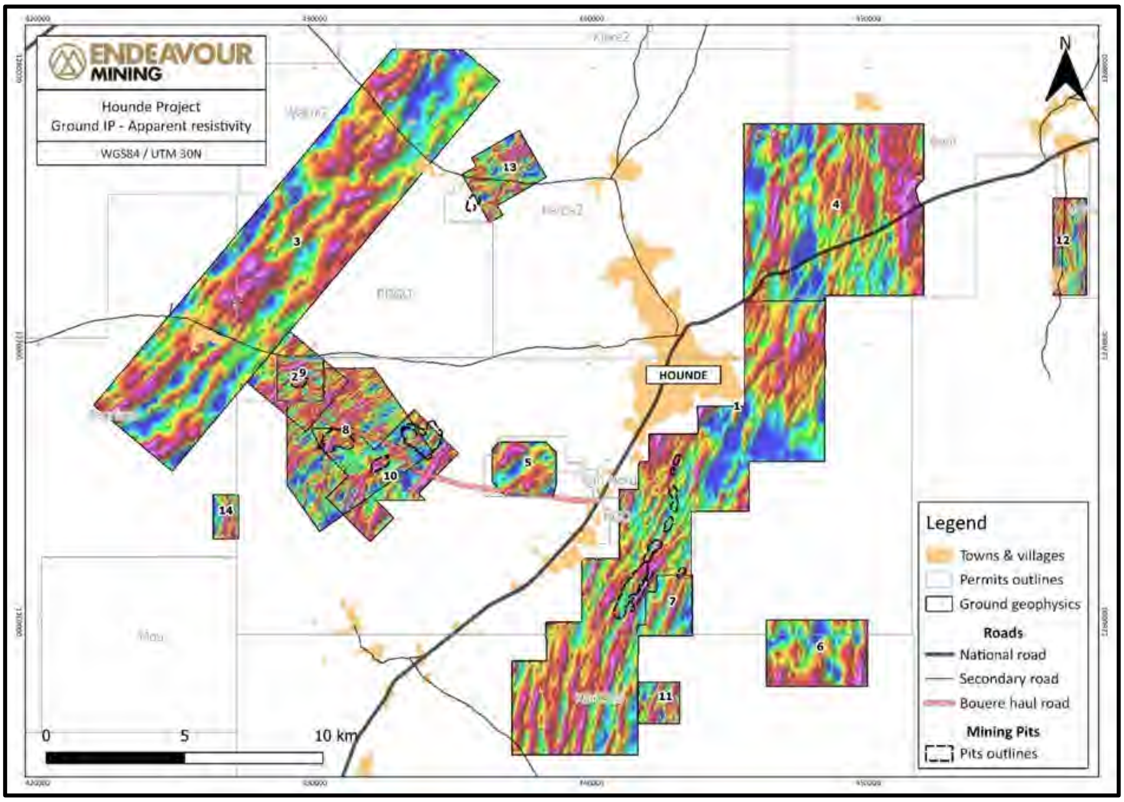


Figure 9-12: Gradient Array IP surveys from 2014 to 2019 – Apparent Chargeability pseudo-image (source: Endeavour)

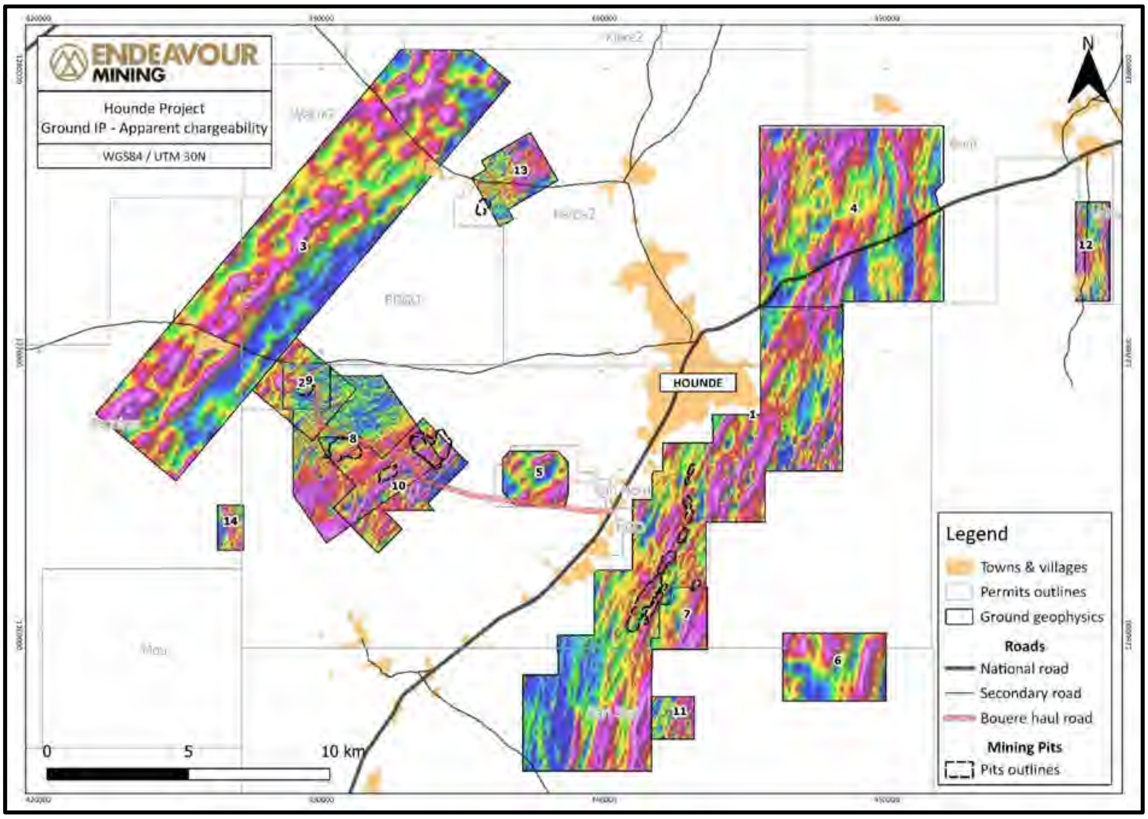


Figure 9-13: Gradient Array IP surveys from 2014 to 2019 - Combined resistivity high / chargeability high worm map (source: Endeavour)

9.7 Exploration Areas of Interest

Approximately thirty-nine areas of interest regarding gold mineralisation ("gold showings") have been identified across the Houndé Permit areas. The areas of interest range in maturity from very early stage exploration with minimal empirical data to potential targets with drilling results and geological hypotheses (Figure 9-14).

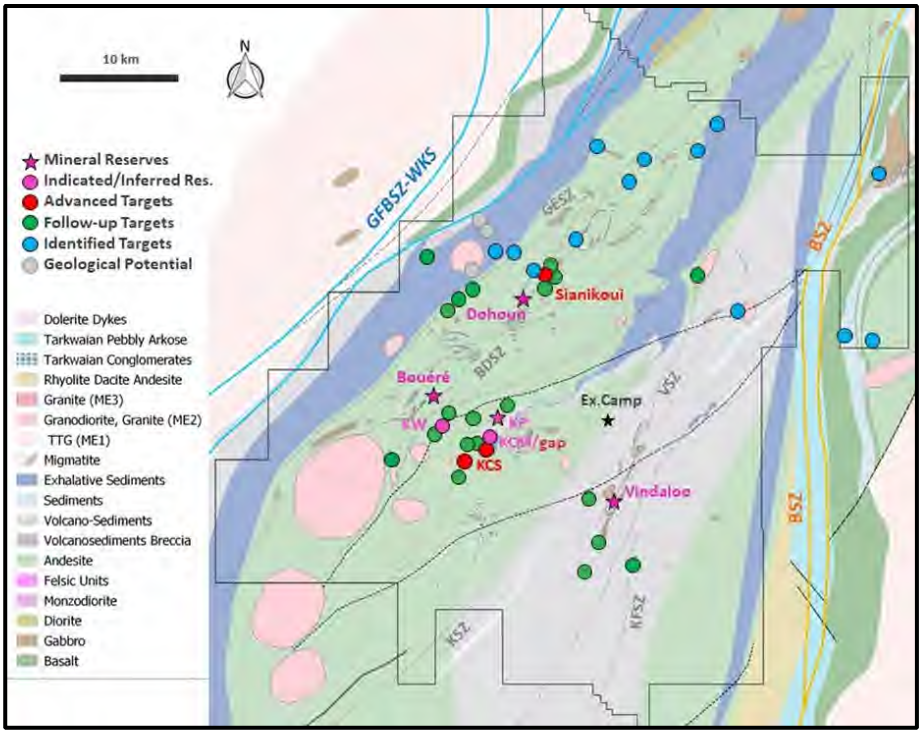
A total of 16 lower order gold showings have been identified which are conceptual in nature and based on low levels of data support. The data includes remote sensing, trends and anomalies in geophysical data sets, artisanal workings, geochemical results (e.g. soil samples and rock chip samples) and occasional broad spaced reconnaissance RAB or AC drill results. These targets can be several hundred metres to thousands of metres in dimension. The activities described in Sections 9.4 to 9.6 contribute heavily into the delineation of these targets.

Twenty gold showings are classified as "follow-up" due to moderate levels of data support and their interpreted potential to host significant gold mineralisation. Most of these projects are clustered in either the Kari area or to the south of Vindaloo. These projects host anomalous geochemical results plus numerous anomalous intercepts from reconnaissance RAB or AC drill holes, and / or RC and DD drill holes.

Three advanced targets have been defined and are the focus of current exploration, namely; Kari Gap, Kari South, and Sianikoui. Kari Gap and Kari South are the southward continuation of the shear and associated mineralisation at Kari Centre. Reconnaissance AC lines and scout RC and DD holes have confirmed the mineralisation over a 3km strike length. Two zones have been identified which have significant grade and mineralised intercepts. Further drilling, in the form of RC, AC and DD are planned for both areas.

Sianikoui is located approximately 3km north of Dohoun and has two identified mineralised structures. These are both north-northeast trending and associated with quartz veined shear zones. The shears are proximal to the contact between volcanites and gabbroic and felsic intrusives and extend for over 1km along the identified trend.

Figure 9-14: Gold Showings and targets (source: Endeavour)



9.8 Risks and Opportunities

No significant risks have been identified with respect to exploration activities at Houndé Gold Mine. The key opportunities related to realisation the potential relating to the exploration targets identified to date which are presently the subject of Endeavour's exploration programme as presently managed by Endeavour.

9.9 Interpretation, Conclusions and Recommendations

The exploration activities completed to date have been undertaken in accordance with Endeavour's standards and practices and in compliance with the commitments made in respect of the governing regulatory permits. It is recommended that the wider exploration programme and in addition the ongoing infill drilling relating to the deposits for which Mineral Resources are reported is completed and incorporated into the next resource model updates as appropriate.

10 DRILLING

10.1 Introduction

The following section provides a summary of the drilling programmes completed to date to support the geological modelling and Mineral Resources as reported herein with specific focus on drilling summaries for the individual deposits; core and sample recovery; drill hole surveying; risks and opportunities; interpretation, conclusions and recommendations.

10.2 Drilling Summary

Exploration drilling in the Vindaloo-Madras area conducted prior to 2014 is included in the 2013 FS and a summary of this is included in Table 10-1 below which indicates that a total of approximately 751 holes have been drilled for a total of 103,677m. The 2012-13 drilling campaign (Figure 10-1) was an infill programme designed to improve the confidence in the geological modelling and resource estimation. In addition, in 2013 Endeavour completed 10 geotechnical holes, 12 holes to test the substrate for infrastructure design, eight water test boreholes and 35 RC sterilization holes.

Table 10-1: Pre-2014 Vindaloo-Madras Drilling Summary

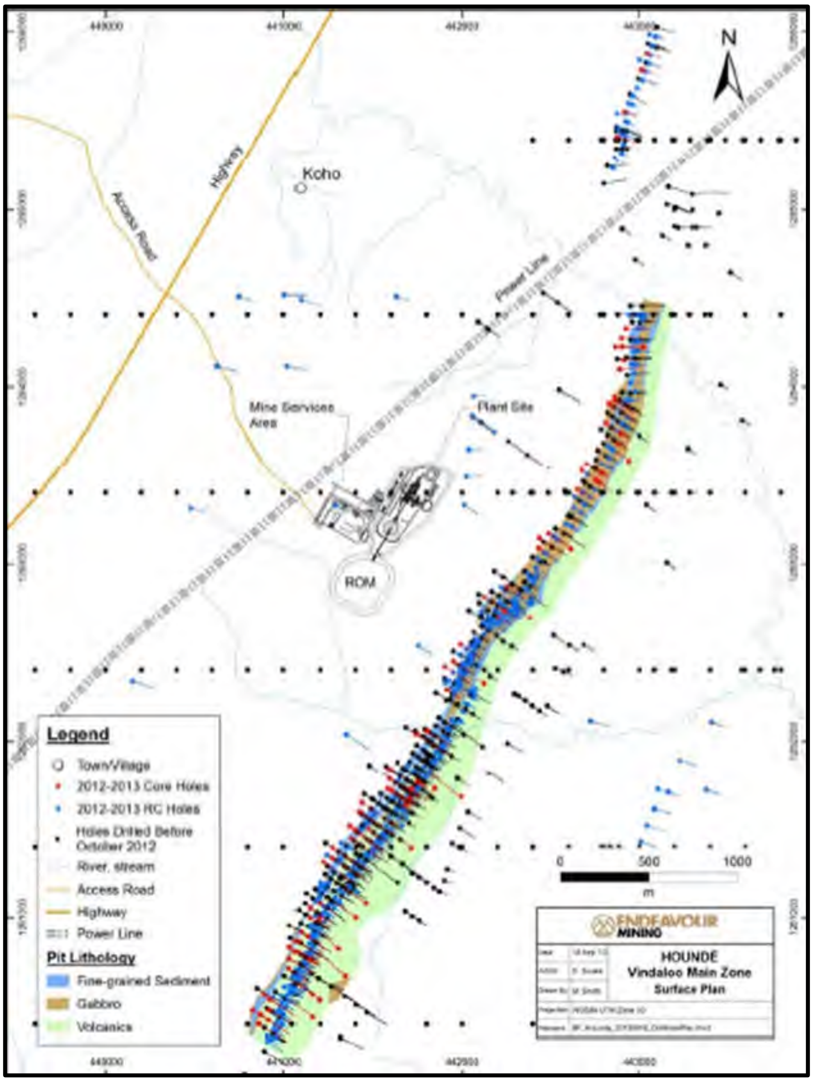
Year	Company	Core Holes (No)	Core Metres (m)	No. RC Holes (No)	RC Metres (m)	Total No. Holes (No)	Total Metres (m)
2007	Barrick	4	625	1	70	5	695
2008	Goldbelt	2	260	61	6,060	63	6,320
2010	Avion	12	3,222	-	-	12	3,222
2011	Avion	94	20,093	68	9,106	162	29,199
2012	Avion	51	11,788	100	11,919	151	23,707
2012/13	Endeavour	77	15,838	281	24,696	358	40,534
Total		**240**	**51,826**	**511**	**51,851**	**751**	**103,677**

Between 2014 and 2019, Endeavour conducted various drilling programs over the exploitation permits (Vindaloo, Bouéré, and Dohoun) and the remaining exploration permits. The programs included phases of air core ("**AC**"), air core reverse circulation ("**ARC**"), auger ("**Auger**"), diamond drill holes ("**DDH**"), reverse circulation percussion ("**RC**") and reverse circulation percussion with diamond core tail ("**RC-DD**"). The statistics of the metres and hole types, and areas they were drilled are summarised in Table 10-2. Contractors engaged to execute the 2014 to 2019 drill programmes are listed in Table 10-3. The locations of the drill hole collars drilled between 2014 and 2019 are shown in Figure 10-2. Collar locations per year from 2014 to 2019 are included in Figure 10-3 to Figure 10-8.

AC drilling is carried out from truck mounted rigs with onboard compressors configured to allow drilling to depths of approximately 100m. At Houndé, most drilling is restricted to the top of the saprock, to allow speed of ground coverage. The drilling technique uses steel or tungsten "blades" to bore a hole into unconsolidated ground. The drill cuttings are removed by the injection of compressed air into the hole. AC is typically used in weathered regolith as the drill rig and steel or tungsten blades struggle to penetrate fresh rock. Thick zones of silica alteration or quartz veins in the saprolite reduce the penetration rate. Endeavour used AC drilling as a first pass exploration drill programme to evaluate potential to host mineralisation as it is relatively fast in execution and inexpensive in comparison to other types of drilling. ARC drilling is where an AC drill rig uses a conventional RC hammer bit, rather than a blade. This technique is primarily used in areas where multiple lenses of quartz occur in the saprolite or thin depths to saprock slow drill penetration rates.

Auger drilling is carried out using small 4WD mounted spiral blade drill rigs. The spiral blades penetrate down to depths of approximately 30m and are used primarily for geochemical sampling beneath laterite cover or transported material. The method is prone to contamination, and results are used as a guide only, along with other sources of data in exploration target ranking. Before ARC and AC drill rates became more cost and time competitive, auger drilling was a common first pass drill technique to obtain sub-surface geochemical data.

Figure 10-1: 2012/13 Vindaloo-Madras In-fill Drill Programme (source: Endeavour)



RC drilling uses a purpose-built drill rig, with large air compressors and a percussion hammer drill bit. The drill rods are twin walled, with an inner and outer tube. High pressure compressed air is injected into the space between the inner and outer drill tubes; the compressed air drives the hammer bit which breaks the ground, and then forces the broken ground sample along with any ground water back to the surface via the inner tube. The sample is discharged at surface via a hose and cyclone assembly. Bags of broken samples are collected for every meter of rock drilled. RC drilling can be used in hard and soft ground conditions and is faster and cheaper than diamond core drilling. It produces much less contamination and produces superior and more representative sample than other types of drilling such as AC, ARC, or Auger.

Diamond drilling produces solid cylinders of rock, which can then be logged and sampled. At Houndé, the core sizes used are typically PQ, HQ, or NQ. Diamond drilling uses diamond impregnated circular drill bits to cut the cylinders of rock. The core is extracted to surface via wireline. Diamond drilling is the most expensive and the slowest of the drilling types used at Houndé, but it produces the best samples for geological, structural and geotechnical data collection. The samples are also used for geo-metallurgical and geochemical analysis. A combination hole which as an RC pre-collar to a certain depth, and the remaining hole to target depth completed by conventional diamond drilling techniques, are recorded as RC-DD

Table 10-2: Drilling Summary (2014 to 2019)

Year/Permit	AC		ARC		Auger		DDH		RC		RC-DD		Total	
	No. Holes	(m)	No. Holes	(m)	No. Holes	(m)	No. Holes	(m)	No. Holes	(m)	No. Holes	(m)	No. Holes	(m)
2014 - Total	**191**	**2,514**			**2,642**	**20,998**	**77**	**16,410**	**362**	**35,135**	**39**	**69,992**	**3,311**	**82,049**
BDGO mine	191	2514			287	1,975	24	4,225	166	16,294	25	4,511	693	29,520
Boni					**325**	**2,353**							**325**	**2,353**
Karba2					**1,401**	**9,849**			**2**	**126**	**2**	**314**	**1,405**	**10,289**
Kari Nord									**10**	**933**	**4**	**646**	**14**	**1,579**
Kari Sud					**431**	**5,619**	**6**	**1,235**	**2**	**227**			**439**	**7,081**
Vindaloo mine							**47**	**10,950**	**182**	**17,555**	**8**	**1,521**	**237**	**30,026**
Wakui2					**198**	**1,202**							**198**	**1,202**
2015- Total					**138**	**2,002**			**4**	**400**			**142**	**2,402**
Kari Sud									1	100			1	100
Vindaloo mine									3	300			3	300
Wakui2					138	2,002							138	2,002
2016- Total	**167**	**4,346**									**2**	**302**	**169**	**4,648**
Karba2											2	302	2	302
Kari Nord	8	298											8	298
Vindaloo mine	159	4,048											159	4,048
2017- Total	**258**	**16,775**	**538**	**41,255**			**42**	**6,770**	**99**	**11,564**			**937**	**76,364**
Bagnima			34	2,453									34	2,453
BDGO permit	258	16,775					16	2,358	28	1,827			302	20,960
Boni							6	511					6	511
Karba2							13	2,566	28	3,620			41	6,186
Kari Nord			504	38,802			2	362	23	3,402			529	42,566
Kari Sud							5	973					5	973
Vindaloo mine									20	2,715			20	2,715
2018- Total			**994**	**76,444**			**80**	**12,674**	**693**	**76,479**			**1,767**	**165,597**
Bagnima			35	1,865									35	1,865
Kari Nord			959	74,579			80	12,674	693	76,479			1,732	163,732
2019- Total			**905**	**68,708**			**84**	**14,637**	**594**	**91,487**			**1,583**	**174,832**
Boni			16	1,311									16	1,311
Kari Nord			889	67,397			84	14,637	594	91,487			1,567	173,521
Total	**616**	**23,635**	**2,437**	**186,407**	**2,780**	**23,000**	**283**	**50,491**	**1,752**	**215,065**	**41**	**7,294**	**7,909**	**505,892**

Table 10-3: Drilling Contractors (2014 to 2019)

Year/ Company	AC No. Holes	ARC No. Holes	Auger No. Holes	DDH No. Holes	RC No. Holes	RC-DD No. Holes	Total No. Holes
2014	**191**		**2,643**	**77**	**362**	**39**	**3,312**
GEODRILL	191			77	362	39	669
SAHARA GEOSERVICES			2,643				2,643
2015			**138**		**4**		**142**
FTE					4		4
SAHARA GEOSERVICES			138				138
2016	**167**					**2**	**169**
MAJOR	167					2	169
2017		**664**		**42**	**99**		**805**
FTE		664		37	99		800
JMS				2			2
MAJOR				3			3
2018	**1,126**			**79**	**693**		**1,898**
FALCON				79			79
GEODRILL					198		198
MAJOR	1,126				495		1,621
2019		**905**		**84**	**594**		**1,583**
AMS		682					682
FORACO				75			75
GEODRILL		223		9	594		826

Figure 10-2: Location of drill hole collars (2014 to 2019) (source: Endeavour)

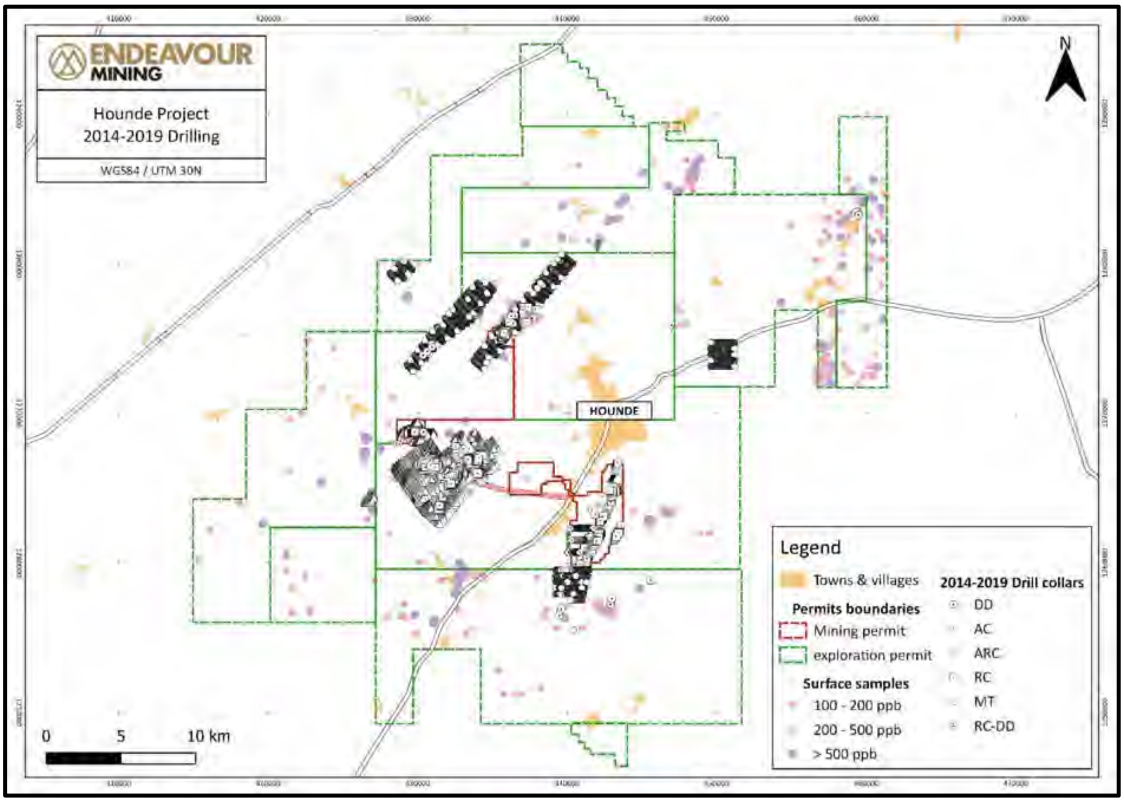


Figure 10-3: Location of drill hole collars in 2014 (source: Endeavour)

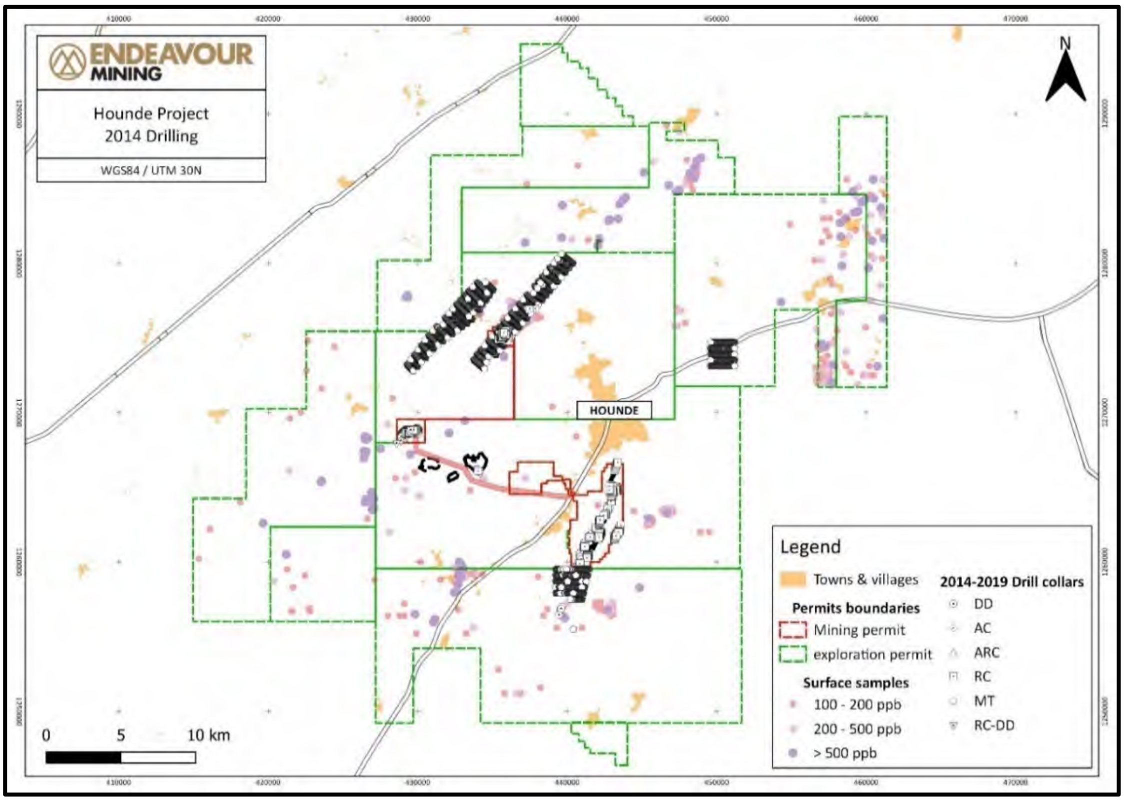


Figure 10-4: Location of drill hole collars in 2015 (source: Endeavour)

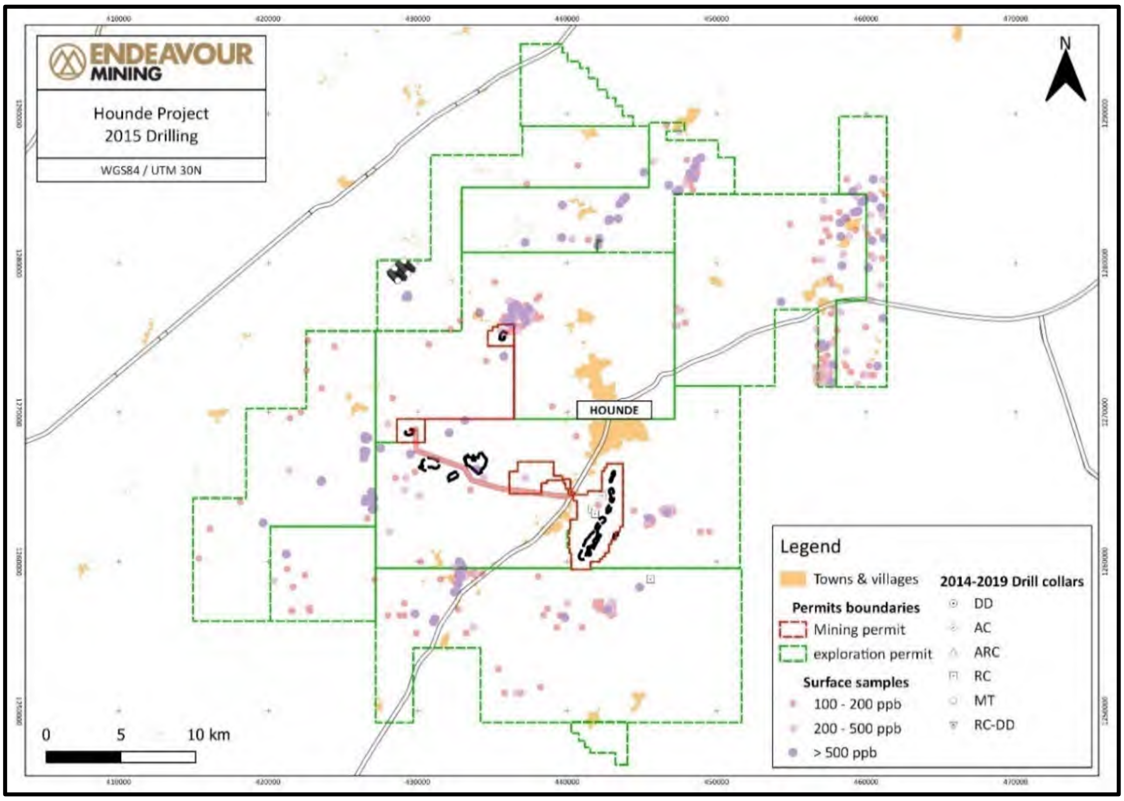


Figure 10-5: Location of drill hole collars in 2016 (source: Endeavour)

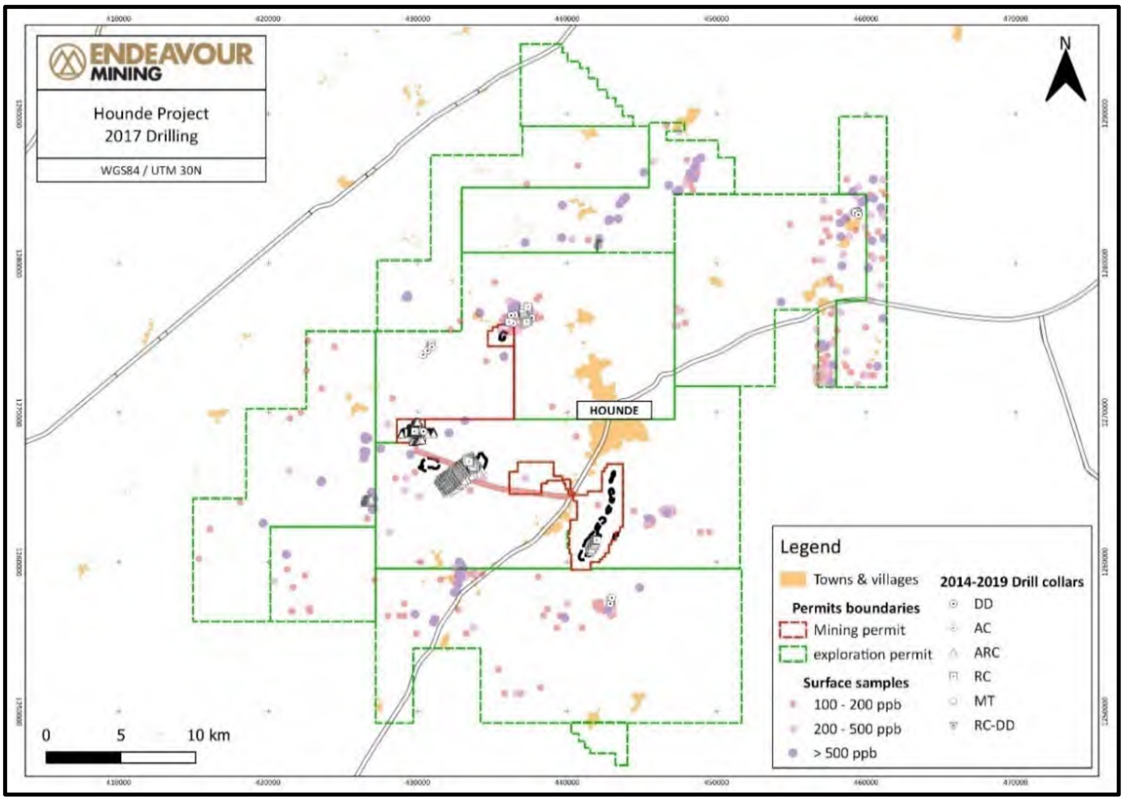


Figure 10-6: Location of drill hole collars in 2017 (source: Endeavour)

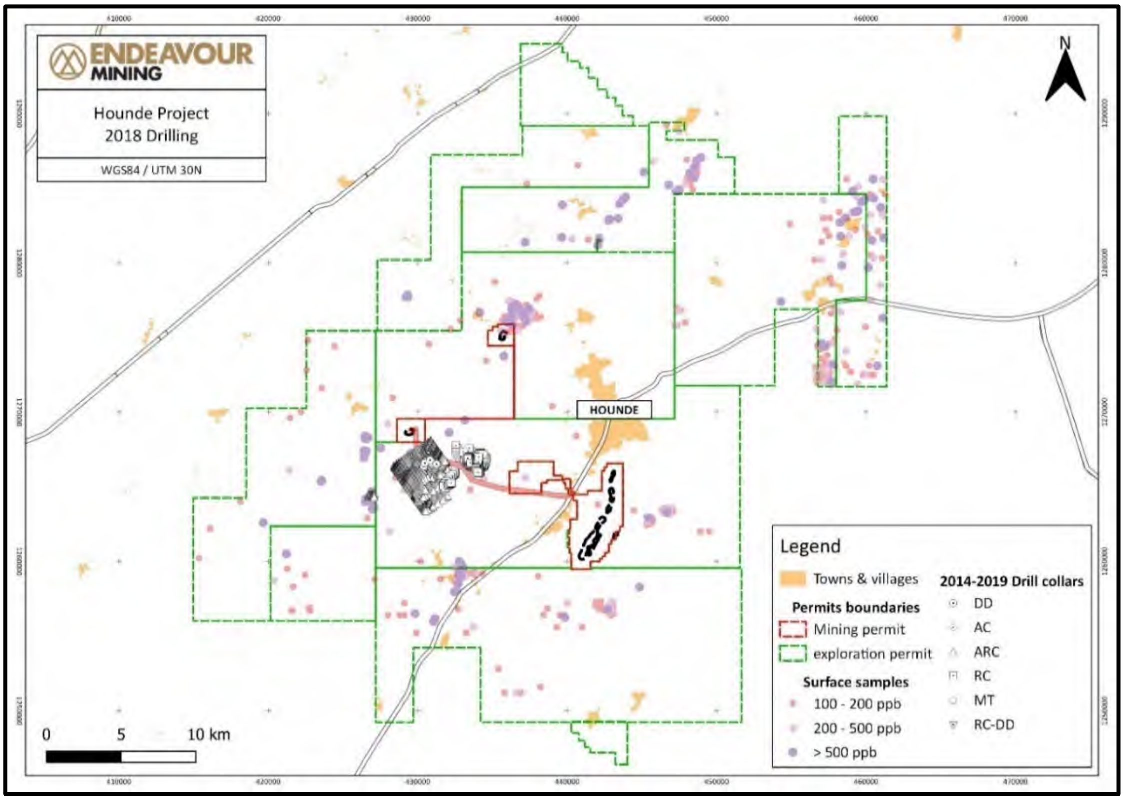


Figure 10-7: Location of drill hole collars in 2018 (source: Endeavour)

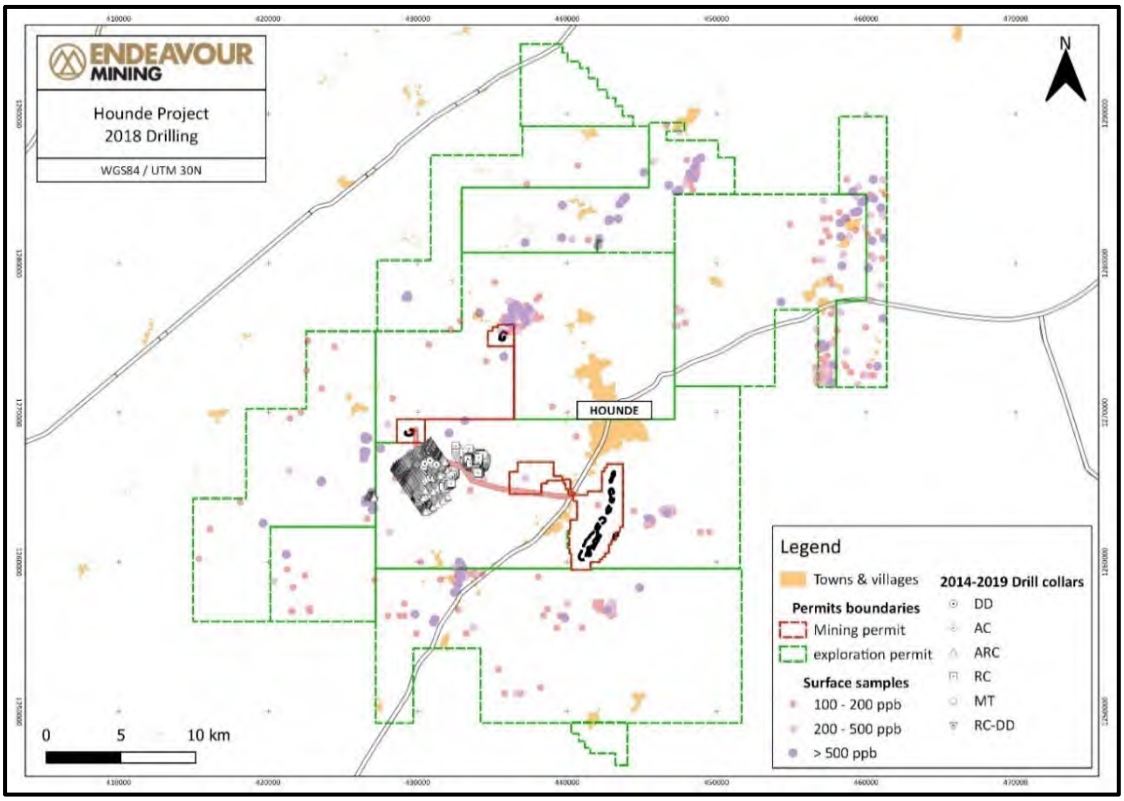
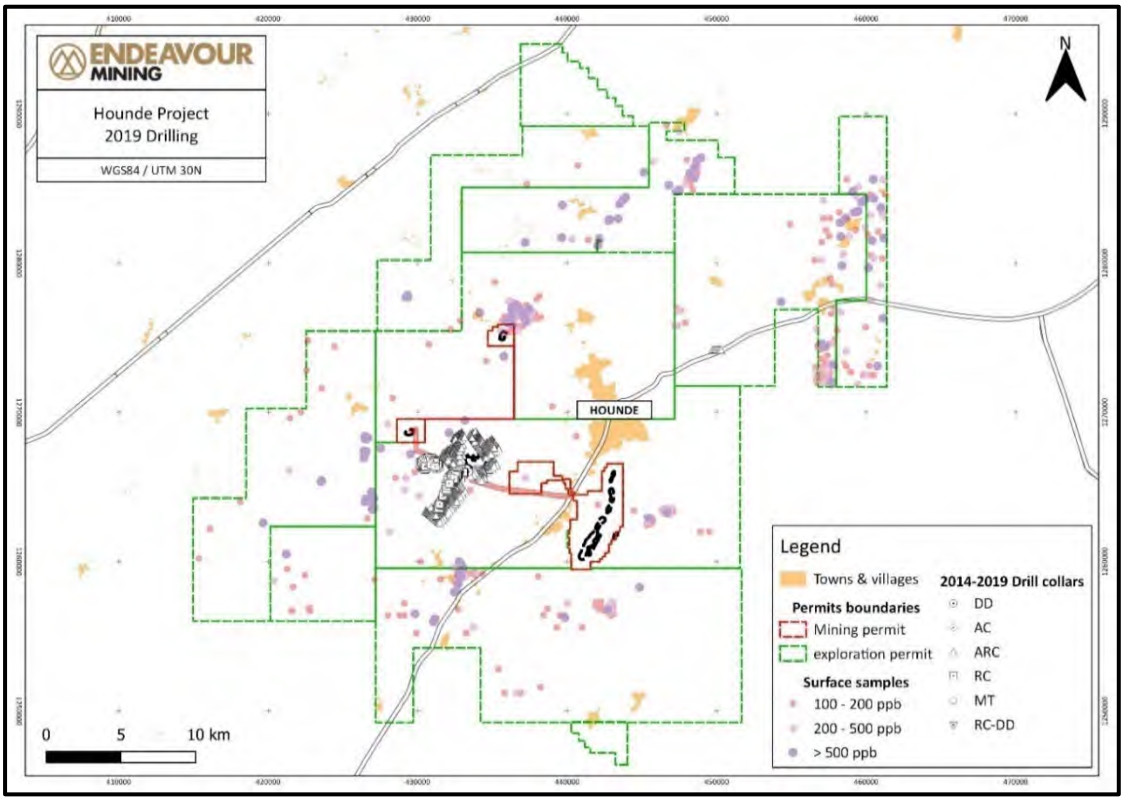


Figure 10-8: Location of drill hole collars in 2019 (source: Endeavour)



10.2.1 Vindaloo

In 2014, Geodrill completed 241 holes within the Vindaloo area, these included 45 DDH, 188 RC, and 7 RC-DD. All holes were focused on further delineating the main mineralisation trends of Koho, Koho East, Vindaloo main, Vindaloo main extension, Vindaloo West, Vindaloo South, Vindaloo Southwest, Vindaloo Northeast, Vindaloo East, Vindaloo 2, Madras, Madras East, Madras West, and Madras Northwest. Sahara Geoservices also completed 429 shallow reconnaissance auger holes on the Soukou/Vindaloo South exploration target located south of the mine permit boundary, on the Kari Sud exploration permit. Drilling lines were 400m apart, with collars at 25m centres. The drill holes ranged between 5m and 29m in length. The results highlighted weak mineralization that warranted further investigation. The collar locations of all the holes drilled in 2014 are shown in Figure 10-9.

In 2015, FTE completed 4 RC drill holes, evaluating historically noted weakly anomalous gold-in-soil values. These holes did not highlight any significant mineralisation. The collars are shown in Figure 10-10.

In 2016, Geodrill completed 167 AC drill holes, with the aim of sterilising areas located to the west of mining infrastructure. The same area had been traversed by closed spaced but shallow auger lines in 2013. Three lines, spaced 800m apart were completed, with collars at 10m to 38m centres. The variable spacing in the collars was due to heel to toe drilling, to ensure no vertical structures would be missed. The results did not highlight significant mineralisation. The collars are also shown in Figure 10-10.

In 2017, FTE completed 20 infill RC drill holes around the Koho mineralised trend, located to the east and parallel to the Vindaloo main trend. The holes varied in length, being between 105m to 162m long. The holes typically intersected mineralisation, confirming previous drill results in the area.

All samples between 2014 and 2017 were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay.

Figure 10-9: Location of drill hole collars in Vindaloo in 2014 (source: Endeavour)

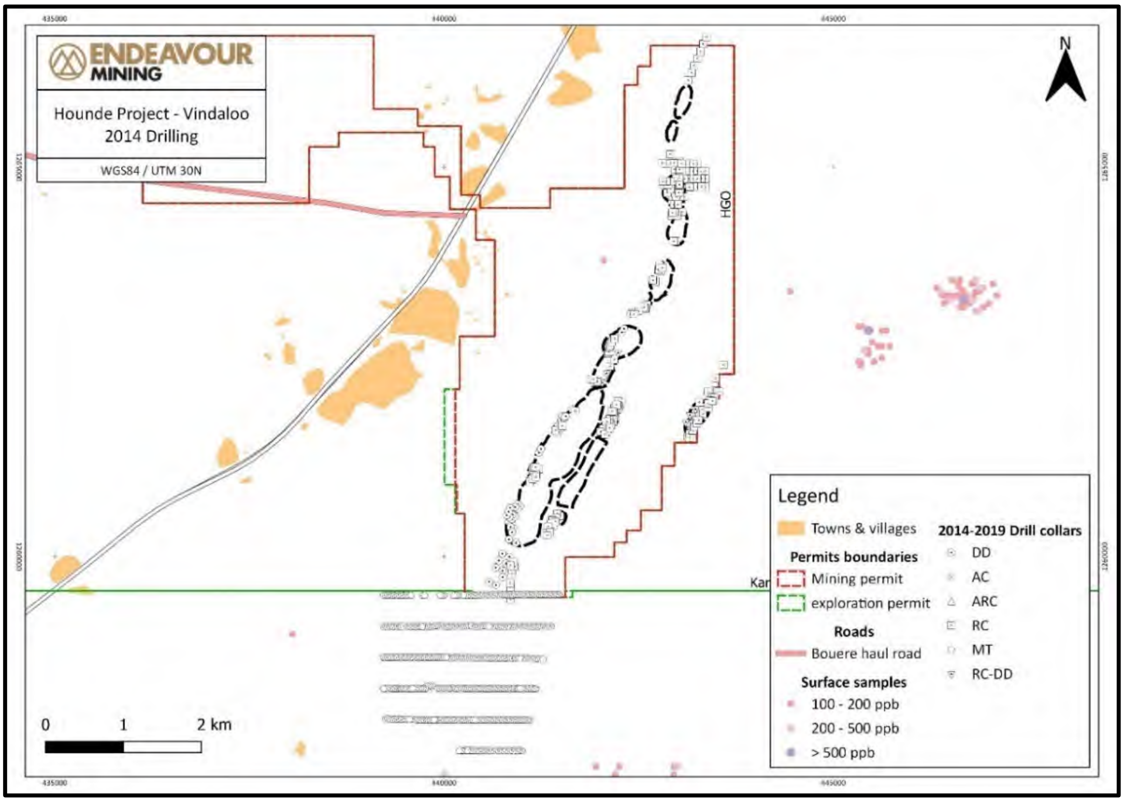
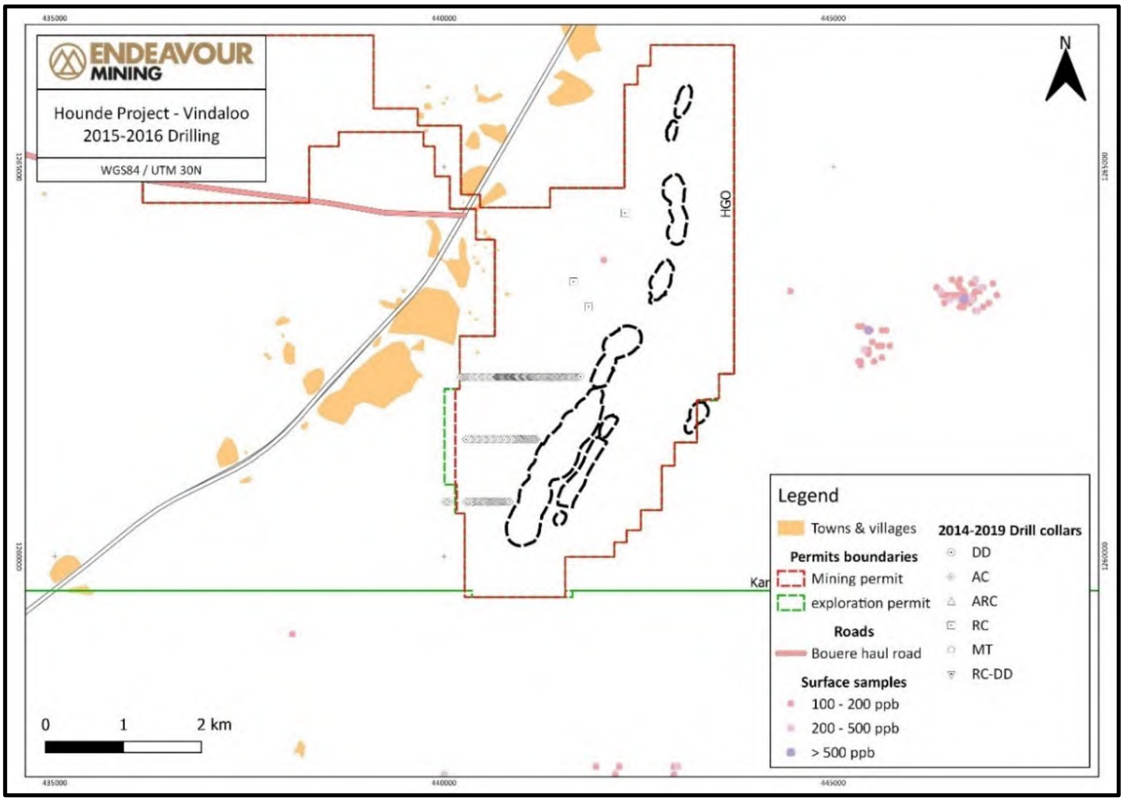


Figure 10-10: Location of drill hole collars in Vindaloo in 2015 and 2016 (source: Endeavour)



10.2.2 Bouéré

In 2014 Geodrill completed 305 vertical AC drill holes within the Bouéré permit (Figure 10-11). The holes ranged in depth between 3m and 57m. Samples were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay. The results supported the interpretation of the main deposit anomaly, but only highlighted sporadic and weak mineralisation outside of the main zone. Geodrill completed a further 63 holes on the deposit, being 15 DDH, 28 RC, and 20 RC-DD. The RC holes ranged in length from 47m to 156m, DDH holes between 138m to 206m, and RC-DD, between 99m to 309m. Samples were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay.

In 2017 FTE completed 294 ARC drill holes, ranging between 23m and 110m in length (Figure 10-12). All were inclined at 40° towards the south. The programme was designed to investigate the potential for further mineralised structures oriented sub-parallel to but offset to the main Bouéré shear zone. Samples were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. Results were not promising. FTE also completed a further 44 holes in 2017 on the deposit, being 16 DDH and 28 RC. The RC drill holes were between 36m to 113m in length, and the DDH drill holes were between 126m and 176m long. Samples were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay.

Figure 10-11: Location of drill hole collars for Bouéré, as drilled in 2014 (source: Endeavour)

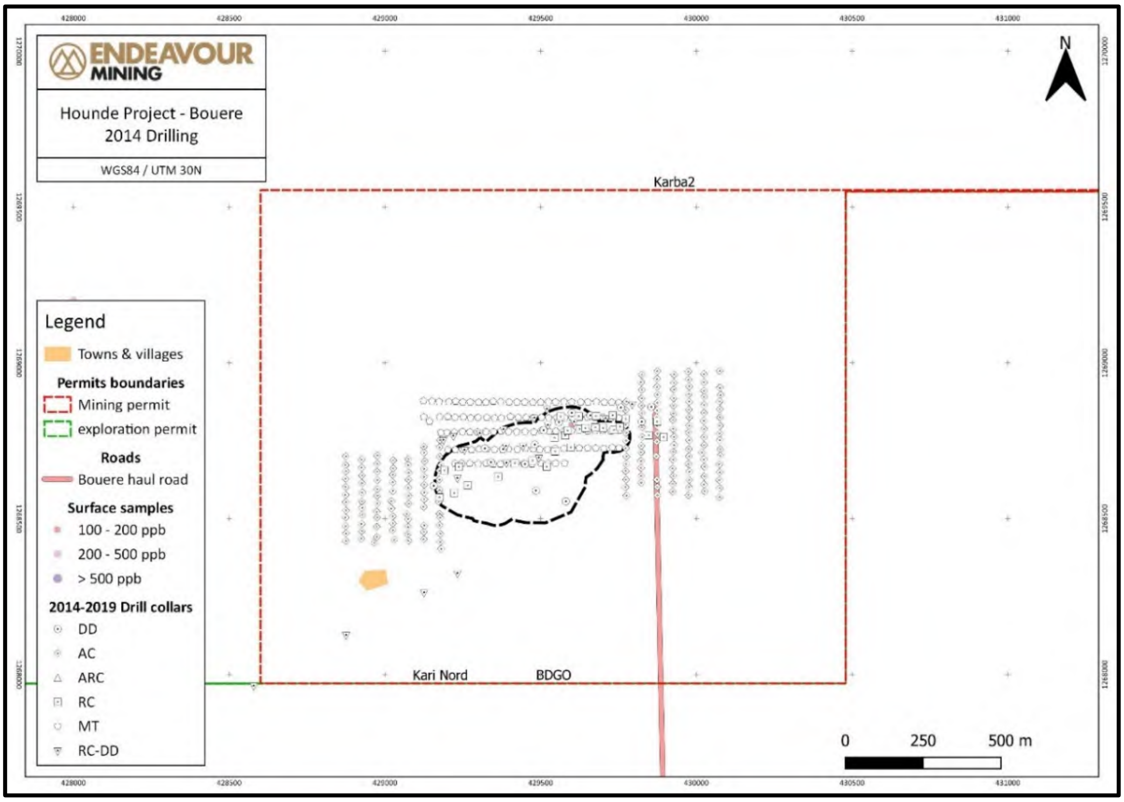
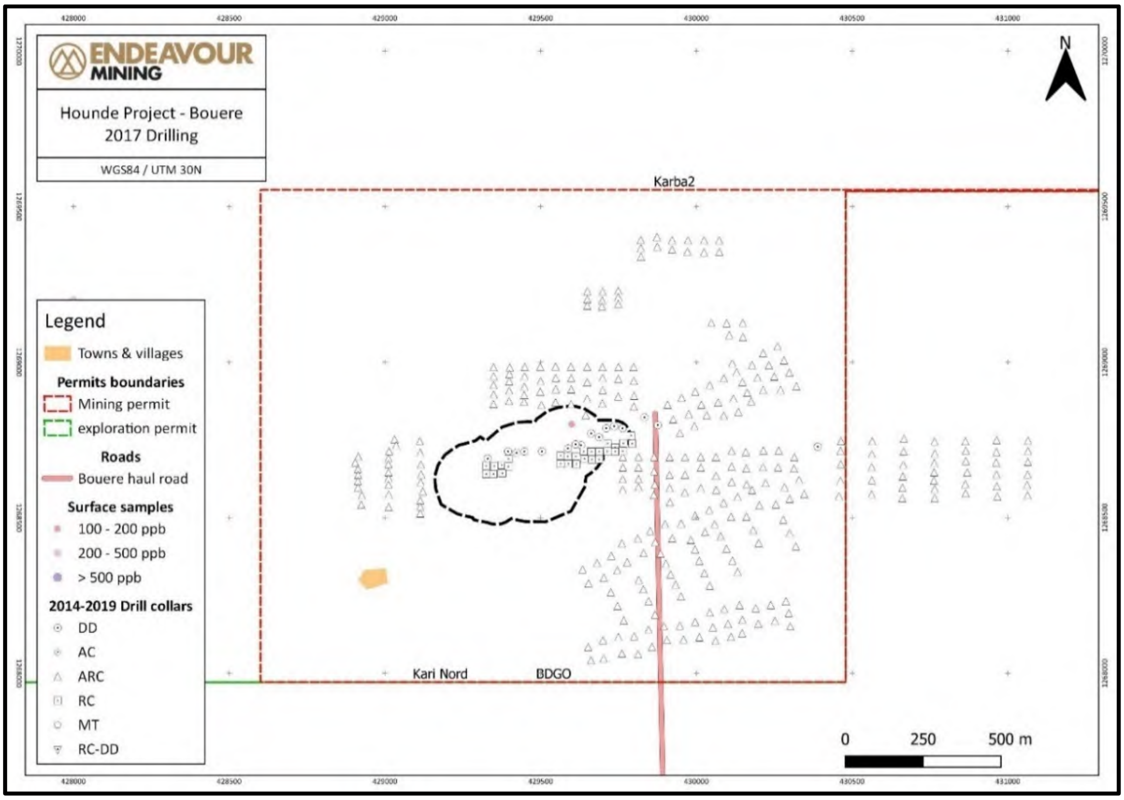


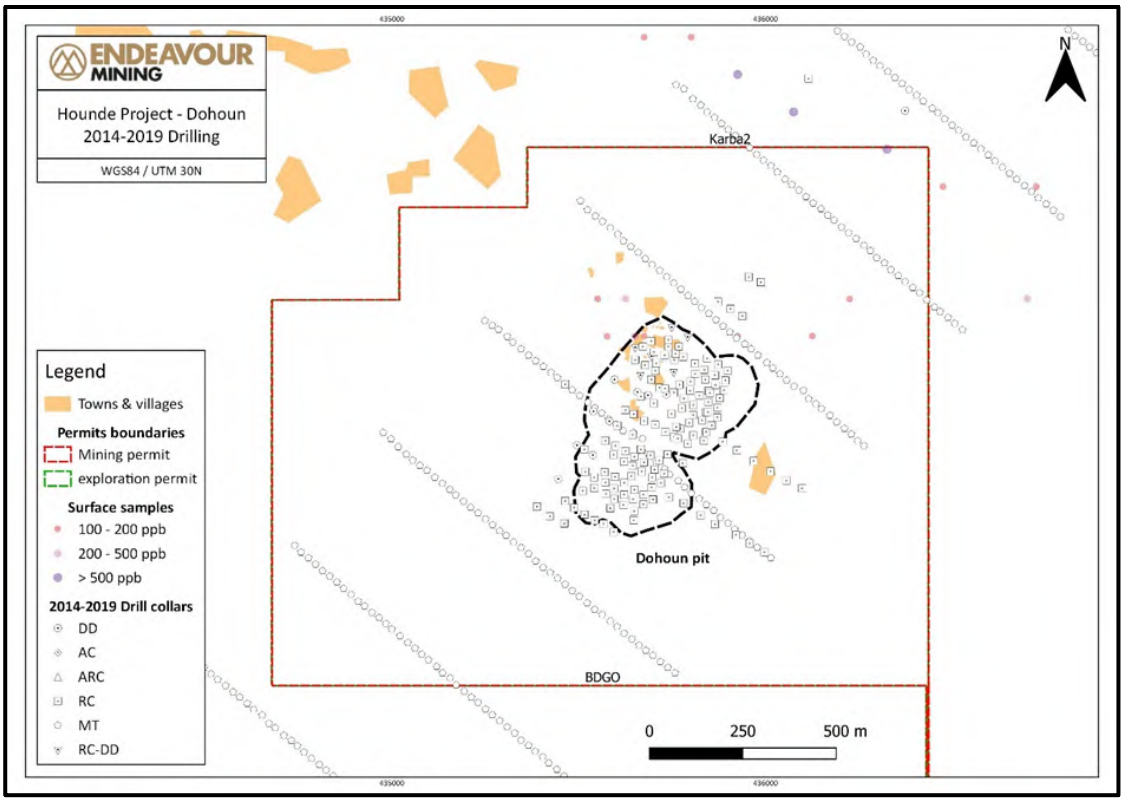
Figure 10-12: Location of drill hole collars for Bouéré, as drilled in 2017 (source: Endeavour)



10.2.3 Dohoun

In 2014, Sahara Geoservices completed 205 vertical Auger holes over the Dohoun area as part of a larger exploration programme covering the Grand Espoire and Dohoun-Sianikoui target trends. Drill holes ranged between 2m and 11m in depth. Samples were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay. The results highlighted weak mineralisation, which suggested a continuation of the mineralisation to the northeast, towards the Sianikoui target. Also, in 2014, Geodrill completed 154 drill holes, being 11 DDH, 137 RC, and 6 RC-DD. All drill holes were focused on further delineating the main mineralised trends associated with the identified sheared contact and thinner quartz vein and felsic dyke intrusive related mineralised lenses in the central and eastern areas of the deposit. RC holes ranged in length between 45m to 183m, with DDH being between 68m and 237m in length. RC-DD drill holes were between 132m to 260m long. Samples were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay. The results typically supported the previous interpretations, and as such, warranted further investigation. The Dohoun collar locations are shown in Figure 10-13.

Figure 10-13: Location of drill hole collars for Dohoun (source: Endeavour)



10.2.4 Kari Deposits (Kari Pump, Kari West, and Kari Centre)

In 2014, Geodrill completed 3 RC-DD drill holes and a single RC drill hole, of 163m length at Kari Pump. The drill holes were targeting a large gold-in-soil anomaly, which had been sporadically drilled prior to 2014. The RC-DD drill holes were between 165m and 198m deep. Samples were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay.

In 2017, FTE completed 361 ARC holes in a grid pattern, covering the large gold-in-soil anomalies identified at the Kari area. The grid covered the Kari Pump and Kari Centre deposits. The drill holes ranged in depth between 35m and 126m. All holes were inclined at 45° towards the southeast. Samples from the first 281 holes were sent to SGS Ouagadougou laboratories for gold analysis by 50g fire assay. Samples from the last 55 holes were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. The collar locations for the 2017 drilling campaign are shown in Figure 10-14 . In 2017 FTE also completed 23 RC holes at Kari Pump. The drill holes were between 83m and 192m in length. All drill holes, except 4, were inclined at 40° towards the southeast. The remaining 4 drill holes were inclined at 80° towards the southeast. JMS completed 2 diamond drill holes in 2017 at Kari Pump, which were 161m and 200m in length. Samples from these drilling programmes were sent to ALS Ouagadougou for gold analysis by 50g fire assay.

In 2018, Major completed 1,091 ARC holes in the Kari area, drilled on a grid pattern covering the Kari West area, and a southwestern extension to the Kari Centre area. The length of the drill holes varied between 15m to 138m. All the drill holes were inclined at 40° towards the southeast. Samples were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. Also, in 2018, Major and Geodrill combined to complete 669 RC drill holes at the Kari Pump deposit. Drill holes were between 30m and 197m long. All holes were inclined at 75° towards the southeast. Falcon also completed 79 DDH drill holes in 2018 in the Kari area. Of these drill holes, 5 were drilled at the Kari Centre deposit, ranging in depth between 90m and

130m. A total of 6 drill holes were drilled at Kari West; with drill holes being between 150m and 311m long. The majority of the diamond holes were drilled at Kari Pump, and comprise 68 drill holes, ranging in length between 52m and 500m. Samples were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. The collar locations for the 2018 campaigns are shown in Figure 10-15.

The first phase of drilling in 2019 was completed by AMS and Geodrill, with 905 ARC drill holes completed in the Kari area. The drill holes were drilled in a grid pattern surrounding the Kari Pump deposit. Drill holes ranged in length between 13m and 130m. All drill holes were inclined at 50° towards the southeast. Samples were sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. Also, in 2019, Geodrill drilled 594 RC holes at the Kari West and Kari Centre deposits. At Kari West, a total of 356 RC drill holes were completed. These drill holes were between 51m to 237m in length. At Kari Centre, 238 RC drill holes, ranging in length between 110m to 222m were completed. All of the Kari Centre drill holes were inclined at 50° towards the southeast. At Kari West, the drill holes were inclined at either 60° or 75° towards the southeast.

Diamond drilling in the Kari area in 2019 was completed by Foraco and Geodrill. At total of 69 DDH were completed, with 19 diamond drill holes in Kari Centre and 50 diamond drill holes at Kari West. The Kari Centre drill holes ranged in length between 150m and 260m, and at Kari West, between 100m and 275m. Samples were all sent to ALS Ouagadougou laboratories for gold analysis by 50g fire assay. The collar locations for all holes drilled in 2019 are illustrated in Figure 10-16.

Figure 10-14: Location of drill hole collars in the Kari area in 2017 (source: Endeavour)

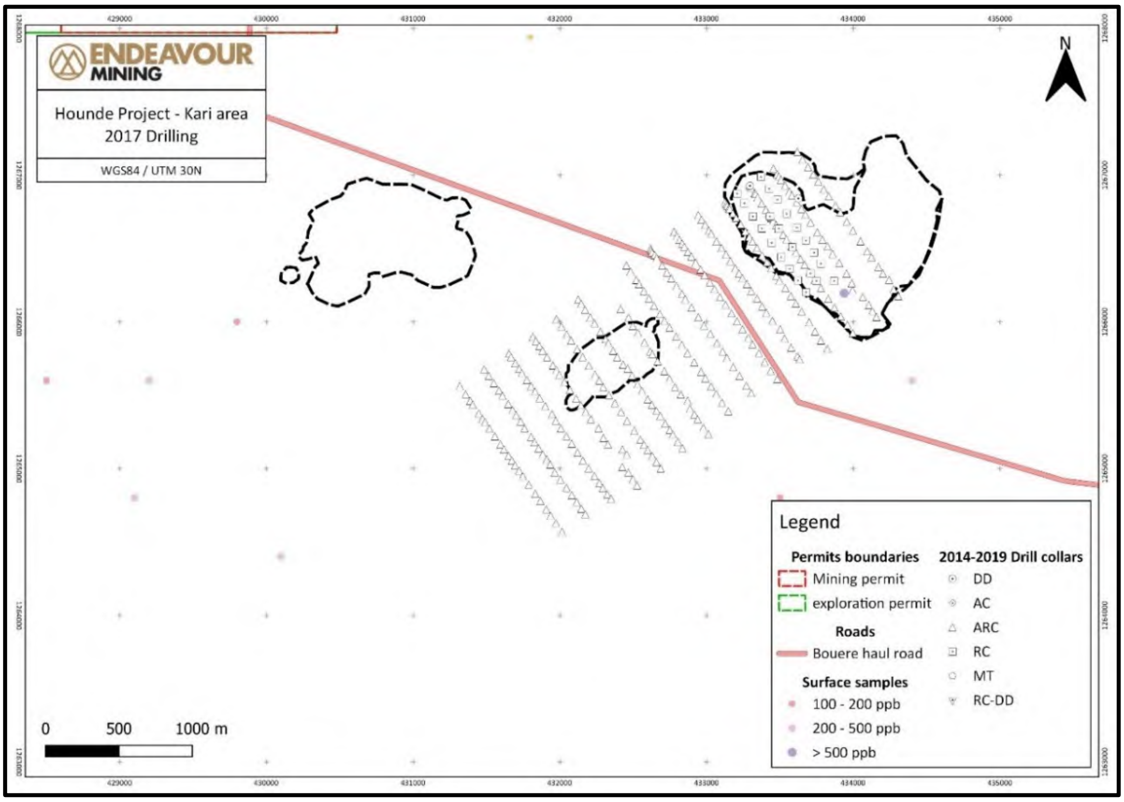


Figure 10-15: Location of drill hole collars in the Kari area in 2018 (source: Endeavour)

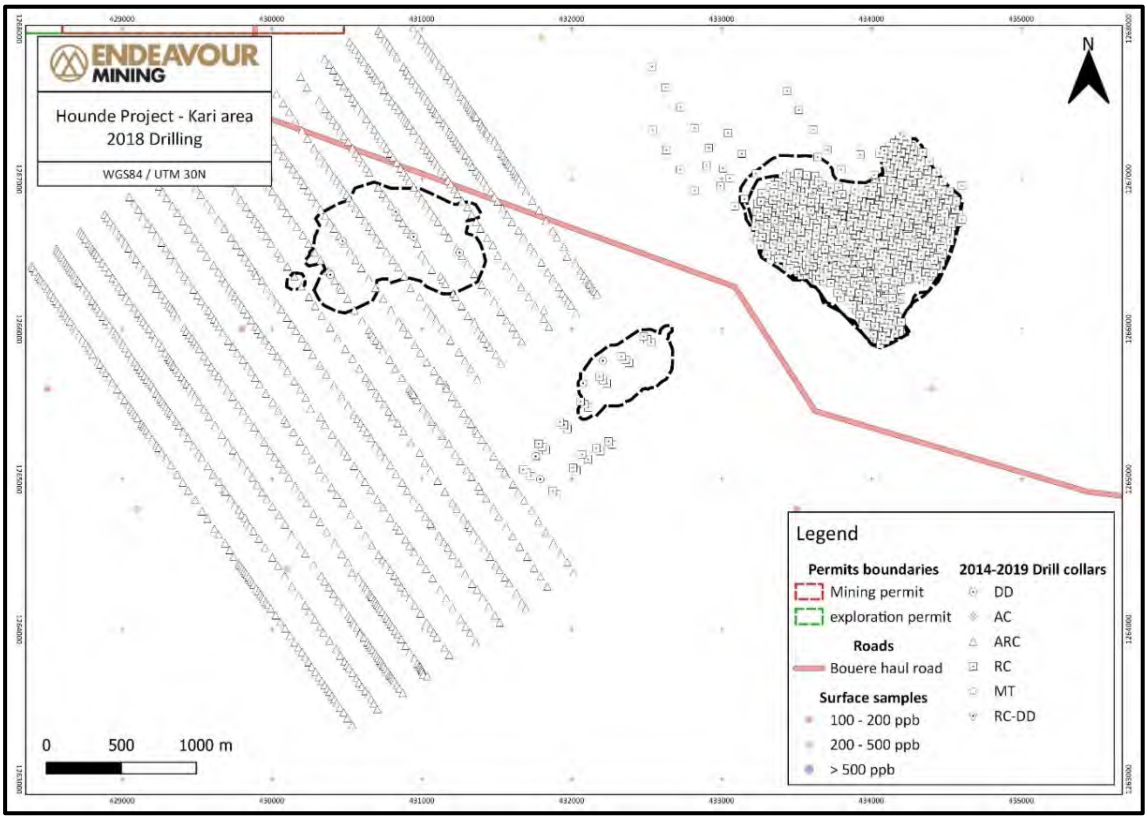
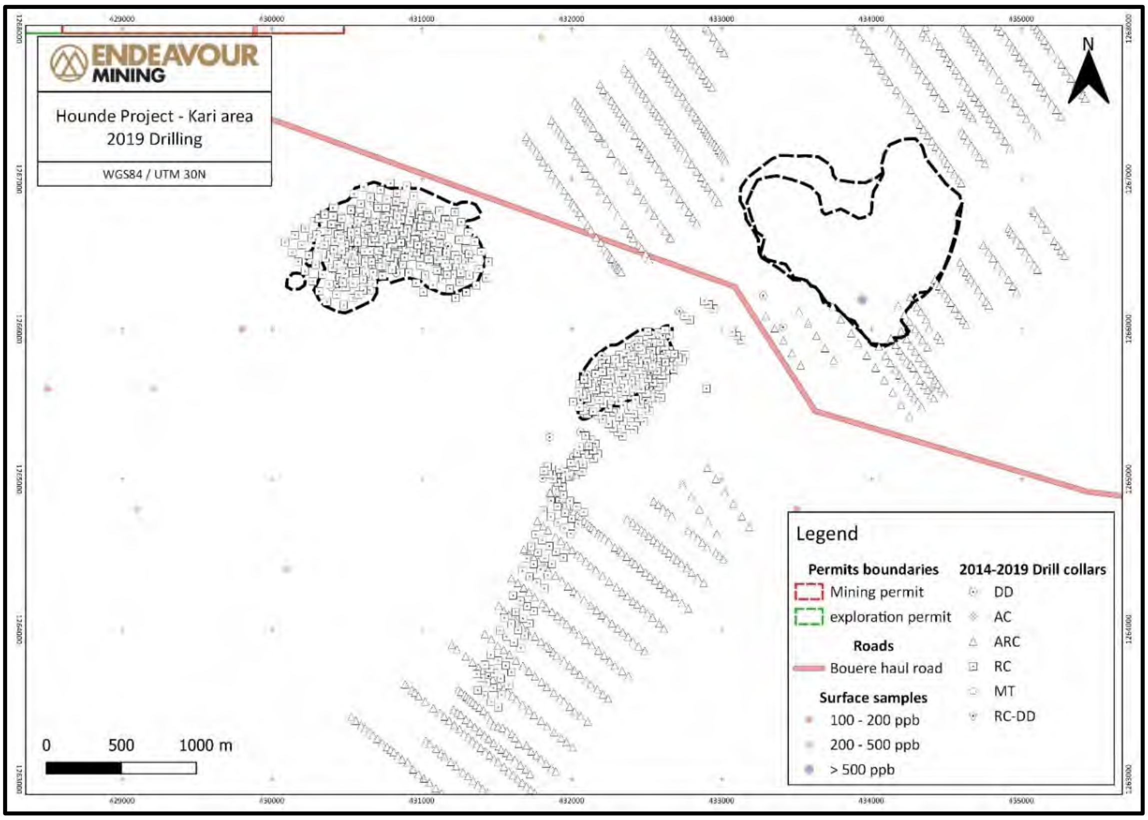


Figure 10-16: Location of drill hole collars in the Kari area in 2019 (source: Endeavour)



10.3 Core and Sample Recovery

For all DDH drill holes completed between 2014 to 2019, core recovery measurements were collected as part of Endeavour's standard logging procedures. The measurements were calculated in the field at the rig by the rig geologist and were then checked at the core logging facility. Core recovery information is captured on paper logs, and then entered into the drilling database. Table 10-4 and Table 10-5 summarises the core recovery from each deposit area drilled between 2014 and 2019. For logging, core trays were marked with the drill hole number and downhole distance for the start and finish of the core in the tray.

Sample bags collected from cyclones at 1m intervals during RC, AC and ARC drill campaigns were weighed, and sample weights recorded in field logs. These were later entered into the drill database. The recorded sample weights assisted in splitting procedures to produce samples for laboratory analysis, identified possible bias by inconsistent drilling practices, and provided information on overall sample recovery

Table 10-4: Drilling Summary (2014 to 2019)(1)

Year / Deposit (Target)	Geodrill (Dm)	Geodrill (Rm)	Geodrill (R%)	FTE (Dm)	FTE (Rm)	FTE (R%)	JMS (Dm)	JMS (Rm)	JMS (R%)
2014									
Bouéré	3,961.4	3,870.52	98%	-	-	-	-	-	-
Dohoun	1,523.8	1,499.87	98%	-	-	-	-	-	-
Kari Pump Ex	90.5	90.02	99%	-	-	-	-	-	-
Vindaloo (Koho East)	414.76	405.45	98%	-	-	-	-	-	-
Vindaloo (Madras W)	51	51.14	100%	-	-	-	-	-	-
Regional (Sianikoui)	103	103.3	100%	-	-	-	-	-	-
Regional (Soukou)	983.5	949.86	97%	-	-	-	-	-	-
Vindaloo (Main Ext)	287	287.58	100%	-	-	-	-	-	-
Vindaloo South	1,933.6	1,888.46	98%	-	-	-	-	-	-
Vindaloo SW	180	180.12	100%	-	-	-	-	-	-
Vindaloo west	392.3	391.12	100%	-	-	-	-	-	-
2017									
Bouéré	-	-	-	1,291.5	1,259.32	98%	-	-	-
Regional (Grand Espoir)	-	-	-	432.5	422.941	98%	-	-	-
Regional (Kari Fault)	-	-	-	606	555.22	92%	-	-	-
Kari Pump Ex	-	-	-	-	-	-	350.4	320.05	91%
Regional (Sianikoui)	-	-	-	1,438.48	1,348.04	94%	-	-	-
Regional (Tanga)	-	-	-	317	310.08	98%	-	-	-
Vindaloo (Main Ext)	-	-	-	-	-	-	-	-	-
2018									
Kari Centre	-	-	-	-	-	-	-	-	-
Kari Pump Ex	-	-	-	-	-	-	-	-	-
Kari West	-	-	-	-	-	-	-	-	-
2019									
Regional (Kari)	-	-	-	-	-	-	-	-	-
Kari Centre	-	-	-	-	-	-	-	-	-
Kari West	947.9	904.36	95%	-	-	-	-	-	-

(1) D: Drilled Meters; R: Recovered Meters; R%: Recovered Meters as a Percentage

Table 10-5: Drilling Summary (2017 to 2019)(1)

Year / Deposit (Target)	Major (Dm)	Major (Rm)	Major (R%)	Falcon (Dm)	Falcon (Rm)	Falcon (R%)	Foraco (Dm)	Foraco (Rm)	Foraco (R%)
2017									
Bouéré	120.75	110.47	91%	-	-	-	-	-	-
Regional (Grand Espoir)	-	-	-	-	-	-	-	-	-
Regional (Kari Fault)	-	-	-	-	-	-	-	-	-
Kari Pump Ex	-	-	-	-	-	-	-	-	-
Regional (Sianikoui)	196.56	191.45	97%	-	-	-	-	-	-
Regional (Tanga)	-	-	-	-	-	-	-	-	-
Vindaloo (Main Ext)	-	-	-	-	-	-	-	-	-
2018									
Kari Centre	-	-	-	1209	1,064.45	88%	-	-	-
Kari Pump Ex	-	-	-	9,584.51	8,613.23	90%	-	-	-
Kari West	-	-	-	1,356.4	1,285.2	95%	-	-	-
2019									
Regional (Kari)	-	-	-	-	-	-	443.05	436.4	98%
Kari Centre	-	-	-	-	-	-	3,488.73	3,239.14	93%
Kari West	-	-	-	-	-	-	9,528.31	9,256.96	97%

(1) D: Drilled Meters; R: Recovered Meters; R%: Recovered Meters as a Percentage

10.4 Drill hole Surveying

10.4.1 Collar Surveys

All exploration drill hole collars are initially marked out by handheld Garmin GPS units. Drill holes planned within the mine permit areas were initially located with the aid of mine surveyors or with handheld Garmin GPS units. Once the drilling was completed, all exploration and mine site collars were marked with lengths of PVC, and clearly labelled with the hole ID and relevant hole details. The mine surveyor then surveyed the collar locations using standard DGPS survey equipment. All final drill collar locations were marked permanently with a concrete plug, etched with hole ID and relevant hole details. Copies of the proposed drill hole location, and the final DGPS drill hole location were entered into the database. Monthly validation checks are routinely completed to evaluate the degree of variance between the proposed hole location, and the final recoded locations. Discrepancies are flagged immediately, and reviews are conducted to correct the issue, usually due to data entry errors, or mix ups with the hole ID.

10.4.2 Downhole Surveys

Down hole surveys were carried out by the relevant drilling contractors, using industry standard Reflex equipment to collect down hole survey data. Reflex supervisors visited the drilling operations at least twice during the campaigns, typically at the beginning and halfway through the campaign, to conduct refresher training on use of the Reflex survey tools and software.

Between 2014 and 2016, down hole surveys were collected by standard Reflex Ez-trac for DDH drill holes. RC drill holes were surveyed using two methods. Some RC holes were drilled with non-magnetic stainless-steel rod lengths behind the hammer, enabling Reflex Ez-trac tools to be lowered inside the RC rod string and obtain a reading at various depths. The second survey method was used once the drill hole had been completed, when the RC rods and hammer were removed, and steel drill casing run back into the hole. The steel casing enabling the hole to be surveyed like a conventional DDH with Reflex Ez-trac equipment.

From 2017 to 2019, all DDH holes were surveyed with Reflex Ez-trac tools and all RC holes were surveyed with Reflex gyro tools (Ez-gyro and Gyro Sprint IQ). In 2019, ARC holes were also surveyed with Reflex gyro tools. The number of individual holes surveyed using the relevant surveying methods is summarised in Table 10-6.

Table 10-6: Type and number of down hole surveys conducted (2014 to 2019)

Drilling Type	Gyro 2017	Gyro 2018	Gyro 2019	Ez-trac 2014	Ez-trac 2016	Ez-trac 2017	Ez-trac 2018	Ez-trac 2019	Total Holes Surveyed
ARC	-	13	557	-	-	13	-	134	717
RC	98	666	573	353	-	-	-	-	1,690
DDH	-	-	4	75	-	39	80	68	266
RC-DD	-	-	-	37	1	-	-	-	38

Between 2014 and 2019, 11 drill holes were not surveyed down the hole. These drill holes were 3 diamond holes in 2017 (H-17-18 and H-17-035 from Kari Fault and Sianikoui; and H-17-042 from Kari Pump) and a single RC hole (RC-17-021 at Kari Pump). This was due to equipment failure. In 2018, 4 RC drill holes at Kari Pump (RCA-18-001, RCA-18-013, RCA-18-083, and RCB-18-131) were not surveyed due to equipment failure. In 2019, 3 RC holes at Kari Centre (KRC19-006, KRC19-007, and KRC19-008) were not surveyed due to data tablet synchronisation failures. All drill holes had the planned collar, dip, and azimuth assigned to the hole traces in the database. This is not considered material or significant.

10.5 Risks and Opportunities

To date no significant risks and opportunities have been identified in respect of sample preparation and security as practice at the Houndé Gold Mine.

10.6 Interpretation, Conclusions and Recommendations

The drilling programmes completed for the deposits investigated to date at Houndé Gold Mine were undertaken to a sufficient standard to inform the geological models and resource models which underpin the Mineral Resources as reported herein. As such other than completion of the planned drilling programme no further conclusions or recommendations are drawn at this stage.

11 SAMPLE PREPERATION AND SECURITY

11.1 Introduction

The following section includes discussion and comment on the sample preparation and security related aspects relating to the collation of samples which inform the geological modelling and resource estimates as reported herein. Specifically, the section focuses on historical sampling; sample submission

For the Feasibility Study (from 2010 to June 2013), sample preparation, analysis and security were under the supervision of suitably qualified geologists. All samples collected by Endeavour, or by third parties contracted by Endeavour, were subject to quality control procedures that ensured that industry best practice was utilised for the handling, sampling, transport, analysis, storage and documentation of sample material and analytical results.

For sample preparation and analysis, Endeavour used the services of SGS Bureau de Liaison ("**SGS**") laboratories at Ouagadougou, Burkina Faso and Morila, Mali. SGS is a global independent provider of assaying and analytical testing services for the mining and mineral exploration industry with consistent quality standards implemented across all regions. Whilst they are not formally accredited, the SGS laboratories at Ouagadougou and Morila operate to ISO 17025 standards. As part of the international group of SGS laboratories, all laboratories take part in regular Round Robin sample analysis to check for bias or systematic error.

Between 2014 and 2016, Endeavour continued to use SGS laboratories at Ouagadougou, Burkina Faso. In 2017, Endeavour engaged ALS Ouagadougou to become the primary assayer of exploration samples. The majority (70%) of 2017 ARC drill samples from the Kari Pump and Kari Centre deposit areas were sent to SGS in Ouagadougou with remaining (30%) submitted to ALS Ouagadougou. All RC and DDH samples from 2017 were submitted to ALS Ouagadougou. At both the ALS and SGS laboratories, samples were processed and analysed for Au content by 50g fire assay, with high-grade samples assayed using a gravimetric finish.

All exploration samples from drilling campaigns in 2018 and 2019 were submitted to ALS Ouagadougou. The samples were processed and analysed for Au content by 50g fire assay, with high-grade samples assayed using a gravimetric finish. ALS Ouagadougou is a formally accredited laboratory. It is part of the international group of ALS laboratories, which all take part in regular Round Robin sample analysis to check for bias or systematic error.

In 2018 and 2019, SGS was used for the external umpire laboratory. Endeavour prepared selected umpire samples at the ALS laboratory in Ouagadougou and these were collected by SGS. Some 7,009 (in 2018) and 5,084 (in 2019) umpire samples were sent to SGS in Ouagadougou. The pulps were entered into Laboratory Information Management System ("**LIMS**"), and weighed and dried. The pulps were checked for particle size, using a 85% passing 75µm screen, and if necessary re-pulverized. The pulveriser was flushed with barren material after each sample. If sufficient sample material, a nominal 50g pulp aliquot was analysed for gold by lead collection fire assay with AAS instrumentation.

11.2 Historical Sampling (Goldbelt Resources, Avocet)

Endeavour carried out drilling and sampling campaigns during 2010 to 2013, to feed into the FS. Prior to this, RAB, RC, and diamond core drilling was carried out by Barrick, Goldbelt Resources and Avocet Mining. At this time, the samples were analysed by Abilabs (Mali) and SGS Ouagadougou. Blanks, standards and duplicates were used to test the precision and accuracy of the respective labs. Generally, every 10th sample was a control sample for QA/QC purposes. Blanks, standards and duplicates were used in equal numbers.

11.3 Sample Submission

A sample submission form detailing the sample number sequences and laboratory instructions accompanied the dispatch of each batch of samples. On arrival at the laboratory, the samples are checked by SGS or ALS against the submission form to ensure all samples were received. At completion of assaying and once results have been delivered, Endeavour staff confirmed that all the submitted samples were analysed by the methods requested.

11.4 Sample Preparation and Analysis

11.4.1 RC, AC, and ARC Drilling Samples

All samples were collected as 1m sample lengths directly from the cyclone discharge at the drill rig. The sample was then split using a riffle into a numbered sample bag to produce a sample of approximately 2kg in size. The corresponding sample tag was included in the sample bag. The riffle splitters, plates, tubs and working areas were cleaned with compressed air after each sample was processed. The remaining reject sample was returned to a bulk plastic bag and remained at the drill site. Representative drill chips were collected from each 1m sample reject and either glued to a sample board or washed and stored in industry standard plastic ‘chip’ storage trays for future reference.

Approximately 30 bagged samples at a time were placed in large polyweave bags and transported to Endeavour’s exploration camp at Houndé. The samples were then transported to the laboratory by Endeavour personnel or collected at site by the dedicated laboratory trucks. Between 2014 and 2016, SGS Ouagadougou processed samples, and between 2018 and 2019 ALS Ouagadougou processed samples. In 2017, both laboratories were engaged.

All samples submitted to both SGS and ALS were prepared using the same method. The samples were logged into LIMS and weighed and dried. The submitted samples were crushed to a 70% passing 2mm using a jaw crusher (Terminators and Rocklabs Boyd crushers), with a sub-sample of <1.5kg taken using a Jones-type riffle splitter. Reject material was retained in the original bag and stored. The sub-sample was pulverised to 85% passing 75µm using an LM2 pulveriser. Approximately 200g was taken for assay and the remainder placed in a plastic bag. The pulveriser was flushed with barren material after each sample. A nominal 50g pulp aliquot was analysed for gold by lead collection fire assay with AAS instrumentation.

11.4.2 Diamond Drilling Samples

Diamond core was placed in steel core boxes holding either 3m of PQ size, 4m of HQ size or 5m of NQ size core. The core trays are transported from the drilling site to the Endeavour exploration camp at Houndé where the core is laid out for geological logging, photographing and other data collection.

Specific intervals for sampling based on lithology were identified during the logging process. The core was cut in half along its longitudinal axis with a purpose-built diamond-blade core saw. After the core was cut, the left-hand side (looking down hole) is consistently returned to the core tray and kept for future reference; the left-hand side has orientation reference line (where applicable) and hole depth information. The right-hand side of the cut core (looking down hole) is further cut at the exact sample depth marks to avoid instances of over or under sampling of core intervals. The entire right-hand side sample interval is then deposited into a single pre-numbered plastic sample bag.

Core samples were then transported to the laboratory by Endeavour’s personnel or collected at site by the dedicated laboratory trucks. Between 2014 and 2016, SGS Ouagadougou processed samples, and between 2018 and 2019 ALS Ouagadougou processed samples. In 2017, both laboratories were engaged.

All samples submitted to both SGS and ALS were prepared using the same method. The samples were logged into LIMS and weighed and dried. The submitted samples were crushed to a 70% passing 2mm using a jaw crusher (Terminators and Rocklabs Boyd crushers), with a sub-sample of <1.5kg taken using a Jones-type riffle splitter. Reject material was retained in the original bag and stored. The sub-sample was pulverised to 85% passing 75µm using an LM2 pulveriser. Approximately 200g was taken for assay and the remainder placed in a plastic bag. The pulveriser was flushed with barren material after each sample. A nominal 50g pulp aliquot was analysed for gold by lead collection fire assay with AAS instrumentation.

11.5 Quality Assurance and Quality Control

Quality assurance ("**QA**") consists of evidence to demonstrate that assay data has precision and accuracy within generally accepted limits for the sampling and analytical method(s) used in order to have confidence in resource estimations. Quality control ("**QC**") consists of procedures used to ensure that an adequate level of quality is maintained in the process of sampling, preparing and assaying exploration samples.

QA/QC programs are designed to prevent or detect contamination and allow analytical precision and accuracy to be quantified. In addition, a QA/QC programme can identify the overall sampling and assaying variability of the sampling method itself. The programme can also determine the reporting accuracy related to data entry and data transfer errors.

Accuracy is assessed by reviewing assays of commercially available Certified Reference Material ("**CRM**") or in-house standards and by check assaying at outside accredited laboratories (referee, umpire or check samples). Precision is assessed by processing duplicate samples from each stage of the analytical process from the primary stage of sample splitting, through sample preparation stages of crushing/splitting, pulverising/splitting and assaying. Control samples can also help identify possible mix-ups or mislabels during sample preparation.

In addition, the SGS and ALS laboratories have their own internal quality performance processes which follow best practice guidelines required for qualification under International Organisation for Standardisation ("**ISO**") standards. The standard QA/QC protocols for the laboratories include the insertion of CRMs, blanks, duplicates and repeat assaying to monitor the quality of the preparation and analytical processes of the laboratory.

11.5.1 Vindaloo-Madras

For Vindaloo-Madras, the QA/QC processes, procedures, results and analysis are included in the FS, and as such, are not reproduced here. At that time, a total of 5,326 records for client introduced blanks, standards, and field duplicates with Au values were in the database of 77,054 Au records. This equates to a total insertion rate of control samples of approximately 7%. A more detailed breakdown is 2,071 standard samples (2.6%); 2,152 blank samples (2.8%) and 1,103 field duplicates (1.4%). In addition, 3,196 internal laboratory standard results (4.1%); 2,899 internal laboratory blank samples (3.8%) and 169 pulp duplicates were also produced and analysed during the time period. Overall, the QAQC samples performed satisfactorily and indicate the sample data is suitable for mineral resource estimation.

ICP Analysis

A total of 2,429 core samples from Vindaloo-Madras were also tested for whole rock analysis and additional elements. A total of 35 elements were analysed, i.e. Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, S, Sb, Sc, Sn, Sr, Ti, V, W, Y, Zn, Zr. The sample preparation was carried out by SGS Ouagadougou, using methods consistent with that for assaying Au. The laboratory then sent the pulps to SGS Canada for ICP analysis.

11.5.2 Bouéré and Dohoun

Summary

Quality control results are assessed in a corporate standard QA/QC analysis spreadsheet. This spreadsheet is auto generated within the database management system when batches of new assay results are imported. Statistics are compiled on a monthly basis for internal review. Table 11-1 summarises the analytical quality control data produced for Bouéré, and Table 11-2 for Dohoun, between 2008 and 2014.

Table 11-1: Summary of Analytical Quality Control Data Produced During Drilling at Bouéré

Sample Type	No. Samples	Percentage
Blanks	627	6.0%
CRMs	605	5.8%

Table 11-2: Summary of Analytical Quality Control Data Produced During Drilling at Dohoun

Sample Type	No. Samples	Percentage
Blanks	896	5.1%
CRMs	816	4.6%

Blanks

Blank material is sourced from building sand and is prepared on-site. Large bulk samples of this material were collected, and random samples were sent to the laboratory for analysis. The results of this analysis confirmed that this material is barren.

The assay results of the blank samples are evaluated in the standard QA/QC analysis spreadsheet. Data for the blank analysis is analysed in standard charts with a 0.05ppm threshold. All blank samples that exceed the 0.05 ppm threshold are compared to the preceding sample. If the preceding sample is relatively elevated in gold the blank sample is deemed to be contaminated and is failed. The performance of the blank samples over the period of drilling is given in Table 11-3 for Bouéré and Table 11-4 for Dohoun.

Table 11-3: Summary of Blank Performance at Bouéré

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2008 to 2014	RC	Blanks	176	0	0.00%
2010 to 2014	DDH	Blanks	250	2	0.80%
2014	RC-DDH	Blanks	195	0	0.00%
2014	AC	Blanks	6	0	0.00%

Table 11-4: Summary of Analytical Quality Control Data Produced During Drilling at Dohoun

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2014	RC	Blanks	657	0	0.00%
2010 to 2014	DDH	Blanks	141	0	0.00%
2014	RC-DDH	Blanks	58	0	0.00%

Duplicate Samples

Field duplicates for the RC drilling and trenching programmes are generated by collecting a second equal sample from the same sample interval and assigning two contiguous sample numbers to these identical samples. Generally, 1 duplicate sample was taken in any given 20 to 30 sample sequence. The assay results of the field duplicates are evaluated in the corporate standard QAQC analysis spreadsheet.

If a sample has a significant Relative Difference of ±30 %, the duplicate is considered a failure. When Au values are very low or very high the evaluator can use a more subjective final decision-making process. The performance of the duplicates in the RC, DDH, RC-DDH and AC is typically good. This suggests that field splitting procedures, laboratory splitting procedures, and general laboratory practices are performing adequately. A summary of the duplicate performance is given in Table 11-5 for Bouéré and Table 11-6 for Dohoun.

Table 11-5: Summary of Field Duplicate Performance at Bouéré

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2008 to 2014	RC	Field Duplicates	154	4	7.27 %
2010 to 2014	DDH	Field Duplicates		No Duplicates Used	
2014	RC-DDH	Field Duplicates	55	0	0.00%
2014	AC	Field Duplicates	3	0	0.00%

Table 11-6: Summary of Field Duplicate Performance at Dohoun

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2014	RC	Field Duplicates	564	17	3.01 %
2010 to 2014	DDH	Field Duplicates		No Duplicates Used	
2014	RC-DDH	Field Duplicates	13	0	0.00%

Standards (Certified Reference Materials)

CRMs were sourced from 2 suppliers, namely Geostats Pty Ltd and Rocklabs. CRMs were generally purchased in bulk. Sachets weighing 30g to 50g were prepared in a controlled environment. All CRMs were stored in clearly labelled boxes in a secure office. Generally, 1 CRM was inserted into any given 20 to 30 sample sequence. The assay results of the CRM samples are evaluated in the corporate standard QAQC analysis spreadsheet. CRM samples that exceed both the manufactures certified average and standard deviation in addition to the general population trend are deemed to have failed.

There were very few CRMs sourced from Rocklabs, all of which performed within expected tolerances, though effective analysis is limited. Most CRMs were consequently sourced from Geostats. These standards performed well within expected tolerances, with very few failures. The exception to this includes Std-I_G300-10, Std-J_G906-3, and Std-C_G311-2. These did not have failures but tended to provide Au values on the positive side of the expected mean. All these positive biased standards had similar gold grades to the other CRMs, so Au grade was not necessarily a contributing factor to this behaviour. Analysis indicates that the positive bias may be a result of the stated tolerances having been underestimated. A summary of the duplicate performance is given in Table 11-7 for Bouéré and Table 11-8 for Dohoun.

Table 11-7: Summary of CRM Performance at Bouéré

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2008 to 2014	RC	CRM	162	2	1.23%
2010 to 2014	DDH	CRM	245	3	1.22%
2014	RC-DDH	CRM	198	0	0.00%
2014	AC	CRM		No CRMs Used	

Table 11-8: Summary of CRM Performance at Dohoun

Year	Drill Type	QAQC Sample Type	No. Samples	Total Failures	% Failure
2014	RC	CRM	621	1	0.16%
2010 to 2014	DDH	CRM	142	1	0.70%
2014	RC-DDH	CRM	54	0	0.00%

Failure Procedures

Sample batches with failed QA/QC samples are reviewed and re-assayed or partially re-assayed where appropriate. Multiple QA/QC samples are inserted in each batch so that batch QA/QC does not rely on a single sample result. If one QA/QC sample fails and the remainder are within limits, then no action is taken. If more than one sample fails, then initially several samples in the sequence before and after the failed QAQC samples are re-assayed. If the majority of QAQC samples fail the entire batch is re-assayed.

11.5.3 Kari Deposits

Summary

A number of QA/QC procedures were rigorously implemented to monitor the accuracy, precision and potential for contamination of the analytical and assay data received from all laboratories during the 2017, 2018 and 2019 RC, AC and DDH drilling programs over the Kari Pump, Kari West and Kari Centre targets. Each sample was assigned an individual sample number. A small number of samples were analysed in 2014, but these are not considered to be material, and as such, are not included in the analysis presented here.

In addition to the assay laboratory QA/QC procedures, a rigorous QA/QC procedure was implemented which was inclusive of:

- Blanks: material returning less than five times the detection limit of the assay method;
- Certified Reference Material ("**CRM**"): independently certified commercial material from Geostats and OREAS of Australia;
- Field Duplicates: a second sample collected in the field from the same source at the same interval;
- Laboratory Generated Coarse Crush Preparation Duplicates: after crushing in the laboratory, a sample is split and both resulting samples are analysed; and
- Laboratory Generated Pulverisation Pulp Preparation Duplicates: After pulverisation in the laboratory, a sample is split and both resulting samples are analysed.

The QA/QC procedures followed during the Kari Pump, Kari West and Kari Centre RC, ARC and DDH drilling programs in 2017, 2018 and 2019 subscribe to industry standards with:

- One blank sample per 20 samples;
- One CRM sample per 20 samples; and
- For duplicates a sequence is followed where by one field duplicate or one coarse crush preparation duplicate or one pulverisation pulp preparation duplicate is inserted per 20 samples.

QC samples are assessed in a corporate standard QA/QC analysis report. This report is auto generated within the Endeavour's Corporate Database Management System when batches of new assay results are imported. Sample batches with failed QA/QC samples are reviewed and are re-assayed or partially re-assayed where appropriate. Table 11-9 summarises the QA/QC programme for the 2017, 2018 and 2019 drilling programmes.

Table 11-9: Summary of QAQC Results for Kari 2017, 2018 and 2019 Programmes

Area	Number	Failures	Failure Percent
Blanks			
Kari Pump Extension	4,624	26	0.56%
Kari West	5,090	3	0.06%
Kari Centre	4,722	4	0.08%
CRM			
Kari Pump Extension	4,737	85	1.79%
Kari West	4,840	68	1.40%
Kari Centre	4,354	64	1.47%
Field Duplicates			
Kari Pump Extension	3,738	27	0.72%
Kari West	3,933	81	2.06%
Kari Centre	4,033	46	1.14%
Coarse Crush Duplicates			
Kari Pump Extension	1,927	51	2.65%
Kari West	1,663	91	5.47%
Kari Centre	1,964	58	2.95%
Pulverisation Pulp Duplicates			
Kari Pump Extension	1,556	59	3.79%
Kari West	1,583	122	7.71%
Kari Centre	1,733	70	4.04%

Blanks

The regular submission of blank samples is used to assess contamination during sample preparation and to identify sample numbering errors. The QA/QC protocol for the Kari deposits stipulates for blanks to be inserted in the sample stream at a rate of at least one in 20 samples. For the 2017 and 2018 programmes, the blank material was fine river sand sourced from Ouagadougou. For the 2019 programme, the blank material was a coarse crushed granodiorite sourced from a quarry near Bobo-Dioulasso. This material was certified blank after analysis at several laboratories in Burkina Faso.

A blank assay was considered a failure if it returned a value greater than five times the detection limit of the assay method. Endeavour inserted 14,436 blank samples over the course of the 2017, 2018 and 2019 drilling programmes over the Kari Pump, Kari West and Kari Centre deposits. The performance of the blanks samples overall was very good with a total of only 33 failures. Table 11-10 provides a summary of blanks used in the 2017, 2018 and 2019 drilling programmes. Plots of the blank results are presented in Appendix X.

Table 11-10: Summary of QAQC Results for Kari 2017, 2018 and 2019 Programmes

Statistic	Kari Pump	Kari West	Kari Centre
Number of Blanks	4,624	5,090	4,722
Blanks > Detection Limit (0.005 ppm)	1,022	1,479	1,390
Max Blank Grade (ppm Au)	1.965	0.243	0.24
Blank Failures (>0.05 ppm Au)	26	3	4
Blank Failures Percentage	0.56%	0.06%	0.08%

Duplicate Samples

Duplicate samples can be from field sources (drill chips, drill core or trench samples), coarse (crushed reject), or pulp (pulverised reject) duplicates. The type of duplicate can assess the natural local-scale grade variation or nugget effect (i.e. inherent grade variation) at the different stage of sampling, sample preparation and analysis.

Field duplicates assess the variability introduced by sampling the same interval and detecting sample number mix-ups. The duplicate splits are bagged separately with different sample numbers in order to be blind to the sample preparation laboratory. The duplicates contain multiple levels of error and can be used to calculate field, preparation and analytical precision. They are also a check on possible sample over selection, that is, the sampler has either purposely or inadvertently sampled the geological material (i.e. drill core) so as to preferentially place visible mineralisation in the sample bag going for analysis (i.e. introduced a bias).

Laboratory generated coarse crush duplicates assess the efficacy of the homogenisation of the samples during crushing and subsequent splitting. Laboratory generated pulverisation pulp duplicates assess the efficacy of the homogenisation of the samples during pulverisation and subsequent splitting.

The approach applied for the Kari deposits applies several procedures for assessing the precision of field, coarse crush and pulverisation pulp duplicates. A set of calculations have been integrated into the Corporate standard QA/QC report based on procedures used by some assay laboratories. A tolerance value can be calculated for each individual duplicate pair based on the mean grade of the pair, the lower limit of detection for the analytical method used, and the method precision, as determined by the laboratory. The absolute relative difference is then calculated for each individual pair and if the result exceeds the calculated tolerance the duplicate pair is considered to have failed, as illustrated in Table 11-11. Graphical evaluation of field duplicate performance is depicted in XY scatter plots and relative difference against mean grade plots (Figure 11-1).

The performance of the field duplicates during the 2017, 2018 and 2019 RC and AC drilling programmes over the Kari West and Kari Centre deposits were well within acceptable limits. No significant bias is present in the duplicate assays. In Kari Pump, one very high-grade outlier duplicate (310ppmAu re-assayed at 287ppmAu) significantly skewed the coefficient of variation, correlation coefficient and % difference between means. When this outlier was removed these key statistical indicators fall within acceptable limits. No field duplicates were taken in DD core samples.

The performance of the laboratory generated coarse crush duplicates and pulverisation pulp duplicates during the 2017, 2018 and 2019 drilling programmes over the Kari Pump, Kari West and Kari Centre deposits were well within acceptable limits. No significant bias is present in the duplicate assays, the results of which are summarised in Table 11-2.

Table 11-11: Example of Field Duplicate Analysis Report

Original Sample ID	Original Au (g/t)	Duplicate Sample ID	Duplicate Au (g/t)	Pair Mean Au (g/t)	Relative Difference	Tolerance %	Difference %	Pass/Fail
RA00310	0.005	RA00311	0.0025	0.004	0.667	2746.667	47.14	PASS
RA00334	0.003	RA00335	0.0025	0.003	0	4080	0	PASS
RA00358	0.009	RA00359	0.005	0.007	0.571	1508.571	40.406	PASS
RA00382	0.005	RA00383	0.009	0.007	-0.571	1508.571	40.406	PASS
RA00408	0.106	RA00409	0.126	0.116	-0.172	166.207	12.191	PASS
RA00432	1.06	RA00433	1.805	1.433	-0.52	86.981	36.774	PASS
RA00454	0.184	RA00455	0.164	0.174	0.115	137.471	8.128	PASS
RA00478	0.077	RA00479	0.053	0.065	0.369	233.846	26.109	PASS
RA00502	0.012	RA00503	0.007	0.01	0.526	1132.632	37.216	PASS
RA00526	0.008	RA00527	0.015	0.012	-0.609	949.565	43.041	PASS
RC01431	0.023	RC01432	0.015	0.019	0.421	606.316	29.773	PASS
RC01455	0.003	RC01456	0.0025	0.003	0	4080	0	PASS
RC01479	0.173	RC01480	0.14	0.157	0.211	143.898	14.91	PASS
RC01503	0.003	RC01504	0.0025	0.003	0	4080	0	PASS
RC01527	0.003	RC01528	0.0025	0.003	0	4080	0	PASS
D272408	0.605	D272409	0.473	0.539	0.245	98.553	17.317	PASS
D294985	0.013	D294986	0.851	0.432	-1.94	103.148	137.166	**FAIL**
D302265	0.069	D302266	0.122	0.096	-0.555	184.712	39.243	PASS
D302289	0.008	D302290	0.006	0.007	0.286	1508.571	20.203	PASS
D302313	0.497	D302314	0.507	0.502	-0.02	99.92	1.409	PASS
D302337	0.092	D302338	0.172	0.132	-0.606	155.758	42.855	PASS
D302361	0.037	D302362	0.031	0.034	0.176	374.118	12.478	PASS
D302385	0.432	D302386	0.394	0.413	0.092	104.213	6.506	PASS
D302409	0.071	D302410	0.066	0.069	0.073	225.985	5.161	PASS
RC01527	0.003	RC01528	0.0025	0.003	0	4080	0	PASS
D272408	0.605	D272409	0.473	0.539	0.245	98.553	17.317	PASS
D294985	0.013	D294986	0.851	0.432	-1.94	103.148	137.166	**FAIL**
D302265	0.069	D302266	0.122	0.096	-0.555	184.712	39.243	PASS
D302289	0.008	D302290	0.006	0.007	0.286	1508.571	20.203	PASS
D302313	0.497	D302314	0.507	0.502	-0.02	99.92	1.409	PASS
D302337	0.092	D302338	0.172	0.132	-0.606	155.758	42.855	PASS
D302361	0.037	D302362	0.031	0.034	0.176	374.118	12.478	PASS
D302385	0.432	D302386	0.394	0.413	0.092	104.213	6.506	PASS
D302409	0.071	D302410	0.066	0.069	0.073	225.985	5.161	PASS

Figure 11-1: Example of Field Duplicate Plots (source: Endeavour)

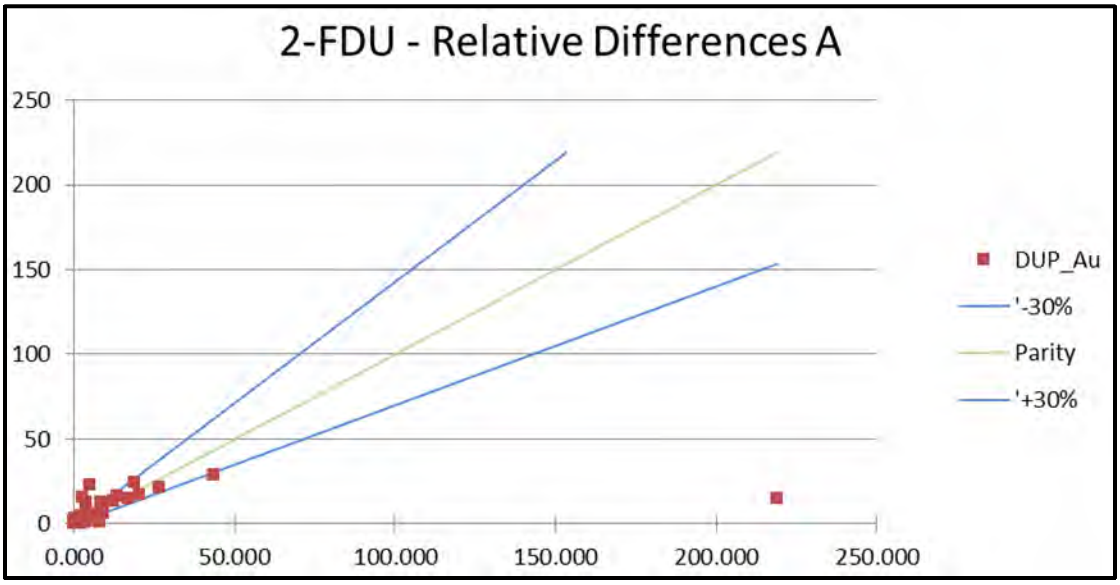


Table 11-12: Summary of Duplicate Statistics for 2017, 2018 and 2019 Drilling Programmes

Statistic	Kari Pump		Kari West		Kari Centre	
Field Duplicates						
No. Duplicates	3,738		3,933		4,033	
No. Duplicate Pairs >Detection Limit	1,938		2,139		2,321	
No. Duplicate Failures	27	0.72%	81	2.06%	46	1.14%
	Original	**Duplicate**	**Original**	**Duplicate**	**Original**	**Duplicate**
Mean Grade (Au g/t)	0.17	0.26	0.24	0.25	0.13	0.12
Minimum Grade (Au g/t)	0.003	0.003	0.003	0.003	0.003	0.003
Maximum Grade (Au g/t)	35.90	310.00	43.50	28.80	15.65	13.45
Median Grade (Au g/t)	0.01	0.01	0.01	0.01	0.01	0.01
Variance	1.22	27.52	1.56	1.58	0.28	0.27
Standard Deviation	1.10	5.25	1.25	1.26	0.53	0.52
CoV	6.70	19.87	5.28	5.00	4.21	4.26
Correlation Coefficient	0.24		0.87		0.78	
% Difference	46.2%*		6.2%		4%	
*Note: Significant difference due to a single high-grade outlier						
Coarse Crush Duplicates						
No. Duplicates	1,927		1,663		1,966	

Statistic	Kari Pump		Kari West		Kari Centre	
No. Duplicate Pairs >Detection Limit	991		1,090		1,327	
No. Duplicate Failures	51	2.65%	91	5.47%	58	2.95%
	Original	**Duplicate**	**Original**	**Duplicate**	**Original**	**Duplicate**
Mean Grade (Au g/t)	0.17	0.17	0.34	0.37	0.13	0.12
Minimum Grade (Au g/t)	0.003	0.003	0.003	0.003	0.003	0.003
Maximum Grade (Au g/t)	35.90	46.30	46.20	47.00	9.77	12.55
Median Grade (Au g/t)	0.006	0.005	0.01	0.01	0.009	0.009
Variance	1.46	1.85	2.97	2.98	0.35	0.34
Standard Deviation	1.21	1.36	1.72	1.73	0.59	0.59
CoV	7.11	7.88	4.67	4.73	4.51	4.73
Correlation Coefficient	0.98		1.00		0.98	
% Difference	1.7%		1.1%		6.0%	
Pulverisation Pulp Duplicates						
No. Duplicates	1,556		1,583		1,733	
No. Duplicate Pairs >Detection Limit	782		967		1,101	
No. Duplicate Failures	59	3.79%	122	7.71%	70	4.04%
	Original	**Duplicate**	**Original**	**Duplicate**	**Original**	**Duplicate**
Mean Grade (Au g/t)	0.11	0.11	0.35	0.35	0.13	0.13
Minimum Grade (Au g/t)	0.003	0.003	0.003	0.003	0.003	0.003
Maximum Grade (Au g/t)	10.35	11.45	118.50	107.50	22.30	21.00
Median Grade (Au g/t)	0.005	0.005	0.008	0.007	0.008	0.007
Variance	0.30	0.33	10.05	8.44	0.47	0.44
Standard Deviation	0.55	0.58	3.17	2.90	0.68	0.66
CoV	5.04	5.25	8.95	8.36	5.35	5.19
Correlation Coefficient	0.97		1.00		1.00	
% Difference	1.9%		1.9%		0.5%	

Standards (Certified Reference Material)

Results of the regular submission of Certified Reference Materials ("**CRM**") are used to identify problems of accuracy with specific sample batches and long-term biases associated with the regular assay laboratory. CRMs from Geostats and OREAS were used for internal accuracy control during the 2017, 2018 and 2019 drilling programmes over the Kari West, Kari Pump and Kari Centre deposits.

Specific pass/fail criteria were determined from the certified values provided for the CRM by the manufacturer. The approach to setting acceptance limits was to use the mean assay (also known as the Certified Reference Value ("**CRV**")) plus/minus two standard deviations (±2SD) as a warning limit and plus/minus three standard deviations (±3SD) as a failure limit. Results falling outside of the failure limit of ±3SD deviations must be investigated to determine the source of the erratic result, either from analytical sources, sample dispatch CRM insertion errors or data entry errors. An overall CRM failure rate of less than 2% was considered to be acceptable. The CRMs used are summarised in Table 11-13.

Table 11-13: Summary of Duplicate Statistics for 2017, 2018 and 2019 Drilling Programmes

CRM Source	CRM Name	Certified Reference Value	Certified SD	±3D
Geostats	Std-G307-4	1.4	0.06	0.18
Geostats	Std-G314-1	0.75	0.04	0.12
Geostats	Std-G315-3	1.97	0.06	0.18
Geostats	Std-G909-5	2.63	0.1	0.3
Geostats	Std-G910-3	4.02	0.17	0.51
Geostats	Std-G911-7	0.72	0.06	0.18
Geostats	Std-G913-2	2.4	0.08	0.24
Geostats	Std-G913-8	4.87	0.16	0.48
Geostats	Std-G914-6	3.21	0.12	0.36
Geostats	Std-G916-10	2.81	0.14	0.42
OREAS	Std-Oreas217	0.338	0.01	0.03
OREAS	Std-Oreas220	0.866	0.02	0.06
OREAS	Std-Oreas223	1.78	0.045	0.135
OREAS	Std-Oreas226	5.45	0.126	0.378
OREAS	Std-Oreas250	0.309	0.013	0.039
OREAS	Std-Oreas254	2.55	0.076	0.228
OREAS	Std-Oreas255	4.08	0.087	0.261

Endeavour inserted 4,738 CRMs into sample sequences for in the 2017, 2018 and 2019 RC, AC and DD drilling programmes over the Kari Pump deposit. In addition, 4,840 CRMs were inserted into sample sequences during the 2017, 2018 and 2019 RC, AC and DD drilling programmes over the Kari West deposit. Also, 4,359 CRMs were inserted into sample sequences in the 2017, 2018 and 2019 RC, AC and DD drilling programs over the Kari Centre deposit. A summary of the CRM is presented in Table 11-14.

Table 11-14: CRM Insertion Summary by Deposit

CRM Source	CRM Name	Kari Pump	Kari West	Kari Centre
Geostats	Std-G307-4	1,186	960	299
Geostats	Std-G314-1	876	364	311
Geostats	Std-G315-3	441	340	518
Geostats	Std-G909-5	182	245	95
Geostats	Std-G910-3	93	1	-
Geostats	Std-G911-7	124	148	266
Geostats	Std-G913-2	269	294	628
Geostats	Std-G913-8	270	424	96
Geostats	Std-G914-6	264	337	231
Geostats	Std-G916-10	777	424	98
OREAS	Std-Oreas217	74	169	74
OREAS	Std-Oreas220	48	115	353
OREAS	Std-Oreas223	45	265	346
OREAS	Std-Oreas226	-	180	182
OREAS	Std-Oreas250	-	140	201
OREAS	Std-Oreas254	54	126	289
OREAS	Std-Oreas255	35	308	372
Total		**4,738**	**4,840**	**4,359**

In summary, of the 4,738 CRMs inserted in the Kari Pump drill programmes only 85 or 1.8% were outside ±3SD for gold and were considered as failures. Of the 4,840 CRMs used for drill programmes over Kari West, only 68 or 1.4% were outside ±3SD. In addition, of the 4,359 CRMs used for drill programmes over Kari West only 64 or 1.5% were outside ±3SD. Table 11-5 to Table 11-17 summarises the CRM performance statistics.

Table 11-15: Performance Summary for CRM Used for 2017, 2018, and 2019 Drill Programmes at Kari Pump

CRM Name	No. CRM	Min Au_ppm	Max. Au_ppm	Avg. Au_ppm	Certified Value	Certified Std Dev	CRV - 3 SD	CRV + 3 SD	Failures	% Failures
Std-G307-4	1186	0.0025	1.98	1.37	1.40	0.06	1.22	1.58	10	0.8%
Std-G314-1	876	0.0025	0.94	0.76	0.75	0.04	0.63	0.87	2	0.2%
Std-G315-3	441	0.83	2.38	1.97	1.97	0.06	1.79	2.15	12	1.0%
Std-G909-5	182	2.41	2.74	2.55	2.63	0.10	2.33	2.93	1	0.1%
Std-G910-3	93	2.26	4.54	3.96	4.02	0.17	3.51	4.53	1	0.1%
Std-G911-7	124	0.48	0.82	0.69	0.72	0.06	0.54	0.90		
Std-G913-2	269	1.41	2.78	2.38	2.40	0.08	2.16	2.64	12	1.0%
Std-G913-8	270	3.76	5.95	4.87	4.87	0.16	4.39	5.35	6	0.5%
Std-G914-6	264	2.07	3.59	3.18	3.21	0.12	2.85	3.57	5	0.4%
Std-G916-10	777	0.73	4.81	2.86	2.81	0.14	2.39	3.23	33	2.8%
Std-Oreas217	74	0.3	0.34	0.32	0.34	0.01	0.31	0.37		
Std-Oreas220	48	0.77	0.89	0.85	0.87	0.02	0.81	0.93	1	0.1%
Std-Oreas223	45	1.43	1.88	1.76	1.78	0.05	1.65	1.92	1	0.1%
Std-Oreas226	54	0.005	2.57	2.40	2.55	0.08	2.32	2.78	1	0.1%
Std-Oreas250	35	3.89	4.31	4.09	4.08	0.09	3.82	4.34		
Std-Oreas254	1186	0.0025	1.98	1.37	1.40	0.06	1.22	1.58	10	0.8%
Std-Oreas255	876	0.0025	0.94	0.76	0.75	0.04	0.63	0.87	2	0.2%
Total	**4,7388**								**85**	**1.8%**

Table 11-16: Performance Summary for CRM Used for 2017, 2018, and 2019 Drill Programmes at Kari West

CRM Name	No. CRM	Min Au_ppm	Max. Au_ppm	Avg. Au_ppm	Certified Value	Certified Std Dev	CRV - 3 SD	CRV + 3 SD	Failures	% Failures
Std-G307-4	960	0.76	3.1	1.36	1.40	0.06	1.22	1.58	8	2.4%
Std-G314-1	364	0.69	0.88	0.76	0.75	0.04	0.63	0.87		
Std-G315-3	340	1.76	2.4	1.97	1.97	0.06	1.79	2.15	1	0.3%
Std-G909-5	245	2.02	2.83	2.58	2.63	0.10	2.33	2.93	1	0.3%
Std-G910-3	1	2.41	2.41	2.41	4.02	0.17	3.51	4.53	1	0.3%
Std-G911-7	148	0.58	0.81	0.70	0.72	0.06	0.54	0.90		
Std-G913-2	294	1.83	2.63	2.37	2.40	0.08	2.16	2.64	2	0.6%
Std-G913-8	424	1.01	5.72	4.84	4.87	0.16	4.39	5.35	3	0.9%
Std-G914-6	337	1.77	3.8	3.20	3.21	0.12	2.85	3.57	11	3.2%
Std-G916-10	424	2.42	4.97	2.86	2.81	0.14	2.39	3.23	5	1.5%
Std-Oreas217	169	0.29	0.35	0.32	0.34	0.01	0.31	0.37	2	0.6%
Std-Oreas220	115	0.01	4.2	0.86	0.87	0.02	0.81	0.93	10	2.9%
Std-Oreas223	265	0.73	2.5	1.76	1.78	0.05	1.65	1.92	9	2.6%
Std-Oreas226	180	4.12	5.98	5.49	5.45	0.13	5.07	5.83	3	0.9%
Std-Oreas250	140	0.28	0.34	0.31	0.31	0.01	0.27	0.35		
Std-Oreas254	126	0.01	2.73	2.44	2.55	0.08	2.32	2.78	1	0.3%
Std-Oreas255	308	3.48	5.21	4.03	4.08	0.09	3.82	4.34	11	3.2%
Total	**4,840**								**68**	**1.4%**

Table 11-17: Performance Summary for CRM Used for 2017, 2018, and 2019 Drill Programmes at Kari West

CRM Name	No. CRM	Min Au_ppm	Max. Au_ppm	Avg. Au_ppm	Certified Value	Certified Std Dev	CRV - 3 SD	CRV + 3 SD	Failures	% Failures
Std-G307-4	299	0.75	1.53	1.36	1.40	0.06	1.22	1.58	6	1.2%
Std-G314-1	311	0.68	1.28	0.76	0.75	0.04	0.63	0.87	2	0.4%
Std-G315-3	518	1.86	4.14	1.98	1.97	0.06	1.79	2.15	4	0.8%
Std-G909-5	95	2.43	2.75	2.55	2.63	0.10	2.33	2.93		
Std-G910-3	266	0.49	2.51	0.74	0.72	0.06	0.54	0.90	3	0.6%
Std-G911-7	628	1.44	2.78	2.40	2.40	0.08	2.16	2.64	12	2.3%
Std-G913-2	96	4.65	5.06	4.86	4.87	0.16	4.39	5.35		
Std-G913-8	231	2.54	3.78	3.21	3.21	0.12	2.85	3.57	5	1.0%
Std-G914-6	98	0.0025	3.62	2.82	2.81	0.14	2.39	3.23	5	1.0%

CRM Name	No. CRM	Min Au_ppm	Max. Au_ppm	Avg. Au_ppm	Certified Value	Certified Std Dev	CRV - 3 SD	CRV + 3 SD	Failures	% Failures
Std-G916-10	74	0.28	0.34	0.32	0.34	0.01	0.31	0.37	2	0.4%
Std-Oreas217	353	0.0025	0.93	0.85	0.87	0.02	0.81	0.93	1	0.2%
Std-Oreas220	346	1.31	2.55	1.78	1.78	0.05	1.65	1.92	8	1.5%
Std-Oreas223	182	2.47	5.77	5.39	5.45	0.13	5.07	5.83	9	1.7%
Std-Oreas226	201	0.0025	3.29	0.34	0.31	0.01	0.27	0.35	3	0.6%
Std-Oreas250	289	2.29	2.63	2.47	2.55	0.08	2.32	2.78		
Std-Oreas254	372	0.0025	4.37	4.04	4.08	0.09	3.82	4.34	4	0.8%
Std-Oreas255	299	0.75	1.53	1.36	1.40	0.06	1.22	1.58	6	1.2%
Total	**4,359**								**64**	**1.6%**

Failure Procedures

When a blank, duplicate or CRM failure is encountered, the initial step was to determine if the failure is genuine or a data entry problem. Data entry problems are identified by cross-checking the relevant original paper sample log against the database. CRM's are additionally checked against photographs taken of each CRM sachet directly prior to when they are inserted into the sample bag. The assay results are assessed, and sample weights are checked to verify that the sample providing the failed values are, in fact QA/QC samples. Genuine failure procedures are summarised as:

- **Duplicate Failure:** The weight of the duplicate pairs is checked and should be similar. (Note, in the case of CRMs, the weight is always much less than a down-the-drill sample, e.g. 0.5kg to 0.6kg versus over 2kg.) If the gold values in the duplicate pair are high and there is a large contrast between the original and duplicate assay grades, the samples are assumed to be in a zone of coarse gold and no re-assay is requested. If the contrast between samples is within normal failure ranges, a re-assay is requested;
- **Blanks Failure:** Always sent for re-assay; and
- **CRM Failure:** The weight of the failed CRM is checked. The weight of CRM is always much less than a down-the-drill sample, e.g. 0.5kg to 0.6kg versus over 2kg. If it occurs in a zone devoid of gold mineralisation, the laboratory is informed of the failure, but a re-assay request is not made. If the failed CRM occurs in a zone of gold mineralisation, the laboratory is informed, and a re-assay request made.

For all failed Q/AQC samples, an interval is requested to be re-assayed including the failed QA/QC sample and all samples above and below to which the QA/QC sample are linked. Typically, five samples before and five samples after the failed QA/QC sample are chosen. If the failure was in a pulp stream, the re-assay is generated by the laboratory taking an additional 50g to 60g sample from the original 250g pulp sample. If the re-assay sequence includes CRMs, replacement CRMs are provided.

- If there is insufficient original pulp material, material from the coarse reject is sourced and a pulp duplicate taken after pulverisation; and
- If the failure was in a coarse crush stream, a new sample is sent from the project site.

11.6 Density Analysis

More than 2,000 density measurements were taken by Endeavour in 2012 and 2013, covering the Vindaloo-Madras deposits. The drill core samples were prepared and measured at site at Houndé by technicians under the supervision of geologists. The rock type and weathering (e.g. oxide, transition, fresh) was recorded.

Competent core was sawn to pieces of approximately 300g. In cases of highly oxidized rock, pieces of appropriate length were chosen. The samples were sun dried for two days before preparation. The density was then determined by the following procedure:

- The dry sample was weighed, and the mass was recorded in a spreadsheet;
- The sample was covered with a thin wax film;

- The wax covered sample was weighed, and the mass was recorded;
- The sample was put in water, weighed and the mass was recorded; and
- The density of the sample was calculated using the following formula: SG=A/(B-C((B-A)/D)) where: SG = Specific Gravity; A = Mass of dry sample; B=Mass of waxed sample out of water; C=Mass of waxed sample in water; D=Density of paraffin (0.9g/cm^3)

11.7 Chain of Custody and Sample Security

All diamond core and split AC, ARC, and RC samples were transported to Endeavour's secure (walled and lockable) central exploration camp at Houndé. All diamond, AC, ARC, and RC samples had QA/QC samples into the sample stream. The batches of samples were placed in sealed and numbered polyweave or plastic bags for transport. The samples are delivered to the laboratory by either Endeavour personnel or collected by laboratory personnel. Upon receipt, the laboratory personnel sign for the secure receipt of all the samples. All aspects of the sample collection and dispatch was conducted by Endeavour personnel, or under the supervision of Endeavour staff.

11.8 Risks and Opportunities

To date no significant risks and opportunities have been identified in respect of sample preparation and security as practice at the Houndé Gold Mine.

11.9 Interpretation, Conclusions and Recommendations

All aspects of the collection, preparation and dispatch of drill samples were carried out by Endeavour. The sample collection and preparation, analytical techniques, security and QA/QC protocols implemented are consistent with standard industry practice and are suitable for the reporting of exploration results and for use in Mineral Resource estimation. The sampling procedures are adequate for and consistent with the style of gold mineralisation under consideration.

12 DATA VERIFICATION

12.1 Introduction

The following section includes discussion and comment on the data verification aspects relating to the underlying geological data utilised to support the geological model and ultimately the Mineral Resources as reported herein. The key areas addressed comprise the data verification processes applied for the Vindaloo-Madras deposits and the Other deposits; site visits completed; risks and opportunities; and interpretation, conclusions and recommendations. Furthermore, the datasets as described are an outcome of several different generations of data, site visits, data verification exercises and QP assessments.

In certain instances, Endeavour has commissioned independent third-party consultants to complete various work streams to support inputs to a number of processes relating to the geological models and the current Mineral Resources statements as reported in this Technical Report. In such circumstances and where specifically stated, the relevant Qualified Person confirms that they have undertaken a sufficiently detailed review of the supporting data, work programmes and final deliverables to confirm that all necessary aspects are appropriate and confirm that they accord with all summary conclusions and opinions expressed herein. The Qualified Person does not place explicit reliance on such third parties and takes full responsibility for the opinions expressed herein which should be considered and read as that of the Qualified Person.

Furthermore, Endeavour under the direction and oversight of the Qualified Person, implements a comprehensive data management system to assure the appropriate level of quality control and data verification is undertaken to support the geological models and current Mineral Resources as reported herein.

12.2 Vindaloo-Madras

The geological model for the Vindaloo-Madras deposit was initially established as part of the 2013 Feasibility Study by a third party independent consultant (Cube Consulting) and was subsequently updated in 2014 which remains as the current basis for the current Mineral Resource reported in this Technical Report. The data verification process completed as part of the original 2013 Feasibility Study comprised:

- Site visit between 9th and 13th February 2013;
- Data verification, inspections and reviews of the Project history, drilling and sampling procedures and results (including QA/QC), data and database management systems;
- SGS Ouagadougou analytical laboratory visit;
- Visit of the sample handling and storage facility in Houndé;
- Independent verification sampling of mineralised gold intercepts from the active drilling programme (31 samples from 2 RC holes). The analysis completed indicates that there is generally a good correlation between the original and independently taken samples and the results are considered to be acceptable;
- Drill hole database validation checks; and
- QA/QC analysis which concluded that the QAQC samples have performed satisfactorily and indicate the sample data is suitable for MRE.

The key findings from the review of all of the available quality control sample data relating to the RC and diamond drilling completed by Endeavour at the Vindaloo Project are:

- the sample control data performed well and indicates the sample assay data to be of a high standard; and

- is appropriate for the reporting of exploration results and use in Mineral Resource estimation.

12.3 Other Deposits

The following section sets out Endeavour Exploration's data management procedures under which the Bouéré, Dohoun Kari Centre, Kari Pump, and Kari West data were generated, managed and validated.

From 2014 to 2019, data has been managed at Houndé in a SQL-based Database Management System (**"DBMS"**) called "**DDHTool**". This system was implemented by the Endeavour Exploration central database team lead by the Endeavour Exploration Group Database and Quality Control Manager. DDHTool includes industry standard error controls and integrity checks.

Since 2014, when a drill hole database is requested by the Endeavour Resources Team, the extraction from the DBMS is audited with internal controls and with software-based audit tools provided by Geosoft Target and/or Leapfrog. These audits are run on both new active and historical data. Audit reports are submitted to local database teams and errors corrected. If the resource team finds further errors using Geovia Surpac, audit reports are transferred to the local database management teams and errors are corrected in the source DBMS.

In 2017 and 2019, CSA-Global was contracted for an independent review of quality control procedures at Houndé. This was a review of the field-based physical generation of the digital data in the database. The resulting report and recommendations were distributed and implemented.

12.3.1 Historical data validation and verification

In 2014, Endeavour Exploration took control of the Bouéré, Dohoun and Kari exploration programmes which had been historically managed in Microsoft Excel. In the process of implementing DDHTool, all historical data was audited for errors such as inconsistent collar coordinates, incorrect or missing down hole survey records, missing sample-assay records, missing or overlapping errors in interval data, etc. If and when errors were identified, they were corrected in the master database.

12.3.2 Database Checks

Since 2014, all data is managed with the strict built-in data integrity requirements of the industry standard DBMS, DDHTool and database checks include identifying:

- inconsistent collar co-ordinates;
- incorrect or missing DTH survey records;
- missing sample-assay records;
- missing data or overlap errors in DTH interval data; and
- incorrect 3D plots of the drill hole traces.

All inconsistencies are reported to the database management team which are then actioned accordingly.

During 2017 and 2019 a third party consultant (CSA-Global) commissioned by Endeavour reviewed the ongoing field procedures which generate the data in the database. All procedures related to drill hole location, downhole surveys, sample collection (analytical and density), quality control management and sample dispatch were reviewed. In 2017 and 2019, drilling campaigns were underway on the Kari Pump Extension, Kari West and Kari Centre deposits. The third party consultant visited all active drilling programmes at all three deposits. From the

2017 review, a report was generated, and all recommendations included were implemented. In addition, a new comprehensive Endeavour Exploration Standard Operating Procedure was generated for all projects across the Company. The 2019 mandate included a follow-up review of all the same procedures. A report was generated, and all recommendations were implemented.

No independent Qualified Persons have evaluated the database management procedures for data generated over the Bouéré, Dohoun and Kari Centre, Pump and West deposits. Notwithstanding this aspect, the Qualified Person considers that the internal processes applied by Endeavour is appropriate to continue to support the geological model and current Mineral Resources as reported herein.

12.3.3 Twinned Holes

There has been no twinned hole comparison undertaken at Bouéré, Dohoun, Kari Centre or Kari Pump. From 2014 to 2019, twin drill holes were completed at Kari West.

Some 25 RC drill holes at Kari West had down-hole survey data that raised concerns during validation checks. Confidence in the survey data, and subsequent hole trace, was low. The drill holes were twinned by another RC hole to understand the issues identified. In most cases, the collar of the twin RC hole was within five metres of the position of the original RC hole. A Reflex technician evaluated the data collection and survey procedures used for the twin hole drilling. All 25 of the twin holes produced survey data that was considered more consistent and repeatable than the original drill holes. Contributing causes to the faulty data in the original RC holes included excessive tool run-in and -out speed rates; data pad and hub sync issues; and rod vibrations during survey runs due to pressurised air from drilling activities. The twins were kept in the database for future use, with the original survey data being flagged as invalid.

In 2019, nine RC holes drilled at Kari West intersected water and produced wet samples during the drilling and sampling processes. The assays appeared to have a positive bias. To re-establish confidence in the assay results, the nine RC holes were twinned with a diamond drill hole, located less than five metres from the original RC drill hole collar position. All nine diamond drill holes produced assays which compared poorly to the original RC intersections. The diamond holes were kept in the database for future use and the RC holes flagged as being invalid.

One RC hole drilled at Kari West (RCB-19-021) intersected two broad intervals of higher-grade material, which appeared anomalous when compared to assays in surrounding holes. The RC intersections were 10.0m at 2.20g/tAu from 26m to 36m; and 18m at 4.61g/t Au from 45m to 63m. No ground water was noted during drilling, logging or sampling. A diamond hole (H-19-030) was drilled to determine the repeatability of the intersected mineralisation. The diamond hole intersected 5.1m at 2.47g/tAu from 25.15m and 3.4m at 12.23g/tAu from 30.80m, which supported the shallower intersection in the RC drill hole. The diamond hole also intersected four thinner zones but of comparable grade to support the lower RC intersection, namely 9.8m at 3.51g/tAu from 43.20m; 5.2m at 3.12g/t Au from 54.00m; 2.4m at 2.57g/tAu from 59.60m and 0.8m at 3.97g/tAu from 62.37m. The results of the diamond twin supported the RC drill hole results and both drill holes were stored in the database as valid results.

Table 12-1 summarises the twin holes in Kari West. The locations of the holes are also illustrated in Figure 12-1 and Figure 12-2.

Table 12-1: Performance Summary for CRM Used for 2017, 2018, and 2019 Drill Programmes at Kari West

Original Hole ID	Original Hole Type	Comment Sample ID	Twin Hole ID	Twin Hole Type	Comment	Hole Kept in DB for Resources	Original Hole ID	Original Hole Type	Comment Sample ID
RC-19-61R	RC	wet sample	H-19-009	DDH	Test & twin RC-19-061R	H-19-009	RC-19-61R	RC	wet sample
RC-19-089	RC	wet sample	H-19-019	DDH	Redrill of RC-19-089	H-19-019	RC-19-089	RC	wet sample
RCA-19-058	RC	wet sample	H-19-020	DDH	Redrill of RCA-19-058	H-19-020	RCA-19-058	RC	wet sample
RC-19-091	RC	wet sample	H-19-022	DDH	Twin to QC RC-19-091	H-19-022	RC-19-091	RC	wet sample
RCB-19-021	RC	wet sample	H-19-024	DDH	Redrill of RCB-19-021	H-19-024	RCB-19-021	RC	wet sample
RCB-19-058	RC	ok sample	H-19-030	DDH	Twin hole RCB-19-058 to conf. int. in RC	H-19-030 RCB-19-058	RCB-19-058	RC	ok sample
RC-19-068	RC	wet sample	H-19-031	DDH	Twinning RC-19-068	H-19-031	RC-19-068	RC	wet sample
RCB-19-071	RC	wet sample	H-19-034	DDH	Twinning RCB-19-071	H-19-034	RCB-19-071	RC	wet sample
RC-19-096	RC	wet sample	H-19-036	DDH	Twinning RC-19-096	H-19-036	RC-19-096	RC	wet sample
RCB-19-066	RC	wet sample	H-19-040	DDH	Twinning RCB-19-066	H-19-040	RCB-19-066	RC	wet sample
RC-19-002	RC	Survey errors	RC-19-002R	RC	consistent survey in twin	RC-19-002R	RC-19-002	RC	Survey errors
RC-19-005	RC	survey errors	RC-19-005R	RC	consistent survey in twin	RC-19-005R	RC-19-005	RC	survey errors
RC-19-008	RC	survey errors	RC-19-008R	RC	consistent survey in twin	RC-19-008R	RC-19-008	RC	survey errors
RC-19-012	RC	survey errors	RC-19-012R	RC	consistent survey in twin	RC-19-012R	RC-19-012	RC	survey errors
RC-19-018	RC	survey errors	RC-19-018R	RC	consistent survey in twin	RC-19-018R	RC-19-018	RC	survey errors
RC-19-019	RC	survey errors	RC-19-019R	RC	consistent survey in twin	RC-19-019R	RC-19-019	RC	survey errors
RC-19-020	RC	survey errors	RC-19-020R	RC	consistent survey in twin	RC-19-020R	RC-19-020	RC	survey errors
RC-19-022	RC	survey errors	RC-19-022R	RC	consistent survey in twin	RC-19-022R	RC-19-022	RC	survey errors
RC-19-025	RC	survey errors	RC-19-025R	RC	consistent survey in twin	RC-19-025R	RC-19-025	RC	survey errors
RC-19-027	RC	survey errors	RC-19-027R	RC	consistent survey in twin	RC-19-027R	RC-19-027	RC	survey errors
RC-19-029	RC	survey errors	RC-19-029R	RC	consistent survey in twin	RC-19-029R	RC-19-029	RC	survey errors
RC-19-060	RC	survey errors	RC-19-060R	RC	consistent survey in twin	RC-19-060R	RC-19-060	RC	survey errors
RC-19-062	RC	survey errors	RC-19-062R	RC	consistent survey in twin	RC-19-062R	RC-19-062	RC	survey errors
RC-19-088	RC	survey errors	RC-19-088R	RC	consistent survey in twin	RC-19-088R	RC-19-088	RC	survey errors
RC-19-092	RC	survey errors	RC-19-092R	RC	consistent survey in twin	RC-19-092R	RC-19-092	RC	survey errors
RC-19-099	RC	survey errors	RC-19-099R	RC	consistent survey in twin	RC-19-099R	RC-19-099	RC	survey errors
RCA-19-027	RC	survey errors	RCA-19-027R	RC	consistent survey in twin	RCA-19-027R	RCA-19-027	RC	survey errors
RCA-19-029	RC	survey errors	RCA-19-029R	RC	consistent survey in twin	RCA-19-029R	RCA-19-029	RC	survey errors
RCA-19-057	RC	survey errors	RCA-19-057R	RC	consistent survey in twin	RCA-19-057R	RCA-19-057	RC	survey errors
RCA-19-060	RC	survey errors	RCA-19-060R	RC	consistent survey in twin	RCA-19-060R	RCA-19-060	RC	survey errors
RCA-19-061	RC	survey errors	RCA-19-061R	RC	consistent survey in twin	RCA-19-061R	RCA-19-061	RC	survey errors
RCA-19-063	RC	survey errors	RCA-19-063R	RC	consistent survey in twin	RCA-19-063R	RCA-19-063	RC	survey errors
RCB-19-005	RC	survey errors	RCB-19-005R	RC	consistent survey in twin	RCB-19-005R	RCB-19-005	RC	survey errors
RCB-19-012	RC	survey errors	RCB-19-012R	RC	consistent survey in twin	RCB-19-012R	RCB-19-012	RC	survey errors
RCB-19-030	RC	survey errors	RCB-19-030R	RC	consistent survey in twin	RCB-19-030R	RCB-19-030	RC	survey errors

Figure 12-1: Location map of DDH twin holes at Kari West (source: Endeavour)

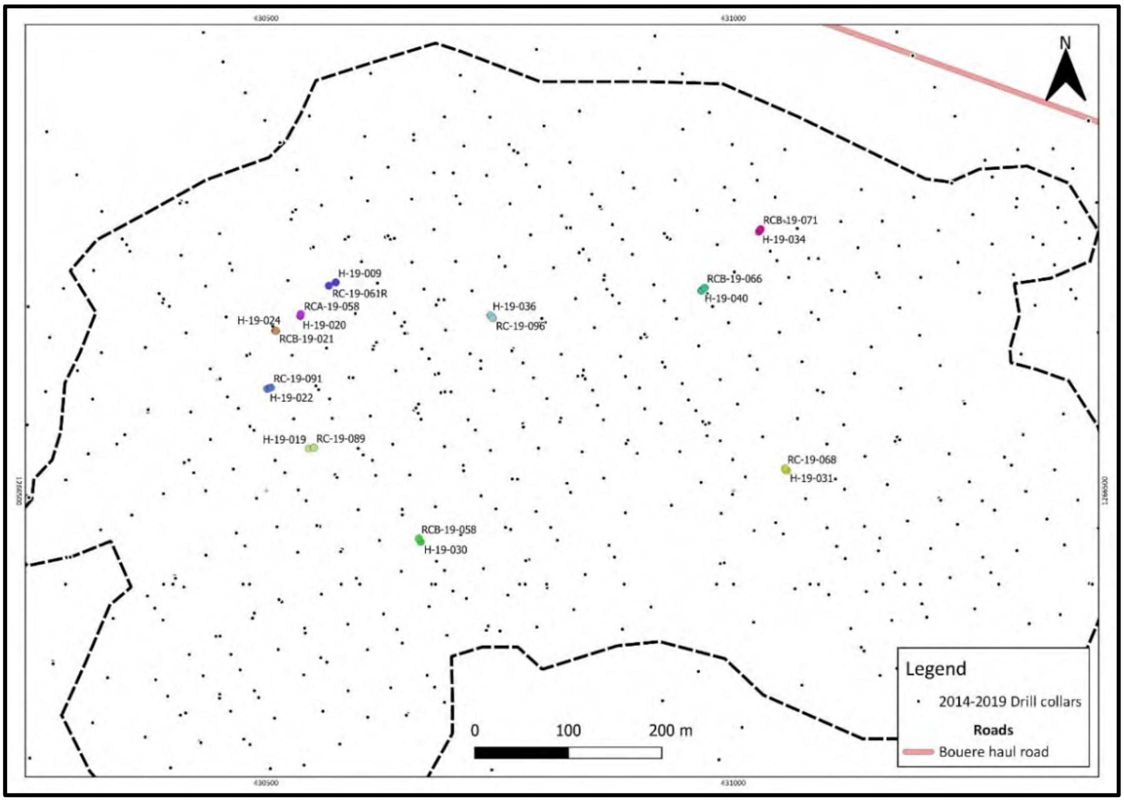
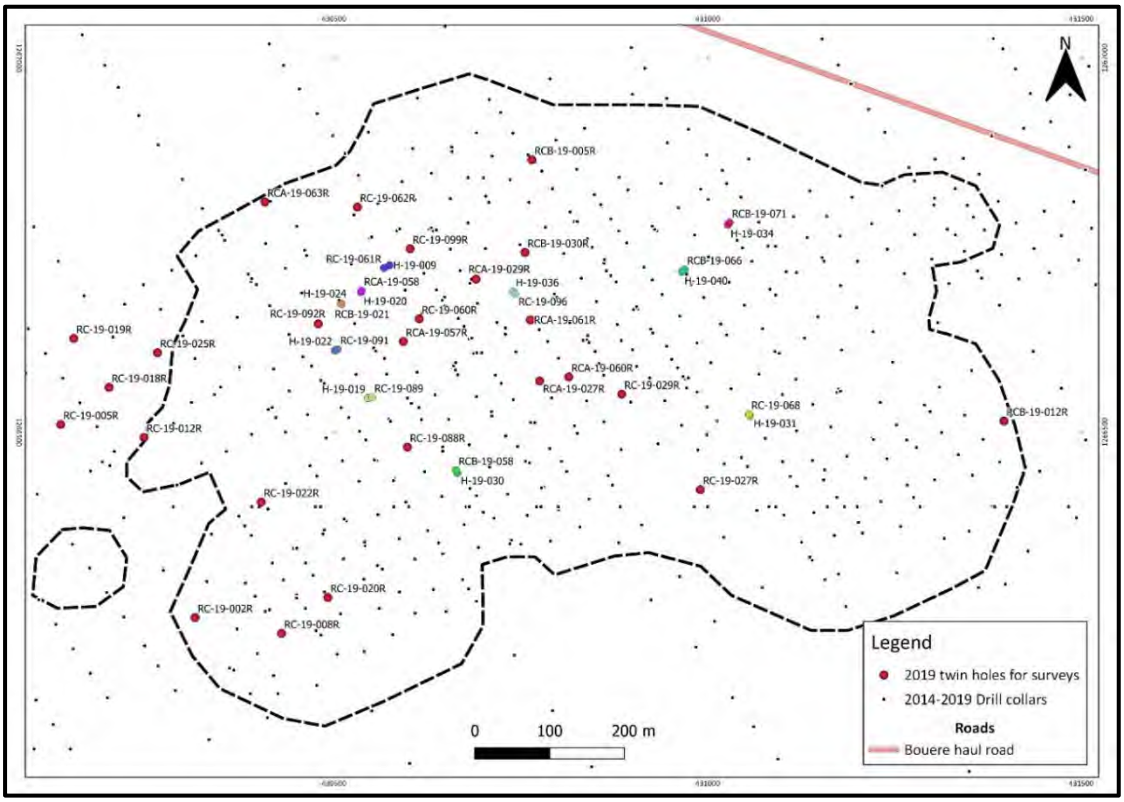


Figure 12-2: Location map of DDH twin holes at Kari West (source: Endeavour)



12.4 Site Visits

The Qualified Person has made regular site visits to the Houndé Gold Mine since 2014. Their site visits have been supplemented by the following people to review the application and adherence to procedures and protocols.

- Gérard de Hert, EurGeol, Senior VP Exploration, visiting since 2014;
- Helen Oliver, FGS CGeol, Group Resource Geologist, visiting since 2017;
- Geoff Day P.Geo, Exploration Group Database and Quality Control Manager, visiting since 2014; and
- Mark Zammit, MAIG, Principal Geologist, Cube Consulting, visiting since 2013.

Several independent consultants have also visited the Kari projects during the active exploration campaigns in 2017, 2018 and 2019. These included Jean-Luc Lescuyer, Dr Laurent Ciancaleoni, and Dr Kim Hein and structural geology specialist contractors from Arethuse Geology Sarl ("**Arethuse**"). The physical field-based litho-structural source data was evaluated, and recommendations made to assist Endeavour to collect better measurements and enhance the database. Additional litho-structural logging and measurements were also made by Arethuse. The independent consultants and Arethuse contributed to developing the understanding of the geological setting and mineralisation controls on the deposits and to assist with exploration target generation. Mark Zammit from Cube Consulting undertook site visits to the Houndé Gold Mine on 9-13 February 2013; and 23-31 January 2019.

12.5 Risks and Opportunities

To date no significant risks and opportunities have been identified with respect to Data verification.

12.6 Interpretation, Conclusions and Recommendations

The data verification processes completed to date have been completed in accordance with the relevant industry benchmarks and practices. Furthermore, the analysis completed to date has not identified any significant issues which would result in any inherent bias in the geological modelling and resource modelling which inform the Mineral Resources as reported in this Technical Report.

The Qualified Person considers the sample data to be robust and of a high standard, and appropriate for the use in Mineral Resource estimation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Several comminution and metallurgical extraction testwork programmes have been performed on samples from the Houndé Gold Mine deposits. Two preliminary testwork programmes were completed on samples from the Houndé deposit under the supervision of Endeavour. The first programme completed in 2010 at SGS Laboratory, Burkina Faso and the second programme was completed in 2011 at the Endeavour Mining Tabakoto Plant metallurgical laboratory, Mali. These programmes showed that the Houndé deposit ores contain a significant amount of gravity gold and that high gold extraction by conventional cyanidation is achievable

A third metallurgical testwork programme was completed during 2013 at SGS Lakefield laboratory in Perth, Western Australia. This detailed testwork programme was developed and supervised by Endeavour with results interpreted by Lycopodium for use in the feasibility study. The results of the detailed programme are presented in this Technical Report.

A fourth preliminary testwork programme was completed during 2019 to assess the metallurgical characteristics of the Kari Pump deposit ore. This detailed programme was developed and supervised by Lycopodium, the results of which are presented in this Technical Report.

13.2 Metallurgical Summary

The metallurgical treatment route applied at the Houndé Gold Mine is based on the results of the all testwork programmes. Full testwork results of the SGS and ALS programmes, conducted on the Houndé (Vindaloo; Bouéré; Dohoun) primary ore composites and the Kari Pump ore composites, are included in the SGS (Houndé) and the ALS (Kari Pump) reports.

The Houndé Gold Mine comprises 4 key mineralised sources: Vindaloo (2P); Bouéré (2P); Dohoun (2P); Kari Pump (2P); Kari West (3R); Kari Centre (3R); and stockpiles (2P) with five (2P) of these contributing to the current Ore Reserve statement. The deposits comprise the three primary levels of weathering: saprolite (oxide), transition and primary (sulphide). Primary mineralisation represents some 75% of the total Ore Reserves with transitional and saprolite mineralisation contributing 7% and 18% respectively. At Vindaloo and Bouéré the primary mineralisation comprises approximately 90% and 100% with Dohoun and Kari Pump comprising 68% an 38% of primary mineralisation respectively. Kari Pump is located approximately 7km west of the Houndé CIL plant and is part of the Houndé west domain ("**HWD**") that is located west of the Tarkwaian sediments.

Comminution testwork and current practice indicates that primary ores require moderate grinding energy and have moderate abrasivity; however, the ores are highly competent and display a high resistance to impact breakage. The Kari Pump material can be described as slightly more competent than the Houndé material tested, based on the limited number of samples tested. The process design criteria stablished to date indicates a range in gravity gold recovery from 30% to 70% with a design value of 46% and for Kari Pump the testwork indicates a similar response to the Houndé deposits. Accordingly, it was concluded that the Kari Pump material's response to gravity gold recovery will be similar to that used for the Houndé Process Plant design. This aside, the Kari Pump samples tested exhibited a lower abrasivity.

Grind sensitivity testwork on the primary composites indicated that lower residue grades, faster leaching rates and higher gold extractions are achieved with increasing fineness of grind. Whilst gold leaching continued to occur through to 48 hours, an optimum residence time of 24 hours was selected for the design and further testwork. The grind optimisation analysis indicated that similar net revenues at grinds of P80 106μm and 75μm were achieved, for both

Houndé and Kari Pump ores. Evaluating the benefits against the increased costs led to selection of a conservative grind size of P80 90µm for the design and for further testwork. Gold extractions after 24 hours using gravity concentration and conventional cyanidation averages can be seen in Table 13-1.

Table 13-1: Houndé and Kari Pump Gravity and Leach Tests: total gold extraction

Weathering	Average Gold Extraction (%)	
	Houndé	Kari Pump
Saprolite	95	95
Saprock	93	88
Primary	89	81

High graphitic material was found with both the Houndé and Kari Pump deposits that has potential for ore dilution was also tested. This graphitic material appears to have no preg-robbing characteristics and can be treated by conventional cyanidation.

Endeavour provided variability samples representative of the gold grades, lithologies and spatial distribution of the Houndé and Kari Pump ore bodies. Variability testwork on the individual samples was completed to determine the level of variability within the ores. While there is considerable variation in gold extraction throughout the ores, the variation for the same oxidation level within the same mining area is minor.

Ancillary testwork for plant design was conducted and indicates that the slurry rheology will not impact on processing, conventional aeration in the CIL is suitable and typical carbon loadings are achievable. Thickening testwork indicated that the primary ores will thicken with acceptable underflow densities. Cyanide destruction testwork showed that the air/SO_2 process can be successfully employed to treat the CIL tailings stream to achieve CNWAD concentrations of less than 5mg/L if required.

13.3 Metallurgical Sampling

Houndé Deposits

Metallurgical sampling for the Houndé deposits is focused on four sub areas of Vindaloo: Vindaloo, Vindaloo NE, Vindaloo 2 and Madras. Mineralisation at the Houndé deposits has been classified into three main types based on rock alteration and degree of weathering:

- Saprolite for strongly oxidised material found near the topographic surface;
- Transition for weakly oxidised material; and
- Primary for unoxidised material located beneath the zone of weathering.

Drill core samples for the detailed testwork programme were selected by Endeavour personnel on the following basis:

- Representative of the Houndé ore types;
- Spatial location across the orebody; and
- Obtaining samples with the expected range of gold head grades to determine the effect of head grade on overall gold extraction.

The drill core was combined to provide 22 samples (4 saprolite, 3 transition and 15 primary samples). Testwork was completed on the individual samples and on 5 primary composites made up from the 15 primary samples. Drill hole locations are shown in Figure 13-1 and sample and composite details are shown in Table 13-2.

Figure 13-1: Houndé Metallurgical Sample Drill Hole Locations (source: Endeavour)

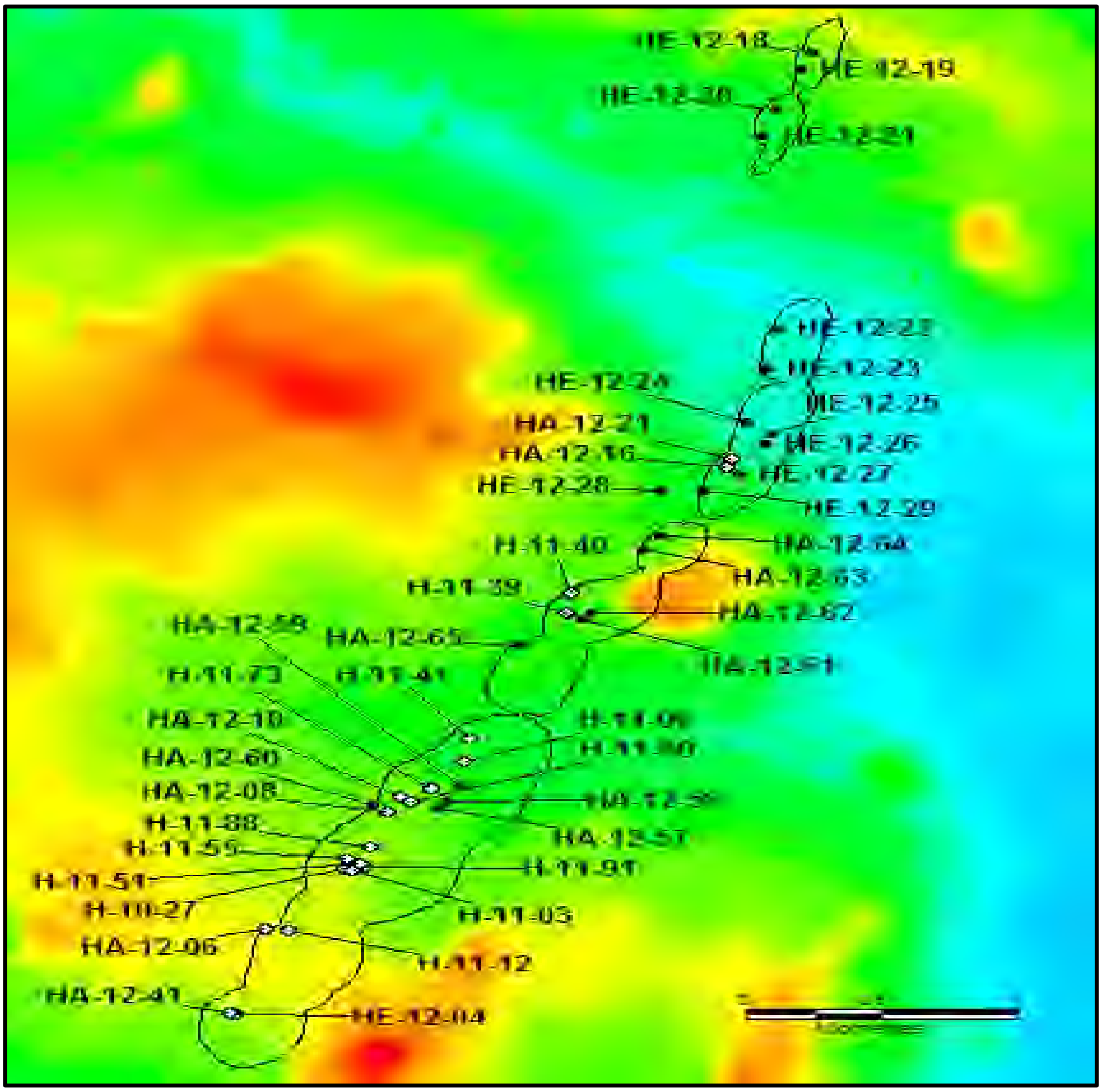


Table 13-2: Houndé and Kari Pump Gravity and Leach Tests: total gold extraction

Sample	Location	Hosted	Oxidation	Section	Hole	From (m)	To (m)	Width (m)	Assay (g/tAu)
1	Vindaloo		Primary	48450	HA-12-41	173.5	179.4	5.9	1.57
				48450	HA-12-41	209.1	216.0	6.9	3.69
				48450	HA-12-41	224.3	234.7	10.4	1.72
				48450	HA-12-41	266.5	275.5	9.0	1.13
				48450	HE-12-04	137.0	141.3	4.3	2.21
2	Vindaloo		Primary	48900	HA-12-06	278.5	286.5	8.0	1.09
						289.0	318.0	29.0	1.07
3	Vindaloo		Primary	49400	H-11-91	114.8	164.0	49.2	2.65
4	Vindaloo		Primary	49500	H-11-88	150.4	164.0	13.6	2.77
						180.5	201.4	20.9	2.82
5	Vindaloo		Primary	49700	HA-12-08	223.7	243.0	19.3	1.67
						247.5	254.5	7.0	2.18
						156.0	190.6	34.6	2.37
7	Vindaloo		Primary	50100	H-11-06	156.8	194.9	38.1	3.04
8	Vindaloo		Primary	50225	H-11-41	196.0	200.5	4.5	1.46
						208.0	226.7	18.7	1.66
9	Vindaloo	Mafic Volcanic	Primary	48950	H-11-12	118.1	133.5	15.4	1.34
						141.3	149.5	8.2	4.72
						156.0	157.4	1.4	1.02
10	Vindaloo	Mafic Volcanic	Primary	49350	H-11-03	100.5	102.8	2.3	2.42
						109.5	115.1	5.6	1.93
						120.0	124.8	4.8	2.51
				49350	H-10-27	135.5	144.5	8.0	2.65
				49400	H-11-51	110.5	126.6	8.0	2.65
				49400	H-11-55	152.5	158.5	8.0	2.65
11	Vindaloo West		Primary	49800	HA-12-10	139.0	166.0	27.0	1.60
				49800	H-11-80	69.0	76.0	7.0	2.95
12	Vindaloo NE		Primary	51000	H-11-39	62.0	85.0	23.0	4.44
						89.0	108.0	19.0	3.66

Sample	Location	Hosted	Oxidation	Section	Hole	From (m)	To (m)	Width (m)	Assay (g/tAu)
13	Vindaloo NE		Primary	51100	H-11-40	200.0	239.0	39.0	2.43
14	Vindaloo 2		Primary	52050	HA-12-21	85.1	114.3	29.2	1.09
				52000	HA-12-16	72.5	82.0	9.5	1.29
15	Vindaloo 2		Primary	52300	HA-12-17	124.5	127.5	3.0	0.77
						136.2	158.5	22.3	1.60
16	Madras NW		Saprolite	54100	HE-12-18	53.5	73.0	19.5	0.69
17	Vindaloo 2		Transition	52150	HA-12-20	30.6	40.0	9.5	1.75
				52200	HE-12-26	42.5	44.5	2.0	0.86
18	Vindaloo 2		Saprolite	52000	HE-12-27	53.5	62.6	9.1	1.06
				51850	HE-12-29	55.0	70.0	15.0	1.37
19	Vindaloo NE		Saprolite	51000	HA-12-61	10.5	19.5	9.0	1.38
				51050	HA-12-62	7.0	17.5	10.5	1.73
						25.0	29.5	4.5	6.78
20	Vindaloo		Transition	52700	HA-13-01	29.0	50.7	21.7	3.34
21	Vindaloo		Transition	49700	H-11-85	19.0	64.0	45.0	2.48
22	Vindaloo		Saprolite	50000	H-11-52	20.5	35.5	15.0	5.35
				49975	HA-12-59	26.0	30.1	4.1	3.02
						33.0	37.5	4.5	0.83

Kari Pump

Sample selection was driven by the requirement to test the various lithology, alteration and weathered rock types within the deposit but limited to the restricted samples made available at the time from the drill programme:

- Saprolite for strongly oxidised material found near the topographic surface;
- Transition for weakly oxidised material; and
- Primary for unoxidised material located beneath the zone of weathering.

Drill core samples for the detailed testwork programme were selected on the following basis:

- representative of the Kari Pump deposit;
- spatial location across the orebody; and
- obtaining samples with the expected range of gold head grades to determine the effect of head grade on overall gold extraction.

A total of an initial 36 samples (1 laterite, 7 saprolite, 8 transition and 16 primary samples) were supplied. Testwork was completed on the individual samples and on 8 composites. Drill hole locations are shown in Figure 13-2 and sample and composite details are shown in Table 13-3.

Figure 13-2: Kari Pump Metallurgical Sample Drill Hole Locations (source: Endeavour)

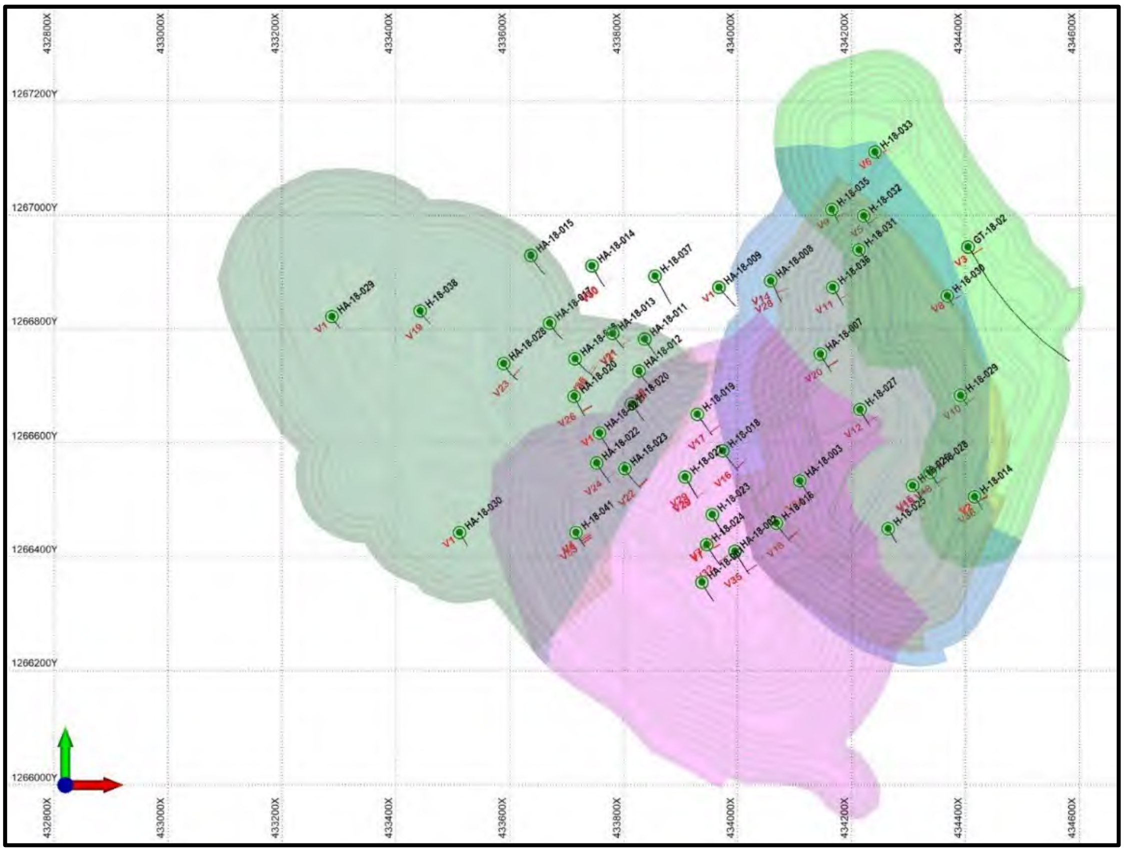


Table 13-3: Kari Pump Metallurgical Testwork Samples

No.	Hosted	Oxidation	Hole ID	Depth From (m)	Depth To (m)	Grade (g/tAu)
V1	Laterite	Laterite	HA-18-009	4	5	1.54
			HA-18-021	0	1	
			HA-18-029	22	23	
			HA-18-030	11	12	
V2	Volcaniclastics & sediments	Saprolite	H-18-014	30.4	40	2.53
V3	Volcanic - mafic to intermediate, tuff	Saprolite	GT-18-02	26	29	9.33
V4	Volcanic - mafic to intermediate, tuff	Saprolite	H-18-041	47.75	71	5.14
V5	Volcanic - mafic to intermediate, tuff	Saprolite	H-18-032	52	58	1.24
V6	Volcanic - mafic to intermediate, tuff	Saprolite	H-18-033	26	33	1.29
V7	Volcanic - mafic to intermediate, tuff	Saprolite	H-18-024	12	41.5	4.98
V8	Volcanic - mafic to intermediate, tuff	Saprolite	H-18-030	31.5	37	10.49
V9	Volcanic - mafic to intermediate, tuff	Saprock	H-18-035	57.5	64	1.08
V10	Volcanic - mafic to intermediate, tuff	Saprock	H-18-029	53.5	58.5	2.4
V11	Volcanic - mafic to intermediate, tuff	Saprock	H-18-036	86.15	90	6.49
V12	Volcanic - mafic to intermediate, tuff	Saprock	H-18-027	100.5	104.75	2.22
V13	Volcanic - mafic to intermediate, tuff	Saprock	H-18-028	77	80	1.18
V14	Volcanic - mafic to intermediate, tuff	Saprock	HA-18-008	87	92	0.77
V15	Volcanic - mafic to intermediate, tuff	Saprock	H-18-026	66	91	1.89
V16	Volcanic - mafic to intermediate, tuff	Primary	H-18-018	146	153	9.58
V17	Volcanic - mafic to intermediate, tuff	Primary	H-18-019	148	154	2.34
V18	Volcanic - mafic to intermediate, tuff	Primary	H-18-016	136.5	145.8	2.43
V19	Volcanic - mafic to intermediate, tuff	Primary	H-18-038	84	86	1.4
V20	Volcaniclastics & sediments	Primary	HA-18-007	100	109	1.34
V21	Volcanic - mafic to intermediate, tuff	Primary	HA-18-013	118	127	1.27
V22	Volcanic - mafic to intermediate, tuff	Primary	HA-18-023	142	152	1.61
V23	Volcanic - mafic to intermediate, tuff	Primary	HA-18-028	105	113	1.09
V24	Volcanic - mafic to intermediate, breccia	Primary	HA-18-022	117	119.75	4.02
V25	Volcanic - mafic to intermediate, tuff	Primary	HA-18-018	127.7	147	1.54
V26	Volcanic - mafic to intermediate, tuff	Primary	HA-18-020	106	115	1.83
V27	Volcanic - mafic to intermediate, tuff	Primary	HA-18-012	117	142	2.28
V28	Volcanic - mafic to intermediate, tuff	Primary	HA-18-008	141.6	143.5	1.58
V29	Volcanic - mafic to intermediate, tuff	Primary	H-18-022	107	152.5	1.17
V30	Volcanic - mafic to intermediate, tuff	Primary	HA-18-014	134.6	147	4.49
V31	Sediment	Primary	H-18-023	147.55	153	3.1
V32	Volcaniclastics & sediments,	Primary	H-18-024	134.45	140	3.85
V33	Volcaniclastics & sediments,	Primary	H-18-041	80	88	2.53
V34	Volcanic - mafic to intermediate, tuff	Primary	HA-18-003	122	125.55	28.41
V35	Volcaniclastics & sediments,	Primary	HA-18-002	139.65	145	26.97
V36	Volcaniclastics & sediments,	Saprock	H-18-014	83	84	1.9

13.4 Metallurgical Testing

Head Analysis

For the **Houndé Deposits** full elemental analyses were conducted on the all individual samples and all composite samples for the Houndé deposits and the analyses are summarised in Table 13-4 through Table 13-6 inclusive below.

Table 13-4: Houndé Primary Composites Head Analyses

Primary Composite	Au 1 (g/t)	Au 2 (g/t)	Au Avg (g/t)	Ag[(1)] (g/t)	As (ppm)	Hg (ppm)	Cu (ppm)	Fe (%)	S (%)	S^{2-} (%)	C_{org} (%)	True SG*
Vindaloo Main	2.65	3.11	2.88	0.80	26	3.4	124	4.8	0.78	0.66	1.97	2.95
Vindaloo Main 2[(2)]	1.92	1.89	1.91	0.30	29	1.0	103	4.9	0.84	0.83	1.97	2.95
Volcanic Rock	2.04	2.52	2.28	0.38	19	1.0	65	4.6	0.45	0.45	2.68	2.96
Vindaloo West	1.56	1.29	1.43	0.13	23	<0.1	92	4.8	1.29	1.21	2.07	2.92
Vindaloo NE1	3.20	2.92	3.06	0.21	<15	0.1	87	4.9	1.28	1.14	1.77	2.89
Vindaloo NE2	0.79	0.86	0.83	0.72	36	0.2	89	5.3	1.43	1.33	1.78	2.92

(1) Weighted average of individual samples.
(2) Additional Vindaloo Main primary composite made up from same individual samples.

Table 13-5: Kari Pump Composites Head Analyses

Primary Composite	Au 1 (g/t)	Au 2 (g/t)	Au 3 (g/t)	Au Avg (g/t)	Ag (g/t)	As (ppm)	C_{org} (%)	S^{2-} (%)	Sb ppm	Te ppm
C1	0.89	1.06	1.14	1.03	<2	90.00	0.09	0.70	0.40	<0.2
C2	1.32	1.19	1.39	1.30	<2	50.00	0.09	0.74	4.30	0.20
C3	1.08	1.20	1.15	1.14	<2	60.00	0.06	0.50	4.70	<0.02
C4	2.73	2.55	6.08	3.47	<2	60.00	0.06	0.90	0.60	0.40
	4.38	2.20	2.89		<2					
C5	2.54	1.78	2.35	1.85	<2	180.00	0.09	1.02	1.50	<0.02
	1.54	1.38	1.53		<2					
C6	1.31	1.20	1.18	1.23	<2	150.00	0.06	0.82	0.20	<0.02
C7	0.96	1.13	1.03	1.04	2.00	50.00	0.06	0.12	0.80	0.40
C8	1.37	1.33	1.38	1.36	<2	300.00	0.12	<0.02	4.70	0.40

Table 13-6: Houndé Individual Metallurgical Sample Head Analyses

Sample Number	Sample	Oxidation	Au 1 (g/t)	Au 2 (g/t)	Au 3 (g/t)	Au 4 (g/t)	Au Avg (g/t)	Ag (g/t)	As (ppm)	Hg (ppm)	Cu (ppm)	Fe (%)	S (%)	S^{2-} (%)	C_{org} (%)	True SG
1	Vindaloo	Primary	1.58	1.71			1.65	0.61	20	0.2	136	4.97	0.47	0.39	2.10	2.94
2	Vindaloo	Primary	1.47	0.97	1.23	1.75	1.36	0.06	20	5.7	123	4.81	0.33	0.29	2.30	2.93
3	Vindaloo	Primary	5.19	4.69			4.94	0.46	40	3.1	142	5.12	0.97	0.94	2.00	2.95
4	Vindaloo	Primary	2.18	3.02	1.97	3.56	2.68	0.78	40	1.0	124	4.57	0.96	0.84	1.80	2.93
5	Vindaloo	Primary	1.81	1.72			1.77	1.87	29	6.8	104	4.63	1.14	0.89	1.90	3.06
6	Vindaloo	Primary	3.12	2.74	3.16	2.95	2.99	0.59	41	3.4	138	4.92	1.27	1.11	1.80	2.93
7	Vindaloo	Primary	3.25	3.03			3.14	1.68	33	0.9	145	5.10	1.08	0.95	2.10	2.94
8	Vindaloo	Primary	2.83	3.56	3.74	4.40	3.63	0.36	28	0.3	188	4.92	1.09	1.03	2.10	2.93
9	Vindaloo Volcanic Rock	Primary	2.25	2.29			2.27	0.34	29	0.3	74	4.81	0.52	0.38	2.80	2.96
10	Vindaloo Volcanic Rock	Primary	1.89	1.39	1.62	1.68	1.65	0.41	37	0.1	57	4.34	0.53	0.45	2.70	2.96
11	Vindaloo West	Primary	1.11	1.27	1.22	1.40	1.25	0.13	38	<0.1	100	4.99	1.28	1.06	2.00	2.92
12	Vindaloo NE	Primary	5.08	4.79			4.94	0.22	27	0.1	85	4.94	1.39	1.20	2.00	2.88
13	Vindaloo NE	Primary	2.21	2.40			2.31	0.2	20	<0.1	111	5.08	1.18	1.00	1.70	2.90
14	Vindaloo 2	Primary	0.90	0.88			0.89	0.57	29	0.2	94	5.58	1.37	1.09	1.70	2.92
15	Vindaloo 2	Primary	0.66	0.70			0.68	0.87	38	0.1	96	5.10	1.54	1.25	1.90	2.92
16	Madras NW	Saprolite	0.49	0.53			0.51	0.39	109	<1	60	6.57	<0.005	<0.01	0.03	3.00
17	Vindaloo 2	Transition	1.01	0.92			0.97	0.43	38	<1	114	5.13	0.40	0.37	0.10	2.91
18	Vindaloo 2	Saprolite	0.87	0.95			0.91	0.51	15	<1	125	6.60	0.02	<0.01	0.01	2.98
19	Vindaloo NE	Saprolite	1.76	2.05			1.91	0.33	17	<1	191	7.81	<0.005	<0.01	0.04	2.99
20	Vindaloo	Transition	3.25	2.88			3.07	0.45	32	<1	165	5.17	<0.005	<0.01	0.03	2.93
21	Vindaloo	Transition	3.82	3.88			3.85	1.15	37	<1	139	4.55	<0.005	<0.01	0.19	2.91
22	Vindaloo	Saprolite	1.46	1.49			1.48	0.18	24	<1	177	5.33	<0.005	<0.01	0.03	2.96

For the **Kari Pump** deposit there was minor variation between the triplicate gold assays for some of the variability samples suggesting there is not an abundance of coarse gold particles. Some differences between the weighted average gold grades estimated from assays carried out on cores by the Company at site were noted. The agreement between ALS assays and the geology database weighted average value was generally better for lower grade samples with the high-grade samples showing the larger differential

For example, the high-grade Primary sample (V35) had an 11.7g/tAu average fire assay versus a 27.97g/tAu weighted average from core assays. Conversely another high grade saprock sample (V8) had a 25.3g/tAu average fire assay versus a 10.49g/tAu weighted average grade from core assays. Sample V32 weighted average was only 3.85g/tAu but the triplicate assays were 23.8g/tAu, 25.8g/tAu and 25.6g/tAu, respectively.

The single laterite sample (V1) gold assays were very low, close to the limit of detection and averaged only 0.05g/tAu. A gold grade of approximately 1.5g/tAu was expected.

A high graphite saprock sample (V36) was predicted to carry a grade of approximately 1.90g/tAu. However, ALS triplicate assays all came back at below the limit of detection. No further work was carried out on this sample.

Several samples (V1, V7, V8, V9, V32 and V36) were resubmitted for gold assay in triplicate. These re-assay results were found to be in line with the initial set and as previously there was only minor variation between the triplicate assays.

This may be related to inaccuracies and discrepancies in individual intercept weights or perhaps the style of mineralisation with metal values unevenly disseminated in clusters of gold particles within the dimensions of the core intercept such that one half of the cut core differs in grade to the other.

Silver grades were low and generally similar to the silver levels in Houndé samples assayed previously in the testwork programme carried out by SGS Lakefield Oretest (Job No: 0149MP) and reported in 2013 and then used for the design of the Houndé Process Plant.

Typically, silver values ranged from the limit of detection (0.3g/tAg) up to 2g/tAg but values of 4.8g/tAg, 2.4g/tAg and 3.0g/tAg were reported from samples V8, V34 and V32. These were higher grade gold samples assaying at 25.7g/tAu, 25.5g/tAu and 20.9g/tAu, respectively. Therefore, the gold to silver ratio is in fact higher (around 5 - 10 to 1) for the higher gold grade samples compared to the rest of the samples with lower gold grades (typically less than 5 to 1).

Mercury and cadmium grades were low, generally just at or below the limit of detection of 0.1ppm and 5ppm, respectively.

Base metal concentrations for copper, lead, and zinc were low. Maximum values were 220ppm, 370ppm and 152ppm, respectively. The copper is at similar levels to those from the Houndé samples by SGS Lakefield Oretest (Job No: 0149MP) and reported in 2013. Lead levels are slightly higher than the previous Houndé samples tested, where assays were generally at or close to the limit of detection (25ppm). Zinc assays are at similar levels.

Arsenic assays were low, typically between 8ppm and 41ppm. The Kari Pump arsenic assays range from 10ppm (V19) up to 540 ppm (V30) across weathered and Primary samples. Depending on the mineralogy, arsenic present may solubilise in the cyanidation process.

Table 13-7: Kari Pump Individual Metallurgical Sample Head Analyses

Sample Number	Oxidation	Au 1 (g/t)	Au 2 (g/t)	Au 3 (g/t)	Au Avg (g/t)	Ag (g/t)	As (ppm)	C_{org} (%)	S^{2-} (%)	Sb (ppm)	Te (ppm)
1	Laterite	0.08	0.04	0.02	0.05	0.9	90	0.15	<0.02	4.9	0.4
		0.06	0.04	0.03							
2	Saprolite	1.24	1.17	1.21	1.21	0.6	90	0.18	0.02	2.1	0.2
3	Saprolite	4.48	4.62	3.31	4.14	0.9	120	0.09	<0.02	1.9	0.2
4	Saprolite	1.58	1.54	1.70	1.61	0.6	170	0.12	<0.02	20.3	0.4
5	Saprolite	1.02	0.88	0.97	0.96	1.2	40	0.12	<0.02	0.7	0.2
6	Saprolite	1.25	0.87	0.97	1.01	0.6	30	0.15	<0.02	0.5	<0.2
7	Saprolite	1.36	1.34	1.34	1.45	0.9	40	0.21	<0.02	1.8	<0.2
		1.61	1.58	1.48							
8	Saprolite	29.20	24.60	23.30	25.30	4.8	270	0.12	<0.02	6.9	1.6
		22.80	27.70	24.30							
9	Saprock	0.57	0.62	0.55	0.58	0.3	50	0.12	0.02	1.0	<0.2
		0.62	0.50	0.61							
10	Saprock	2.25	2.63	2.34	2.41	0.9	80	0.15	<0.02	4.4	0.8
11	Saprock	6.71	5.30	5.31	5.77	1.5	350	0.12	0.16	1.8	2.4
12	Saprock	2.06	2.80	2.81	2.56	0.9	20	0.12	0.20	2.2	<0.2
13	Saprock	1.13	1.40	1.40	1.31	1.2	180	0.12	<0.02	2.2	0.6
14	Saprock	0.65	0.64	0.65	0.65	0.3	20	0.06	<0.02	0.3	<0.2
15	Saprock	1.32	1.31	1.17	1.27	0.6	230	0.3	0.02	6.5	0.4
16	Primary	5.93	6.18	5.72	5.94	0.9	130	0.12	0.76	5.3	0.6
17	Primary	2.98	2.76	3.28	3.01	0.6	160	0.09	0.12	.94.1	0.4
18	Primary	2.57	2.45	2.45	2.49	0.6	210	0.12	0.86	0.3	0.4
19	Primary	1.94	1.53	1.69	1.72	0.9	10	0.06	<0.02	1.1	<0.2
20	Primary	1.34	1.04	1.41	1.26	0.9	110	0.06	0.78	0.5	0.2
21	Primary	1.26	1.39	1.26	1.30	0.6	40	0.06	0.48	5.3	0.2
22	Primary	1.24	1.52	1.21	1.32	0.6	180	0.09	1.08	0.7	0.4
23	Primary	0.96	0.91	1.34	1.07	0.3	90	0.15	0.90	2.8	<0.2
24	Primary	2.29	2.24	2.15	2.23	0.6	130	0.12	1.06	0.3	0.6
25	Primary	0.94	1.25	1.21	1.18	<0.3	60	0.18	0.54	0.5	<0.2
26	Primary	1.27	1.46	1.42	1.38	0.6	30	0.12	0.70	0.3	0.4
27	Primary	3.21	2.29	2.09	2.53	1.5	40	0.12	0.74	0.3	0.4
28	Primary	1.92	1.86	1.98	1.92	1.2	60	0.09	1.86	0.5	0.8

Sample Number	Oxidation	Au 1 (g/t)	Au 2 (g/t)	Au 3 (g/t)	Au Avg (g/t)	Ag (g/t)	As (ppm)	C_{org} (%)	S^{2-} (%)	Sb (ppm)	Te (ppm)
29	Primary	1.28	1.41	1.41	1.37	1.8	110	0.09	1.14	1.2	1.4
30	Primary	3.38	3.45	3.43	3.42	0.9	540	0.12	2.20	1.8	0.6
31	Primary	3.30	2.75	3.58	3.21	0.9	70	0.3	0.90	12.9	0.6
32	Primary	23.80	25.80	25.60	25.40	3.0	190	0.06	2.84	9.60	2.20
		30.60	24.40	22.20							
33	Primary	2.27	2.92	1.93	2.37	0.6	150	0.33	0.46	6.3	0.6
34	Primary	22.10	19.60	21.10	20.90	2.4	50	0.09	0.52	2.1	2.2
35	Primary	10.50	11.90	11.70	11.40	1.2	330	0.45	1.86	11.6	4.8
36	Saprock	<0.02	<0.02	<0.02	<0.02	1.8	30	0.12	<0.02	<0.2	<0.2
		<0.02	<0.02	<0.02							

Comminution Testwork

For the **Houndé Deposits** comminution testwork was conducted on the 15 individual Houndé primary samples and on seven of the eight Kari Pump primary ore composites samples to determine the variability of comminution parameters throughout each the orebody and determine parameters for comminution circuit design. One of the Kari Pup samples (C8) was not sufficiently competent to perform the SMC tests. The results from the SAG Mill Comminution ("**SMC**") tests were interpreted and ranked by JKTech.

The comminution testwork results are summarised in Table 13-8 and Table 13-9. The Houndé primary ores have average Bond rod and ball mill work indices indicating moderate grinding energy requirement and moderate abrasion indices. The JK breakage parameters indicate the ores are highly competent and display a high resistance to impact breakage.

The comminution results were utilised by Orway Mineral Consultants ("**OMC**") for comminution circuit selection and mill sizing.

Table 13-8: Houndé Comminution Testwork Results Summary

Sample Number	Sample	Ai (g)	RWi (kWh/t)	BWi (kWh/t)	DWi (kWh/m^3)	JK Breakage Parameters A	b	Axb	ta	SG
1	Vindaloo Primary	0.210	19.5	15.3	9.89	99.2	0.29	28.8	0.26	2.87
2	Vindaloo Primary	0.173		13.3						
3	Vindaloo Primary	0.196		16.9	10.38	100.0	0.29	29.0	0.25	3.00
4	Vindaloo Primary	0.225		16.3						
5	Vindaloo Primary	0.273		16.4						
6	Vindaloo Primary	0.252	19.4	17.0	9.52	100.0	0.29	29.0	0.27	2.79
7	Vindaloo Primary	0.260		17.4						
8	Vindaloo Primary	0.215		16.1	8.84	100.0	0.32	32.0	0.29	2.86
9	Vindaloo Volcanic Rock Primary	0.119		15.0						
10	Vindaloo Volcanic Rock Primary	0.116		16.1	8.86	67.3	0.49	33.0	0.29	2.89
11	Vindaloo West Primary	0.284		16.2	9.57	100.0	0.29	29.0	0.27	2.76
12	Vindaloo NE Primary	0.229		15.9	9.91	100.0	0.29	29.0	0.26	2.83
13	Vindaloo NE Primary	0.207		17.3	12.22	100.0	0.23	23.0	0.21	2.8
14	Vindaloo 2 Primary	0.144		14.1						
15	Vindaloo 2 Primary	0.232		15.4						
Primary Ores 85th (Design) Percentile Value		**0.259**	**19.4**	**17.0**		**99.0**	**0.29**	**28.8**	**0.25**	**2.89**
Saprolite/Transition Composite				**9.9**						

Table 13-9: Kari Pump Comminution Testwork Results Summary

Sample Number	Sample	Ai (g)	BWi (kWh/t)	DWi (kWh/m^3)	JK Breakage Parameters A	b	Axb	ta	SG
C1	Primary	0.149	17.6	5.49	70.2	0.7	49.1	0.47	2.70
C2	Primary	0.160	17.8	5.27	68.6	0.77	52.8	0.49	2.77
C3	Primary	0.095	17.2	6.9	70.6	0.58	40.9	0.38	2.82
C4	Primary	0.178	17.5	5.05	73.2	0.74	54.2	0.51	2.75
C5	Primary	0.097	15.8	7.18	74.4	0.52	38.7	0.36	2.78
C6	Primary	0.116	18	4.41	64.4	0.97	62.5	0.59	2.75
C7	Saprock	0.042	11	2.47	59.9	1.66	99.4	1.05	2.45
Primary Ores 85th (Design) Percentile Value		**0.164**	**17.85**	**6.97**	**73.50**	**0.82**	**56.28**	**0.53**	**2.79**

For the **Kari Pump Deposits** the highest index recorded from the tests was 18.0kWh/t (Sample C6). In general, the Primary samples returned high values (>17kWh/t) except for Sample C5 at 15.8kWh/t. In contrast the saprock sample (C6) was significantly lower (11.0kWh/t). The 85th percentile value for the Primary samples is 17.8kWh/t.

For comparison the Houndé Process Plant design criteria (85th percentile) used a value of 17.0kWh/t for the Bond Ball Work index of primary material and 14.7 for transition. The range of work indices were 13.3kW/t to 17.4kWh/t for primary material. The Kari Pump material can be described as slightly more competent than the Houndé material tested, based on the limited number of samples tested.

The Primary samples tested range in Abrasion Index range from 0.0947 to 0.1779 and the 85th percentile value is 0.1644. For comparison the Houndé Process Plant design criteria used a range of 0.21 to 0.29 for primary (unweathered) material and used an 85th percentile value of 0.259. The Kari Pump samples tested exhibited a lower abrasivity.

Variability Testwork

Variability testwork was conducted on the all individual variability samples at the beginning of the testwork programme to determine the metallurgical performance of the Houndé and Kari Pump ores and the variability within them. All testwork was conducted at a grind size of P80 75µm and included a gravity concentration step. The results are summarised in Table 13-10, Table 13-11 and Table 13-12 and Figure 13-3 to Figure 13-5. There is considerable variation in gold extraction throughout the Vindaloo ores, although the variation for the same oxidation level within the same mining area is minor.

For the **Houndé Deposits** overall, 24-hour primary ore gold extractions varied between 57% and 92% with an average of 85%. The average gold extraction for Vindaloo 2 primary ores was significantly lower at 57% while the other primary ore were less variable (average 89%, range 83% to 95%). The gold extraction for the 8 Vindaloo primary samples varied between 85% and 92% and averaged 89%:

- **Saprolite samples:** Overall, 24-hour gold extraction averaged 95% with a range of 92% to 97%. The 4 saprolite samples showed minor variation in gold extraction despite originating from 4 separate mining areas;
- **Transition samples:** Overall, 24-hour gold extractions for the transition ores averaged 93% with a range of 89% to 95%. The 3 transition samples represented 2 mining areas with the 2 Vindaloo transition samples showing no variation in gold extraction; and
- **Primary samples:** Diagnostic leach testwork was completed on the 2 Vindaloo 2 primary samples which achieved the lowest gold extractions. The results are summarised in Table 13.4.8 and show that the samples had 22% to 35% of the gold occluded in sulphides and silicates and not readily amenable to cyanidation.

Table 13-10: Houndé Variability Testwork Summary

Variability Sample	Grade g/t Au Assay Head	Calc Head	Calc Leach	Leach Residue	Gravity Mass Pull %	Leach 24h	% Au Extraction Total Total including Gravity 0h	2h	4h	8h	24h	48h
Vindaloo Primary, Sample 1	1.65	1.41	0.59	0.16	4.4	73.0	58.1	87.8	87.8	87.8	87.8	88.7
Vindaloo Primary, Sample 2	1.36	1.02	0.44	0.11	4.5	74.9	57.0	86.5	87.9	89.2	89.2	89.2
Vindaloo Primary, Sample 3	4.94	4.46	1.12	0.34	4.7	70.2	74.8	91.6	92.0	92.0	92.2	92.5
Vindaloo Primary, Sample 4	2.68	2.53	0.83	0.30	4.7	64.6	67.1	87.8	87.8	88.4	88.4	88.4
Vindaloo Primary, Sample 5	1.77	1.52	0.70	0.23	4.8	68.0	53.8	84.3	85.2	85.2	85.2	85.2
Vindaloo Primary, Sample 6	2.99	2.40	0.94	0.28	4.9	70.6	61.0	87.9	88.5	89.0	89.0	88.5
Vindaloo Primary, Sample 7	3.14	3.03	1.15	0.29	4.9	74.9	61.9	88.6	89.6	90.0	90.4	90.4
Vindaloo Primary, Sample 8	3.63	1.84	0.70	0.23	7.7	67.9	61.8	86.3	87.1	87.1	87.1	87.7
Volcanic Rock Primary, Sample 9	2.27	2.35	1.08	0.21	5.7	80.6	54.1	86.0	90.2	89.7	91.3	91.3
Volcanic Rock Primary, Sample 10	1.65	1.60	0.36	0.11	5.6	69.7	77.3	92.3	92.3	92.3	93.1	93.1
Vindaloo West Primary, Sample 11	1.25	1.26	0.50	0.22	6.4	57.1	60.4	82.9	82.9	84.0	83.0	83.0
Vindaloo NE Primary, Sample 12	4.94	5.62	1.56	0.29	6.4	81.4	72.3	94.1	94.1	94.8	94.8	94.8
Vindaloo NE Primary, Sample 13	2.31	2.39	0.78	0.25	6.1	68.7	67.2	89.2	89.2	89.2	89.7	89.7
Vindaloo 2 Primary, Sample 14	0.89	0.60	0.54	0.20	6.7	63.8	9.8	65.1	65.1	67.3	67.3	67.3
Vindaloo 2 Primary, Sample 15	0.68	0.44	0.42	0.24	6.4	43.5	5.5	46.4	46.4	49.5	46.6	46.6
Madras NW Saprolite, Sample 16	0.51	0.67	0.47	0.05	6.0	90.4	30.2	91.4	92.4	92.4	92.4	93.3
Vindaloo 2 Saprolite, Sample 18	0.91	1.10	0.50	0.04	6.8	91.9	55.0	95.1	95.1	96.3	96.9	96.4
Vindaloo NE Saprolite, Sample 19	1.91	1.66	1.04	0.08	6.1	92.3	37.7	91.8	93.6	94.4	95.6	95.2
Vindaloo Saprolite, Sample 22	1.48	1.43	0.51	0.07	5.9	86.3	64.2	95.6	94.6		95.1	95.1
Vindaloo 2 Transition, Sample 17	0.97	1.12	0.69	0.12	6.3	83.3	38.7	86.8	87.4	89.8	88.7	89.8
Vindaloo Transition, Sample 20	3.07	3.03	1.11	0.16	6.4	86.1	63.3	91.5	92.9	93.6	94.7	94.9
Vindaloo Transition, Sample 21	3.85	2.87	1.01	0.15	5.8	85.6	64.9	90.7	92.7	93.4	94.5	95.0
Average Vindaloo Primary	2.8	2.28	0.81	0.24	5.1	70.5	61.9	87.6	88.2	88.6	88.7	88.8
Average Volcanic Rock Primary	2.0	1.98	0.72	0.16	5.7	75.1	65.7	89.2	91.3	91.0	92.2	92.2
Average Vindaloo West Primary	1.3	1.26	0.50	0.22	6.4	57.1	60.4	82.9	82.9	84.0	83.0	83.0
Average Vindaloo NE Primary	3.6	4.01	1.17	0.27	6.2	75.1	69.7	91.7	91.7	92.0	92.3	92.3
Average Vindaloo 2 Primary	0.8	0.52	0.48	0.22	6.6	53.6	7.7	55.8	55.8	58.4	57.0	57.0
Average Primary	2.4	2.17	0.78	0.23	5.6	68.6	56.1	83.8	84.4	85.0	85.0	85.1
Average Primary (without Vindaloo 2)	2.7	2.42	0.83	0.23	5.5	70.9	63.6	88.1	88.8	89.1	89.3	89.4
Average Saprolite	1.2	1.22	0.63	0.06	6.2	90.3	46.8	93.5	93.9	94.4	95.0	95.0
Average Transition	2.6	2.34	0.94	0.14	6.2	85.0	55.6	89.7	91.0	92.3	92.6	93.2

(1) Note: Grind size P80 75µm. Leach tests included gravity concentration and intensive leach of gravity concentrate, with combined leach of gravity concentrate leach tails and gravity tails.

Table 13-11: Houndé Variability Testwork Summary

Variability Sample	Addition	24 h Reagents kg/t Consumption			48 h Reagents kg/t Consumption	
	NaCN	NaCN	NaOH	Lime	NaCN	Lime
Vindaloo Primary, Sample 1	3.36	0.38	0.03	0.43	0.53	0.43
Vindaloo Primary, Sample 2	3.37	0.38	0.03	0.34	0.43	0.34
Vindaloo Primary, Sample 3	3.50	0.35	0.03	0.61	0.39	0.61
Vindaloo Primary, Sample 4	3.46	0.33	0.02	0.51	0.45	0.51
Vindaloo Primary, Sample 5	3.53	0.34	0.01	0.40	0.46	0.40
Vindaloo Primary, Sample 6	3.55	0.33	0.03	0.42	0.40	0.42
Vindaloo Primary, Sample 7	3.52	0.36	0.10	0.47	0.47	0.47
Vindaloo Primary, Sample 8	4.65	0.27	0.08	0.47	0.43	0.47
Volcanic Rock Primary, Sample 9	3.98	0.40	0.08	0.52	0.51	0.52
Volcanic Rock Primary, Sample 10	3.87	0.36	0.07	0.43	0.45	0.43
Vindaloo West Primary, Sample 11	4.23	0.37	0.07	0.59	0.51	0.59
Vindaloo NE Primary, Sample 12	4.12	0.32	0.04	0.56	0.48	0.56
Vindaloo NE Primary, Sample 13	3.99	0.28	0.08	0.45	0.46	0.45
Vindaloo 2 Primary, Sample 14	4.25	0.24	0.07	0.61	0.27	0.61
Vindaloo 2 Primary, Sample 15	4.12	0.38	0.07	0.46	0.46	0.46
Madras NW Saprolite, Sample 16	4.05	0.43	0.22	1.54	0.48	1.54
Vindaloo 2 Saprolite, Sample 18	4.09	0.40	0.32	2.25	0.45	2.25
Vindaloo NE Saprolite, Sample 19	3.96	0.38	0.23	2.14	0.38	2.14
Vindaloo Saprolite, Sample 22	3.91	0.29	0.29	1.30	0.40	1.30
Vindaloo 2 Transition, Sample 17	4.41	0.50	0.29	2.52	0.52	2.52
Vindaloo Transition, Sample 20	4.29	0.37	0.31	1.91	0.37	1.91
Vindaloo Transition, Sample 21	4.19	0.42	0.28	1.59	0.45	1.59
Average Vindaloo Primary	3.62	0.34	0.04	0.46	0.44	0.46
Average Volcanic Rock Primary	3.93	0.38	0.08	0.48	0.48	0.48
Average Vindaloo West Primary	4.23	0.37	0.07	0.59	0.51	0.59
Average Vindaloo NE Primary	4.06	0.30	0.06	0.51	0.47	0.51
Average Vindaloo 2 Primary	4.19	0.31	0.07	0.53	0.36	0.53
Average Primary	3.83	0.34	0.05	0.48	0.45	0.48
Average Primary (without Vindaloo 2)	3.78	0.34	0.05	0.48	0.46	0.48
Average Saprolite	4.00	0.37	0.26	1.81	0.43	1.81
Average Transition	4.30	0.43	0.29	2.00	0.44	2.00

(1) Note: Grind size P80 75µm. Leach tests included gravity concentration and intensive leach of gravity concentrate, with combined leach of gravity concentrate leach tails and gravity tails.

Figure 13-3: Variability Testwork on Vindaloo Primary Samples (source: Endeavour)

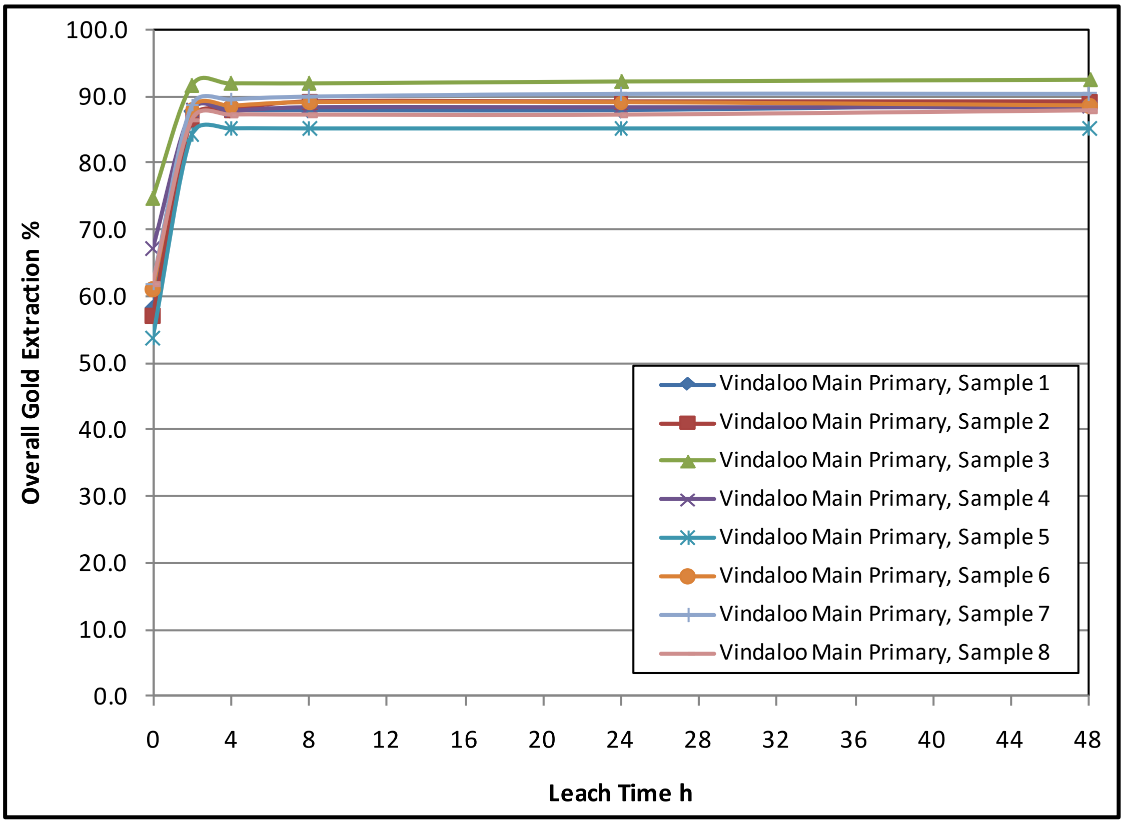


Figure 13-4: Variability Testwork on other Houndé Primary Samples (source: Endeavour)

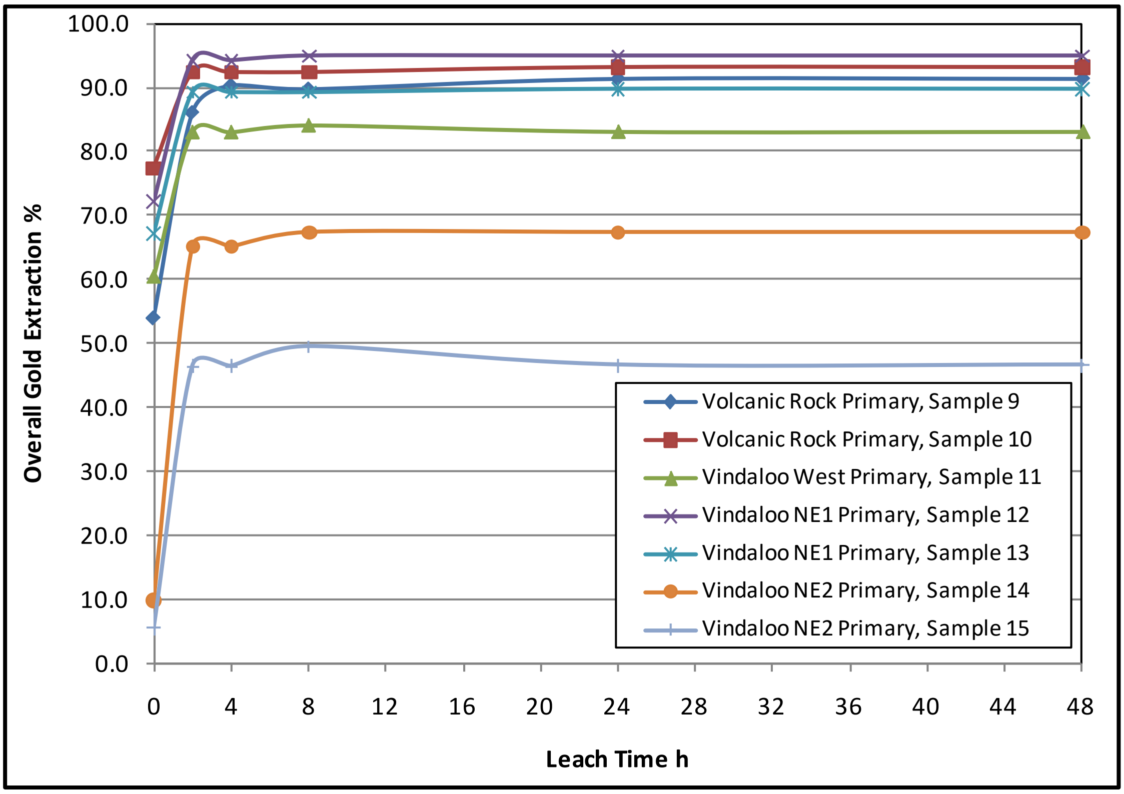


Figure 13-5: Variability Testwork on Houndé Saprolite and Transition Samples (source: Endeavour)

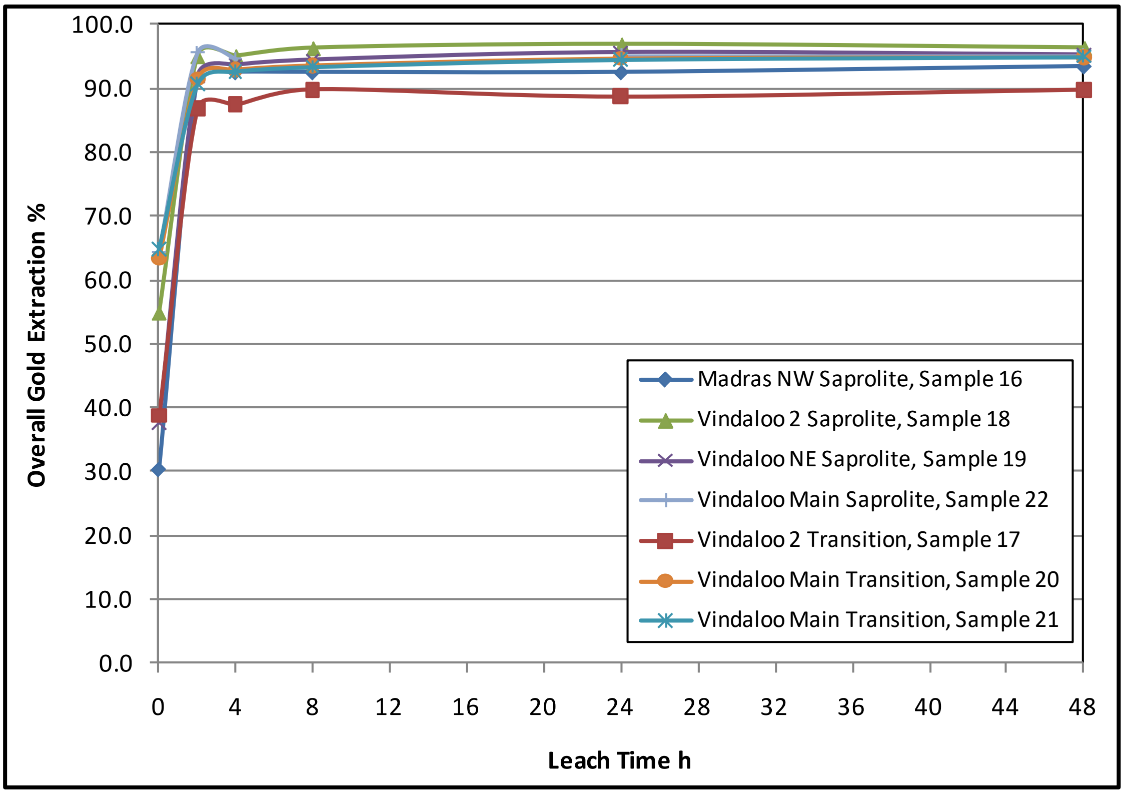


Table 13-12: Vindaloo 2 Primary Samples Diagnostic Leach Summary

Gold Association	Vindaloo 2 Sample 14		Vindaloo 2 Sample 15	
	Grade (g/tAu)	Distribution (Au%)	Grade (g/tAu)	Distribution (Au%)
Readily Cyanidable	0.71	76.2	0.44	63.8
Slow Leaching	0.01	1.6	0.01	1.1
Sulphide Occluded	0.15	16.2	0.21	30.8
Silicate Occluded	0.06	5.9	0.03	4.4
Total - Calc Head Grade	**0.92**	**100.0**	**0.68**	**100.0**
Assayed Head Grade	**0.89**		**0.68**	

For the **Kari Pump Deposits** the following applies:

Gold leach kinetics were very fast with more than 85% of the ultimate gold extraction at 36 hours being achieved within the first 8 hours for all leach tests. The 24-hour residence time in the CIL used in the Houndé plant design criteria would therefore appear appropriate or even excessive for Kari Pump material.

- **Primary Samples:** Overall, primary extractions were lower at an average of only 81% with a range between 38% and 98%. However, this was affected by the irregular results from testing on sample V30. If this result was excluded the average becomes 82.7%. Sample V30 returned a low gravity recoverable gold result (14.8%) and only just over 37% overall extraction at 36 hours. It is not clear why this sample is anomalous. The head grade is typical at (assayed) 3.41g/tAu and (calculated) 3.91g/tAu. It may be significant that the arsenic head grade (540ppm) was the highest of all the samples indicating a refractory nature;
- **Transition Samples:** The overall extractions for the Saprock material was lower at an average of only 88.9%, with a range of 38% to 98%. This average was lowered by sample V36 which was very low grade. If this were excluded the average improves to 90.8%; and
- **Saprolite Samples:** The overall extractions for the saprolite ores were good, averaging over 95% with a range of 89% to 98%.

Table 13-13: Kari Pump Variability Testwork Summary

Sample ID	Weathering Type	Grade (g/tAu)			Total Gold Extraction (%)				Reagents kg/t Consumption	
		Assay Head	Calc Head	Leach Residue	Gravity 0	4	8	36	NaCN	Lime
V2	Saprolite	1.21	1.15	0.06	17.73	91.78	93.32	94.8	0.2	0.98
V3	Saprolite	4.14	2.33	0.11	45.3	91.72	95.54	96.28	0.18	1.65
V4	Saprolite	1.61	1.5	0.17	19.98	85.13	88.28	88.66	0.14	2.10
V5	Saprolite	0.96	1.04	0.04	24.13	90.03	91.74	96.1	0.18	1.20
V6	Saprolite	1.01	1.24	0.05	39.6	91.24	94.59	95.97	0.15	1.05
V7	Saprolite	1.45	1.46	0.04	31.18	88.07	92.92	97.26	0.2	1.30
V8	Saprolite	25.3	26.1	0.36	65.91	96.06	97.62	98.64	0.2	1.25
V9	Saprock	0.58	0.83	0.04	56.2	94.51	92.37	95.17	0.18	0.90
V10	Saprock	2.41	2.57	0.23	26.13	88.76	90.16	91.07	0.14	0.75
V11	Saprock	5.77	5.13	0.77	10.1	82.72	83.42	84.99	0.12	0.90
V12	Saprock	2.56	2.11	0.08	73.91	95.9	96.74	96.21	0.08	0.45
V13	Saprock	1.31	1.46	0.07	20.58	92.82	93.23	95.21	0.12	0.45
V14	Saprock	0.65	0.71	0.12	12.83	73.46	78.4	83.21	0.18	3.35
V15	Saprock	1.27	1.23	0.33	16.8	74.01	73.55	73.54	0.14	0.75
V16	Primary	5.94	5.85	0.73	56.75	85.51	87.52	87.53	0.14	0.75
V17	Primary	3.01	3.53	0.8	37.68	75.37	77.04	77.37	0.14	0.53
V18	Primary	2.49	2.15	0.78	25.37	62.89	63.71	63.71	0.17	0.55
V19	Primary	1.72	1.51	0.02	34.96	97.9	98.3	98.68	0.2	0.93
V20	Primary	1.26	1.3	0.4	32.3	68.89	68.87	69.31	0.12	0.60
V21	Primary	1.3	1.29	0.16	54.64	87.18	88.09	87.64	0.12	0.63
V22	Primary	1.32	1.45	0.43	31.8	69.63	70.43	70.42	0.14	0.50
V23	Primary	1.07	1.09	0.16	52.26	83.69	84.77	85.3	0.14	0.43
V24	Primary	2.23	2.77	0.74	37.61	71.81	72.66	73.28	0.12	0.45
V25	Primary	1.18	0.79	0.14	44.46	79.31	81.53	82.25	0.08	0.55
V26	Primary	1.38	1.29	0.22	41.09	81.7	80.35	83	0.08	0.45
V27	Primary	2.53	2.13	0.22	58.68	88.53	89.39	89.66	0.14	0.43
V28	Primary	1.92	2.11	0.46	31.23	76.65	76.93	78.2	0.19	0.80
V29	Primary	1.37	1.54	0.31	29.98	74.66	76.6	79.93	0.14	0.46
V30	Primary	3.42	3.91	2.43	14.86	36.88	37.04	37.86	0.28	0.90
V31	Primary	3.21	4.09	0.5	58.44	88.15	88.61	87.78	0.14	0.65
V32	Primary	25.4	23.5	0.97	57.18	93.96	94.77	95.89	0.17	0.60
V33	Primary	2.37	2.04	0.31	39.02	85.05	86.23	84.83	0.18	2.65
V34	Primary	20.9	22.3	0.51	70.38	95.74	97.92	97.71	0.12	0.73
V35	Primary	11.4	11.8	1.4	68.55	87.46	87.78	88.16	0.12	1.00
V36	Saprock	<0.02	0.18	0.06	58.87	75.83	69.43	66.53	0.18	0.75
C1	Primary		0.98	0.20	40.4	79.03	78.43	79.6	0.12	0.50
			1.32	0.20	44.08	83.49	83.49	84.82	0.14	0.48
C2	Primary		1.14	0.20	37.29	81.04	81.55	82.53	0.12	0.58
			1.07	0.20	28.59	80.14	79.61	81.25	0.12	0.68
C3	Primary		1.29	0.15	50.51	88.39	87.02	88.37	0.20	0.83

Sample ID	Weathering Type	Assay Head	Grade (g/tAu) Calc Head	Leach Residue	Total Gold Extraction (%) Gravity 0	4	8	36	Reagents kg/t Consumption NaCN	Lime
			1.49	0.19	41.2	86.16	86.95	87.29	0.20	0.88
C4	Primary		2.75	0.34	59.52	86.37	87.45	87.65	0.18	0.53
			2.49	0.33	51.56	84.9	86.08	86.76	0.12	0.68
C5	Primary		1.58	0.47	34.65	69.87	69.49	70.23	0.24	0.83
			1.65	0.47	31.62	71.56	71.79	71.55	0.20	0.85
C6	Primary		2.25	0.27	70.28	87.94	87.95	88.21	0.14	0.55
			1.29	0.26	33.89	77.07	78.92	79.79	0.18	0.50
C7	Saprock		1.16	0.12	29.44	85.64	88.2	89.69	0.24	1.50
			1.11	0.09	30.3	87.74	88.87	91.86	0.26	1.50
C8	Saprock		1.50	0.05	23.63	95.48	95.81	96.68	0.18	0.80
			1.38	0.05	20.71	95.47	96.78	96.38	0.18	0.55
Saprock			1.40	0.06	14.50	91.78	94.40	95.71	0.34	0.48
Primary 1			1.30	0.21	31.12	83.36	84.30	83.83	0.20	0.60
Primary 2			1.24	0.28	25.39	73.87	75.85	77.33	0.36	0.44
Average Saprolite		5.10	4.97	0.12	34.83	90.58	93.43	95.39	0.18	1.36
Average Saprock		2.08	1.60	0.16	30.31	87.24	87.80	88.94	0.18	1.01
Average Primary		4.77	3.48	0.45	42.86	80.12	80.81	81.40	0.16	0.69

(1) Note: Grind size P_{80} 75µm. Leach tests included gravity concentration and intensive leach of gravity concentrate, with combined leach of gravity concentrate leach tails and gravity tails

Figure 13-6: Variability Testwork on Kari Pump Saprolite Samples (source: Endeavour)

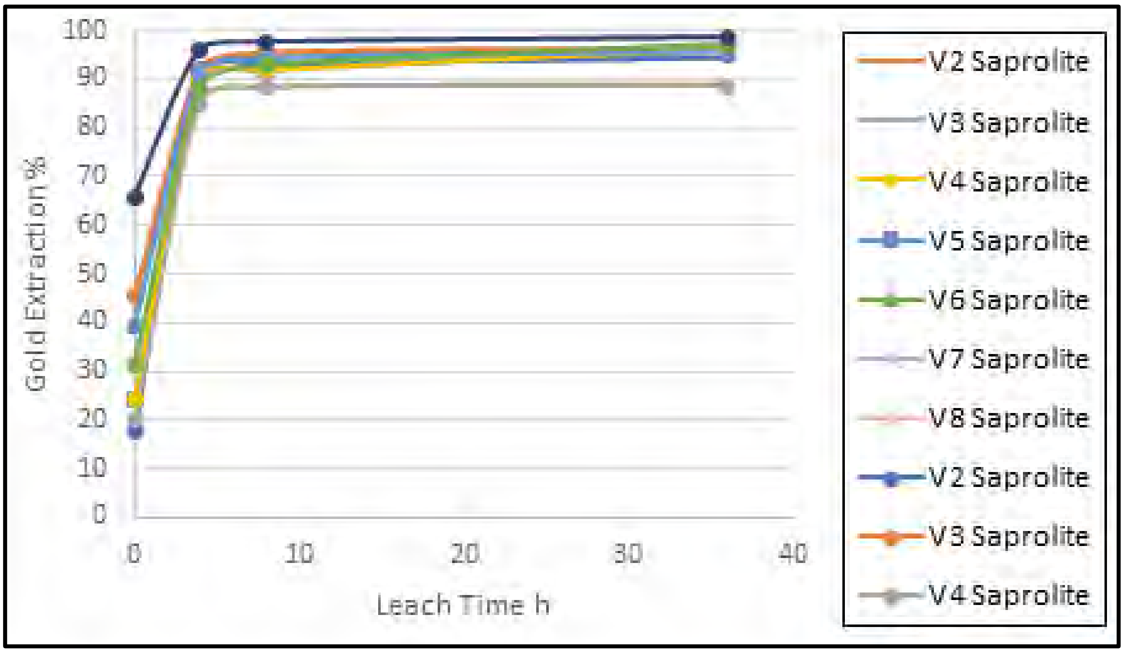


Figure 13-7: Variability Testwork on Kari Pump Saprock Samples (source: Endeavour)

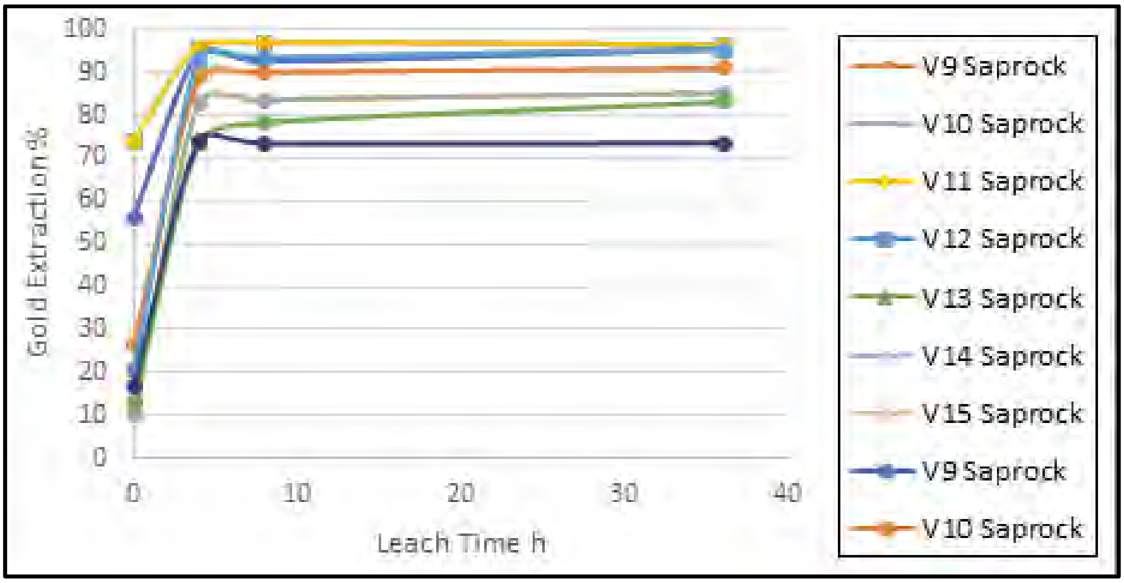
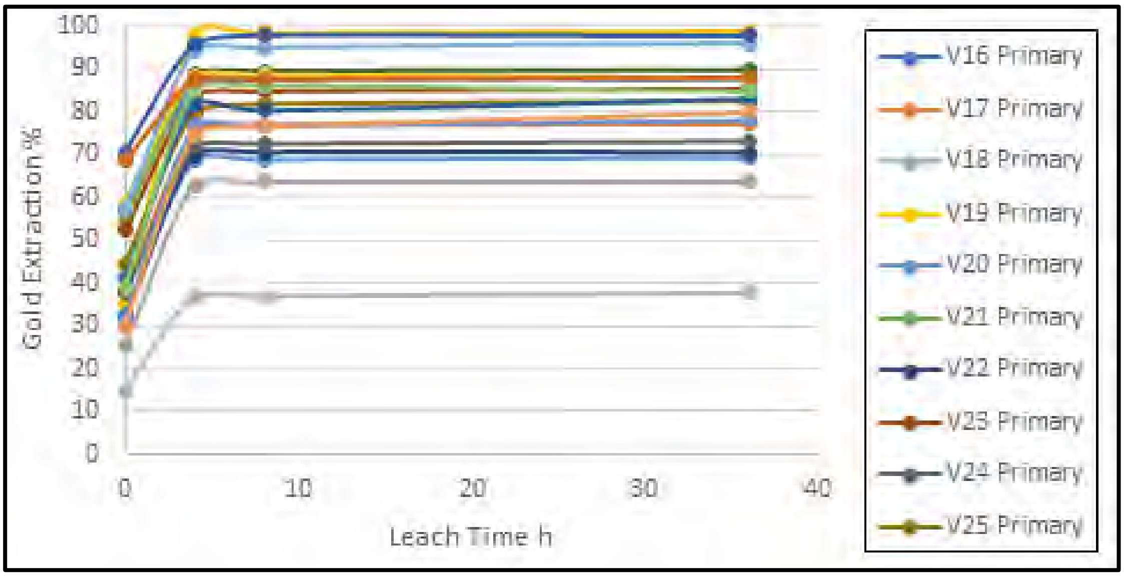


Figure 13-8: Variability Testwork on Kari Pump Primary Samples (source: Endeavour)



Gravity / Intensive Leach Testwork

Testwork to determine the amount of gravity gold in the Houndé and Kari Pump ores was completed on the individual samples as part of variability testwork and on the primary/saprock composites. Results are summarised in Table 13-14 and Table 13-15.

For the **Houndé Deposits** the gravity concentrates for all samples contained an average 60% of the gold in 6% mass. The Vindaloo 2 samples (saprolite, transition and primary) had lower gold distributions in the gravity concentrate and the primary samples had poor concentrate intensive leach extractions (average 24%). The primary samples, excluding the Vindaloo 2 samples, had high gravity concentrate gold distributions (average 69%) with an average intensive leach extraction of 90%. The saprolite and transition samples had highly intensive leach extractions (average 99%).

Table 13-14: Houndé Gravity/Concentrate Intensive Leach Testwork on Individual Samples Summary

Sample Number	Sample		Calc Head Grade (g/tAu)	Gravity Concentrate Mass Pull (%)	Gravity Concentrate Au in Gravity Conc (%)	Conc Intensive Leach Calc IL Head (g/tAu)	Conc Intensive Leach Assay IL Res (g/tAu)	Conc Intensive Leach Extraction Au (%)	Gravity Conc Extraction Au (%)
1	Vindaloo	Primary	1.41	4.4	57.5	20.2	1.66	91.8	52.8
2	Vindaloo	Primary	1.02	4.5	65.4	14.3	1.42	90.1	58.9
3	Vindaloo	Primary	4.46	4.7	78.2	75.1	4.37	94.2	73.6
4	Vindaloo	Primary	2.53	4.7	70.8	40.0	3.92	90.2	63.9
5	Vindaloo	Primary	1.52	4.8	60.7	17.1	3.34	80.4	48.8
6	Vindaloo	Primary	2.40	4.9	69.2	33.2	3.49	89.5	61.9
7	Vindaloo	Primary	3.03	4.9	70.9	41.8	3.72	91.1	64.6
8	Vindaloo	Primary	1.84	7.7	80.9	16.7	2.05	87.7	71.0
9	Volcanic Rock	Primary	2.35	5.7	53.5	24.8	2.56	89.7	48.0
10	Volcanic Rock	Primary	1.60	5.6	78.8	23.6	1.45	93.9	73.9
11	Vindaloo West	Primary	1.26	6.4	64.1	14.8	2.83	80.9	51.9
12	Vindaloo NE	Primary	5.62	6.4	69.8	67.0	3.33	95.0	66.3
13	Vindaloo NE	Primary	2.39	6.1	72.9	29.4	3.11	89.4	65.2
14	Vindaloo 2	Primary	0.60	6.7	49.0	2.7	1.81	32.5	15.9
15	Vindaloo 2	Primary	0.44	6.4	46.4	2.4	2.01	15.9	7.4
16	Madras NW	Saprolite	0.67	6.0	12.6	3.4	0.05	98.7	12.5
17	Vindaloo 2	Transition	1.12	6.8	35.7	7.4	0.12	98.5	35.2
18	Vindaloo 2	Saprolite	1.10	6.1	34.7	10.1	0.04	99.6	34.6
19	Vindaloo NE	Saprolite	1.66	5.9	41.3	11.1	0.08	99.3	41.0
20	Vindaloo	Transition	3.03	6.3	62.0	31.6	0.16	99.5	61.6
21	Vindaloo	Transition	2.87	6.4	75.5	30.4	0.15	99.5	75.1
22	Vindaloo	Saprolite	1.43	5.8	71.6	17.2	0.07	99.6	71.3
Average All			**2.02**	**5.8**	**60.1**	**24.3**	**1.90**	**86.7**	**52.5**
Average Primary			**2.41**	**5.6**	**65.9**	**28.2**	**2.74**	**80.8**	**54.9**
Average Primary, excluding Vindaloo 2			**2.42**	**5.5**	**68.7**	**32.2**	**2.87**	**89.5**	**61.6**
Average Saprolite			**1.22**	**6.0**	**40.1**	**10.5**	**0.06**	**99.3**	**39.8**
Average Transition			**2.34**	**6.5**	**57.7**	**23.2**	**0.14**	**99.2**	**57.3**

(1) Note: Grind size P_{80} 75µm. Testwork included gravity concentration and intensive leach of gravity concentrate

For the **Kari Pump Deposits** results indicate a wide range in the amount of potentially gravity recoverable gold. The gravity recoverable gold for the saprolite and Saprock samples was generally lower with test results that range from 8% to 22%, with an average of 14%. For the primary samples the average was 47% and ranged from 25 to 73%. However, the high values were associated with very high-grade samples (V35 at 11.4gAu/t). Excluding this sample reduces the average to 45%.

The Houndé process design criteria indicates a range in gravity gold recovery from 30 to 70% with a design value of 46%. It can be concluded that the Kari Pump material's response to gravity gold recovery will be similar to that used for the Houndé Process Plant design. The results generally show trend of increasing gold extraction at finer grind size

Table 13-15: Kari Pump Gravity and Intensive Leach Testwork on Individual Samples Summary

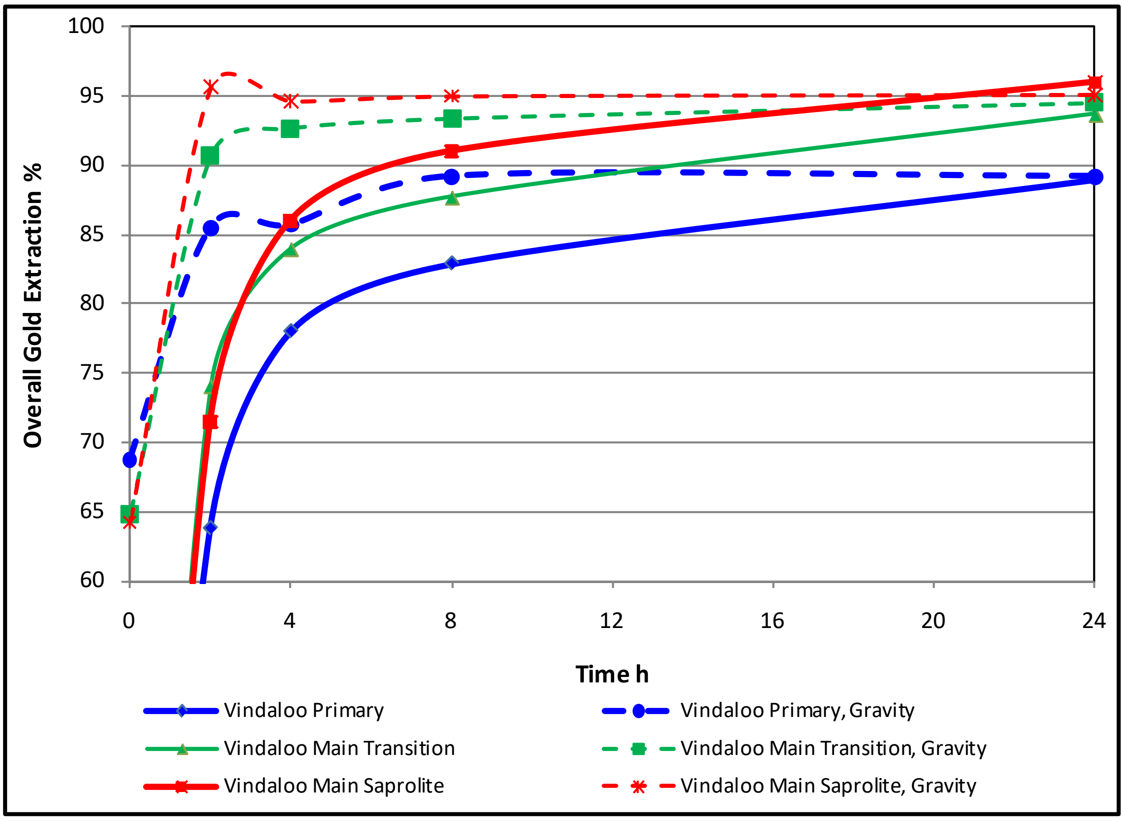
Sample ID	Weathering Type	Grade (g/tAu)			% Au Extraction Total		Reagents Consumption	
		Assay Head (g/tAu)	Calc Head (g/tAu)	Leach Residue	GRG (%)	Overall Gold Extraction (%)	NaCN (kg/t)	Lime (kg/t)
V2	Saprolite	1.21	1.15	0.06	17.73	94.8	0.2	0.98
V3	Saprolite	4.14	2.33	0.11	45.3	96.28	0.18	1.65
V4	Saprolite	1.61	1.5	0.17	19.98	88.66	0.14	2.10
V5	Saprolite	0.96	1.04	0.04	24.13	96.1	0.18	1.20
V6	Saprolite	1.01	1.24	0.05	39.6	95.97	0.15	1.05
V7	Saprolite	1.45	1.46	0.04	31.18	97.26	0.2	1.30
V8	Saprolite	25.3	26.1	0.36	65.91	98.64	0.2	1.25
V9	Saprock	0.58	0.83	0.04	56.2	95.17	0.18	0.90
V10	Saprock	2.41	2.57	0.23	26.13	91.07	0.14	0.75
V11	Saprock	5.77	5.13	0.77	10.1	84.99	0.12	0.90
V12	Saprock	2.56	2.11	0.08	73.91	96.21	0.08	0.45
V13	Saprock	1.31	1.46	0.07	20.58	95.21	0.12	0.45
V14	Saprock	0.65	0.71	0.12	12.83	83.21	0.18	3.35
V15	Saprock	1.27	1.23	0.33	16.8	73.54	0.14	0.75
V16	Primary	5.94	5.85	0.73	56.75	87.53	0.14	0.75
V17	Primary	3.01	3.53	0.8	37.68	77.37	0.14	0.53
V18	Primary	2.49	2.15	0.78	25.37	63.71	0.17	0.55
V19	Primary	1.72	1.51	0.02	34.96	98.68	0.2	0.93
V20	Primary	1.26	1.3	0.4	32.3	69.31	0.12	0.60
V21	Primary	1.3	1.29	0.16	54.64	87.64	0.12	0.63
V22	Primary	1.32	1.45	0.43	31.8	70.42	0.14	0.50
V23	Primary	1.07	1.09	0.16	52.26	85.3	0.14	0.43
V24	Primary	2.23	2.77	0.74	37.61	73.28	0.12	0.45
V25	Primary	1.18	0.79	0.14	44.46	82.25	0.08	0.55
V26	Primary	1.38	1.29	0.22	41.09	83	0.08	0.45
V27	Primary	2.53	2.13	0.22	58.68	89.66	0.14	0.43
V28	Primary	1.92	2.11	0.46	31.23	78.2	0.19	0.80
V29	Primary	1.37	1.54	0.31	29.98	79.93	0.14	0.46
V30	Primary	3.42	3.91	2.43	14.86	37.86	0.28	0.90
V31	Primary	3.21	4.09	0.5	58.44	87.78	0.14	0.65
V32	Primary	25.4	23.5	0.97	57.18	95.89	0.17	0.60
V33	Primary	2.37	2.04	0.31	39.02	84.83	0.18	2.65
V34	Primary	20.9	22.3	0.51	70.38	97.71	0.12	0.73
V35	Primary	11.4	11.8	1.4	68.55	88.16	0.12	1.00
V36	Saprock	<0.02	0.18	0.06	58.87	66.53	0.18	0.75
C1	Primary		0.98	0.20	40.4	79.6	0.12	0.50
			1.32	0.20	44.08	84.82	0.14	0.48
C2	Primary		1.14	0.20	37.29	82.53	0.12	0.58
			1.07	0.20	28.59	81.25	0.12	0.68
C3	Primary		1.29	0.15	50.51	88.37	0.20	0.83
			1.49	0.19	41.2	87.29	0.20	0.88
C4	Primary		2.75	0.34	59.52	87.65	0.18	0.53
			2.49	0.33	51.56	86.76	0.12	0.68
C5	Primary		1.58	0.47	34.65	70.23	0.24	0.83
			1.65	0.47	31.62	71.55	0.20	0.85
C6	Primary		2.25	0.27	70.28	88.21	0.14	0.55
			1.29	0.26	33.89	79.79	0.18	0.50
C7	Saprock		1.16	0.12	29.44	89.69	0.24	1.50
			1.11	0.09	30.3	91.86	0.26	1.50
C8	Saprock		1.50	0.05	23.63	96.68	0.18	0.80
			1.38	0.05	20.71	96.38	0.18	0.55
Saprock			1.40	0.06	14.50	95.71	0.34	0.48
Primary 1			1.30	0.21	31.12	83.83	0.20	0.60
Primary 2			1.24	0.28	25.39	77.33	0.36	0.44
Average Saprolite		5.10	4.97	0.12	34.83	95.39	0.18	1.36
Average Saprock		2.08	1.60	0.16	30.31	88.94	0.18	1.01
Average Primary		4.77	3.48	0.45	42.86	81.40	0.16	0.69

Houndé Direct Cyanidation and Gravity/Cyanidation Testwork

Direct cyanidation tests with and without gravity concentration were conducted on the 5 primary composites and on the 7 saprolite / transition samples to determine the effect of a gravity stage on gold extraction and leach kinetics.

The effect of gravity on gold extraction and extraction rates for Vindaloo primary, transition and saprolite ores is shown in Figure 13-9. This effect was typical for most samples and shows that inclusion of a gravity stage increased the leach kinetics but did not increase the overall 24-hour gold extraction. All further testwork was completed using a gravity concentration stage based on the improved leach kinetics.

Figure 13-9: Houndé Effect of Gravity Stage on Gold Extraction (source: Endeavour)



Grind/Extraction Testwork

For the **Houndé Deposits** grind / extraction tests were performed on the primary composites at grinds of P80 150µm, 125µm, 106µm and 7 µm to determine the effect of grind on gold extraction. The gold extraction results for the gravity concentrate intensive leach and overall 24-hour and 48-hour leaches for all primary composites are summarised in Table 13-16 with results for the Vindaloo Main composite illustrated graphically in Figure 13-10. The results typically indicate that lower residue grades and higher gravity leach and overall gold extractions are achieved with increasing fineness of grind; however, similar extractions were typically achieved typically for the P80 106µm and 75µm grinds. Leaching kinetics also increased as the grind size decreased.

Table 13-16: Houndé Grind Sensitivity Testwork on Primary Composites

Primary Composite	150µm	125 µm	106 µm	75 µm
Gravity Concentrate Leach Au Extraction % @ Grind P_{80}				
Vindaloo Main	84.7	88.3	89.8	92.3
Volcanic Rock	91.5	91.7	93.7	96.0
Vindaloo West	74.2	75.7	82.3	81.0
Vindaloo NE 1	85.9	88.9	89.7	91.5
Vindaloo NE 2	80.7	84.9	82.5	83.9
Overall 24-hour Leach Au Extraction % @ Grind P_{80}				
Vindaloo Main	84.6	86.9	88.3	89.2
Volcanic Rock	89.3	89.2	89.3	93.9
Vindaloo West	75.3	75.6	81.2	78.7
Vindaloo NE 1	85.2	87.4	91.4	86.9
Vindaloo NE 2	80.2	70.9	74.9	73.1
Overall 48-hour Leach Au Extraction % @ Grind P_{80}				
Vindaloo Main	85.1	87.9	89.0	90.3
Volcanic Rock	90.3	90.1	91.6	94.2
Vindaloo West	76.1	78.0	82.1	80.6
Vindaloo NE 1	87.2	88.8	92.0	89.2

Primary Composite	150µm	125 µm	106 µm	75 µm
Vindaloo NE 2	76.6	76.4	77.0	76.6

(1) Note: Overall leach results include gravity concentrate intensive leach and combined leach of gravity concentrate leach tails and gravity tails.

The average amount of gravity gold in each primary composite over the 4 grind sizes and the extraction of that gold by intensive leaching is summarised in Table 13-7. Gold reporting to the gravity concentrate was highest in the Vindaloo Main primary composite (73%) and lowest in the Vindaloo NE2 primary composite (33%). Extraction of that gravity concentrate gold by intensive leaching varied between 78% and 93% over the 5 composites indicating that some of the gold is locked in the gangue and could be liberated by further grinding prior to leaching.

A test on the Vindaloo NE2 primary composite using lead nitrate addition as a leaching activator showed no improvement in gold extraction. Additional work to increase the recovery of occluded gold from the gravity concentrate was completed and is discussed below.

Figure 13-10: Houndé Effect of Grind on Total Gold Extraction – Vindaloo Main Primary (source: Endeavour)

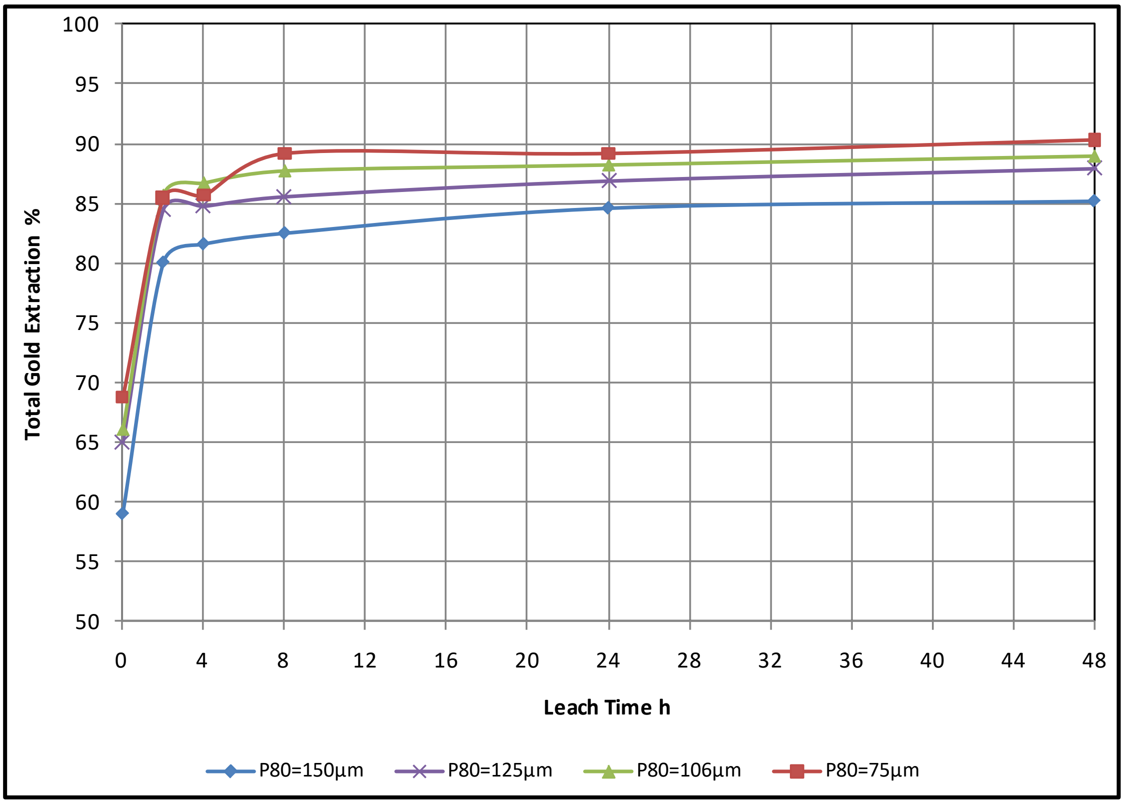


Table 13-17: Houndé Gravity Gold Extraction – Primary Composites

Primary Composite	Calc Head Grade[1] (g/tAu)	Gravity Concentrate[1] Mass Pull (%)	Gravity Concentrate[1] Au in Gravity Conc (%)	Concentrate Intensive Leach[1] Calc IL Head (g/tAu)	Concentrate Intensive Leach[1] Assay IL Res (g/tAu)	Concentrate Intensive Leach[1] Extraction Au (%)	Gravity Conc Extraction* Au (%)
Vindaloo Main	2.82	2.0	72.6	97.5	10.0	89.4	65.0
Volcanic Rock	2.45	2.1	66.9	80.3	5.2	93.2	62.4
Vindaloo West	1.58	2.7	57.7	35.3	7.6	78.3	45.2
Vindaloo NE1	3.19	2.5	59.0	77.3	8.4	89.0	52.5
Vindaloo NE2	1.01	3.8	32.9	10.0	1.7	83.0	27.2
Average All	**2.21**	**2.6**	**57.8**	**60.1**	**6.57**	**86.6**	**50.4**

(1) Average data of 4 grind size tests for each composite

For the **Kari Pump deposits** grind/extraction tests were performed only 19 variability composites, as it was deemed only these sample had sufficient mass to be subjected to all necessary tests. Each sample was tested at grinds of P80 150µm, 106µm and 75µm to determine the effect of grind on gold extraction. The gold extraction results for the gravity concentrate intensive leach and overall 36-hour leaches for all primary composites are summarised in Table 13-18 with impact of grind for each weather type illustrated graphically in

Figure 13-11 to Figure 13-14. The results indicated that lower residue grades and higher gravity leach and overall gold extractions are achieved with increasing fineness of grind; however, similar extractions were achieved for the P80 106µm and 75µm grinds. Leaching kinetics also increased as the grind size decreased.

Table 13-18: Kari Pump Effect of Grind on Recovery Summary

Sample ID	Weathering	150µm	106µm	75 µm
		Gravity Recovery Gold % @ Grind P_{80}		
V2	Saprolite	15.8	16.8	17.7
V4	Saprolite	13.7	21.7	20.0
V11	Saprock	9.2	9.2	10.1
V14	Saprock	8.8	12.2	12.8
V15	Saprock	8.1	15.0	16.8
V16	Primary	49.8	56.4	56.7
V17	Primary	44.0	40.2	37.7
V18	Primary	47.8	36.2	25.4
V20	Primary	47.6	37.4	32.3
V21	Primary	44.6	50.5	54.6
V22	Primary	29.7	31.6	31.8
V23	Primary	46.6	47.9	52.3
V25	Primary	50.2	60.0	44.5
V26	Primary	40.4	43.3	41.1
V27	Primary	51.5	55.0	58.7
V31	Primary	48.4	55.6	58.4
V32	Primary	46.1	54.4	57.2
V33	Primary	46.7	32.8	39.0
V35	Primary	68.7	72.8	68.6
		Overall 36h Gold Extraction % @ Grind P_{80}		
V2	Saprolite	91.5	93.3	94.8
V4	Saprolite	84.6	88.0	88.7
V11	Saprock	82.3	83.9	85.0
V14	Saprock	73.9	80.0	83.2
V15	Saprock	81.4	72.2	73.5
V16	Primary	82.8	89.1	87.5
V17	Primary	78.0	77.3	77.4
V18	Primary	71.7	65.9	63.7
V20	Primary	69.7	66.9	69.3
V21	Primary	79.8	84.7	87.6
V22	Primary	65.4	68.4	70.4
V23	Primary	78.0	78.5	85.3
V25	Primary	81.3	86.0	82.2
V26	Primary	75.3	78.0	83.0
V27	Primary	84.4	85.9	89.7
V31	Primary	79.8	83.2	87.8
V32	Primary	91.9	94.4	95.9
V33	Primary	82.3	81.4	84.8
V35	Primary	86.4	87.1	88.2

Figure 13-11: Effect of Grind on Total Gold Extraction – Kari Pump Saprolite (source: Endeavour)

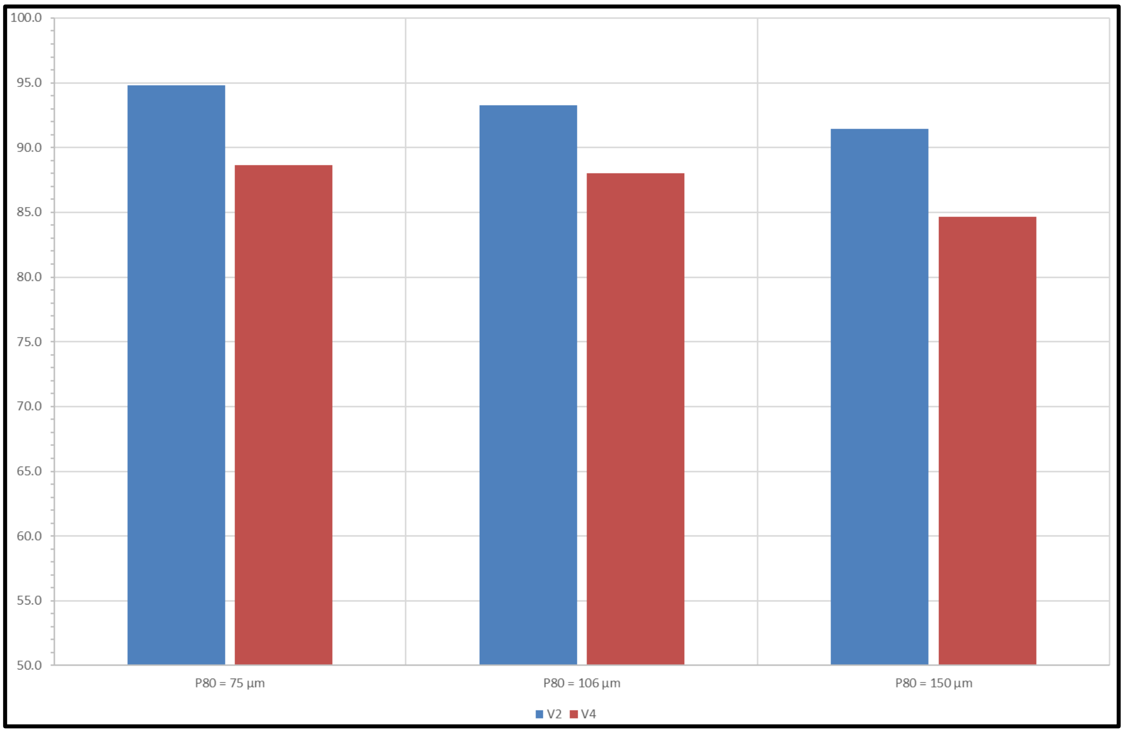


Figure 13-12: Effect of Grind on Total Gold Extraction – Kari Pump Saprock (source: Endeavour)

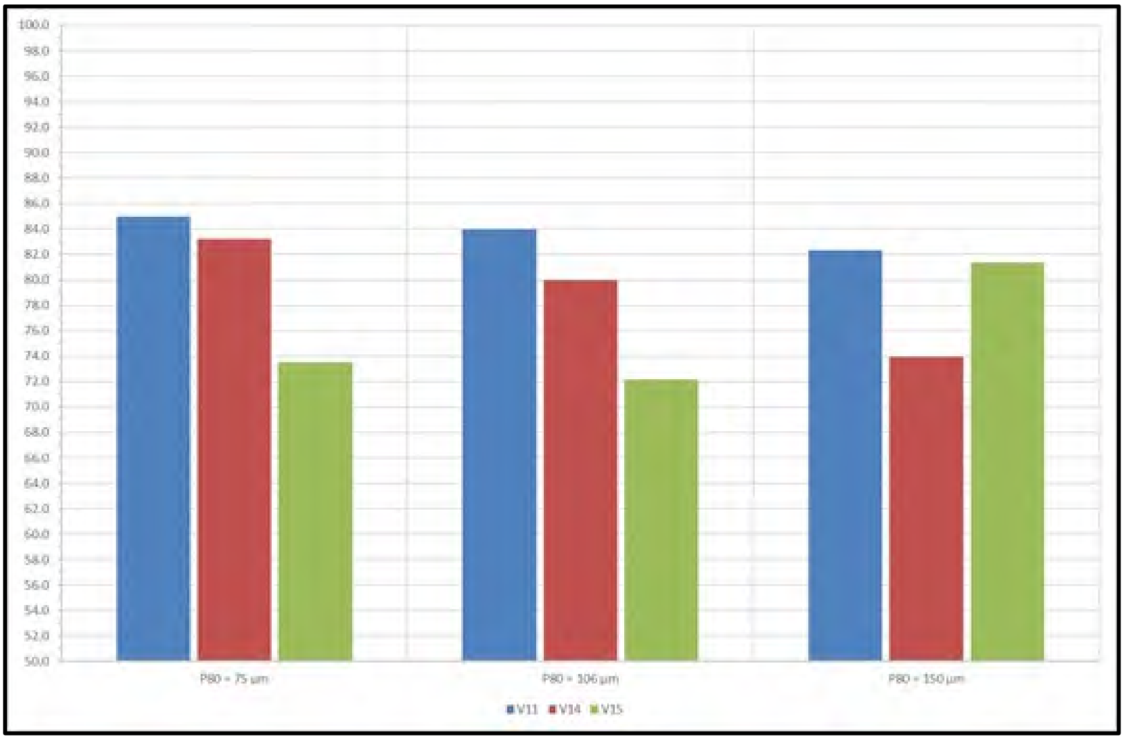


Figure 13-13: Effect of Grind on Total Gold Extraction – Kari Pump Saprock (source: Endeavour)

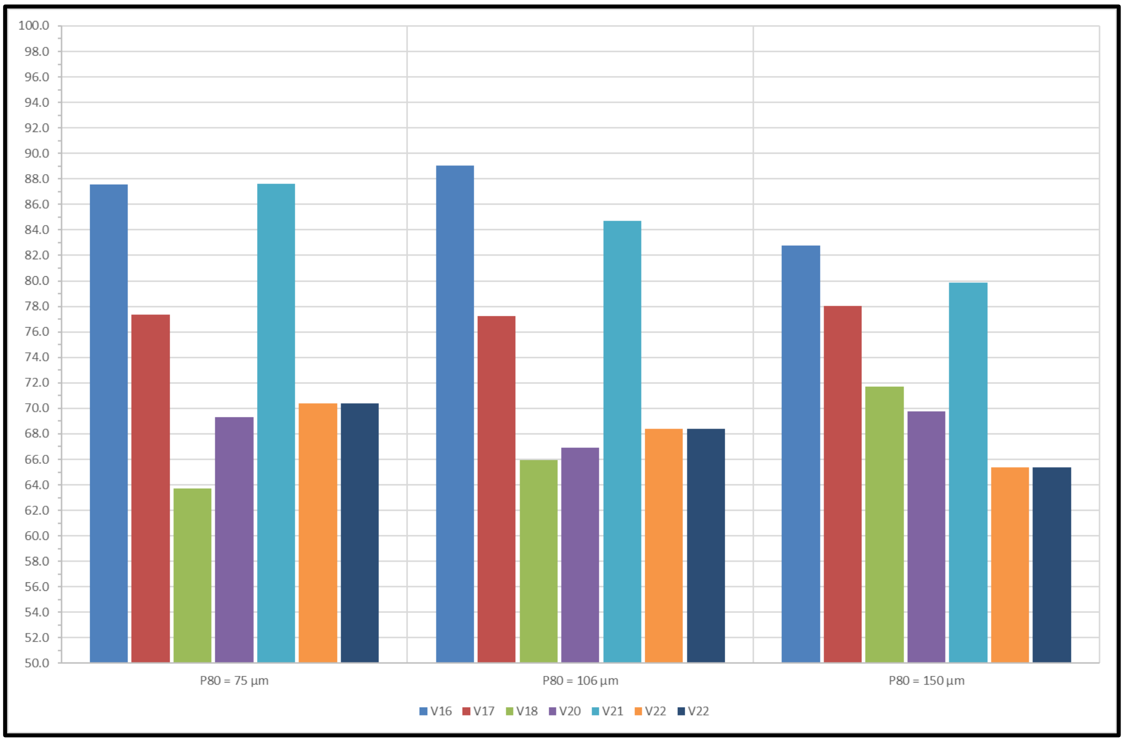
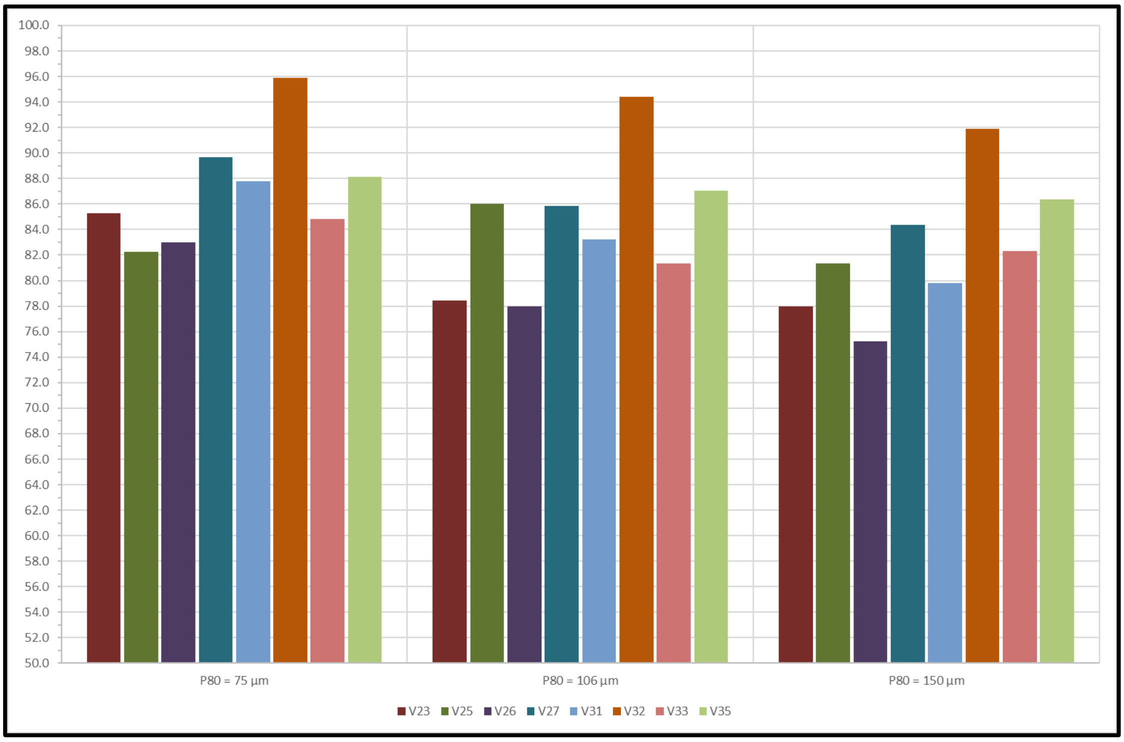


Figure 13-14: Effect of Grind on Total Gold Extraction – Kari Pump Primary (source: Endeavour)



Grind Optimisation and Residence Time Analysis

A grind optimisation and residence time analysis was completed to evaluate the effect of grind size and leach residence time on project economics. The analysis compared gold revenue against operating and capital expenditure for the grind sizes considered and for 24-hour, 36-hour and 48-hour leach times.

The analysis showed similar net revenues at grinds of P80 106µm and 75µm with the increase in gold revenue (recovery) at P80 75µm offset by the increase in operating cost. A conservative grind size of P80 90µm was selected for the design and for further testwork.

Although gold leaching continued to occur through to 48 hours for the Houndé ores, the increased costs (leach reagents and CIL power and tankage) associated with the longer residence time were similar to the increased gold revenue. A residence time of 24 hours was selected for the design and further testwork.

Gold leach kinetics of the Kari Pump samples were very fast with in excess of 85% of the ultimate gold extraction, at 36 hours, being achieved within the first 8 hours for all leach tests. The 24 hour residence time in the CIL used in the Process Plant design criteria would therefore appear appropriate or even excessive for Kari Pump material.

Preg-Robbing Test

- **Houndé Deposits:** The Company identified the presence of high graphitic material on the western resource boundary that has potential for ore dilution. A preg-robbing test was carried out on a sample of the Vindaloo Main primary composite combined with 10% of the graphitic ore and indicated the graphitic material has no preg-robbing characteristics and could be treated by conventional cyanidation; and
- **Kari Pump Deposits:** Leach tests showed there was no significant preg-robbing effect. Sample V12 which was the only Saprock sample logged with a graphite presence, albeit only 1%, achieves good extraction without carbon anyway and no real improvement is noted

when leaching gravity tails with carbon present. It should be noted that the gravity recoverable component is very high at over 70% for this sample. From this data it could be concluded that preg-robbing is not making any significant impact on the overall extraction of the Kari Pump deposit.

Bulk Leach Testwork

- **Houndé Deposits:** Bulk leach tests were completed on the Vindaloo Main primary composite to provide leached slurry samples for subsequent testwork. All bulk leaches achieved similar gold extractions and reagents consumption to the lower mass tests; and
- **Kari Pump Deposits:** Bulk gravity separation and cyanidation testwork was conducted on each of the three composites in order to provide sufficient leach slurry for the subsequent carbon adsorption testwork. A summary of the bulk cyanidation testwork results can be seen in Table 13-19.

Table 13-19: Kari Pump Bulk Cyanidation Leach Results

Composite ID	Calc. Head (g/tAu)	GRG (%)	Leach Residue (Au g/t)	Overall Gold Extraction (%)	Reagent NaCN (kg/t)	Reagent Lime (kg/t)
Primary 1	1.3	31.1	0.21	83.8	0.2	0.6
Primary 2	1.24	25.4	0.28	77.3	0.36	0.44
Saprock	1.4	14.5	0.06	95.7	0.34	0.48

All bulk leaches achieved similar gold extractions and reagents consumption to the lower mass tests.

Ancillary Testwork - Rheology

- **Houndé Deposit:** Viscosity testwork was conducted over a range of slurry densities (40% to 65% w/w solids) on a Vindaloo Main primary composite and a saprolite / transition composite, each ground to P80 90µm and adjusted to pH10.5. The saprolite / transition composite is more viscous than the primary composite; however, the apparent viscosities for both composites are within acceptable limits at the CIL design conditions of 50% w/w solids and viscosity modification is not required; and
- **Kari Pump Deposit:** A series of rheology tests were performed on the gravity tails slurry for a saprolite sample (V4) at different pulp densities (40%, 50%, and 60% w/w solids). A Primary (C5) and Saprock (C7) comminution sample was also used for rheology testing at different pulp densities (40%, 50% and 60% w/w solids). The samples were ground to 75µm. Lime addition can have an effect on viscosity. The slurry for all of the tests was adjusted to pH 10.5 using milk of lime thereby simulating CIL operating pH conditions.

  The saprolite sample exhibited the highest viscosity, closely followed by the Saprock. Pumping of slurries at solids contents close to ~60% w/w solids using centrifugal pumps could be problematical for Saprolite and Saprock material.

  Operation of a CIL circuit at a pulp density greater than 50% w/w solids would not be recommended. The Primary samples exhibited low viscosity at low pulp densities, indicating that ‘sanding’ of the CIL tanks may pose a problem if the circuit is operated at low pulp densities. The operation of the pre-leach thickener ahead of the CIL circuit will allow the CIL to operate at densities of 50% w/w solids or greater which will improve slurry mixing characteristics.

Ancillary Testwork - Oxygen Uptake Test

- **Houndé Deposit:** An oxygen uptake test was conducted on the Vindaloo Main primary composite to determine the change in the rate of oxygen consumption of the slurry. The results were typically below 0.05mg/L/min, indicating that the ore has a moderate to low oxygen uptake rate and normal slurry aeration in plant practice should provide adequate dissolved oxygen concentrations in the leach solution for gold dissolution; and

- **Kari Pump Deposit:** The uptake rates vary for The V32 (bedrock) sample returned the highest initial oxygen demand (0.025mg/l.min). Thereafter the oxygen demand remained dropped up to the end of the 24h testing period. Other samples of various weathering states returned similar uptake rates. This oxygen consumption rate is still considered to be very low. The oxygen uptake demand is significantly less than 0.15mg/l.min for all tests. The addition of air to the CIL tanks is adequate for the Kari Pump material treated in the Houndé plant.

Ancillary Testwork - Carbon Loading Kinetic and Equilibrium Carbon Loading Testwork

A triple contact sequential carbon loading test and equilibrium carbon loading testwork were completed on samples prepared from bulk leaches of the Vindaloo Main primary, Kari Pump Saprock and two Kari Pump Primary composites with the results indicating that high carbon loadings are achievable. The modelling of the adsorption circuit for the process plant has been based on typical design values.

Ancillary Testwork - Thickening

- **Houndé Deposit:** Thickening testwork was completed by Outotec on a slurry sample prepared from bulk leaches of the Vindaloo Main primary composite. The testwork included flocculant screening, dynamic thickening and basic rheology tests. The ore settled well under conventional high rate thickening conditions. Outotec calculated a thickening flux rate of 1.2t/m^{2}h with a high rate thickener achieving an underflow density of 58%w/w to 61%w/w solids. Outotec have indicated that densities 2% to 3% higher than those achieved in testwork should be achievable in a full-scale thickener.
- **Kari Pump Deposit:** Sub-samples from three selected comminution samples milled to a target P80 of 75µm and despatched to Outotec to undertake thickening testwork. Several of test runs were performed using a 99mm diameter Supaflo high rate thickener test rig. The Houndé Process Plant design criteria used a thickener flux design value of 1.20t/m^{2}h for fresh material and 0.5t/m^{2}h for Saprolite/Transition. A thickener underflow of 50%w/w solids was targeted in the design for the CIL feed and a flocculant addition of 30g/tAu was used for design.

  Based on the testwork for Kari Pump samples the Houndé plant thickener will be suitable for dewatering slurries of ground bedrock ores or blends with a minority Saprock component. A saprolite sample was not tested. The thickener is likely to not perform well at all when treating feed blends high in saprolite material and the Houndé Process Plant flowsheet allows the thickener to be bypassed when processing highly weathered material.

Ancillary Testwork - Cyanide Destruction – Air / SO2 Process

- **Houndé Deposit:** A series of batch cyanide destruction tests using the air/SO_2 process were conducted on a Vindaloo Main primary composite bulk leach tails. A range of reagent addition rates were trialled and showed that the air/SO_2 process can be successfully employed to treat the CIL tailings stream to decrease weak acid dissociable cyanide ("**CNWAD**") concentrations to less than 5mg/L if required. The CNWAD level in the test solution before commencement of tests was 150mg/L and a batch residence time of 120 minutes (equivalent to 60 minutes in a plant continuous reactor) was sufficient to achieve acceptable tails CNWAD concentration. The results are presented in Table 13-20.

Table 13-20: Air/SO_2 Cyanide Destruction Testwork – Vindaloo Main Primary

Test No.	Slurry % Solids w/w	SMBS Addition Stoich	Cu mg/L In Tails Solution	Cu mg/L Detox Level	CN_{WAD} Concentration mg/L Start	CN_{WAD} Concentration mg/L 60 minutes	CN_{WAD} Concentration mg/L 120 minutes
1	42	113%	18	50	150		29
2	42	225%	18	50	150		<5
3	42	165%	18	50	150		<5
4	48	200%	18	30	150	<5	<5

- Kari Pump Deposit results are presented in Table 13-21.

Table 13-21: Air/SO_2 Cyanide Destruction Testwork – Kari Pump Master Composites

Sample Identity	ALS Test No.	Test Conditions: Retention Time (mins)	pH	DO (ppm)	Reagents: SMBS:CN Ratio (%)	SO_2 (g/gCNP)	$CuSO_4.5H_2O$ (mg/L)	NaOH (g/gSO₂)	Solution Assays: Detox Feed CN_P (mg/L)	Treated Effluent CNP (mg/L)
Bedrock 1	JR5154	85.44	9.1	8.96	200	5.00	203	0.74	111.0	1.22
Bedrock 2	JR5155	86.09	9.1	8.98	200	4.89	163	0.76	58.1	0.47
Saprock	JR5156	86.19	9.1	8.68	200	4.88	111	0.73	45.9	0.63

Tailings

- **Houndé Deposit:** Sample for tailings testwork was prepared from the tailings from bulk leaches of the Vindaloo Main primary composite. The tailings testwork evaluated the tailings settling characteristics and beaching properties and was completed by Knight Piésold. Details; and
- **Kari Pump Deposit:** The residue from the detoxification tests was supplied to Knight Piésold for characterisation for tailings storage facility design.

Metallurgical Recoveries and Reagent Consumptions

For the **Houndé Deposit**s the average results of the metallurgical testwork programme on the individual samples and primary composites are summarised by weathering, mining area and rock type in Table 13-21 and Table 13-23.

It is recommended that a constant recovery approach be assigned to each ore type group based on average testwork results. Testwork gold extraction has been discounted to estimate the anticipated plant recovery, which considers tailings soluble losses, potential for short circuiting in the leach circuit and other associated problems that may impact overall plant gold recovery. A 0.010mg/L soluble gold loss has been allowed which is equivalent to a solid loss of 0.011g/tAu at the expected CIL tailings slurry density of 48%w/w solids. The calculation of the anticipated Houndé Process Plant gold recoveries is summarised in Table 13-21 through Table 13-24.

The reagents consumption from the testwork have been used to anticipate the plant leach reagent consumptions. Overall cyanide consumption was calculated based on the concentrate leach consumption at 0.2% w/v NaCN concentration and the average of the bottle roll leach testwork cyanide consumptions. A CIL tails allowance of 100 mg/L NaCN is equivalent to an additional 0.11 kg/t NaCN at the expected CIL tailings slurry density of 48% w/w solids. The average lime consumption in the testwork adjusted for the difference between 60% available lime used in the testwork and 90% available lime for the plant supply. The average sodium hydroxide consumption in the concentrate leach testwork was used.

The anticipated Process Plant gold recoveries and leach reagent consumptions are summarised in Table 13-25 and are based on:

- **Saprolite:** whole ore leach (no gravity concentration or concentrate treatment);
- **Transition:** gravity concentration and intensive leaching of concentrate and leaching of gravity tails.
- **Primary:** gravity concentration and intensive leaching of the concentrate and leaching of gravity tails.

Recoveries and reagent consumptions have also been nominated for two ore types not included in the testwork programme, Vindaloo NE1 and Madras NW transition, and are summarised in Table 13-24 and Table 13-25. Vindaloo NE1 ore has similar mineralogy and stratigraphic position to Vindaloo West and Vindaloo Mafic Volcanic and therefore a similar recovery and reagent consumption has been nominated. The testwork gold extraction for Madras NW saprolite was higher than that achieved for Vindaloo Main saprolite so a recovery and reagent consumption similar to Vindaloo Main transition has been allocated to Madras NW transition.

Table 13-22: Summary of Testwork Leach Gold Extractions and Reagent Requirements by Weathering and Deposit Area

Weathering	Gravity	Gravity Concentrate Regrind	Mining Area	Rock Type	Primary Grind Size P_{80} (µm)	Gravity Conc Regrind Size P_{80} (µm)	Gravity Conc Mass Pull (%)	Overall 24 h Extraction (%)
Saprolite	No	No	Vindaloo	Vindaloo Main	75			96.0
			Vindaloo	Mafic Volcanic	75			96.0
			Vindaloo West		75			96.0
			Vindaloo NE		75			95.5
			Vindaloo 2		75			95.3
			Madras NW		75			98.3
Transition	Yes	No	Vindaloo	Vindaloo Main	75		6.3	94.6
			Vindaloo	Mafic Volcanic	75		6.3	94.6
			Vindaloo West		75		6.3	94.6
			Vindaloo 2		75		6.8	88.7
Primary	Yes	Yes	Vindaloo	Vindaloo Main	90	10	3.4	94.5
			Vindaloo	Mafic Volcanic	90	10	6.0	93.6
			Vindaloo West		90	10	7.2	86.0
			Vindaloo NE		90	10	7.0	93.1
			Vindaloo 2		90	10	7.4	80.0

Table 13-23: Summary of Testwork Leach Gold Extractions and Reagent Requirements by Weathering and Deposit Area

Weathering	Gravity	Gravity Concentrate Regrind	Mining Area	Rock Type	Concentrate Leach Reagents kg/t concentrate		Leach Reagents kg/t ore		Overall Reagents kg/t ore		
					NaCN 24 h Consumption	NaOH Addition	NaCN 24 h Consumption	Lime Addition	NaCN 24 h Consumption	NaOH Addition	Lime Addition
Saprolite	No	No	Vindaloo	Vindaloo Main			0.27	1.39	0.27		1.39
			Vindaloo	Mafic Volcanic			0.27	1.39	0.27		1.39
			Vindaloo West				0.27	1.39	0.27		1.39
			Vindaloo NE				0.27	1.85	0.27		1.85
			Vindaloo 2				0.29	2.05	0.29		2.05
			Madras NW				0.30	1.48	0.30		1.48
Transition	Yes	No	Vindaloo	Vindaloo Main	2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo	Mafic Volcanic	2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo West		2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo 2		3.40	4.31	0.27	2.52	0.50	0.29	2.52
Primary	Yes	Yes	Vindaloo	Vindaloo Main	2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo	Mafic Volcanic	2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo West		2.52	4.50	0.23	1.75	0.39	0.30	1.75
			Vindaloo NE		3.40	4.31	0.27	2.52	0.50	0.29	2.52
			Vindaloo 2		5.18	6.56	0.19	0.43	0.37	0.23	0.43

Table 13-24: Calculation of Houndé Plant Gold Recoveries

Weathering	Mining Area	Rock Type	Overall 24 hour Extraction (%)	Calc Testwork Residue (g/tAu)	Calc Plant Solution Losses[1] (%Au)	Calc Total Plant Losses[2] (g/tAu)	Estimated Plant Recovery[3] (%Au)
Saprolite	Vindaloo	Mafic Volcanic	96.0	0.08	0.5	0.09	95.4
	Vindaloo		96.0	0.08	0.5	0.09	95.4
	Vindaloo West		96.0	0.08	0.5	0.09	95.4
	Vindaloo NE		95.5	0.09	0.5	0.10	94.9
	Vindaloo 2		95.3	0.09	0.5	0.11	94.7
	Madras NW		98.3	0.03	0.5	0.05	97.7
Transition	Vindaloo	Mafic Volcanic	94.6	0.11	0.5	0.12	94.1
	Vindaloo		94.6	0.11	0.5	0.12	94.1
	Vindaloo West		94.6	0.11	0.5	0.12	94.1
	Vindaloo NE		94.6	0.11	0.5	0.12	94.1
	Vindaloo 2		88.7	0.23	0.5	0.24	88.1
	Madras NW		94.6	0.11	0.5	0.12	94.1
Primary	Vindaloo	Mafic Volcanic	94.5	0.11	0.5	0.12	94.0
	Vindaloo		93.6	0.13	0.5	0.14	93.1
	Vindaloo West		86.0	0.28	0.5	0.29	85.5
	Vindaloo NE		93.1	0.14	0.5	0.15	92.6
	Vindaloo 2		80.0	0.40	0.5	0.41	79.4

(1) Based on 0.010 mg/LAu soluble losses (equivalent to 0.01gAu/t at 48% solids slurry density)
(2) Includes tails solids and solution losses
(3) Based on 100 ppm residual NaCN in tails (equivalent to 0.11kgNaCN/t at 48% solids slurry density)

Table 13-25: Summary of Houndé Plant Gold Recoveries and Reagent Consumptions

Weathering	Mining Area	Rock Type	Estimated Plant Recovery[1] (%)	Overall Reagents Reagents kg/t ore NaCN 24 h Consumption[2]	NaOH Addition	Lime Addition
Saprolite	Vindaloo	Mafic Volcanic	95.4	0.38		0.93
	Vindaloo		95.4	0.38		0.93
	Vindaloo West		95.4	0.38		0.93
	Vindaloo NE		94.9	0.38		1.23
	Vindaloo 2		94.7	0.39		1.37
	Madras NW		97.7	0.41		0.99
Transition	Vindaloo	Mafic Volcanic	94.1	0.50	0.30	1.17
	Vindaloo		94.1	0.50	0.30	1.17
	Vindaloo West		94.1	0.50	0.30	1.17
	Vindaloo NE		94.1	0.50	0.30	1.17
	Vindaloo 2		88.1	0.61	0.29	1.68
	Madras NW		94.1	0.50	0.30	1.17
Primary	Vindaloo	Mafic Volcanic	94.0	0.48	0.23	0.28
	Vindaloo		93.1	0.63	0.13	0.28
	Vindaloo West		85.5	0.59	0.14	0.23
	Vindaloo NE		92.6	0.69	0.14	0.30
	Vindaloo 2		79.4	0.72	0.22	0.30

(1) Based on 2.0g/tAu head grade, 0.010mg/LAu solution tails losses and processing flowsheet.
(2) Based on 100ppm residual NaCN in tails

For the **Kari Pump Deposits** the flowsheet used in the original design of the Houndé Process Plant appears appropriate to treat this material. In all characteristics tested, the Kari Pump samples exhibit responses that would generate inputs comparable to those incorporated in the original Houndé Process Plant design criteria. The programme of comminution and metallurgical testwork on the Kari Pump prospect has highlighted a variation in ore physical characteristics between the weathered and fresh samples.

In developing a robust set of design criteria, it is necessary to consider the relative contributions of each material type and their proposed sequence of exploitation throughout the life of mine. It is possible that the various weathering types will be mined from an open pit simultaneously and that a process plant will typically receive a blended feed rather than one single type of ore for an extended campaign.

The existing Houndé Process Plant open circuit SAG mill followed by closed circuit ball mill and recycle pebble crushing has the advantage of being able to accommodate the wide spectrum of weathering type competencies. Results of the testwork conducted on the variability samples indicated the presence of a significant proportion of gravity recoverable gold. A gravity circuit was included in the flowsheet together with a dedicated intensive cyanidation circuit for the gravity concentrate and a separate electrowinning facility.

Initial leaching rates were high for most of the samples with little improvement in gold recovery beyond 24 hours residence time. Pulp viscosity was also found to be low for bedrock samples but higher for saprolite and saprock material. It is possible to use the pre-leach thickener to enable the CIL circuit to operate at a nominal 50% w/w solids for low viscosity feed blends with the ability to operate at a lower solids content and reduced residence time when treating the more viscous slurries with a high proportion of saprolite and the thickener bypassed.

Soluble arsenic values for the Kari Pump samples are low. Copper head assays for the variability samples were consistently low with the highest reported copper value across all variability samples being 220 ppm in sample V3 with an average 56 ppm.

- **Leach Extraction:** The leach tails grade versus the calculated head grade for the samples in the three weathering classes are shown in the graph in Table 13-15. The range of results for the tests conducted on the variability and comminution samples at a grind of 80% passing 75µm is summarised in Table 13-26. The test results for samples that returned a gold head assay of less than 0.5 g/tAu or more than 10g/tAu were excluded. Also excluded were test results for samples that were found to be outside the anticipated pit extent (V30) and where repeat or duplicate tests were completed on a single sample, only the initial test result was used. The predicted gold average recoveries based on the nominal head grades specified and typical solution losses of 0.015 ppm are presented in Table 13-27. The predictions (Table 13-28) assume the CIL tails slurry solids content is 50% w/w for bedrock and 40% w/w or saprock and saprolite. The cyanide and lime addition requirements for the various weathering classifications were estimated. These were based on the testwork average consumptions for leach tests without carbon at 75µm. The cyanide addition is based on a residual free cyanide concentration maintained at 100ppm (as 100% NaCN) in the leach tail. The lime addition is based on an active CaO content of 90%. The predictions assume CIL tails slurry solids contents are 50%w/w for bedrock or saprock and 40%w/w for saprolite.

Figure 13-15: Kari Pump Leach Test Tails Grade versus Calculated Head Grade (source: Endeavour)

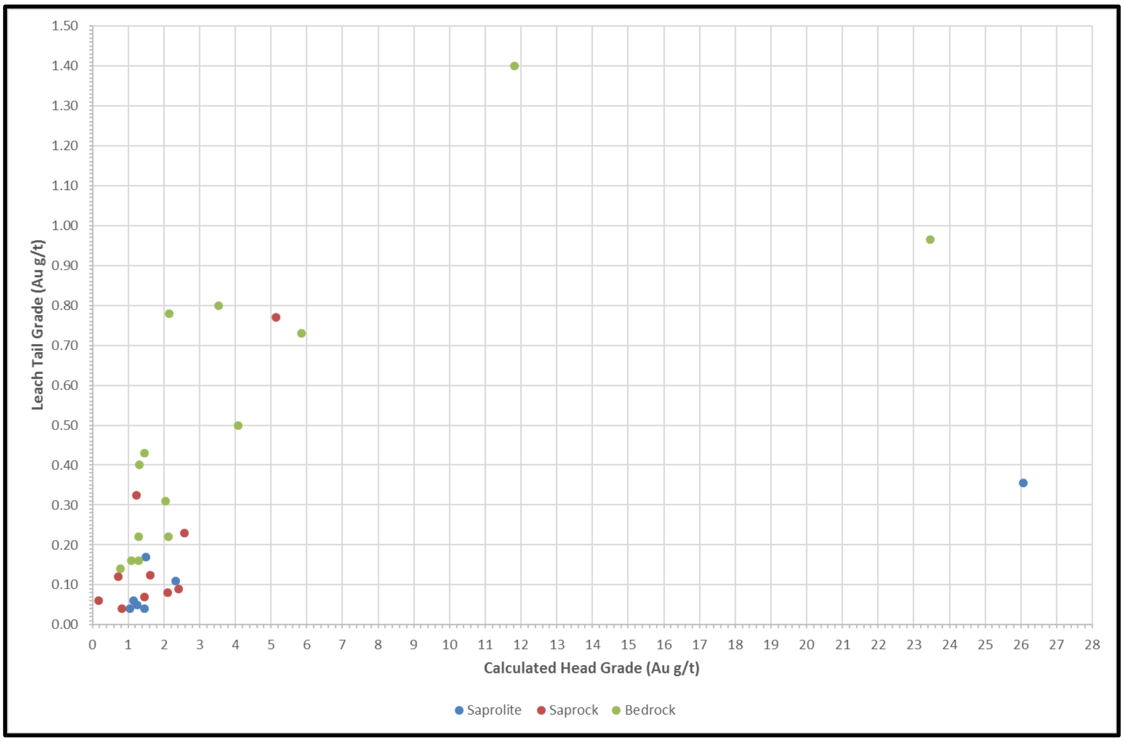


Table 13-26: Kari Pump Gravity and Leach Tests - Total Gold Extraction

Weathering	Gold Extraction Minimum (%)	Maximum (%)	Average (%)
Saprolite	88.7	97.3	94.7
Saprock	73.5	96.7	89.5
Bedrock	61.3	98.7	82.3

Table 13-27: Predicted Gold Recovery

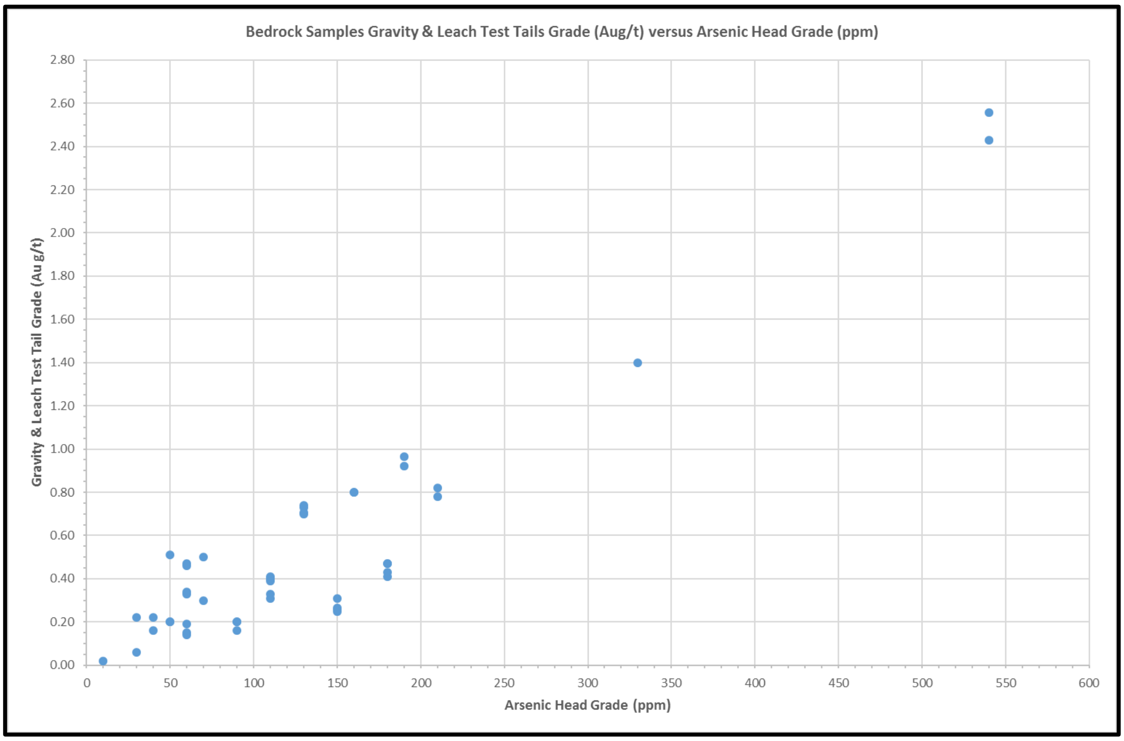
Weathering Type	Nominal Head Grade (Au g/t)	Predicted Plant Gold Recovery (%)
Saprolite	2.60	93.9
Saprock	3.00	88.8
Bedrock	3.70	81.9

Table 13-28: Predicted Cyanide Consumption

Weathering Type	Predicted Cyanide Addition (kg/t)	Predicted Lime Addition (kg/t as 90% CaO)
Saprolite	0.30	0.83
Saprock	0.20	0.53
Bedrock	0.24	0.37

- **Arsenic Grade impact on Kari Pump Leach Tail:** The results of the diagnostic leaches showed the leach tail grade is related to gold locked in labile sulphides, typically arsenopyrite. For weathered samples the negligible levels of total and sulphide sulphur indicate the sulphides had been oxidised and the sulphur content had been leached out via weathering, thereby exposing any occluded gold particles to cyanidation. The correlation for arsenic in the head grade is shown in Figure 13-16 for bedrock samples. The highest arsenic grade sample V30 had the lowest gravity and leach extraction but was found to lie outside the expected open pit extent.

Figure 13-16: Arsenic Head Grade to Tail Grade Relationship (source: Endeavour)



- Key Process Design Parameters (Kari Pump): Some fundamental process design parameters derived from the comminution and metallurgical testwork are reported in Table 13-29 below.

Table 13-29: Process Design Parameters

Milling Circuit Design	
Comminution	
SMC A x b	
Saprock	99.4
Bedrock	40.4 (85th percentile)
Bond Ball Mill Work Index	
Saprock	11kWh/t
Bedrock	17.8kWh/t (85th percentile)
Abrasion Index (Ai)	
Saprock	0.0423
Bedrock	0.1644 (85th percentile)
CIL Design	
Residence Time	24h
CIL Slurry Solids	
Saprolite	40%w/w
Saprock	45%w/w
Bedrock	50%w/w
Cyanide Addition	
Saprolite	1kg/t of ore
Saprock	1kg/t of ore
Bedrock	0.5kg/t of ore
Lime Addition	
Saprolite	1kg/t of ore
Saprock	1kg/t of ore
Bedrock	1kg/t of ore

13.5 Risks and Opportunities

The mineral processing and metallurgical testing completed to date is considered adequate to meet the requirements for supporting the Mineral Resources and Mineral Reserves as reported herein. In certain instances, however further work is required to supplement the metallurgical testwork completed for the Kari Pump deposits and to establish enhanced grade-recovery relationships through additional variability testwork for the lower grade material, specifically the

SO grade categories and the stockpiles. At the increased plant throughput of 4.0Mtpa and specifically in periods where fresh ore tonnage contributions exceed the initial assumed design throughput, further work is required to confirm that the outcome of earlier leach kinetics analysis remain valid.

The key risks are therefore related to the certain of the metallurgical assumptions related to the above. Endeavour has however outlined additional variability testwork to address these issues as outlined below.

Gravity Concentration

Two continuous centrifugal gravity concentrators were selected in the plant design to recover a 2 to 3% mass gravity concentrate from the cyclone overflow stream, however this was designed as a duty/ standby arrangement. A grade recovery relationship was established in the current test programme using a multiple pass approach on a batch basis. The relationship was very clear and indicates a mass pull of 2.5% would result in a gold recovery of approximately 57% for the Vindaloo-Madras deposits. The option has been trialled to run both Knelson concentrators at the same to increase the gravity gold recovery, though there is a significant impact on water usage as the Knelson concentrators utilise around $60m^3$ per hour of raw water from the water storage dam, not the tailings return water and thus can place additional water onto the TSF.

Gravity Concentrate Comminution

Testwork to determine the gravity concentrate milling specific energy has not been completed due to time and sample limitations. A conservative milling specific energy has been assumed for the purposes of the design. If the specific energy requirement is less than the conservative estimate, there is opportunity to reduce the project capital and operating cost. Alternatively, a larger gravity concentrate mass could be collected with an opportunity for increased plant gold recoveries for some ores. Fine grinding mill vendor testwork on a gravity concentrate sample to provide this data is likely to improve project economics.

Process Plant Recoveries

Plant recoveries for the transition ores do not include fine grinding of the gravity concentrate prior to leaching as this flowsheet was not trialled on the transition ores due to the typically high recoveries achieved without further grinding. There is an opportunity that the plant recovery for the moderately oxidised transition ores will increase when processed with the selected flowsheet.

The plant recoveries estimated for the minority Houndé primary ores (i.e. other than Vindaloo) have been based on higher mass pull gravity concentrates. There is a risk that the recoveries may be reduced at the lower plant design gravity mass pulls, although this risk is minimised by the minor proportion that these ores constitute and the possibility that a higher concentrate mass pull may be able to be treated as a conservative concentrate milling specific energy has been selected.

The plant recoveries have been estimated based on the leaching testwork 24h extractions. The plant CIL design allows for 36 hours leaching residence time and there is opportunity for higher plant gold recoveries than nominated.

Reagent Optimisation

The concentrate leach cyanide consumption was based on a high leaching concentration of 0.2%NaCNw/w (2,000ppm). There is an opportunity to optimise the plant concentrate leach cyanide concentration, thereby reducing the overall cyanide consumption and operating cost.

13.6 Interpretation, Conclusions and Recommendations

For the next phase of evaluation at Kari Pump it is recommended to perform comminution and leach test work on composites of material with different weathering characteristics to represent the possible feed blends to the plant over the life of mine based on an optimised mine schedule.

Variability samples should be selected for both comminution and leach test work once the mining schedule and pit design is developed. An investigation if improvement in leach extraction from bedrock material can be realised on recovery at finer grind than 75µm tested should be carried out.

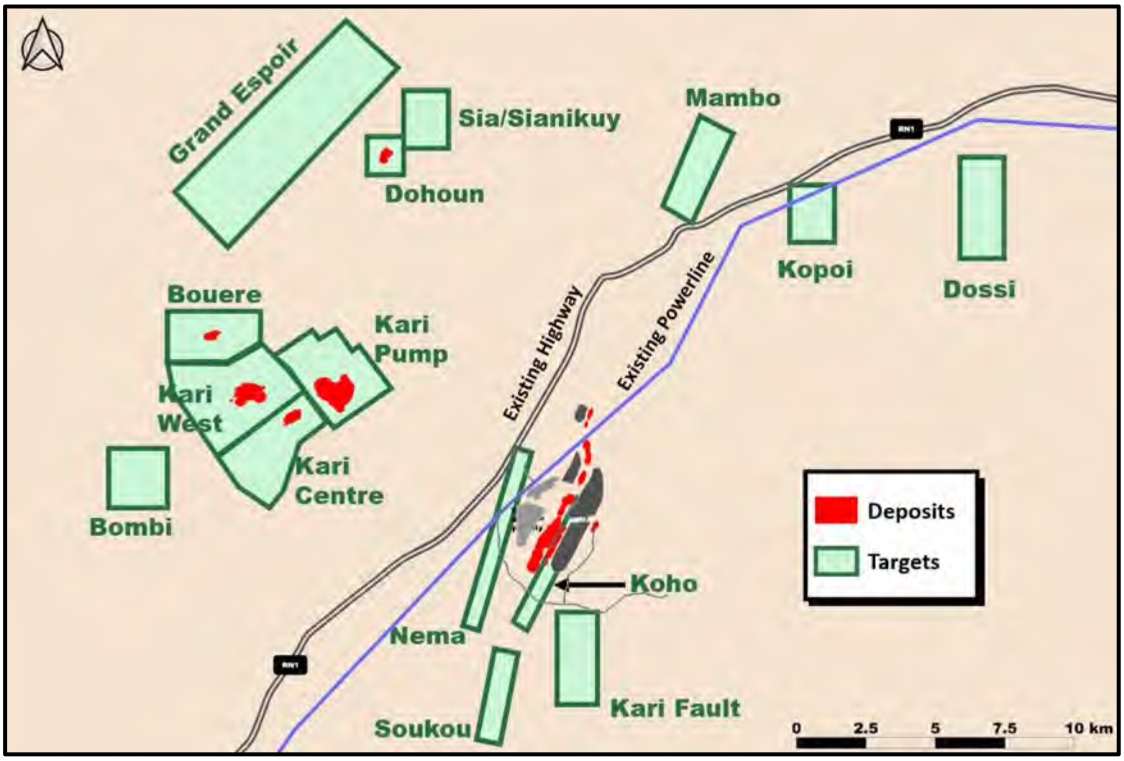
If zones of potential ore with high arsenic grades are identified it, some mineralogical analysis is recommended to better understand the relative occurrence of mineral species and the association of gold within these various minerals.

14 MINERAL RESOURCES

14.1 Introduction

The following section includes discussion and comment on all aspects relating to the Mineral Resource statement reported at 31 December 2019 for the Houndé Gold Mine. The specific areas covered comprise geological modelling; density; statistical analysis; variography; block modelling; grade estimation; mineral resource classification; grade-control and reconciliation; reasonable prospects for economic extraction; and 2019 Mineral Resource statement. In the majority of instances, the specific technical sub-sections are grouped by deposit (Figure 14-1): Vindaloo-Madras; Bouéré, Dohoun, Kari Centre; Kari Pump; and Kari West.

Figure 14-1: Location of deposits in the Mineral Resource Statement ((source: Endeavour)



14.2 Basis of Supporting Data

The Mineral Resource estimates for the Houndé Gold Mine are reported as at 31 December 2019 and depleted based on topographic surfaces obtained with this effective date. All of the deposits were modelled in GEOVIA Surpac™ integrated geology and resource modelling software. No grade-control drilling data was utilised in the estimation of Mineral Resources reported herein and the cut-off date for the drill hole database for the individual deposits were:

- Vindaloo-Madras (December 2014);
- Bouéré (May 2017);
- Dohoun (January 2015);
- Kari Centre (September 2019);
- Kari Pump (October 2018); and
- Kari West (September 2019).

14.3 Vindaloo-Madras Deposits

Lithology

The Vindaloo-Madras lithological interpretation was generated based on geological logging undertaken by Houndé Gold Mine and validated by Cube Consulting Pty Ltd ("**Cube**"). The interpretation polylines were mainly based on 25m spaced sections, which increased to 50m spaced sections towards the north. The polylines were snapped to drill holes in most instances, meaning that the creation of valid three-dimensional ("**3D**") solids was not possible. Cube modified the interpretation by removing the snapped interpretation by translating the polyline interpretation points onto section lines. This method honoured the initial interpretation but also enabled the creation of valid wireframes. The final lithology solids were used for direct assignment of lithology into the block model. The lithological interpretations, 3DM file names and block model codes as assigned, are summarised in Table 14-1.

Table 14-1: Vindaloo-Madras Deposits: lithological modelling and codes

Lithology	3DM	Block Model Code (lithology)
Fine grained sediments	hounde_fgsed_2014.dtm	Fgsed
Gabbro	hounde_gb_2014.dtm	gb
Quartz-rich gabbro	hounde_qrg_2014.dtm	qrg
Shear with graphitic sediments	hounde_shear_2014.dtm	Shear
Mafic volcanics	No 3DM (All Other Material)	mv

Weathering

Weathering surfaces (Digital Terrain Models – "**DTMs**") were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac^{TM} along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-2.

Table 14-2: Vindaloo-Madras Deposits: weathering modelling and codes

Weathering Type	Vindaloo-Madras
Air	0
Laterite	
Overburden	1
Saprolite	2
Saprock / Transition	3
Fresh / Bedrock	4

The Vindaloo-Madras deposits weathering interpretation was provided to Cube for review and incorporation into the geological model. The deposit is covered by a laterite layer, generally between 2m and 20m thick, typically 5m to 7m thick. The laterite has been subjected to artisanal workings in places and thickens towards the north. The saprolite is typically about 30m thick and the saprock/transition approximately 10m thick. The top of the fresh rock is generally about 50m below the topographic surface, varying between 30m and 70m

Mineralisation

Mineralised zones are interpreted based upon lithology, structure, mineralisation and assay data from the drill hole data. The interpreted polylines are created on 20m to 50m spaced sections, depending on drill line density. The polylines are snapped to drill holes in most instances and a threshold applied to distinguish between mineralised and non-mineralised material. Solid wireframe DTMs were created from the interpreted polylines. Individual mineralised zones, veins or lenses are grouped into domains were appropriate, based on similar style of mineralisation, grade tenure, geometry and/or location.

The initial mineralisation domains were provided to Cube and where appropriate was subsequently modified by Cube. The interpretations were completed on 25m spaced sections south of 1262950N and 50m spaced sections north of 1262950N. The mineralisation interpretation was based on local geological knowledge and typically were focussed on grades greater than 0.5g/tAu.

For the mineralisation wireframes, the interpreted polylines were snapped to the drill hole sample positions. A minimum down-the-hole ("**DTH**") length of 1m was used. For each section, the interpretation was not typically extended more than 50m along strike or down-dip past the last drill hole. Some sectional interpretations were extended further than 50m in some sparsely sampled areas of the better defined and continuous domains. The final interpretation that included 73 domains which were subsequently been grouped into 11 areas. These are summarised below in Table 14-3 and illustrated in Figure 14 2.

Table 14-3: Vindaloo-Madras Deposits: mineralisation modelling and codes

Area	Vein Number
Koho	50 to 59
Koho East	60 to 62
Koho south	63
Madras	70 to 73
Madras North West	30 and 32 to 36
Madras West	40 and 41
Vindaloo 2	23 to 28, 31 to 37
Vindaloo Far South	43
Vindaloo Main	1 to 13, 38 and 39
Vindaloo North East	14 to 22
Vindaloo South	42

Cube modified the supplied interpretation, by allowing the wireframes to include mineralisation greater than 0.3g/tAu rather than 0.5g/tAu. This modelling threshold change resulted in a more robust interpretation with better domain continuity down dip and along strike. This resulted in some lower grade material being included as internal dilution to preserve overall continuity of the mineralised zones. The original interpretation for the mineralisation was based on grade and geological continuity within or parallel to steeply dipping gabbro intrusions. The Cube interpretation was an attempt to include more of the mineralised material and produce a model that reduces the risk of conditional bias that could be introduced where the constraining interpretation and data selection is based on a significantly higher grade than the natural geological lower threshold. The revised Cube interpretation was reviewed and adjusted by the Company, with a view of keeping the focus on modelling mineralisation that has a better chance of being economic. The final modification to the interpretation was the inclusion of some minor flatter west dipping domains that are likely to represent linking structures.

Cube completed a boundary analysis for the larger domains (an example is given in Figure 14 3). This analysis shows an abrupt grade change at the interpreted boundary position with average grades inside the domain significantly higher than the average grades outside the domain. This suggests the absence of any obvious gradational boundaries.

Figure 14-2: Vindaloo-Madras Deposits: wireframes, illustrated by area (source: Endeavour)

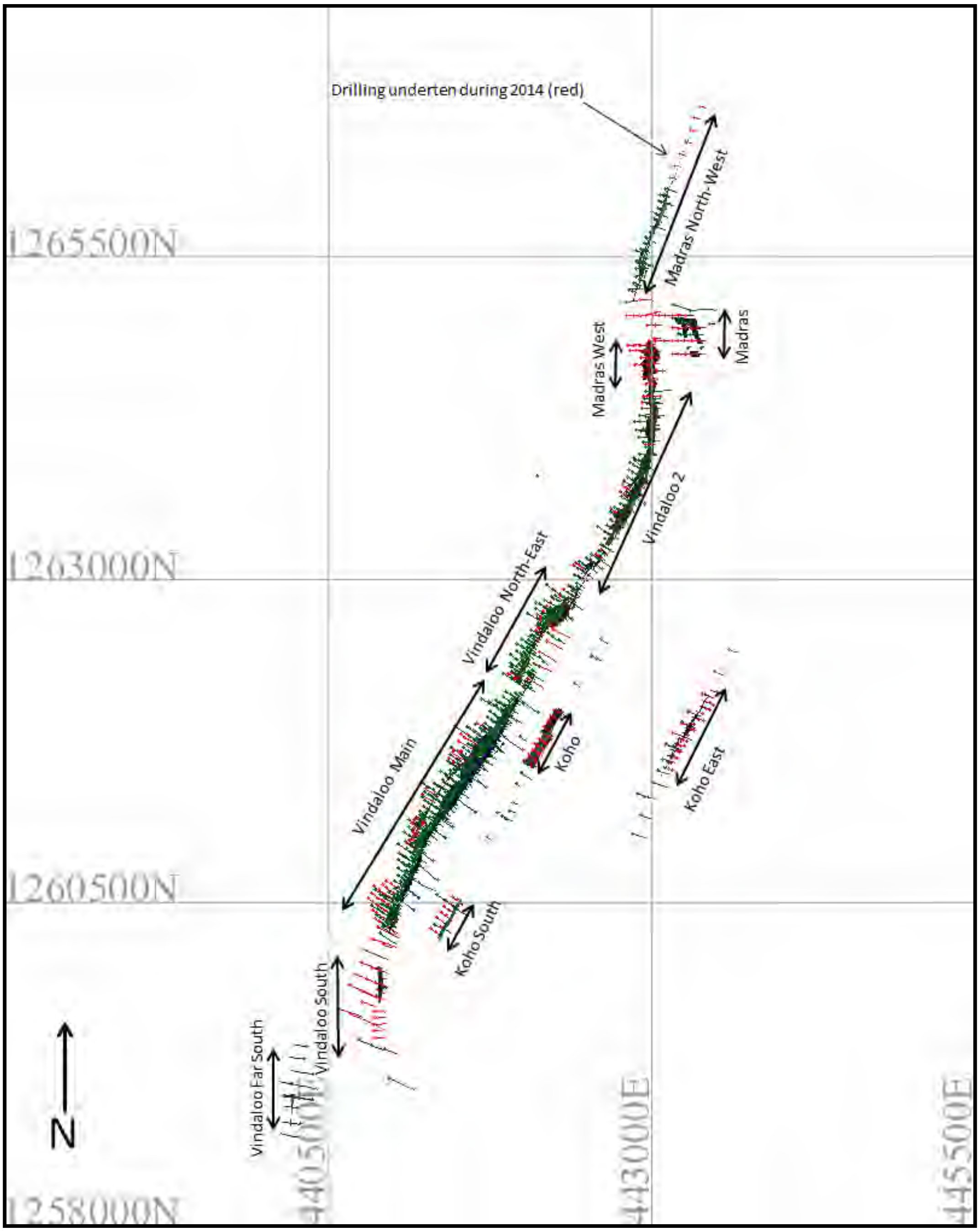
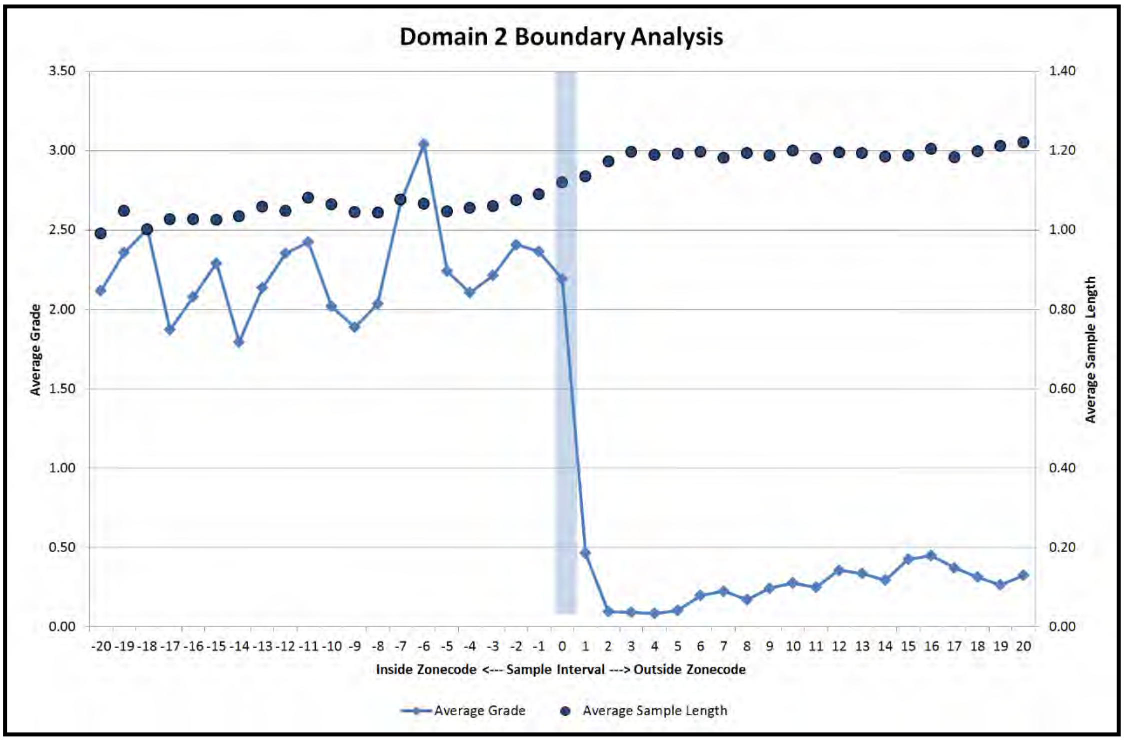


Figure 14-3: Vindaloo-Madras deposits: boundary analysis – Domain 2 (source: Endeavour)



Density

Over 10,000 density readings have been taken from core using the Archimedes method (i.e. the core is coated in wax and measured using the standard water displacement method) at the Houndé Gold Mine. The measurements are grouped according to deposit, logged lithology type and/or weathering style/oxidation type. Within the Vindaloo-Madras deposits trend, some 1,860 density measurements have been made, grouped into the 6 weathering types, as shown in Table 14-4.

Table 14-4: Vindaloo-Madras deposits: density analysis summary

Weathering	Overburden		Saprolite		GB		QRG		FGSED		MV	
	Number (No)	Density (t/m^3)	Number (No)	Density (t/m^3)	Number (No)	Density (t/m^3)	Number (No)	Density (t/m^3)	Number (No)	Density (t/m^3)	Number (No)	Density (t/m^3)
Overburden	7	1.92			2	1.72	1	2.55	1	1.92	1	1.92
Saprolite			322	1.85	44	1.85	4	1.68	29	1.95	84	1.92
Transition					80	2.33	12	2.58	55	2.26	127	2.28
Fresh					190	2.74	221	2.78	137	2.67	543	2.74

Table 14-5: Vindaloo-Madras deposits: assigned density

Weathering	GB (t/m^3)	QRG (t/m^3)	FGSED (t/m^3)	SHEAR (t/m^3)	MV (t/m^3)
Overburden	1.80	1.80	1.80	1.80	1.80
Saprolite	1.80	1.80	1.90	1.90	1.90
Transition	2.33	2.33	2.26	2.26	2.28
Fresh	2.74	2.78	2.67	2.67	2.74

Statistical Analysis

Each drill hole database for each deposit has been coded for drill intercepts within each of the mineralised domains. This coded interval is then used to control the raw assay analysis, compositing process, capping analysis, and variography by vein and/or domain. The codes included in the database for Vindaloo-madras are ZONECODE.

There are slight differences in the capping and compositing order for the separate Houndé Gold Mine deposits due to different estimation dates, QPs and methodologies. These differences are not considered to be material or significant. At the Vindaloo-Madras deposits capped composites were used.

Assay sample lengths varied from 0.19m to 9.00m with the mean length of 1.06m and median of 1.00m. To ensure equal sample support, Cube used 1m downhole composites for all compositing within the mineralised domains, with a minimum of 50%. Cube analysed the basic statistical nature of the 59 domains, details of which can be found in the previously published 2013 Technical Report and are not included herein.

The assays or composites have been capped (also termed “**top-cut**”) to reduce the effect or influence of high-grade outliers prior to estimation. The assays or composites are reviewed using histograms, log-histograms, log-probability plots and graphical inspection of the spatial grade distribution. The assay or composite data is reviewed for each individual deposit by mineralised domain.

Composting is undertaken to reduce the variability of the data, and to standardise sample support. This also maintains the geological definition of the mineralisation. The downhole compositing process uses a 'best fit' approach, resulting in composites of slightly variable but equal length within a contiguous drill hole intersection. This ensures the composite length is as close as possible to the nominated composite length. The downhole compositing process starts at the drill hole intersection with the mineralised zone and any composites less than a defined percent of the composite interval are ignored.

Variography

Variography was used to analyse the spatial continuity within the mineralised zones and to determine appropriate estimation inputs to the grade interpolation process. The variogram modelling process typically involved the following steps:

- calculate and model the omni-directional or down-hole variogram to characterise the nugget effect;
- calculate a variogram map of variograms within the plane of greatest continuity to identify the direction of maximum continuity within the plane; and
- model the variogram in the direction of maximum continuity and the orthogonal directions.

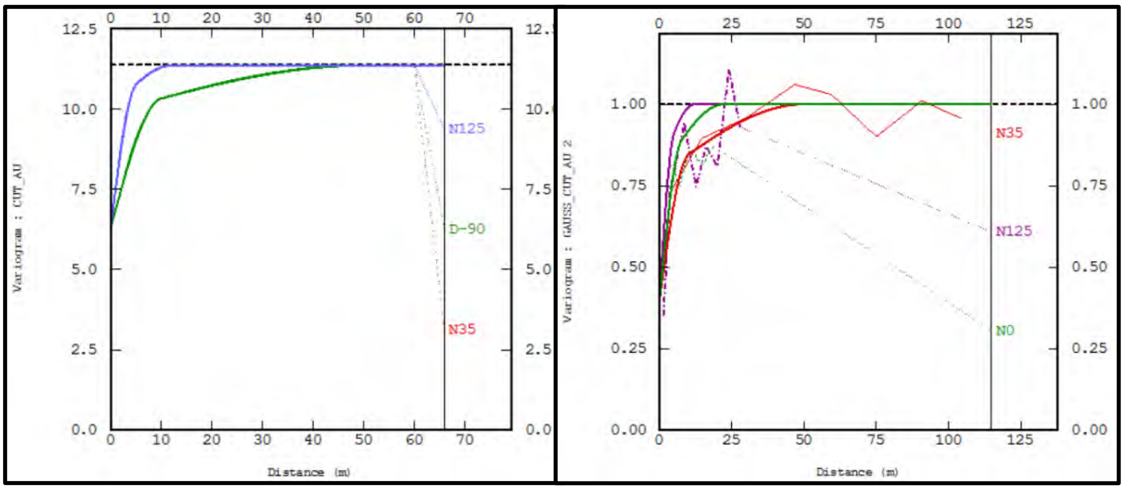
Cube analysed the spatial continuity within the mineralised zones to determine appropriate estimation inputs to the interpolation process with variography, details of which can be found in the 2013 Technical Report. Cube considered that the additional data did not materially affect the variography and existing parameters for the 2014 Mineral Resource Estimate update, and so the parameters remained unchanged.

Variogram relative nugget effects were typically in the range of 50% to 60% indicating a moderate to high degree of short scale variability as would be expected for gold deposits. Variogram ranges were typically in the order of 50m to 60m indicating maximum spatial continuity is greater than the average drill hole spacing. No plunge component was evident during the variogram modelling process. Table 14-6 below summarises the absolute and relative variogram parameters used in the estimate. The modelled variograms are illustrated in Figure 14-4.

Table 14-6: Vindaloo-Madras deposits: variogram parameters

Domain No	Nugget	Spherical 1				Spherical 2				Isatis rotation (mathematical)		
		Sill	Major (m)	Semi (m)	Minor (m)	Sill	Major (m)	Semi (m)	Minor (m)	Az (°)	Ay (°)	Ax (°)
Absolute												
2	6.31	3.6	10	10	5	1.46	50	50	12	55	0	90
Relative												
2	0.55	0.32	10	10	5	0.13	50	50	12	55	0	90

Figure 14-4: Vindaloo-Madras deposits: Domain 2 Variograms - Gaussian transformed (Left) & Back transformed (Right) (source: Endeavour)



Block Modelling

Individual block models were created for the all Houndé deposits in GEOVIA Surpac™. The block model set-up for Vindaloo-Madras deposits is presented in Table 14-7. Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit (“**SMU**”).

Table 14-7: Vindaloo-Madras deposits: block model definition

Axis	Minimum	Maximum	Model Extent
Y	1,259,300	1,268,000	8,700
X	438,680	441,180	2,500
Z	-75	405	480
Parent Cell Y	10	Min. Sub-Cell Y	2.5
Parent Cell X	5	Min. Sub-Cell X	1.25
Parent Cell Z	5 (10)	Min. Sub-Cell Z	2.5
Rotation from Y	31		

Two block models were created using Surpac 6.3 software. The first was used for grade estimation with a parent block size of (Y) 10m by (X) 5m by (Z) 5m with sub-blocks of (Y) 2.5m by (X) 1.25m by (Z) 2.5m. The second and final block model was created with a larger parent cell of 10m in the Z direction, resulting in a smaller model file size that was easier to manipulate. The grade estimate was exported from the initial estimation model and imported into the final model. The block model attributes and descriptions are summarised in Table 14-8.

Table 14-8: Vindaloo-Madras deposits: block model attributes

Attribute	Description
au_cut	Estimated by Ordinary Kriging- Au ppm - Cut
au_uncut	Estimated by Ordinary Kriging- Au ppm - Uncut
au_cut_idw	Estimated by Inverse Distance Cubed- Au ppm - Cut
au_uncut_idw	Estimated by Inverse Distance Cubed - Au ppm - Uncut
au_cut_nn	Estimated by Nearest Neighbour- Au ppm - Cut
au_uncut_nn	Estimated by Nearest Neighbour - Au ppm - Uncut
avd	Average Distance to Samples
classification	1=Measured 2=Indicated 3=Inferred 4=Unclassified
density	Insitu Density
dns	Distance to Nearest Sample
domain	Mineralisation Domain Code
kv	Kriging Variance
lithology	Lithology Identifier
ns	Number of Samples
pass	Estimate Pass Number
weathering	0=Air 1=Overburden 2=Saprolite 3=Transitional 4=Fresh

Grade Estimation

Grade interpolation was carried out using Ordinary Kriging (“**OK**”) for each mineralised domain using the uniquely coded one metre DTH composite data specific to that domain. All block estimates were based on grade interpolation into parent cells of 10m (Y) by 5m (X) x 10m (Z).

Block discretisation points were set to 4 (Y) by 2 (X) by 2(Z).

Cube attempted to characterise the spatial relationship of the data using variography and sought to implement search strategies aimed at producing a robust block estimate whilst at the same time minimising estimation error and conditional biases. Cube routinely tests several search iterations before determining the most appropriate search strategy. Fundamental to the search strategy is the determination of appropriate minimum and maximum numbers of composites for estimation. The minimum number of composites was considered by Cube as a key component of the criteria applied in determining the appropriate resource classification.

Cube initially based the search distances for the first search iteration on the analysis of the theoretical kriging weight charts. An examination of these kriging weight charts provided a good starting point for testing a search strategy as they provided a guide as to the distribution of kriging weights for a given variogram with respect to distance along the major axis of the search volume. Of particular interest was the approximate distance that kriging weights tend towards zero. It is good estimation practice to use a search distance that ensures that kriging weights allocated to composites tend toward zero or slightly negative on the periphery of the search.

Cube extended the search where there were large positive weights at the periphery and reduced the search where there were a large proportion of negative kriging weights involved. A limitation of these charts is that they assume that each block is directly informed by a composite at the block centroid and they, therefore generally understate the required search with respect to actual data spacing to achieve a robust block estimate.

A Quantitative Kriging Neighbourhood Analysis ("**QKNA**") was undertaken to assist in optimising the search parameters. The procedure for search optimisation adopted by Cube involved selecting several individual blocks representing data configurations ranging from poorly to well informed. The aim of these tests is to optimise the kriging search neighbourhood and maximise the quality of the kriging when dealing with a non-exhaustive data set. A number of key criteria were captured for each selected block as follows:

- Block coordinates and dimensions;
- Estimated grade;
- Kriging variance;
- Block Dispersion variance;
- Slope of Regression of estimated blocks z*(v) and theoretical true blocks z(v);
- A listing of the actual informing composites within the search volume of the block including coordinates, grades, distance from block and kriging weight; and
- Statistics of the informing composites including number of composites, minimum, maximum, mean, standard deviation, variance and coefficient of variation.

An important feature of Ordinary Kriging is its inherent property to minimise estimation error. The estimation error will increase substantially as the amount of informing data decreases. Based on the QKNA and visual analysis of the samples selected under OK, appropriate search parameters were chosen and are detailed below in Table 14-35. Search orientations for each domain interpolation were orientated to follow the direction of the mineralised domain. A two-pass search strategy was used for grade estimation. The first pass search used a search radius of 75m and this was doubled for the second search pass to 150m. The same minimum (6) and maximum (30) number of samples were used for both search passes. A full set of estimation parameters for each domain can be found in Cube's 2014 Technical Report and a summary is included in Table 14-9.

Table 14-9: Vindaloo-Madras: grade estimation parameters

Domain No	Min. No. Composites (No)	Max. No. Composites. (No)	Search Radius (No)	Azimuth of Major Axis (°)	Plunge of Major Axis (°)	Dip of Major Axis (°)	Major/Semi Major Ratio	Major/Minor Ration
1	6	30	75 (150)	25	0	-90	1	4
2	6	30	75 (150)	30	0	-90	1	4
3	6	30	75 (150)	25	0	-90	1	4
4	6	30	75 (150)	35	0	80	1	4
5	6	30	75 (150)	35	0	-90	1	4
6	6	30	75 (150)	40	0	70	1	4
7	6	30	75 (150)	30	0	70	1	4
8	6	30	75 (150)	30	0	-90	1	4
9	6	30	75 (150)	40	0	-90	1	4
10	6	30	75 (150)	40	0	-90	1	4
11	6	30	75 (150)	30	0	80	1	4
12	6	30	75 (150)	30	0	80	1	4
13	6	30	75 (150)	35	0	75	1	4
14	6	30	75 (150)	25	0	80	1	4
15	6	30	75 (150)	30	0	80	1	4
16	6	30	75 (150)	30	0	70	1	4
17 South	6	30	75 (150)	30	0	-90	1	4
17 Centre	6	30	75 (150)	45	0	75	1	4
17 North	6	30	75 (150)	30	0	-90	1	4
18	6	30	75 (150)	35	0	-90	1	4
19	6	30	75 (150)	35	0	80	1	4
20	6	30	75 (150)	35	0	-90	1	4
21	6	30	75 (150)	40	0	-90	1	4
22	6	30	75 (150)	30	0	-90	1	4
23	6	30	75 (150)	35	0	80	1	4
24 South	6	30	75 (150)	30	0	75	1	4
24 North	6	30	75 (150)	15	0	75	1	4
25	6	30	75 (150)	35	0	75	1	4
26 South	6	30	75 (150)	30	0	75	1	4
26 North	6	30	75 (150)	5	0	70	1	4
27	6	30	75 (150)	35	0	70	1	4
28 South	6	30	75 (150)	30	0	-90	1	4
28 North	6	30	75 (150)	15	0	80	1	4
29	6	30	75 (150)	0	0	85	1	4
30	6	30	75 (150)	20	0	85	1	4
31	6	30	75 (150)	35	0	75	1	4
32	6	30	75 (150)	20	0	85	1	4
33	6	30	75 (150)	20	0	85	1	4
34	6	30	75 (150)	20	0	85	1	4
35	6	30	75 (150)	20	0	85	1	4
36	6	30	75 (150)	20	0	85	1	4
37	6	30	75 (150)	30	0	75	1	4
38	6	30	75 (150)	35	0	50	1	4
39	6	30	75 (150)	35	0	30	1	4
40	6	30	75 (150)	355	0	50	1	4
41	6	30	75 (150)	0	0	45	1	4
42	6	30	75 (150)	0	0	75	1	4
43	6	30	75 (150)	0	0	-90	1	4
50	6	30	75 (150)	30	0	55	1	4
51	6	30	75 (150)	30	0	60	1	4
52	6	30	75 (150)	30	0	55	1	4
53	6	30	75 (150)	35	0	55	1	4
54	6	30	75 (150)	30	0	55	1	4
55	6	30	75 (150)	30	0	60	1	4
56	6	30	75 (150)	35	0	60	1	4
59	6	30	75 (150)	30	0	60	1	4
60	6	30	75 (150)	25	0	-90	1	4
61	6	30	75 (150)	30	0	-90	1	4
62	6	30	75 (150)	25	0	-90	1	4
63	6	30	75 (150)	30	0	-80	1	4
70	6	30	75 (150)	345	0	45	1	4
71	6	30	75 (150)	345	0	45	1	4
72	6	30	75 (150)	350	0	50	1	4
73	6	30	75 (150)	355	0	50	1	4

Block Model Validation

Cube used multiple methods to validate the Vindaloo-Madras deposits block model. The details of which can be found in the Cube December 2014 Technical Report. In summary, the validation steps included:

- Comparing the composite grades to the block grades visually;
- Comparing the mean block estimate for each domain to the mean composite grade of the corresponding domain;
- Swath plots of the estimated tonnes, estimated grade, number of composites and mean composite grade (tabulated by northing and RL) were created for the largest 20 interpolated mineralisation domains; and
- Comparing an OK estimate for both cut and uncut Au against two other estimation techniques, IDW3 and Nearest Neighbour ("**NN**").

The results of the validation exercises confirmed that the estimates honoured the composite data well with some degree of grade smoothing of the block estimates as would be expected.

Mineral Resource Classification

Mineral Resources are classified into Measured, Indicated and Inferred categories based upon increasing geological confidence. At Houndé Gold Mine, in addition to a review of the data quality the Mineral Resource classification within the mineralised vein wireframes is generally based on drill hole spacing, grade continuity and overall geological continuity. The distance to the nearest composite and the number of drill holes are also considered in the classification.

As with any non-rigidly defined classification system, there will always be some blocks within categories that depart from the defined criteria. The final outcome reflects a practical combination of geological knowledge and estimation quality parameters that may be more numerical in nature.

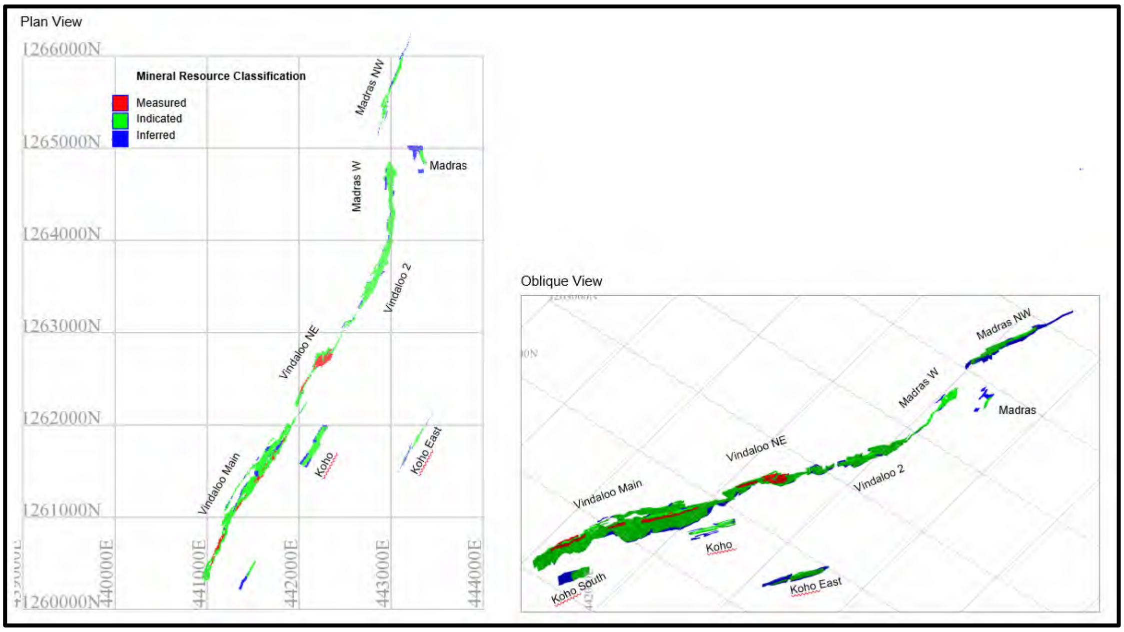
The Vindaloo mineralisation is sufficiently drilled to allow classification in accordance with the CIM guidelines. The final outcome must reflect a practical combination of geological knowledge and estimation quality parameters that may be more numerical in nature. This approach to classification aims to avoid creating a complex numerically based ‘mosaic’. Cube has considered all criteria and has classified the Mineral Resource accordingly.

The primary criterion for Measured Mineral Resources is defined by a drill spacing of at least 25m by 25m. In addition, Measured Mineral Resources were confined to the largest interpreted mineralisation domains that had the least amount of risk associated with geological interpretation and continuity. The only domains to include Measured Mineral Resources are 2, 3, 15, 17, and 19. A basic Conditional Simulation study was undertaken on Domain 2 to provide supporting evidence for classification of the Measured Mineral Resources. The results suggested that on a mining production quarterly basis the grade variance was within ±10% at a 90% confidence limit.

Indicated Mineral Resources are defined as areas outside the Measured Mineral Resource and defined by 50m by 50m drill spacing. Indicated Mineral Resources were confined to blocks estimated within the first search pass.

Inferred Mineral Resources include all remaining estimated mineralisation defined by a drill spacing greater than 50m by 50m or estimated within the second pass search. The classification applied to the Vindaloo-Madras deposits is shown in Figure 14-5.

Figure 14-5: Vindaloo-Madras Deposits: Block model coloured by classification (source: Endeavour)



Mineral Resource Statements

The Mineral Resource Statements for the Vindaloo-Madras deposits are presented in Section 14.13 of this Technical Report.

14.4 Bouéré Deposits

Lithology

The Bouéré deposit is not litholgically modelled as the mineralisation is generally structurally controlled and strong alteration has often masked lithological changes/differences.

Weathering

Weathering surfaces (DTMs) were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac^{TM} along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-10.

Table 14-10: Bouéré deposit: weathering modelling and codes

Weathering Type	Vindaloo-Madras
Air	
Laterite	LATR
Overburden	
Saprolite	SAPR
Saprock / Transition	TRANS
Fresh / Bedrock	BDRK

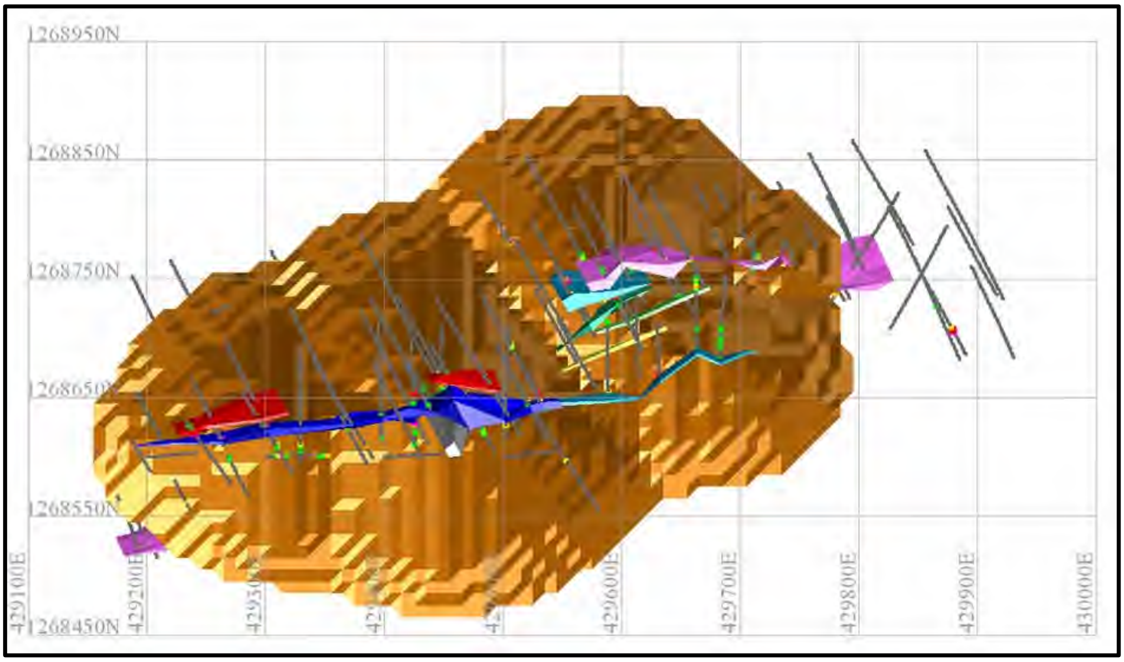
Bouéré is covered by a laterite blanket ranging between 2m and 28m thick; it has been significantly disturbed by artisanal workings in some areas as it is sporadically mineralised. The saprolite is between 5m and 25m thick. The saprock (transition) material is generally between 2m and 13m thick. The weathering domains generally lie relatively parallel to the topography and one another.

Mineralisation

Mineralised zones are interpreted based upon lithology, structure, mineralisation and assay data from the drill hole data. The interpreted polylines are created on 20m to 50m spaced sections, depending on drill line density. The polylines are snapped to drill holes in most instances and a threshold applied to distinguish between mineralised and non-mineralised material. Solid wireframe DTMs were created from the interpreted polylines. Individual mineralised zones, veins or lenses are grouped into domains were appropriate, based on similar style of mineralisation, grade tenure, geometry and/or location.

Bouéré deposit mineralisation was interpreted based upon lithology, structure, mineralisation and assay data in the drill hole data. The interpreted polylines were based mainly on 25m spaced sections. The supplied polylines were snapped to drilling in most instances and generally followed a 0.50g/tAu grade threshold. Eleven mineralised lenses were created from the interpreted polylines to represent zones of continuous mineralisation of economic interest, Figure 14-6, which can be grouped into northwest and southeast groups possibly displaced by a fault trending N30.

Figure 14-6: Bouéré deposit: Lenses with Drill Traces – Plan View (source: Endeavour)



Density

Approximately 8,480 density measurements have been collected for the other deposits, comprising 1,860 at the Bouéré deposit. The densities do not vary significantly for the different weathering domains within the deposit. The densities assigned to the respective block models are presented in Table 14-11.

Table 14-11: Bouéré deposit: assigned density

Laterite (t/m^3)	Saprolite (t/m^3)	Saprock/Transition (t/m^3)	Fresh / Bedrock (t/m^3)
1.90	1.80	2.30	2.74

Statistical Analysis

Each drill hole database for each deposit has been coded for drill intercepts within each of the mineralised domains. This coded interval is then used to control the raw assay analysis, compositing process, capping analysis, and variography by vein and/or domain. The codes included in the database for the Bouéré deposit is OREZONE & ORECODE.

There are slight differences in the capping and compositing order for the separate Houndé Gold Mine deposits due to different estimation dates, QPs and methodologies. These differences are not considered to be material or significant. At the Bouéré deposit capped composites were used (see Section 14.3 for addition details regarding the general approach).

Assay sample lengths varied from 0.1m to 3m with the mean length of 1.1m and median of 1m. To ensure equal sample support, 1m downhole composites were appropriate for all compositing within the mineralised domains. Any composites less than 50% of the 1m composite interval are ignored. Descriptive statistics and plots for the 1m uncapped composites were derived and reviewed for each of the domains (Table 14-12**)**. Descriptive statistics and plots for the 1m uncapped composites were derived and reviewed for each of the domains (Table 14-12 and Figure 14-7 to Figure 14-9 inclusive).

Table 14-12: Bouéré deposit: uncapped descriptive statistics

Domain No	Count	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	172	0.01	49.21	4.31	1.70	7.58	1.76
2	237	0.01	61.34	5.19	1.48	9.90	1.91
3	100	0.01	123.00	6.91	2.56	14.35	2.08
4	33	0.08	5.85	1.38	1.00	1.44	1.05
5	14	0.03	5.18	1.26	0.84	1.42	1.13
6	8	0.01	4.37	1.93	1.64	1.36	0.70
7	98	0.02	74.60	7.88	2.02	13.33	1.69
8	11	0.03	21.90	3.76	1.10	6.19	1.65
9	8	0.09	8.24	1.92	1.10	2.54	1.32
10	18	0.01	3.64	0.94	0.85	0.79	0.84
11	41	0.01	11.00	1.64	0.73	2.57	1.57

Capping analysis for the Bouéré deposit indicated a cap of 30g/tAu for 4 domains, with 7 domains which did not need capping due to a lack of high-grade outliers. Descriptive statistics for the capped 1m composites were derived for each of the domains, as shown in Table 14-13.

Table 14-13: Bouéré deposit: capped descriptive statistics

Domain No	Count	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	172	0.01	30.00	4.02	1.70	6.21	1.54
2	237	0.01	30.00	4.69	1.48	7.92	1.69
3	100	0.01	30.00	5.75	2.56	7.93	1.38
4	33	0.08	5.85	1.38	1.00	1.44	1.05
5	14	0.03	5.18	1.26	0.84	1.42	1.13
6	8	0.01	4.37	1.93	1.64	1.36	0.70
7	98	0.02	30.00	6.68	2.02	9.47	1.42
8	11	0.03	21.90	3.76	1.10	6.19	1.65
9	8	0.09	8.24	1.92	1.10	2.54	1.32
10	18	0.01	3.64	0.94	0.85	0.79	0.84
11	41	0.01	11.00	1.64	0.73	2.57	1.57

Figure 14-7: Bouéré deposit: all domains 1m uncapped composites - log probability plot (source: Endeavour)

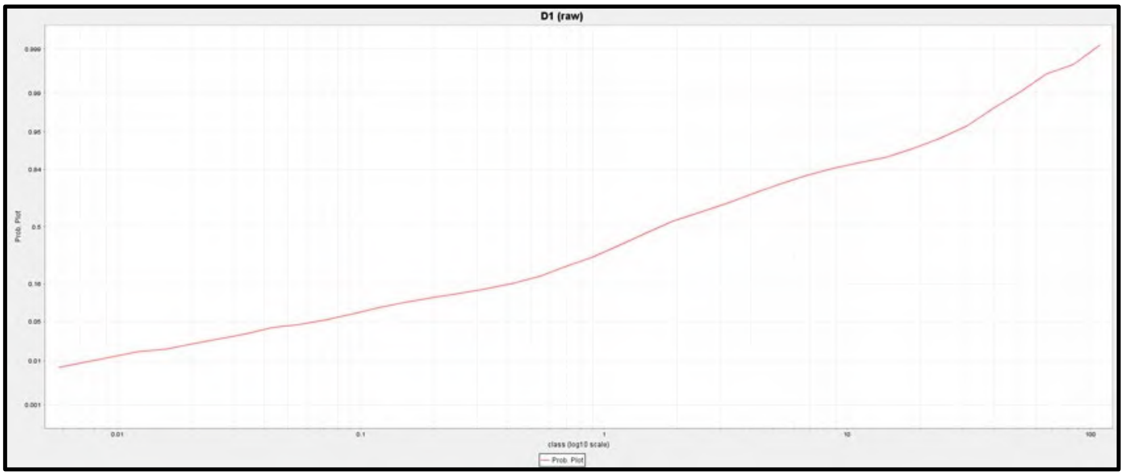


Figure 14-8: Bouéré deposit: all domains 1m uncapped composites - log histogram plot (source: Endeavour)

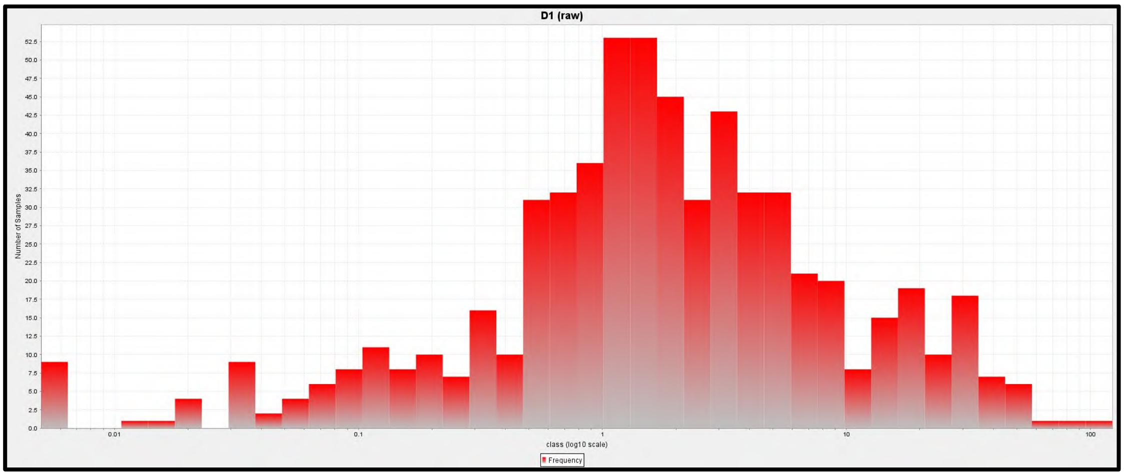
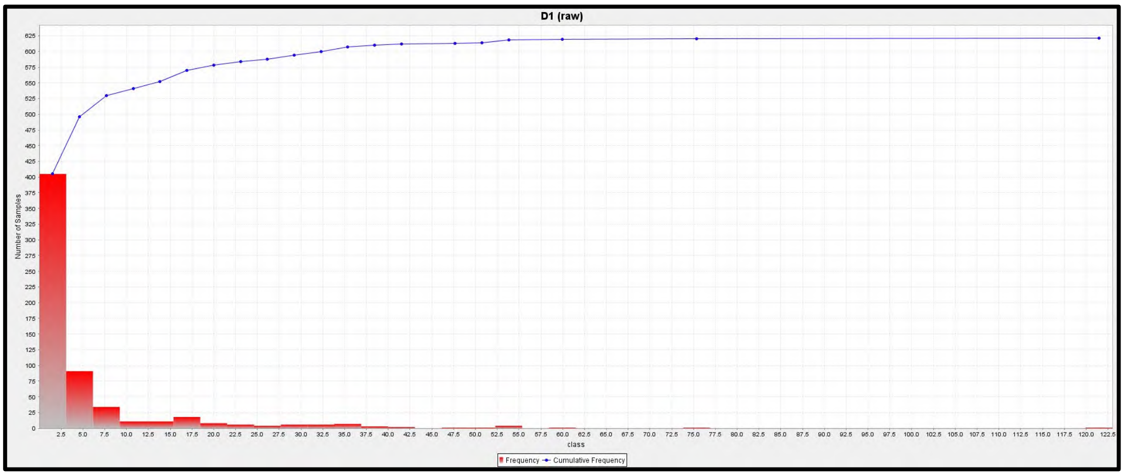


Figure 14-9: Bouéré deposit: all domains 1m uncapped composites – histogram / cumulative frequency plot (source: Endeavour)



Variography

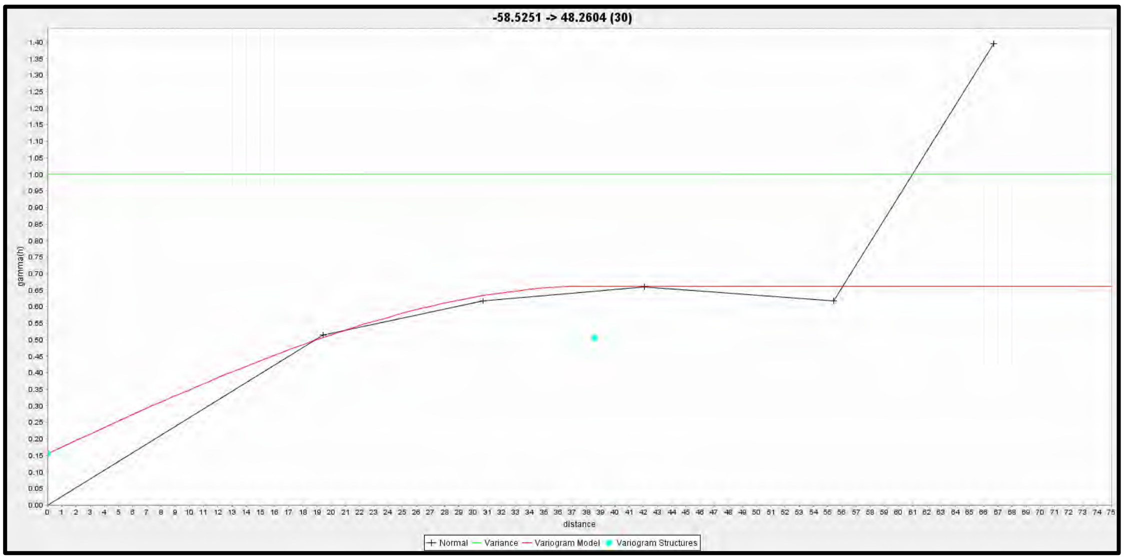
Variogram parameters were derived for the most sampled mineralisation domains within the project areas. Variogram modelling for the more sparsely sampled domains was difficult and not considered appropriate for use as the number of composite samples was limited. In these cases, the parameters were adopted based on adjacent mineralised domains and the directions and anisotropy ratios modified to best suit the geometry of the domain under consideration.

Variogram ranges were typically in the order of 30m to 50m indicating maximum spatial continuity is greater than the average drill hole spacing. The variogram parameters are given in Table 14-14 and illustrated in Figure 14 27.

Table 14-14: Bouéré deposit: capped descriptive statistics

Domain No	Nugget	Sill	Range			Surpac Rotation		
			Major (m)	Semi-major (m)	Minor (m)	Bearing (°)	Plunge (°)	Dip (°)
1-2	0.16	0.51	38	38	10	48	-58	31

Figure 14-10: Bouéré deposit: Domain 1-2 Variogram (source: Endeavour)



Block Modelling

The block model was created in GEOVIA Surpac^{TM}. The block model set-up for the Bouéré deposit is presented in Table 14-15. Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit ("**SMU**").

Table 14-15: Bouéré deposit: block model definition

Axis	Minimum	Maximum	Model Extent
Y	Y	1,268,350	1,268,980
X	X	429,030	430,050
Z	Z	150	380
Parent Cell Y	Parent Cell Y	5	Min. Sub-Cell Y
Parent Cell X	Parent Cell X	5	Min. Sub-Cell X
Parent Cell Z	Parent Cell Z	2.5	Min. Sub-Cell Z
Rotation from Y	Rotation from Y	-	-

The block model attributes and descriptions are summarised in Table 14-16.

Table 14-16: Bouéré deposit: block model attributes

Attribute	Description
au_30cap	Gold estimate (g/t Au)
ave_dist	Average distance to samples (m)
class	1=Measured; 2=Indicated; 3=Inferred
density	Specific gravity
near_sample	Distance to nearest sample (m)
number_samp	Number of samples
orezone	Mineralised zone domain code
weathering	Weathering type

Grade Estimation

Grade interpolation for the Bouéré deposit used IDW3 for each mineralised domain using the coded 1m composite data specific to that domain. The grade was estimated in two passes using IDW3 rather than by OK as the variography was inconclusive due to the relatively low continuity of the mineralisation and the small number of informing points per domain. The grade estimation parameters are summarised in Table 14-17.

Table 14-17: Bouéré deposit: grade estimation parameters

Domain No	Min. No. Composites (No)	Max. No. Composites. (No)	Search Radius (pass 1) (m)	Search Radius (pass 2) (m)	Azimuth of Major Axis (°)	Plunge of Major Axis (°)	Dip of Major Axis (°)
1	4	20	40	75	330	(80)	-
2	4	20	40	75	330	(80)	-
3	4	20	40	75	330	(80)	-
4	4	20	40	75	330	(80)	-
5	4	20	40	75	330	(80)	-
6	4	20	40	75	330	(80)	-
7	4	20	40	75	330	(80)	-
8	4	20	40	75	330	(80)	-
9	4	20	40	75	330	(80)	-
10	4	20	40	75	330	(80)	-

Block Model Validation

Block grades within the domains have been compared with the composite grades. Initially a visual validation was undertaken comparing the block estimates with the composite data in cross section and plan. The estimates honoured the composite data well with some degree of grade smoothing of the block estimates as would be expected from Inverse Distance. The mean block estimate for each domain was also compared to the mean composite grade of the corresponding domain (Table 14-18).

Table 14-18: Bouéré deposit: block model estimate compared to composites

Domain No	Tonnes (t)	Composites (No)	Mean composite grade Au capped (g/tAu)	Block Grade (g/tAu)	Relative Difference (%)
1	302,873	172	4.02	3.32	17
2	650,321	237	4.69	3.91	17
3	240,009	100	5.75	6.13	(7)
4	81,126	33	1.38	1.37	1
5	41,528	14	1.26	1.15	9
6	31,681	8	1.93	2.08	-8
7	126,013	98	6.68	6.15	8
8	31,282	11	3.76	2.39	36
9	28,556	8	1.92	1.85	4
10	32,389	18	0.94	1.01	(7)
11	98212	41	1.64	1.92	(17)

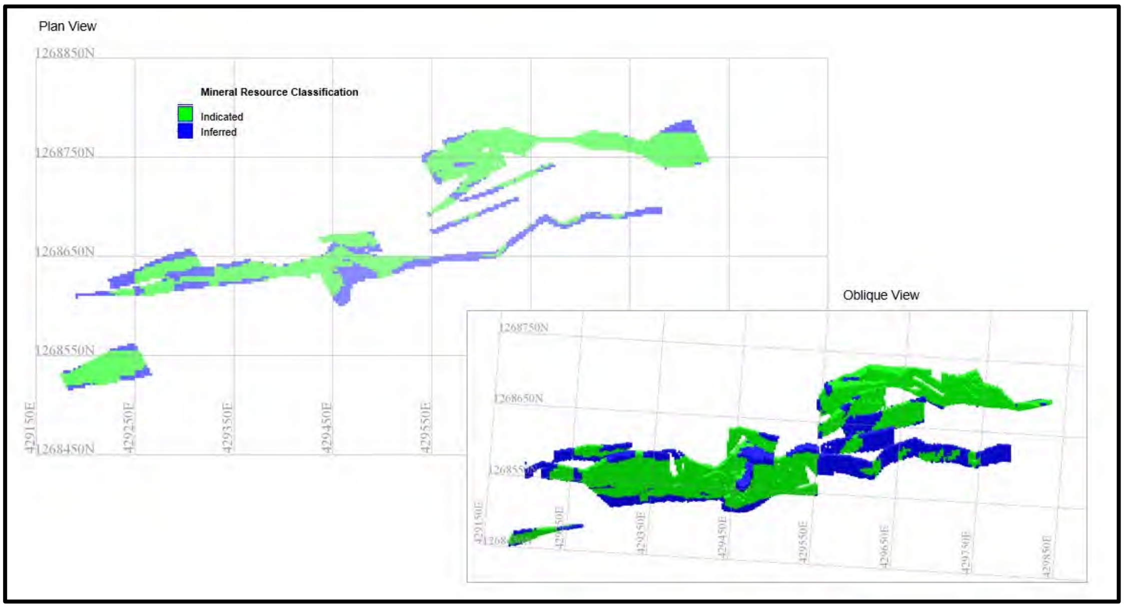
Mineral Resource Classification

Mineralisation at the Bouéré deposit is sufficiently drilled to allow classification in accordance with the CIM guidelines. No Measured Mineral Resources were defined. Indicated Mineral Resources were defined as areas with a drill spacing of approximately 30m to 50m (depending on zone), as established by the geostatistical analysis. A two-pass search strategy was used for grade estimation and the Indicated Mineral Resource is confined to blocks estimated within the first pass search. Inferred Mineral Resources include all remaining estimated mineralisation defined either by a drill spacing of greater than 30m to 50m or estimated within the second pass search . The classification applied to the Kari Pump deposits is shown in Figure 14-11.

Mineral Resource Statements

The Mineral Resource Statements for the Bouéré deposit is presented in Section 14.13 of this Technical Report.

Figure 14-11: Bouéré deposit: Block model coloured by classification (source: Endeavour)



14.5 Dohoun Deposit

Lithology

The Dohoun deposit is not lithologically modelled as the mineralisation is generally structurally controlled and strong alteration has often masked lithological changes/differences.

Weathering

Weathering surfaces (DTMs) were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac™ along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-19.

Table 14-19: Dohoun deposit: weathering modelling and codes

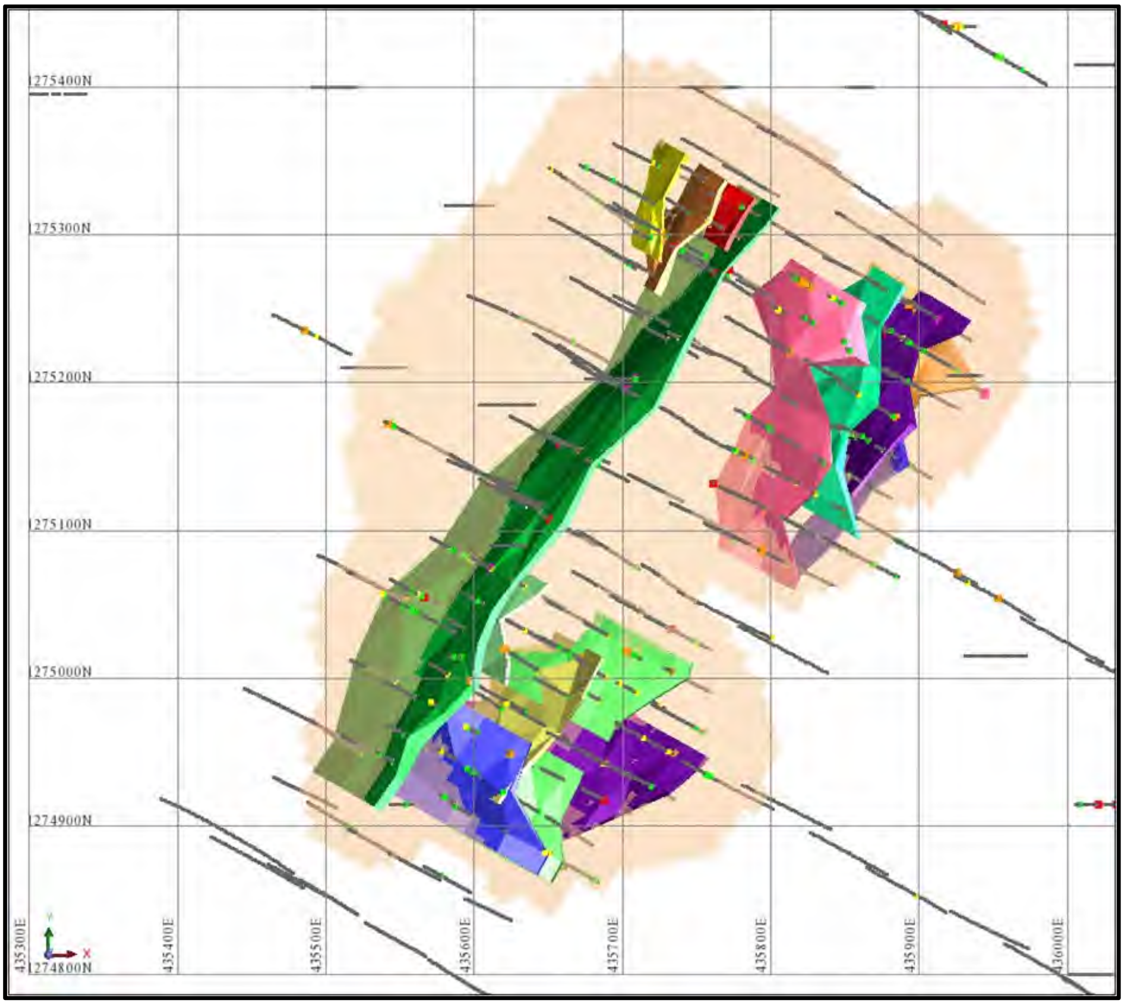
Weathering Type	Vindaloo-Madras
Air	
Laterite	LATR
Overburden	
Saprolite	SAPR
Saprock / Transition	TRANS
Fresh / Bedrock	BDRK

Dohoun is covered by a laterite cover, typically 3m to 6m thick, up to 10m; the laterite is not mineralised. The saprolite is generally 15m thick and varies between 10m and 20m thick. The saprock (transition) material is typically between 5m and 10m thick. The weathering domains lie relatively parallel to the topography and one another.

Mineralisation

Mineralisation at Dohoun was interpreted on 25m spaced sections, snapped to drill holes, based on lithological, structural, mineralisation and assay data with a threshold of 0.5g/tAu. Sixteen mineralised zones or lenses were modelled. A single long lens trends north-northeast and encapsulates mineralisation associated with the shear zone in the western margins of the granodiorite, with a group of lenses in the southeast and another group in the northeast within the granodiorite. The modelled mineralisation is illustrated in Figure 14 5

Figure 14-12: Dohoun deposit: Mineralisation Lenses with Drill Traces – Plan View (source: Endeavour)



Density

414 density measurements were taken at the Dohoun deposit. The densities do not vary significantly for the different weathering domains within the deposit and the densities assigned to the respective block models are presented in Table 14-20.

Table 14-20: Dohoun deposit: assigned density

Laterite (t/m^3)	Saprolite (t/m^3)	Saprock/Transition (t/m^3)	Fresh/Bedrock (t/m^3)
1.90	1.80	2.30	2.74

Statistical Analysis

Each drill hole database for each deposit has been coded for drill intercepts within each of the mineralised domains. This coded interval is then used to control the raw assay analysis, compositing process, capping analysis, and variography by vein and/or domain. The codes included in the database for the Dohoun deposit is OREZONE & ORECODE.

There are slight differences in the capping and compositing order for the separate Houndé Gold Mine deposits due to different estimation dates, QPs and methodologies. These differences are not considered to be material or significant. At the Bouéré deposit capped composites were used (see Section 14.3 for addition details regarding the general approach).

Assay sample lengths varied from 0.1m to 3m with the mean length of 1.1m and median of 1m. To ensure equal sample support, 1m downhole composites were generated. Any composites less than 50% of the 1m composite interval are ignored. Descriptive statistics and plots for the 1m uncapped composites were derived and reviewed for each of the domains (Table 14-21 and Figure 14 13 to Figure 14 15).

Table 14-21: Dohoun deposit: uncapped descriptive statistics

Domain No (No)	Count (No)	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	322	0.005	38.50	3.08	1.27	5.70	1.85
2	18	0.02	7.27	1.79	1.35	1.73	0.97
3	55	0.02	9.11	1.93	1.26	2.07	1.07
4	21	0.005	15.9	3.47	1.86	3.83	1.10
5	85	0.01	5.70	1.35	0.80	1.45	1.08
6	101	0.005	17.10	1.79	1.03	2.48	1.39
7	104	0.005	25.6	1.85	1.66	2.90	1.57
8	38	0.005	8.41	1.32	0.81	1.64	1.24
9	33	0.01	6.7	1.55	0.71	1.77	1.14
10	89	0.005	10.4	1.38	0.74	1.98	1.44
11	89	0.005	25.5	1.29	0.81	2.85	2.20
12	27	0.005	5.57	1.88	1.73	1.50	0.80
13	48	0.005	6.14	1.02	0.68	1.20	1.18
14	38	0.19	36.70	2.33	0.68	5.87	2.52
15	37	0.008	15.00	1.20	0.64	2.46	2.04

Figure 14-13: Dohoun deposit: all domains 1m uncapped composites - log probability plot (source: Endeavour)

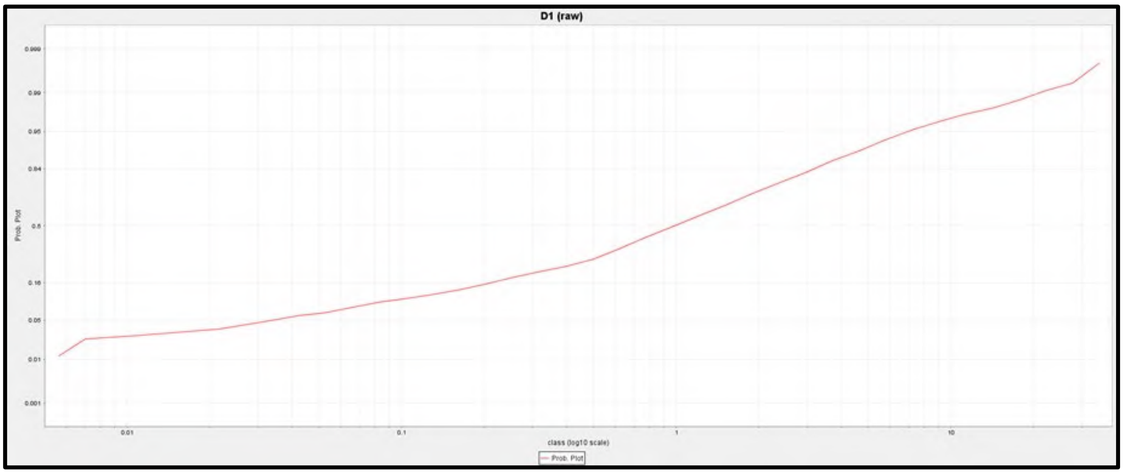


Figure 14-14: Dohoun deposit: all domains 1m uncapped composites - log probability plot (source: Endeavour)

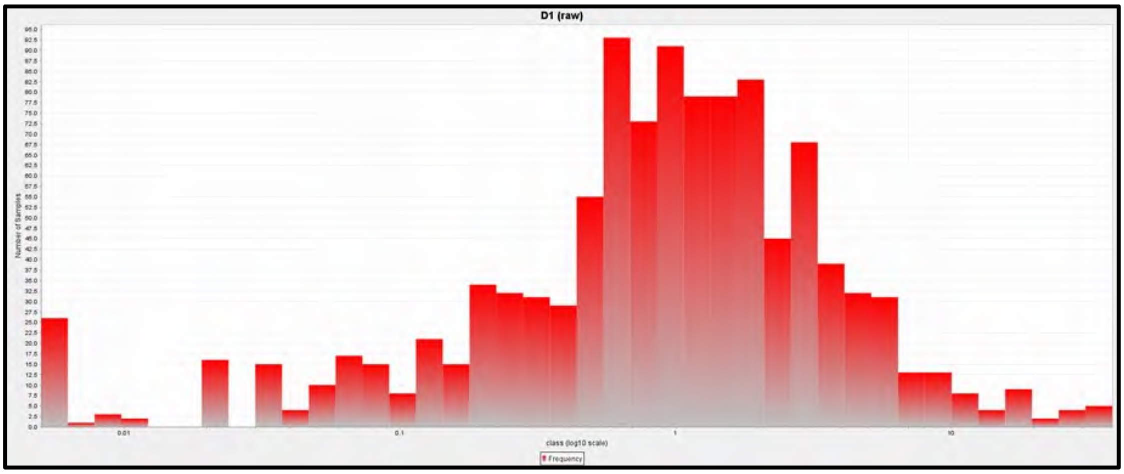
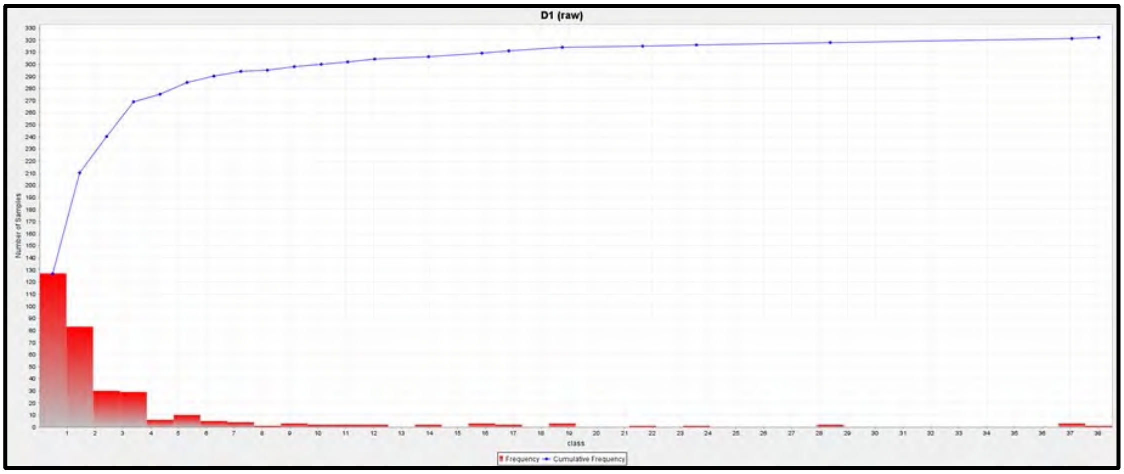


Figure 14-15: Dohoun deposit: all domains 1m uncapped composites - log probability plot (source: Endeavour)



Capping analysis for Dohoun indicated a cap between 10g/tAu and 20g/tAu for 8 domains, with 7 domains not requiring capping due to a lack of high-grade outliers. Basic descriptive statistics for the capped gold composites were calculated for each of the domains, as shown in Table 14-22.

Table 14-22: Dohoun deposit: capped descriptive statistics

Domain No	Count (No)	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	322	0.005	20.00	2.80	1.27	4.31	1.54
2	18	0.02	7.27	1.79	1.35	1.73	0.97
3	55	0.02	9.11	1.93	1.26	2.07	1.07
4	21	0.005	10.00	3.20	1.86	3.05	0.95
5	85	0.01	5.70	1.35	0.80	1.45	1.08
6	101	0.005	10.00	1.69	1.03	1.96	1.16
7	104	0.005	10.00	1.70	1.17	1.90	1.10
8	38	0.005	8.41	1.32	0.81	1.64	1.24
9	33	0.01	6.70	1.55	0.71	1.77	1.14
10	89	0.005	10.00	1.37	0.74	1.96	1.43
11	89	0.005	10.00	1.12	0.82	1.53	1.37
12	27	0.005	5.57	1.88	1.73	1.50	0.80
13	48	0.005	6.14	1.02	0.68	1.20	1.18
14	38	0.19	10.00	1.62	0.68	2.11	1.30
15	37	0.008	10.00	1.06	0.64	1.72	1.61

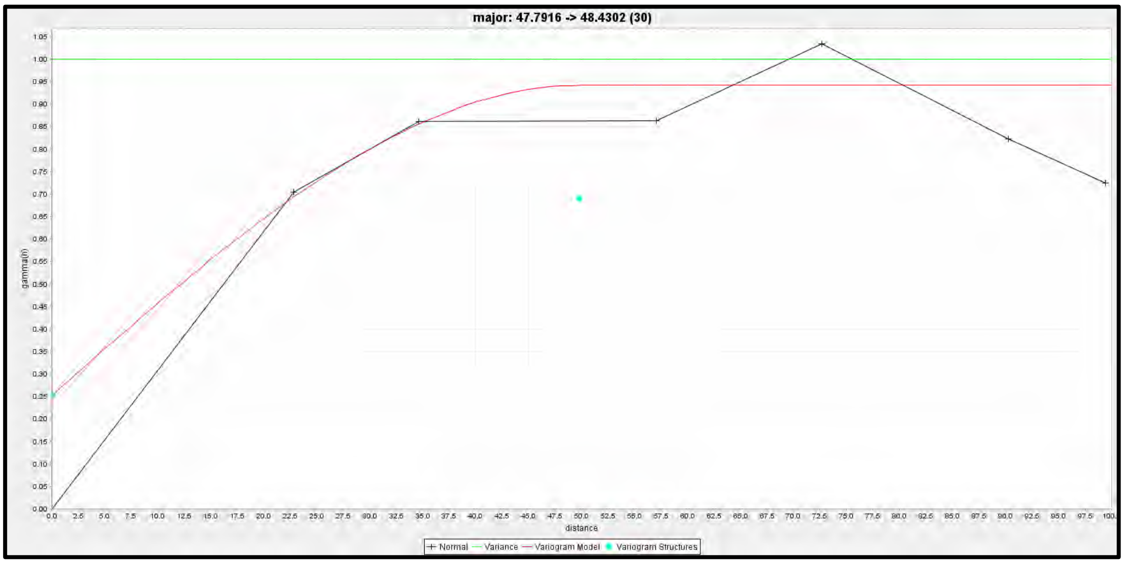
Variography

To determine variograms for the Dohoun deposit, the same approach as for the Bouéré deposit was applied. The variogram parameters are given in Table 14-23 and illustrated in Figure 14-16.

Table 14-23: Dohoun deposit: capped descriptive statistics

Domain No	Nugget	Sill	Range			Surpac Rotation		
			Major (m)	Semi-major (m)	Minor (m)	Bearing (°)	Plunge (°)	Dip (°)
1	0.25	0.69	50	50	10	48	48	51

Figure 14-16: Dohoun deposit: Domain 1-2 Variogram (source: Endeavour)



Block Modelling

The block model was created in GEOVIA Surpac™. The block model set-up for the Dohoun deposit is presented in Table 14-24. Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit ("**SMU**").

Table 14-24: Dohoun deposit: block model definition

Axis	Minimum	Maximum	Model Extent
Y	1,274,875	1,275,675	800
X	435,275	435,775	500
Z	110	340	230
Parent Cell Y	5	Min. Sub-Cell Y	2.5
Parent Cell X	5	Min. Sub-Cell X	2.5
Parent Cell Z	2.5	Min. Sub-Cell Z	2.5
Rotation from Y	32	-	-

The block model attributes and descriptions are summarised in Table 14-25.

Table 14-25: Dohoun deposit: block model attributes

Attribute	Description
au_id3	Gold estimate cut (g/t Au)
ave_dist	Average distance to samples (m)
class	1=Measured; 2=Indicated; 3=Inferred
nearest_sample	Nearest sample for estimate (m)
number_samples	Number of samples in estimate
orezone	Mineralised zone domain code
sg	Specific gravity
weathering	Weathering type. Air, Laterite (latr), Saprolite (sapr), Transitions(sprk), Fresh(bdrk)

Grade Estimation

Grade interpolation for Dohoun used IDW3 for each mineralised domain using the coded 1m composite data specific to that domain. OK was not used due to poor variograms. The grade was estimated in two passes. The grade estimation parameters are summarised in Table 14-26.

Table 14-26: Dohoun deposit: grade estimation parameters

Domain No	Min. No. Composites (No)	Max. No. Composites. (No)	Search Radius (pass 1) (m)	Search Radius (pass 2) (m)	Azimuth of Major Axis (°)	Plunge of Major Axis (°)	Dip of Major Axis (°)
1	4	20	50	75	300	-74	0
2	4	20	30	75	280	-70	0
3	4	20	30	75	300	-70	0
4	4	20	30	75	300	-70	0
5	4	20	35	75	275	-35	0
6	4	20	35	75	280	-45	0
7	4	20	35	75	290	-45	0
8	4	20	35	75	295	-30	0
9	4	20	35	75	300	-70	0
10	4	20	35	75	300	-60	0
11	4	20	35	75	330	-35	0
12	4	20	35	75	300	-30	0
13	4	20	35	75	300	-30	0
14	4	20	35	75	300	-70	0
15	4	20	35	75	300	-30	0

Block Model Validation

For the Dohoun deposit, block grades within the domains have been compared with the composite grades. Initially a visual validation was undertaken comparing the block estimates with the composite data in cross section and plan. The estimates honoured the composite data well with some degree of grade smoothing of the block estimates as would be expected from Inverse Distance. The mean block estimate for each domain was also compared to the mean composite grade of the corresponding domain (Table 14-27). Although these two parameters are not strictly comparable due to data clustering and volume influences, they do provide a useful validation tool in detecting any major biases and allow the comparison between input composite grade and the estimated block grade. The global comparisons for gold indicate good agreement between composites and estimates throughout much of the deposit. Locally areas of deviation occur but these are generally the result of data clustering.

Table 14-27: Dohoun deposit: block model estimate compared to composites

Domain No	Tonnes (t)	Composites (No)	Mean composite grade Au capped (g/tAu)	Block Grade (g/tAu)	Relative Difference (%)
1	921,092	322	3.08	2.81	10
2	27,695	18	1.79	2.30	(22)
3	60,683	55	1.93	1.86	4
4	19,835	21	3.47	2.96	17
5	93,815	85	1.35	1.27	6
6	139,660	101	1.79	1.72	4
7	142,445	104	1.85	1.76	5
8	57,112	38	1.32	1.34	(1)
9	48,431	33	1.55	1.59	(3)
10	129,567	89	1.38	1.31	5
11	160,593	89	1.29	1.17	10
12	33,791	27	1.88	1.90	(1)
13	51,048	48	1.02	0.99	3
14	56,413	38	2.33	1.83	27
15	26,284	37	1.20	1.25	(4)
1	921,092	322	3.08	2.81	10

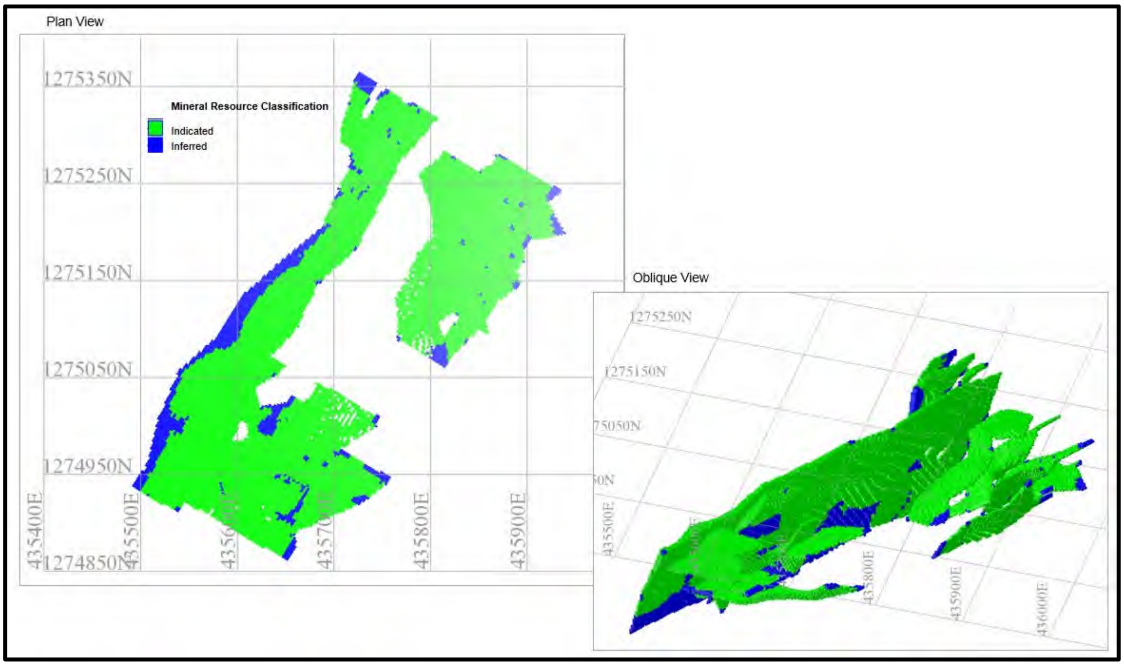
Mineral Resource Classification

Mineralisation at Dohoun is sufficiently drilled to allow classification in accordance with the CIM guidelines. No Measured Mineral Resources were defined. Indicated Mineral Resources are defined as areas with a drill spacing within the 30m to 50m limits (depending on zone) established by the geostatistical analysis. A two-pass search strategy was used for grade estimation and the Indicated Mineral Resource is confined to blocks estimated within the first pass search. Inferred Mineral Resources include all remaining estimated mineralisation defined either by a drill spacing greater than 30m to 50m or estimated within the second pass search . The classification applied to the Kari Pump deposits is shown in Figure 14-17.

Mineral Resource Statements

The Mineral Resource Statements for the Dohoun deposit is presented in Section 14.13 of this Technical Report.

Figure 14-17: Dohoun deposit: Block model coloured by classification (source: Endeavour)



14.6 Kari Pump Deposit

Lithology

The Kari Pump deposit local lithological interpretation is based on geological logging. Geological profiles were interpreted in Leapfrog GEO and surfaces and solids created, as summarised in Table 14 4. The interpretation polylines were based mainly on 40m spaced sections and included some 33 m spaced sections in the western part of the deposit.

Table 14-28: Kari Pump deposit: lithological modelling and codes

Lithology	3DM
Exhalative Sediments	gm_kpe_grplitho_-_exhalatif_sed.dtm
Mafic Intrusion	gm_kpe_grplitho_-_mafic_intrusif.dtm
Mylonite	gm_kpe_grplitho_-_mylonite.dtm
Volcanic Sediments	gm_kpe_grplitho_-_volcanosed.dtm

Weathering

Weathering surfaces (DTMs) were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac™ along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-29.

The laterite and saprolite are relatively thick at Kari Pump with an average thickness ranging from 50m to 85m combined. The lateritic cover averages about 12m in thickness whereas saprolite has an average thickness of approximately 60m.

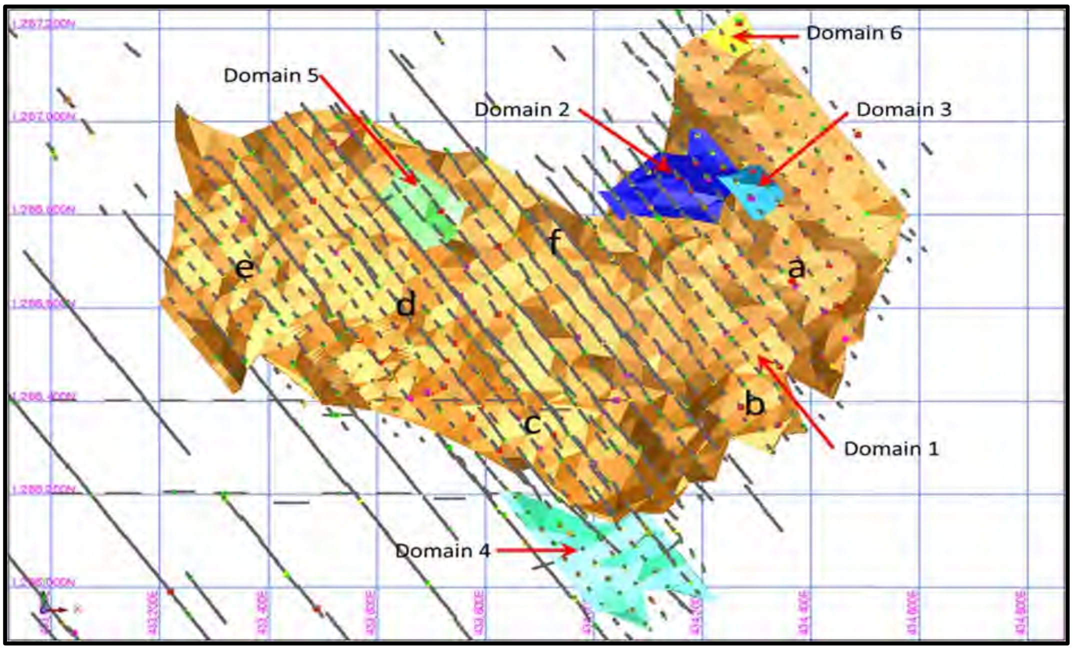
Table 14-29: Kari Pump deposit: weathering modelling and codes

Weathering Type	Vindaloo-Madras
Air	
Laterite	LATR
Overburden	
Saprolite	SAPR
Saprock / Transition	TRANS
Fresh / Bedrock	BDRK

Mineralisation

A total of 6 mineralisation domains were modelled at Kari Pump (Figure 14-18). The interpretations were completed on 40m and 33m spaced sections, snapped to drill holes. The interpretation is based on local geological knowledge and a threshold of 0.3g/tAu. Typically, a minimum width of 2m of mineralised zone was used, which resulted in lower grade material being occasionally included. The interpretations are not typically extended more than 30m along strike or down-dip past the last drill hole. Occasionally, sectional interpretations were extended if needed to provide better continuity. Domain 1 is the main zone and is further subdivided into 6 sub-domains (a to f) to account for the variability in the orientation of the mineralisation. The other 5 mineralised zones have limited extents.

Figure 14-18: Kari Pump deposit: mineralisation lenses with drill traces (source: Endeavour)



Density

4,046 density measurements were taken at the Kari Pump deposit. The densities do not vary significantly for the different weathering domains within the deposit and the densities assigned to the respective block models are presented in Table 14-30.

Table 14-30: Kari Pump deposit: assigned density

Laterite (t/m^3)	Saprolite (t/m^3)	Saprock/Transition (t/m^3)	Fresh / Bedrock (t/m^3)
2.00	1.80	2.25	2.74

Statistical Analysis

Each drill hole database for each deposit has been coded for drill intercepts within each of the mineralised domains. This coded interval is then used to control the raw assay analysis, compositing process, capping analysis, and variography by vein and/or domain. The codes included in the database for the Kari Pump deposit is MIN_ZONE & WFRM.

There are slight differences in the capping and compositing order for the separate Houndé Gold Mine deposits due to different estimation dates, QPs and methodologies. These differences are not considered to be material or significant. At the Kari Pump deposit capped composites were used (see Section 14.3 for addition details regarding the general approach).

Assay sample lengths varied from 0.15m to 6m with the mean length of 1.03m and median of 1m. To ensure equal sample support, 1m downhole composites were generated. Any composites less than 50% of the 1m composite interval are ignored.

The statistics of the composites were reviewed to check for outlier composite grades prior to estimation. The composite data was reviewed using histograms, log-histograms, log-probability plots, high grade sensitivity analysis and graphical inspection of the spatial grade distribution. The composite data was reviewed for each individual domain (Table 14-31). Log probability and histogram plots for the 1m composites for domain 1 are shown in Figure 14-19 and Figure 14-20.

Table 14-31: Kari Pump deposit: uncapped descriptive statistics

Domain No (No)	Count (No)	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	3,851	0.003	406.0	3.0	1.1	13.0	4.3
2	72	0.022	25.9	3.2	1.7	5.0	1.5
3	25	0.014	23.4	2.6	1.1	4.7	1.8
4	147	0.003	13.4	1.4	0.8	2.0	1.4
5	63	0.003	8.5	1.8	0.8	1.9	1.1
6	57	0.060	10.0	1.8	1.0	2.2	1.2

Figure 14-19: Kari Pump deposit: Domain 1 1m uncapped composites – cumulative frequency plot (source: Endeavour)

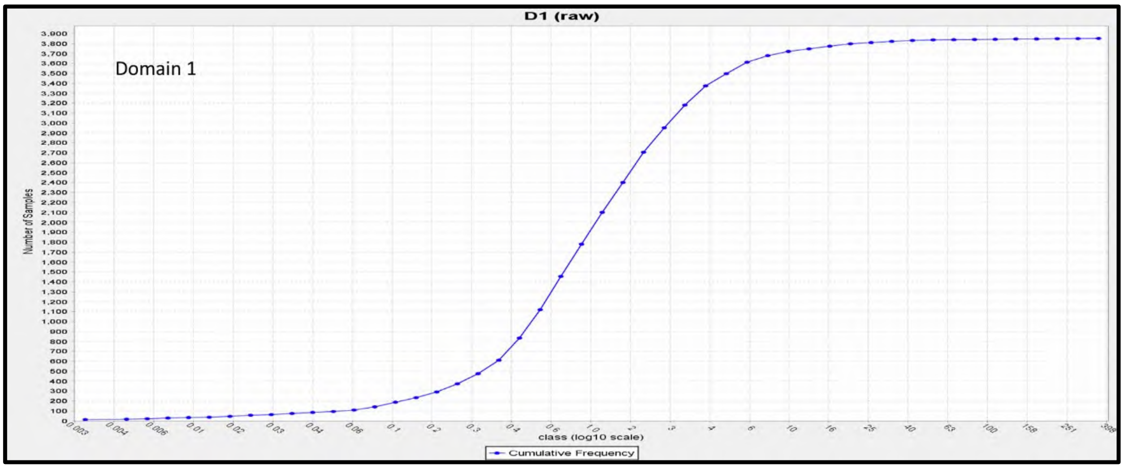
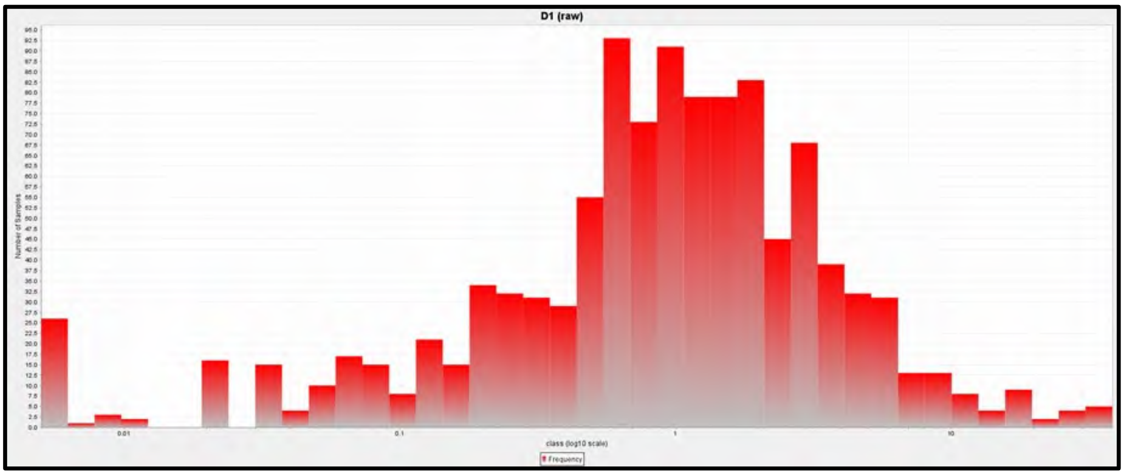


Figure 14-20: Kari Pump deposit: Domain 1 1m uncapped composites – log histogram plot (source: Endeavour)



A top cut of 40g/tAu was determined to be appropriate for Domain 1 and between 10g/tAu to 12g/tAu for three other domains. Two domains were not capped and the descriptive statistics for the capped composites were derived for each of the domains are shown in Table 14-32.

Table 14-32: Kari Pump deposit: capped descriptive statistics

Domain No	Count (No)	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev	CV
1	3,852	0.0025	40	2.5	1.1	4.8	1.9
2	72	0.022	12	2.8	1.2	3.2	1.2
3	25	0.0135	10	2.1	0.8	2.6	1.3
4	147	0.0025	10	1.3	0.4	1.8	1.4
5	63	0.0025	8.46	1.8	0.8	1.9	1.1
6	57	0.06	9.97	1.8	1.0	2.2	1.2

Variography

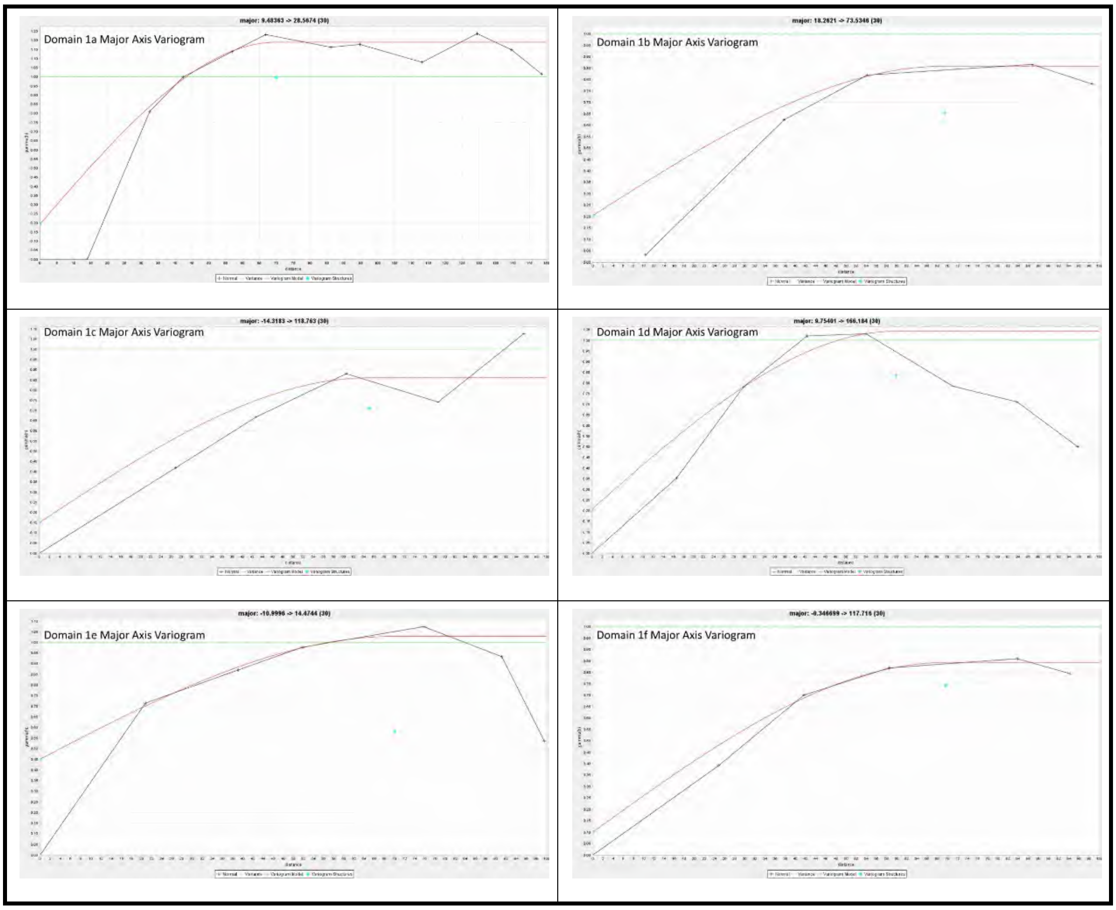
Variogram modelling of the sub-domains of Domain 1 produced reasonable results. The variogram modelling for the more sparsely sampled domains were less well defined, so average parameters were assigned for Domains 2 to 6. Variogram nugget effects were typically in the range of 0.2 to 0.5, indicating a moderate to high degree of short scale variability as would be expected in gold deposits. Variogram ranges were typically in the order of 60m to 70m indicating maximum spatial continuity is greater than the average drill hole spacing.

Table 14-33 below summarises the variogram parameters used in the estimate. The modelled variograms for Domain 1 are shown in Table 14-33.

Table 14-33: Kari Pump deposit: capped descriptive statistics

Domain No	Nugget	Sill	Range	Rotation		
			(m)	Bearing (°)	Plunge (°)	Dip (°)
1a	0.20	1.00	70	28	9	10
1b	0.20	0.65	70	307	(29)	0
1c	0.20	0.70	65	118	(14)	30
1d	0.20	0.80	60	167	10	20
1e	0.45	0.60	70	15	(11)	0
1f	0.20	0.75	70	117	(1)	0
2	0.20	1.20	70	257	(14)	20
3	0.20	1.20	60	160	(24)	0
4	0.60	0.60	60	166	19	10
5	0.20	0.20	60	245	(10)	0
6	0.20	0.20	60	213	(10)	0
1a	0.20	1.00	70	28	9	10
1b	0.20	0.65	70	307	(29)	0
1c	0.20	0.70	65	118	(14)	30
1d	0.20	0.80	60	167	10	20

Figure 14-21: Kari Pump deposit: Domain 1 Variograms (source: Endeavour)



Block Modelling

The block model was created in GEOVIA Surpac™. The block model set-up for the Kari Pump deposit is presented in Table 14-34. Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit ("**SMU**").

Table 14-34: Kari Pump deposit: block model definition

Axis	Minimum	Maximum	Model Extent
Y	1,266,960	1,268,640	1,680
X	432,650	434,470	1,820
Z	100	430	330
Parent Cell Y	10	Min. Sub-Cell Y	1.25
Parent Cell X	10	Min. Sub-Cell X	1.25
Parent Cell Z	5	Min. Sub-Cell Z	2.5
Rotation from Y	55		

The block model attributes and descriptions are summarised in Table 14-35.

Table 14-35: Kari Pump deposit: block model attributes

Attribute	Description
au_id2	gold grade id2 estimate
au_ok	gold grade ordinary kriging estimate
ave_dist_id	average distance to sample for ID2 estimation
ave_dist_ok	average distance to samples for OK
block_var	OK block variance
class	2=indicated, 3=inferred
cond_bias	OK conditional bias
density	specific gravity
domain	domain within mineralized zone1
krig_eff	OK kriging efficiency
krig_var	OK kriging variance
min_zone	mineralized zone code
nearest_id	distance to nearest sample ID2 estimation
nearest_ok	nearest sample for OK estimation
numb_dhs_id	number drill holes in ID2 estimation
numb_dhs_ok	number drill hole is OK estimation
numb_samp_id	number samples in ID2 estimation
numb_samp_ok	number samples in OK estimation
pass_id	estimation pass ID2 estimation

Attribute	Description
pass_ok	estimation pass for OK estimation
rockcode	rockcode for whittle export
weathering	laterite, saprolite, transition, fresh

Grade Estimation

Grade estimation at Kari Pump was undertaken using OK for each mineralised domain using the coded 1m composites specific to that domain. IDW2 estimation for validation and comparison purposes was also undertaken. All block estimates were based on grade interpolation into parent cells of 10m (Y) by 10m (X) by 5m (Z). Block discretisation points were set to 3 (Y) by 3 (X) by 3 (Z).

Search ellipsoid orientations for each domain interpolation were orientated to follow the direction of the mineralised domain. A two-pass search strategy was used for grade estimation. The first pass search used a search radius of 50 m and was increased for the second search pass to 75m. A minimum of 6 and maximum of 20 samples were stipulated for the first pass, and a minimum of 3 and maximum of 20 for the second pass (Table 14-36) for the estimation parameters used for each domain

Table 14-36: Kari Pump deposit: grade estimation parameters

Domain	Orientation			Pass 1					Pass 2				
	Bearing	Plunge	Dip	Min. No. Comp.	Max. No. Comp..	Search Radius	Major/Semi Major	Major-Minor	Min. No. Comp.	Max. No. Comp..	Search Radius	Major/Semi Major	Major/ /Minor
(No)	(°)	(°)	(°)	(No)	(No)	(m)	Ratio	Ratio	(No)	(No)	(m)	Ratio	Ratio
1a	28	9	10	6	20	50	1	4	3	20	75	1	4
1b	307	-29	0	6	20	50	1	4	3	20	75	1	4
1c	118	-14	30	6	20	50	1	4	3	20	75	1	4
1d	167	10	20	6	20	50	1	4	3	20	75	1	4
1e	15	-11	0	6	20	50	1	4	3	20	75	1	4
1f	117	-1	0	6	20	50	1	4	3	20	75	1	4
2	257	-14	20	6	20	50	1	4	3	20	75	1	4
3	160	-24	0	6	20	50	1	4	3	20	75	1	4
4	166	19	10	6	20	50	1	4	3	20	75	1	4
5	245	-10	0	6	20	50	1	4	3	20	75	1	4
6	213	-10	0	6	20	50	1	4	3	20	75	1	4

Block Model Validation

Block estimates within the modelled domains have been compared with the composite grades in a number of ways. Initially a visual validation was undertaken comparing the block grades with the composite grades in cross section. The estimates compared well with the composite data with a degree of grade smoothing as would be expected from OK.

Swath plots showing the estimated block grade (OK and IDW2), the composite grade, and number of samples were also used for validation. There is generally good agreement between the block estimate and composite mean for all domains. As expected, the OK and IDW2 grades were typically more smoothed when compared to the composite grades. The swath plot for domain 1 is shown in Figure 14-22.

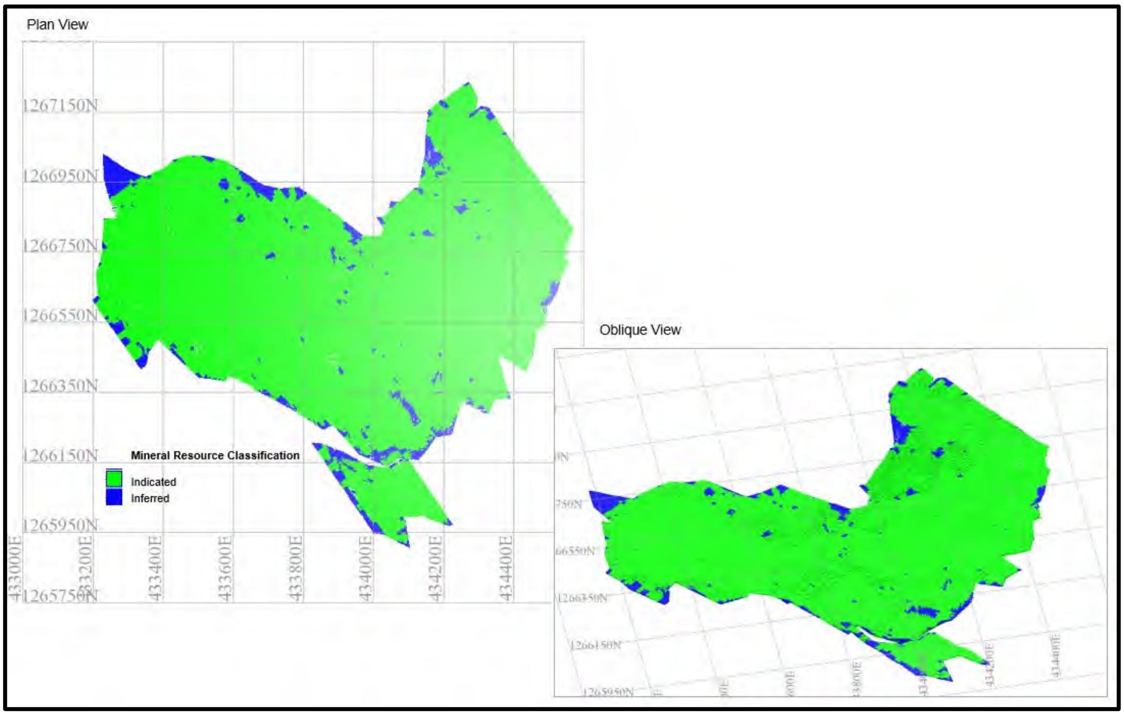
A final validation methodology involved a comparison of the OK estimate against an IDW2 estimate. Above a 0.50g/tAu cut-off, there is very good agreement between the two estimation techniques.

Figure 14-22: Kari Pump deposit: Block Model Validation by Easting for Domain 1 (source: Endeavour)

Mineral Resource Classification

The Kari Pump deposit mineralisation typically shows very good continuity, especially in Domain 1. The drill spacing ranges from 33m by 33m to 40m by 40m over the majority of the modelled area allowing for classification into the Indicated and Inferred Mineral Resource categories. No Measured Mineral Resources are defined. The Indicated Mineral Resources are defined as the area with sufficient composite density and drill spacing for blocks to be estimated in the first search pass. Blocks estimated in the second search pass are classified as Inferred Mineral Resources. The classification applied to the Kari Pump deposits is shown in Figure 14-23.

Figure 14-23: Kari Pump deposit: Block model coloured by classification (source: Endeavour)



Mineral Resource Statements

The Mineral Resource Statements for the Kari Pump deposit is presented in Section 14.13 of this Technical Report.

14.7 Kari Centre

Lithology

Kari Centre was not lithologically modelled as the mineralisation is generally structurally controlled and strong alteration has often masked lithological changes/differences. Additional drilling is planned for 2020 at Kari Centre which may facilitate lithological models being compiled.

Weathering

Weathering surfaces (DTMs) were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac™ along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-37.

Kari Centre is covered in a laterite blanket, ranging between 3m in the southwest, increasing to 12m in the northeast. The cover is generally unmineralised. The thickness of the saprolite varies greatly, from 3m in the southwest to 75m in the northeast. The thickness of the saprock also varies greatly from 50m in the southwest to 7m in the northeast (i.e. the saprolite and saprock thickness have an inversely proportional thickness). The top of the fresh rock is generally between 70m and 90m below surface. Most of the mineralisation is found within the thick saprolite.

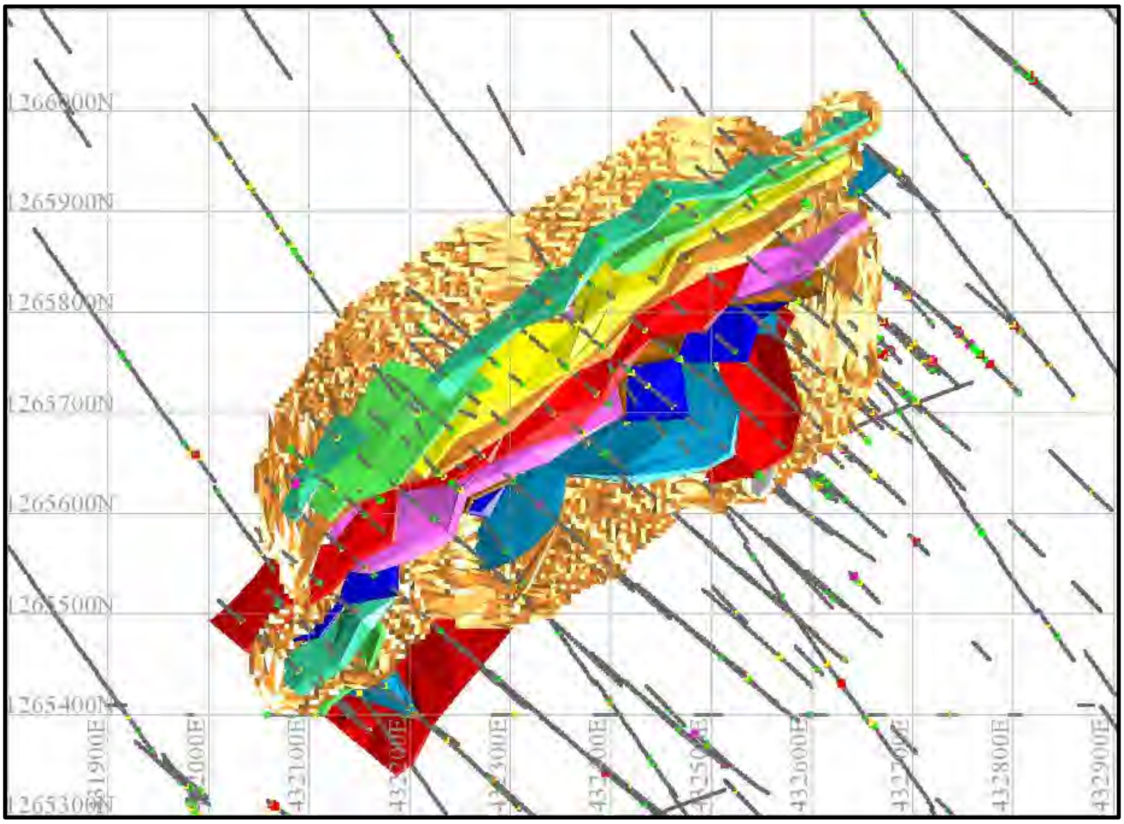
Table 14-37: Kari Centre deposit: weathering modelling and codes

Weathering Type	Vindaloo-Madras
Air	
Laterite	LATR
Overburden	
Saprolite	SAPR
Saprock / Transition	SPRK
Fresh / Bedrock	FRESH

Mineralisation

Mineralisation at Kari Centre is considered to have both a lithological control and a weathering control, in association with a structural control and alteration influence. The interpretation was completed on 40m spaced sections, snapped to drill holes. A threshold of 0.4g/tAu was used to distinguish non-mineralised and mineralised material. A significant proportion of the mineralisation lies within the saprolite, with approximately half of the mineralised structures only within the saprolite. The mineralisation is predominately hosted in 17 mineralised zones/structures (Figure 14-24) delineated by a minimum of two samples down hole. This is equivalent to 2m DTH, representing a "*minimum mining width*" of 1.5m. The up-dip continuation of the mineralised lenses has been stopped at the base of the laterite. The laterite is typically not mineralised.

Figure 14-24: Kari Centre deposit: mineralisation lenses with drill traces – Plan View (source: Endeavour)



Density

147 density measurements were taken at the Kari Centre deposit. The densities do not vary significantly for the different weathering domains within the deposit and the densities assigned to the respective block models are presented in Table 14-38.

Table 14-38: Kari Centre deposit: assigned density

Laterite (t/m^3)	Saprolite (t/m^3)	Saprock/Transition (t/m^3)	Fresh / Bedrock (t/m^3)
2.12	1.77	2.27	2.75

Statistical Analyses

At Kari Centre, assays were capped prior to compositing. The raw assay descriptive statistics by domain are presented in Table 14-39. The data was reviewed by individual domain using histograms, log-histograms, log-probability plots, high grade sensitivity analysis and graphical inspection of the spatial grade distribution (Figure 14-25 16 to Figure 14-27). A cap of 6g/tAu was selected for all domains.

The capped assays were composited to 1m, using a best fit methodology, and composites of less than 50% being ignored. The capped composite descriptive statistics are presented in Table 14-40.

Table 14-39: Kari Centre deposit: raw assay descriptive statistics

Statistic	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	All
Host Rock	Volc	Volc	Volc	Volc	Volc FW	Volc FW	Volc FW	ALT	Volc Stringer	Sed	S Sed	Sed	Sed	Qz vn Sed	Volc	
Count	67	76	140	159	227	313	226	503	289	127	103	56	41	150	39	2,532
Minimum (g/tAu)	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.0025
Maximum (g/tAu)	4.99	6.80	4.11	11.70	26.50	23.60	13.50	15.10	123.50	24.70	4.36	14.70	15.65	8.64	4.49	123.50
Mean (g/tAu)	0.87	0.66	0.80	1.07	1.47	1.23	1.37	1.18	1.64	1.22	0.64	1.35	0.93	0.95	1.07	1.20
Median (g/tAu)	0.63	0.48	0.59	0.75	0.90	0.80	0.99	0.78	0.69	0.71	0.36	0.55	0.55	0.50	0.69	0.73
Variance	1.08	0.86	0.66	1.96	6.74	2.91	3.05	2.10	56.28	7.44	0.64	4.90	5.63	1.91	0.89	9.45
Std Dev	1.04	0.93	0.81	1.40	2.60	1.71	1.75	1.45	7.50	2.73	0.80	2.21	2.37	1.38	0.94	3.07
CV	1.19	1.39	1.01	1.30	1.77	1.39	1.28	1.23	4.58	2.24	1.25	1.64	2.55	1.45	0.88	2.55

Table 14-40: Kari Centre deposit: capped 1m composite descriptive statistics

Statistic	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	All
Host Rock	Volc	Volc	Volc	Volc	Volc FW	Volc FW	Volc FW	ALT	Volc Stringer	Sed	S Sed	Sed	Sed	Qz vn Sed	Volc	
Count	67	74	139	157	225	308	221	500	285	126	98	57	39	146	39	2,481
Minimum (g/t Au)	0.0025	0.006	0.01	0.0025	0.006	0.0025	0.0025	0.0025	0.0025	0.009	0.0025	0.0025	0.007	0.0025	0.005	0.0025
Maximum (g/t Au)	4.99	6.00	4.11	6.00	6.00	6.00	6.00	6.00	6.00	6.00	4.36	6.00	6.00	6.00	4.49	6.00
Mean (g/t Au)	0.92	0.72	0.81	1.04	1.28	1.17	1.26	1.15	1.09	0.98	0.66	1.23	0.71	0.94	1.07	1.08
Median (g/t Au)	0.80	0.54	0.60	0.76	0.91	0.84	1.01	0.82	0.70	0.71	0.40	0.56	0.55	0.52	0.69	0.75
Variance	1.02	0.76	0.66	1.30	1.53	1.15	1.45	1.28	1.68	0.96	0.65	2.05	0.94	1.45	0.89	1.30
Std Dev	1.01	0.87	0.81	1.14	1.23	1.07	1.20	1.13	1.30	0.98	0.81	1.43	0.97	1.20	0.94	1.14
CV	1.10	1.21	1.00	1.10	0.96	0.91	0.96	0.98	1.19	1.00	1.22	1.16	1.37	1.28	0.88	1.06

Figure 14-25: Kari Centre deposit: all domains uncapped assays - log probability plot – Plan View (source: Endeavour)

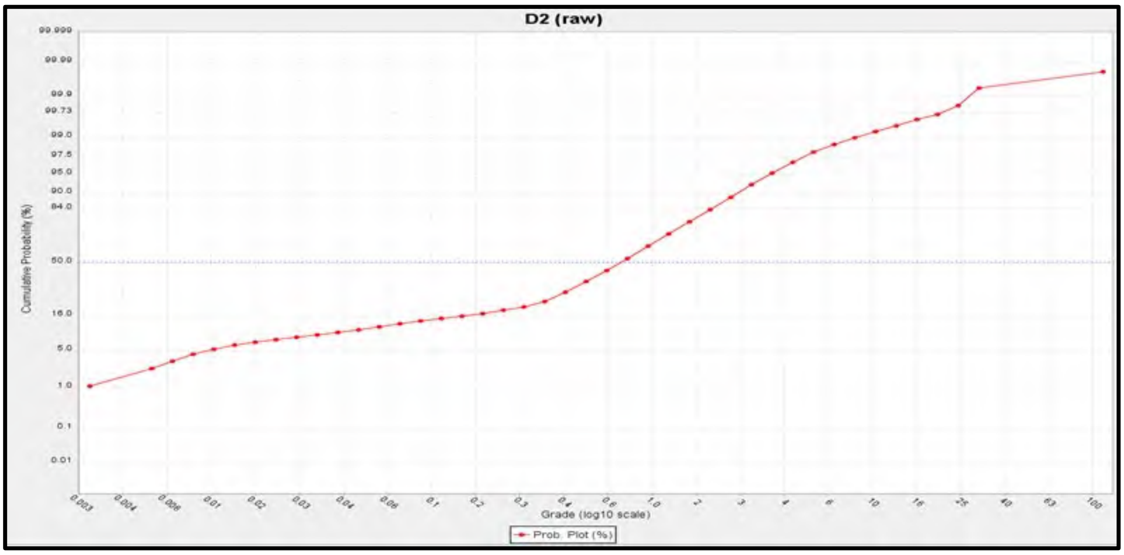


Figure 14-26: Kari Centre deposit: all domains uncapped assays - log histogram plot – Plan View (source: Endeavour)

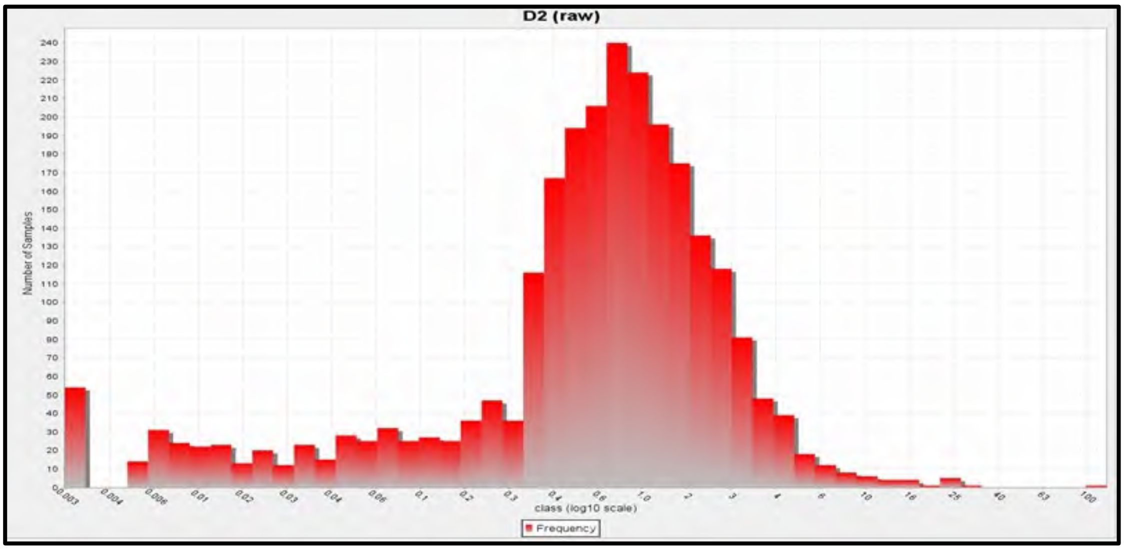
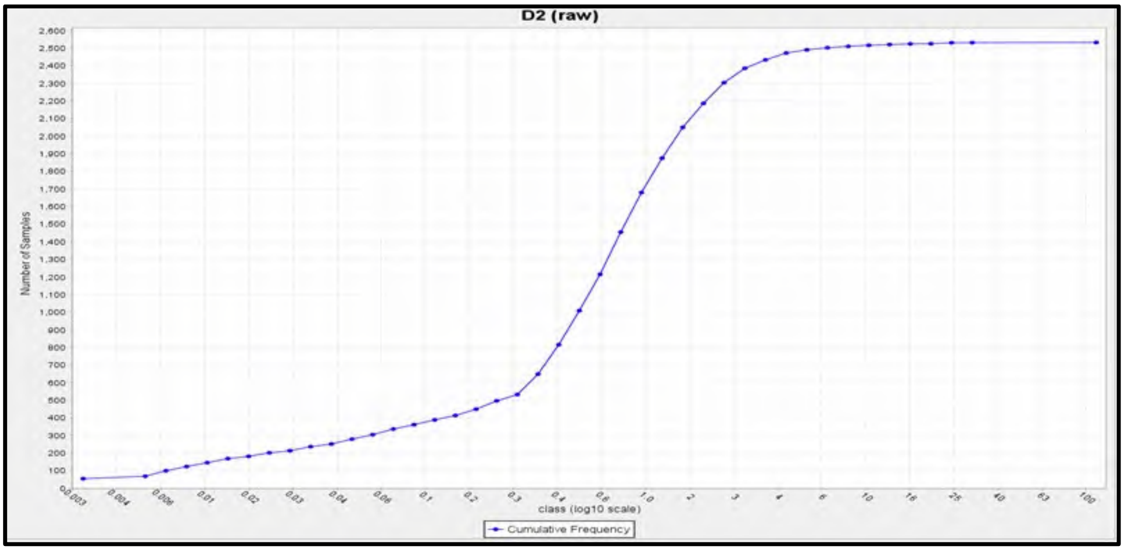


Figure 14-27: Kari Centre deposit: all domains uncapped assays – log cumulative frequency plot (source: Endeavour)



Variography

Variograms were generated for the larger mineralised domains. More than half the wireframes have less than 200 composites and would not generate meaningful variograms. Many of the larger domains also could not produce satisfactory directional variograms (Table 14-41 and Figure 14-28).

Variogram parameters were assigned to smaller domains with directions and anisotropy ratios assigned to best suit the geometry of the domain under consideration (cognisance was taken of nearby larger domain variogram parameters).

Variogram ranges were approximately 60m indicating maximum spatial continuity is greater than the average drill hole spacing.

Table 14-41: Kari Centre deposit: capped descriptive statistics

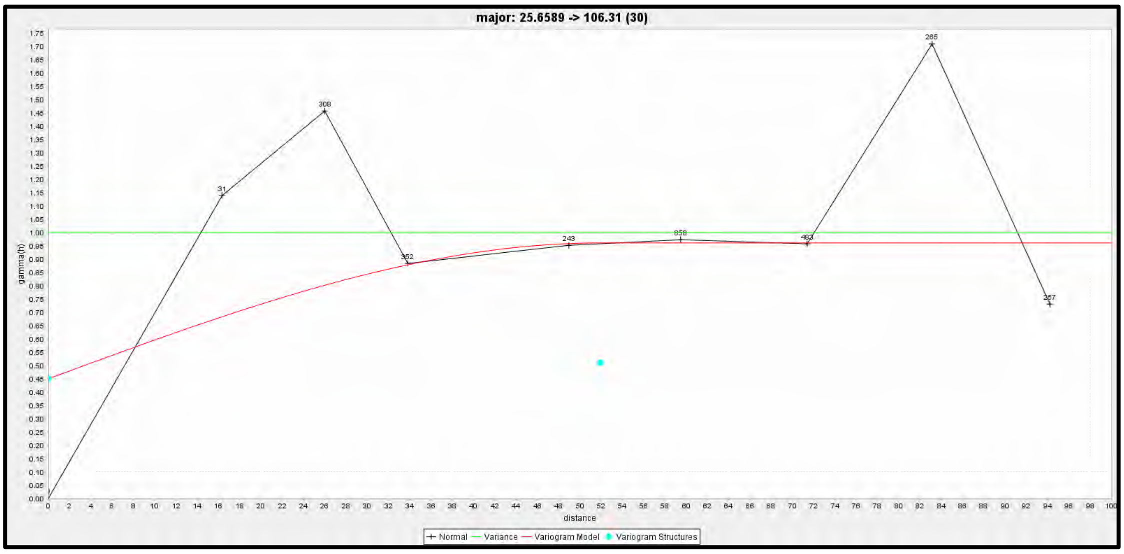
Wireframe Lithology		8 Volc	9 Volc	10[(1)] Volc	11[(2)] Alt	12 Volc	17[(3)] Sed
Nugget Variance		0.35	0.45	0.50	0.35	0.30	0.1
Omnidirectional Variogram Range		50	58	57	-	97	
Plane Dip (°)		-30	-30	-30	-40	-40	-45
Dip Direction (°)		320	320	320	320	320	325
Directional Variogram	Nugget	0.13	0.45	0.48	0.25	0.18	0
	Sill	0.96	0.51	0.46	0.79	0.37	0.95
	Range (m)	71	52	74	50	63	64
Search Ellipsoid	Bearing (°)	106	106	96	-	127	352
	Plunge (°)	26	26	23	-	39	-42
	Dip (°)	16	16	20	-	8	19
Major/Semi-Major Ratio		1	1	1	-	1	1
Major/Minor Ratio		4	3	4	-	3	4

(1) Wfrm 10 Poor omni-directional variogram.

(2) Wfrm 11 Very poor omni-directional variogram, Directional variography inconclusive. The model fits most of the directions => Use average/assumed dip and dip direction and anisotropy ratios.

(3) Wfrm 17 Poor DTH and directional variography.

Figure 14-28: Kari Centre deposit: Domain 1 Variograms (source: Endeavour)



Block Modelling

The block model was created in GEOVIA Surpac™. The block model set-up for the Kari Centre deposit is presented in Table 14-42. Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit ("**SMU**").

Table 14-42: Kari Centre deposit: block model definition

Axis	Minimum	Maximum	Model Extent
Y	Y	1,265,100	1,266,200
X	X	431,800	433,000
Z	Z	400	100
Parent Cell Y	Parent Cell Y	10	Min. Sub-Cell Y
Parent Cell X	Parent Cell X	10	Min. Sub-Cell X
Parent Cell Z	Parent Cell Z	5	Min. Sub-Cell Z
Rotation from Y	Rotation from Y	0	

The block model attributes and descriptions are summarised in Table 14-43.

Table 14-43: Kari Centre deposit: block model attributes

Attribute	Description
Au_gt_OK	Gold grade estimated by OK
Au_gt_ID2	Gold grade estimated by ID2
Avg_Sam_Dist	Average informing point distance
Blk_Var	Block kriging variance
Classif	0 = Unclassified, 1 = Measured, 2 = Indicated, 3 = Inferred, 4 – Exploration Potential
Density	
ID2_Num_Sam	Number of informing points for ID2 grade estimate
Krig_effic	Kriging efficiency
Krig_var	Kriging variance
Near_Sam_Dist	Nearest informing point distance (m)
OK_Num_Sam	Number of informing points for OK grade estimate
Search_pass	Search Pass
Topo	0 – Air, 1 - Rock
Weathering	LATR, SAPR, SPRK, FRESH
Wfrn_num	Mineralised lens number

Grade Estimation

Grade estimation at Kari Centre used OK for each mineralised domain using the coded 1m composite data, specific to that domain. The grade was calculated in two passes to ensure all blocks within the wireframes were populated; the first pass used a 60m maximum search radius and the second pass 80m. Inverse Distance Squared ("**IDW2**") was also completed for validation and comparison purposes. Block discretisation points were set to 3 (Y) by 3 (X) by 3 (Z). The estimation parameters are summarised in Table 14-44.

Table 14-44: Kari Centre deposit: grade estimation parameters

Wireframe	4, 5, 6, and 7[(1)]	8	9	10	11	12	13, 14, 15, 16, 17, and 19
Nugget Effect	0.30	0.35	0.45	0.50	0.35	0.30	0.30
Sill	0.70	0.96	0.51	0.46	0.79	0.37	0.70
Bearing (°)	105	106	105	96	100	127	172
Plunge (°)	25	26	26	23	30	39	42
Dip (°)	15	16	16	20	20	8	19
Major/Semi-major Ratio	1						
Major/Minor Ratio	4						
Min. number composites	Pass 1, 5 composites, Pass 2, 3 composites						
Max. number composites	20						
Max. no composites per drill hole	Pass 1, 2 composites, Pass 2, 3 composites						

(1) Wireframes use assumed search ellipsoid and variography parameters due to a lack of informing points (composites).

Block Model Validation

The Kari Centre block model was validated and checked using several techniques. These included:

- Checking for negative grades;
- Checking for blocks lying outside the wireframes containing grade estimates;
- Visual comparison of block grades and drill holes (original assays) on plan and section
- Swath plots for zones 8, 9, 10, 11 and 12; and
- Comparison of IDW2 and OK block grades (Table 14-45).

The observations/results indicated that the block grade estimate is a satisfactory reflection of the sample grades and there is no bias in the tenor of grade in the block model. The block model accurately portrays the mineralisation geometry.

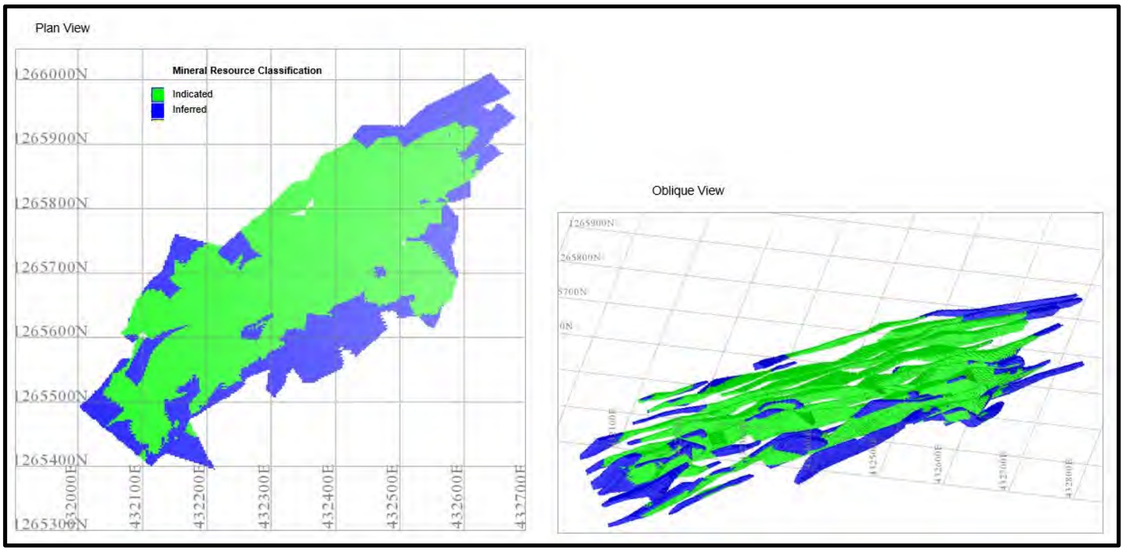
Table 14-45: Kari Centre deposit: block model estimate compared to composites

Method	Tonnes (kt)	Mean Grade (g/tAu)
IDW2	6,243	1.16
OK	6,243	1.15
Difference	-	0.01 (0.9%)

Mineral Resource Classification

The Kari Centre deposit was classified as Indicated and Inferred Mineral Resources. The Indicated classification criteria at Kari Centre is defined as a block filled by the first pass and is within an area of continuous Indicated material. The Kari Centre Inferred material is defined as a block being filled by the second pass or within an area within the 80m drill line spacing or informed by a single drill line and within an area of continuous Inferred material. The classification applied to the Kari Centre deposits is shown in Figure 14-29**.**

Figure 14-29: Kari Centre deposit: Block model coloured by classification (source: Endeavour)



Mineral Resource Statements

The Mineral Resource Statements for the Kari Centre deposit is presented in Section 14.13 of this Technical Report.

14.8 Kari West Deposit

Lithology

Kari West was not lithologically modelled as the mineralisation is generally structurally controlled and strong alteration has often masked lithological changes/differences. Additional drilling is planned for 2020 at Kari West which may facilitate lithological models being compiled.

Weathering

Weathering surfaces (DTMs) were interpreted to define the laterite, saprolite, saprock (also referred to herein as transition) and fresh rock (also referred to herein as bedrock) boundaries for each deposit. Surfaces were modelled either in Leapfrog GEO or GEOVIA Surpac^{TM} along the weathering boundaries from the drill hole logging data and coded into the respective block models as summarised in Table 14-46.

Laterite blankets the Kari West deposit, where it is up to 20m thick and generally not mineralised. It has been transported and has also been disturbed by artisanal workings in certain areas. The saprolite has a typical thickness of 35m and the saprock 6m. The top of the fresh bedrock is generally at a depth of 55m to 60m below the surface. The weathering surfaces very gently dip towards the west

Table 14-46: Kari West deposit: weathering modelling and codes

Weathering Type	Vindaloo-Madras
Air	
Laterite	LATR
Overburden	
Saprolite	SAPR
Saprock / Transition	SPRK
Fresh / Bedrock	FRESH

Mineralisation

Kari West is a multiple, sheeted, auriferous quartz vein deposit that is subdivided into seven domains based on mineralisation continuity and orientation (Figure 14-30). The "*breaks*" between the domains are co-incident with some of the regional geophysical lineaments and trends seen in the top of the fresh rock surface and/or lithological changes.

A threshold of 0.3g/tAu to 0.4g/tAu has been used to distinguish non-mineralised and mineralised material. The mineralisation is predominately hosted in quartz veins. A total of 92 quartz veins/mineralised lenses have been delineated with a minimum of two samples. This is equivalent to 2m DTH, representing a "*minimum mining width*" of 1.5m. The interpretations were completed on 40m spaced sections, snapped to drill holes. The up-dip continuation of the quartz veins/mineralised lenses has been stopped at the base of the laterite.

The gold mineralisation at Kari West is hosted within two vein systems, both dipping northwest, with one set dipping at 30° and the other at 60° (Figure 14-31). Typically, both orientations can be observed in cross-section, but the shallow vein set has been generally given precedence as it appears to have better continuity. Where the two sets intersect, there is often an increase in the size and tenure of mineralisation. Kari West remains open along strike and at depth.

The single wireframe domain No. 68 has a different geometry to the other domains. The drill holes have been successfully re-drilled, and the geometry of the mineralised zone corresponds to particular volcanic facies. The modelled domains for Kari West are summarised in Table 14-47.

Figure 14-30: Kari West deposit: mineralisation lenses – Plan View (source: Endeavour)

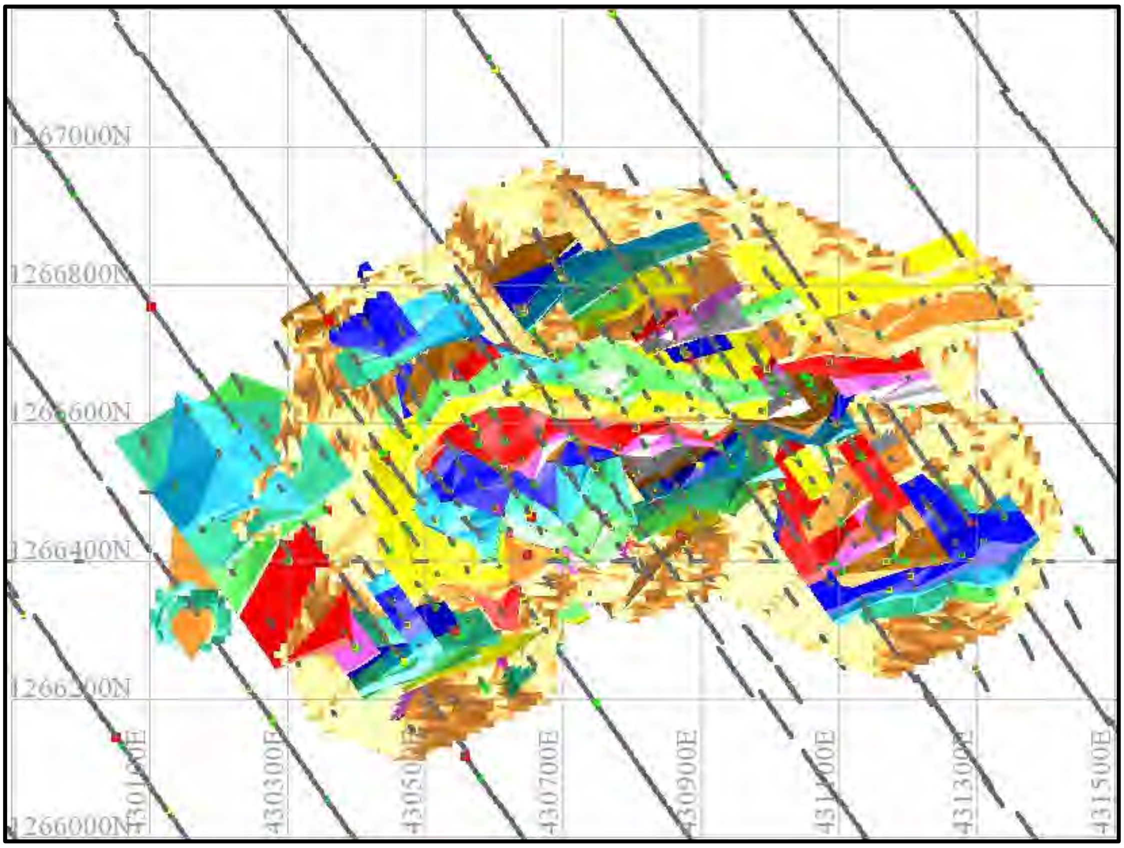


Figure 14-31: Kari West deposit: mineralisation (>0.3g/t Au) in cross-section with two orientations. Section 4960 (NW – SE, looking NE) (source: Endeavour)

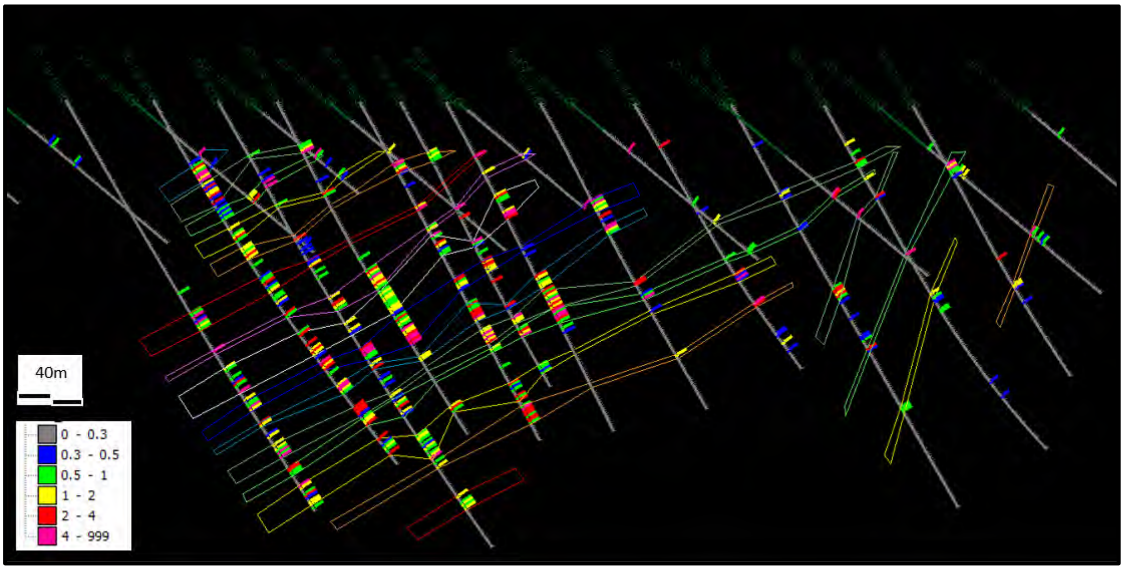


Table 14-47: Kari West deposit: domain summary

Domain	No Veins	Volume ('000m³)	Average Thickness (DTH m)	Dip (°)
61 Central	23	4,135	4.7	Shallow (25°) to the NW
62 Northeast	11	719	4.9	Shallow (30°) to the NNW
63 Southeast	13	1,740	5.3	Moderate (40°) to the NNW
64 Northwest	8	816	3.2	Shallow (30°) to the NW
65 North	12	616	3.6	Steep (60°) to the NW
66 South	12	1,883	6.7	Steep (60°) to the NW
67 Southwest	12	839	5.5	Steep (60°) to the NW
68 Sole	1	260	NA	NA

Density

1,307 density measurements were taken at the Kari West deposit. The densities do not vary significantly for the different weathering domains within the deposit and the densities assigned to the respective block models are presented in Table 14-48.

Table 14-48: Kari West deposit: assigned density

Laterite (t/m³)	Saprolite (t/m³)	Saprock/Transition (t/m³)	Fresh / Bedrock (t/m³)
2.04	1.76	2.40	2.72

Statistical Analyses

Assays within the Kari West domains have a mean grade of 1.69 g/t Au and CV of 2.53 g/t Au. The domained assay data were reviewed by individual vein using histograms, log-histograms, log-probability plots, high grade sensitivity analysis and graphical inspection of the spatial grade distribution. The Kari West assays were composited to 1m using the best fit method to include composites over 50% by vein. Table 14-49 presents the uncapped composite statistical analysis by domain.

The 1m composites were capped at 6g/tAu and 15g/tAu by vein. Table 14-50 presents the capped composite statistical analysis by domain.

Table 14-49: Kari West deposit: raw assay descriptive statistics

Domain (No)	Count (No)t	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev (g/tAu)	CV
61	4,152	0.0025	84.10	1.63	0.85	3.05	1.86
62	361	0.0025	116.00	1.64	0.62	6.97	4.24
63	1,420	0.0025	20.55	1.32	0.68	2.11	1.60
64	243	0.0025	30.60	1.02	0.59	2.24	2.20
65	361	0.0025	175.22	2.45	0.80	9.98	4.07
66	1,851	0.0025	90.38	1.83	0.93	3.77	2.06
67	509	0.0025	118.50	1.79	0.73	5.93	3.31
68	332	0.009	2.60	1.30	2.60	4.11	1.58

Table 14-50: Kari West deposit: capped 1m composite descriptive statistics

Domain (No)	Count (No)	Min. (g/tAu)	Max. (g/tAu)	Mean (g/tAu)	Median (g/tAu)	Std Dev (g/tAu)	CV
61	4,152	0.0025	15.00	1.54	0.85	2.19	1.42
62	361	0.0025	15.00	1.23	0.62	2.04	1.65
63	1,420	0.0025	15.00	1.30	0.68	1.99	1.52
64	243	0.0025	6.00	0.90	0.59	1.12	1.24
65	361	0.0025	15.00	1.83	0.80	2.75	1.50
66	1,851	0.0025	15.00	1.71	0.94	2.39	1.40
67	509	0.0025	15.00	1.51	0.74	2.38	1.57
68	332	0.009	15.00	2.41	1.30	3.02	1.25

Variography

An extensive variography study was undertaken on the larger mineralised veins in the Kari West deposit. Variogram parameters were assigned to smaller veins with insufficient samples to generate meaningful variograms; with directions and anisotropy ratios being assigned to best suit the geometry of the vein. Variogram ranges were approximately 50m indicating that the maximum spatial continuity is greater than the average drill hole spacing. Variogram nugget effects were typically in the range of 0.2 to 0.3, indicating a moderate degree of short scale variability. Table 14-51 presents the selected variogram parameters used in the block grade estimation.

Table 14-51: Kari West deposit: Variogram parameters

Domain	Vein	Zone Orientation		Variogram Rotation					Variogram Parameters		
	(No)	Dip direction (°)	Dip (°)	Bearing (°)	Plunge (°)	Dip (°)	Major/Semi Major	Major/ Minor	Range (m)	Nugget	Sill
61	1	4	-40	4	-40	0	1	4	50	0.2	0.8
	2	352	-30	352	-30	0	1	4	50	0.2	0.8
	3	355	-25	355	-25	0	1	4	50	0.2	0.8
	4	355	-32	131	24	22	1	4	52	0.2	1
	5	359	-38	81	-6	38	1	4	50	0.2	0.84
	6	356	-34	143	29	18	1	4	55	0.2	0.75
	7	355	-37	119	23	30	1	4	55	0.2	0.82
	8	355	-32	6	-32	6	1	4	40	0.2	0.75
	9	357	-27	144	23	14	1	4	50	0.2	0.88
	10	357	-27	7	-26	5	1	4	60	0.2	0.71
	11	358	-31	113	15	28	1	4	50	0.2	0.69
	12	355	-27	102	9	26	1	4	65	0.2	0.89
	13	355	-30	130	22	20	1	4	58	0.2	0.86
	14	358	-32	165	31	7	1	4	55	0.2	0.51
	15	2	-26	159	24	10	1	4	50	0.2	0.88
	16	2	-26	2	-26	0	1	4	50	0.2	0.8
	17	334	-30	334	-30	0	1	4	50	0.2	0.8
	18	312	-34	312	-34	0	1	4	50	0.2	0.8
	19	331	-24	331	-24	0	1	4	50	0.2	0.8
	20	331	-29	331	-29	0	1	4	50	0.2	0.8
	21	330	-18	330	-18	0	1	4	50	0.2	0.8
	22	332	-19	332	-19	0	1	4	50	0.2	0.8
	23	293	-26	293	-26	0	1	4	50	0.2	0.8
62	24	336	-26	336	-26	0	1	4	50	0.2	0.8
	25	343	-33	343	-33	0	1	4	50	0.2	0.8
	26	346	-32	346	-32	0	1	4	50	0.2	0.8
	27	354	-39	354	-39	0	1	4	50	0.2	0.8
	28	338	-38	338	-38	0	1	4	50	0.2	0.8
	29	341	-42	341	-42	0	1	4	50	0.2	0.8
	30	328	-35	328	-35	0	1	4	50	0.2	0.8
	31	344	-41	344	-41	0	1	4	50	0.2	0.8
	32	344	-41	344	-41	0	1	4	50	0.2	0.8
	33	345	-43	345	-43	0	1	4	50	0.2	0.8
	34	335	-43	335	-43	0	1	4	50	0.2	0.8
63	35	326	-32	326	-32	0	1	4	50	0.2	0.8
	36	321	-36	321	-36	0	1	4	50	0.2	0.8
	37	326	-33	326	-33	0	1	4	50	0.2	0.8
	38	317	-33	317	-33	0	1	4	50	0.2	0.8
	39	345	-37	345	-37	0	1	4	50	0.2	0.8
	40	340	-32	340	-32	0	1	4	50	0.2	0.8
	41	338	-38	3	-35	15	1	4	50	0.2	0.68
	42	335	-37	10	-31	20	1	4	50	0.2	0.84
	43	333	-41	333	-41	0	1	4	50	0.2	0.8
	44	328	-37	328	-37	0	1	4	50	0.2	0.8
	45	332	-37	332	-37	0	1	4	50	0.2	0.8
	46	323	-36	323	-36	0	1	4	50	0.2	0.8

Domain	Vein (No)	Zone Orientation Dip direction (°)	Dip (°)	Variogram Rotation Bearing (°)	Plunge (°)	Dip (°)	Major/Semi Major	Major/ Minor	Variogram Parameters Range (m)	Nugget	Sill
	47	313	-39	313	-39	0	1	4	50	0.2	0.8
64	48	332	-21	332	-21	0	1	4	50	0.2	0.8
	49	328	-22	328	-22	0	1	4	50	0.2	0.8
	50	332	-28	332	-28	0	1	4	50	0.2	0.8
	51	336	-31	336	-31	0	1	4	50	0.2	0.8
	52	329	-33	329	-33	0	1	4	50	0.2	0.8
	53	327	-33	327	-33	0	1	4	50	0.2	0.8
	54	326	-28	326	-28	0	1	4	50	0.2	0.8
	55	333	-30	333	-30	0	1	4	50	0.2	0.8
	56	346	-22	346	-22	0	1	4	50	0.2	0.8
	57	341	-30	341	-30	0	1	4	50	0.2	0.8
65	58	336	-54	336	-54	0	1	4	50	0.2	0.8
	59	338	-56	338	-56	0	1	4	50	0.2	0.8
	60	327	-59	327	-59	0	1	4	50	0.2	0.8
	61	335	-57	335	-57	0	1	4	50	0.2	0.8
	62	336	-64	336	-64	0	1	4	50	0.2	0.8
	63	338	-56	338	-56	0	1	4	50	0.2	0.8
	64	330	-58	92	41	45	1	4	55	0.2	0.6
	65	323	-62	323	-62	0	1	4	50	0.2	0.8
	66	330	-55	2	-50	26	1	4	50	0.2	0.52
	67	336	-66	336	-66	0	1	4	50	0.2	0.8
	68	340	-62	340	-62	0	1	4	50	0.2	0.8
	69	347	-65	347	-65	0	1	4	50	0.2	0.8
66	70	331	-48	331	-48	0	1	4	55	0.3	0.8
	71	333	-46	333	-46	0	1	4	55	0.3	0.8
	72	320	-54	320	-54	0	1	4	55	0.3	0.8
	73	329	-60	128	58	18	1	4	55	0.3	0.72
	74	330	-64	330	-64	0	1	4	55	0.3	0.75
	75	332	-62	332	-62	0	1	4	75	0.3	0.66
	76	335	-60	335	-60	0	1	4	70	0.3	1.1
	77	331	-69	27	-55	50	1	4	55	0.3	0.86
	78	335	-63	335	-63	0	1	4	55	0.3	0.8
	79	326	-55	326	-55	0	1	4	55	0.3	0.8
	80	338	-75	338	-75	0	1	4	55	0.3	0.8
	81	320	-67	320	-67	0	1	4	55	0.3	0.8
67	82	332	-65	332	-65	0	1	4	55	0.3	0.8
	83	329	-63	329	-63	0	1	4	55	0.3	0.8
	84	333	-56	7	-51	28	1	4	75	0.35	0.75
	85	335	-59	335	-59	0	1	4	55	0.3	0.8
	86	341	-58	341	-58	0	1	4	55	0.3	0.8
	87	334	-61	334	-61	0	1	4	55	0.3	0.8
	88	330	-62	330	-62	0	1	4	55	0.3	0.8
	89	329	-63	329	-63	0	1	4	55	0.3	0.8
	90	328	-61	328	-61	0	1	4	55	0.3	0.8
	91	334	-63	334	-63	0	1	4	55	0.3	0.8
	92	327	-59	327	-59	0	1	4	55	0.3	0.8
	93	332	-56	332	-56	0	1	4	55	0.3	0.8
68	94	195	-86	195	-86	0	1	3	55	0.2	0.8

Block Modelling

The block model was created in GEOVIA Surpac™. The block model set-up for the Kari West deposit is presented in Table 14-52 Several criteria were considered when setting up the block models including mineralisation trend, drill hole (data) spacing, potential mine design and mining selectivity implications, such as the current or anticipated selective mining unit ("**SMU**"). The Kari West block model attributes are presented in Table 14-53.

Table 14-52: Kari West deposit: block model definition

Axis	Minimum	Maximum	Model Extent
Y	Y	1,265,830	1,267,230
X	X	429,680	431,780
Z	Z	50	375
Parent Cell Y	Parent Cell Y	10	Min. Sub-Cell Y
Parent Cell X	Parent Cell X	10	Min. Sub-Cell X
Parent Cell Z	Parent Cell Z	2.5	Min. Sub-Cell Z
Rotation from Y	Rotation from Y	0	

The block model attributes and descriptions are summarised in Table 14-43.

Table 14-53: Kari West deposit: block model attributes

Attribute	Description
Au_ID2	Gold inverse distance estimate (g/t)
Au_ok	Gold ordinary kriging estimate (g/t)
Ave_dist_id	Average distance of informing samples for ID2 estimate (m)
Ave_dist_ok	Average distance of informing samples for OK estimate (m)
Block_var	Block variance
Class	0 = Unclassified, 2 = Indicated, 3 = Inferred
Cond_bias	Conditional bias
Density	t/m^3
Domain	Code of mineralised domains
Krig_eff	Kriging efficiency
Krig_var	Kriging variance
Min_zone	Integer code for mineralised domains
Nearest_id	Distance to nearest sample, ID2 estimate (m)
Nearest_ok	Distance to nearest sample, OK estimate (m)
Numb_samp_id	Number of informing samples, ID2 estimate

Attribute	Description
Numb_samp_ok	Number of informing samples, OK estimate
Wfrm_Grp	Wireframe number
Pass_id	Estimation pass ID2
Pass_ok	Estimation pass OK
Rockcode	Rock code for Whittle
Weathering	LATR, SAPR, TRANS, FRESH
Au_ID2	Gold inverse distance estimate (g/t)
Au_ok	Gold ordinary kriging estimate (g/t)

Grade Estimation

Grade estimation at Kari West was undertaken by OK for each mineralised vein using the 1m coded composites, specific to the individual domain. An IDW2 estimate was also completed for validation and comparison purposes. All block estimates were based on grade interpolation into parent cells of 10 m (Y) by 10 m (X) by 2.5 m(Z). Block discretisation points were set to 3 (Y) by 3 (X) by 3 (Z).

The search ellipsoid, kriging parameters and search pass criteria are presented in Table 14-54 and Table 14-55 for each vein by domain. Search ellipsoid orientations for each domain were orientated to follow the direction of the mineralised vein. A two-pass search strategy was used for grade estimation. The first pass search used a search radius of 55m and was increased for the second search pass to 75m. A minimum of 5 and a maximum of 20 samples were used for the first pass, and a minimum of 3 and maximum of 20 for the second pass.

Table 14-54: Kari West deposit: grade estimation parameters

Domain	Venin No	Zone Orientation		Search Ellipsoid					Kriging Parameters		
		Dip direction (°)	Dip (°)	Bearing (°)	Plunge (°)	Dip (°)	Major/Semi Major (°)	Major/ Minor	Range (°)	Nugge (°)t	Sill (°)
	1	4	-40	4	-40	0	1	4	50	0.2	0.8
	2	352	-30	352	-30	0	1	4	50	0.2	0.8
	3	355	-25	355	-25	0	1	4	50	0.2	0.8
	4	355	-32	131	24	22	1	4	52	0.2	1
	5	359	-38	81	-6	38	1	4	50	0.2	0.84
	6	356	-34	143	29	18	1	4	55	0.2	0.75
	7	355	-37	119	23	30	1	4	55	0.2	0.82
	8	355	-32	6	-32	6	1	4	40	0.2	0.75
	9	357	-27	144	23	14	1	4	50	0.2	0.88
	10	357	-27	7	-26	5	1	4	60	0.2	0.71
	11	358	-31	113	15	28	1	4	50	0.2	0.69
61	12	355	-27	102	9	26	1	4	65	0.2	0.89
	13	355	-30	130	22	20	1	4	58	0.2	0.86
	14	358	-32	165	31	7	1	4	55	0.2	0.51
	15	2	-26	159	24	10	1	4	50	0.2	0.88
	16	2	-26	2	-26	0	1	4	50	0.2	0.8
	17	334	-30	334	-30	0	1	4	50	0.2	0.8
	18	312	-34	312	-34	0	1	4	50	0.2	0.8
	19	331	-24	331	-24	0	1	4	50	0.2	0.8
	20	331	-29	331	-29	0	1	4	50	0.2	0.8
	21	330	-18	330	-18	0	1	4	50	0.2	0.8
	22	332	-19	332	-19	0	1	4	50	0.2	0.8
	23	293	-26	293	-26	0	1	4	50	0.2	0.8
	24	336	-26	336	-26	0	1	4	50	0.2	0.8
	25	343	-33	343	-33	0	1	4	50	0.2	0.8
	26	346	-32	346	-32	0	1	4	50	0.2	0.8
	27	354	-39	354	-39	0	1	4	50	0.2	0.8
	28	338	-38	338	-38	0	1	4	50	0.2	0.8
62	29	341	-42	341	-42	0	1	4	50	0.2	0.8
	30	328	-35	328	-35	0	1	4	50	0.2	0.8
	31	344	-41	344	-41	0	1	4	50	0.2	0.8
	32	344	-41	344	-41	0	1	4	50	0.2	0.8
	33	345	-43	345	-43	0	1	4	50	0.2	0.8
	34	335	-43	335	-43	0	1	4	50	0.2	0.8
	35	326	-32	326	-32	0	1	4	50	0.2	0.8
	36	321	-36	321	-36	0	1	4	50	0.2	0.8
	37	326	-33	326	-33	0	1	4	50	0.2	0.8
	38	317	-33	317	-33	0	1	4	50	0.2	0.8
	39	345	-37	345	-37	0	1	4	50	0.2	0.8
	40	340	-32	340	-32	0	1	4	50	0.2	0.8
63	41	338	-38	3	-35	15	1	4	50	0.2	0.68
	42	335	-37	10	-31	20	1	4	50	0.2	0.84
	43	333	-41	333	-41	0	1	4	50	0.2	0.8
	44	328	-37	328	-37	0	1	4	50	0.2	0.8
	45	332	-37	332	-37	0	1	4	50	0.2	0.8
	46	323	-36	323	-36	0	1	4	50	0.2	0.8
	47	313	-39	313	-39	0	1	4	50	0.2	0.8
	48	332	-21	332	-21	0	1	4	50	0.2	0.8
	49	328	-22	328	-22	0	1	4	50	0.2	0.8
	50	332	-28	332	-28	0	1	4	50	0.2	0.8
	51	336	-31	336	-31	0	1	4	50	0.2	0.8
64	52	329	-33	329	-33	0	1	4	50	0.2	0.8
	53	327	-33	327	-33	0	1	4	50	0.2	0.8
	54	326	-28	326	-28	0	1	4	50	0.2	0.8
	55	333	-30	333	-30	0	1	4	50	0.2	0.8
	56	346	-22	346	-22	0	1	4	50	0.2	0.8

Domain	Venin No	Zone Orientation		Search Ellipsoid					Kriging Parameters		
		Dip direction (°)	Dip (°)	Bearing (°)	Plunge (°)	Dip (°)	Major/Semi Major (°)	Major/ Minor	Range (°)	Nugge (°)t	Sill (°)
	57	341	-30	341	-30	0	1	4	50	0.2	0.8
65	58	336	-54	336	-54	0	1	4	50	0.2	0.8
	59	338	-56	338	-56	0	1	4	50	0.2	0.8
	60	327	-59	327	-59	0	1	4	50	0.2	0.8
	61	335	-57	335	-57	0	1	4	50	0.2	0.8
	62	336	-64	336	-64	0	1	4	50	0.2	0.8
	63	338	-56	338	-56	0	1	4	50	0.2	0.8
	64	330	-58	92	41	45	1	4	55	0.2	0.6
	65	323	-62	323	-62	0	1	4	50	0.2	0.8
	66	330	-55	2	-50	26	1	4	50	0.2	0.52
	67	336	-66	336	-66	0	1	4	50	0.2	0.8
	68	340	-62	340	-62	0	1	4	50	0.2	0.8
	69	347	-65	347	-65	0	1	4	50	0.2	0.8
66	70	331	-48	331	-48	0	1	4	55	0.3	0.8
	71	333	-46	333	-46	0	1	4	55	0.3	0.8
	72	320	-54	320	-54	0	1	4	55	0.3	0.8
	73	329	-60	128	58	18	1	4	55	0.3	0.72
	74	330	-64	330	-64	0	1	4	55	0.3	0.75
	75	332	-62	332	-62	0	1	4	75	0.3	0.66
	76	335	-60	335	-60	0	1	4	70	0.3	1.1
	77	331	-69	27	-55	50	1	4	55	0.3	0.86
	78	335	-63	335	-63	0	1	4	55	0.3	0.8
	79	326	-55	326	-55	0	1	4	55	0.3	0.8
	80	338	-75	338	-75	0	1	4	55	0.3	0.8
	81	320	-67	320	-67	0	1	4	55	0.3	0.8
67	82	332	-65	332	-65	0	1	4	55	0.3	0.8
	83	329	-63	329	-63	0	1	4	55	0.3	0.8
	84	333	-56	7	-51	28	1	4	75	0.35	0.75
	85	335	-59	335	-59	0	1	4	55	0.3	0.8
	86	341	-58	341	-58	0	1	4	55	0.3	0.8
	87	334	-61	334	-61	0	1	4	55	0.3	0.8
	88	330	-62	330	-62	0	1	4	55	0.3	0.8
	89	329	-63	329	-63	0	1	4	55	0.3	0.8
	90	328	-61	328	-61	0	1	4	55	0.3	0.8
	91	334	-63	334	-63	0	1	4	55	0.3	0.8
	92	327	-59	327	-59	0	1	4	55	0.3	0.8
	93	332	-56	332	-56	0	1	4	55	0.3	0.8
68	94	195	-86	195	-86	0	1	3	55	0.2	0.8

Table 14-55: Kari West deposit: grade estimation parameters

Domain	Vein No	Zone Orientation		Pass 1				Pass 2			
(No)		Dip direction (°)	Dip (°)	Min. Comp (No)	Max. Comp. (No)	Max. Comp/ Drill hole (No)	Search Distances (m)	Min. No. Compo. (No)	Max. No. Comp. (No)	Max. Comp/ Drill hole (No)	Search Distances (m)
61	1	4	-40	5	20	2	55	3	20	3	75
	2	352	-30	5	20	2	55	3	20	3	75
	3	355	-25	5	20	2	55	3	20	3	75
	4	355	-32	5	20	2	55	3	20	3	75
	5	359	-38	5	20	2	55	3	20	3	75
	6	356	-34	5	20	2	55	3	20	3	75
	7	355	-37	5	20	2	55	3	20	3	75
	8	355	-32	5	20	2	55	3	20	3	75
	9	357	-27	5	20	2	55	3	20	3	75
	10	357	-27	5	20	2	55	3	20	3	75
	11	358	-31	5	20	2	55	3	20	3	75
	12	355	-27	5	20	2	55	3	20	3	75
	13	355	-30	5	20	2	55	3	20	3	75
	14	358	-32	5	20	2	55	3	20	3	75
	15	2	-26	5	20	2	55	3	20	3	75
	16	2	-26	5	20	2	55	3	20	3	75
	17	334	-30	5	20	2	55	3	20	3	75
	18	312	-34	5	20	2	55	3	20	3	75
	19	331	-24	5	20	2	55	3	20	3	75
	20	331	-29	5	20	2	55	3	20	3	75
	21	330	-18	5	20	2	55	3	20	3	75
	22	332	-19	5	20	2	55	3	20	3	75
	23	293	-26	5	20	2	55	3	20	3	75
62	24	336	-26	5	20	2	55	3	20	3	75
	25	343	-33	5	20	2	55	3	20	3	75
	26	346	-32	5	20	2	55	3	20	3	75
	27	354	-39	5	20	2	55	3	20	3	75
	28	338	-38	5	20	2	55	3	20	3	75
	29	341	-42	5	20	2	55	3	20	3	75
	30	328	-35	5	20	2	55	3	20	3	75
	31	344	-41	5	20	2	55	3	20	3	75
	32	344	-41	5	20	2	55	3	20	3	75
	33	345	-43	5	20	2	55	3	20	3	75
	34	335	-43	5	20	2	55	3	20	3	75
63	35	326	-32	5	20	2	55	3	20	3	75
	36	321	-36	5	20	2	55	3	20	3	75
	37	326	-33	5	20	2	55	3	20	3	75
	38	317	-33	5	20	2	55	3	20	3	75
	39	345	-37	5	20	2	55	3	20	3	75
	40	340	-32	5	20	2	55	3	20	3	75
	41	338	-38	5	20	2	55	3	20	3	75
	42	335	-37	5	20	2	55	3	20	3	75
	43	333	-41	5	20	2	55	3	20	3	75
	44	328	-37	5	20	2	55	3	20	3	75
	45	332	-37	5	20	2	55	3	20	3	75
	46	323	-36	5	20	2	55	3	20	3	75
	47	313	-39	5	20	2	55	3	20	3	75
64	48	332	-21	5	20	2	55	3	20	3	75

Domain		Zone Orientation		Pass 1				Pass 2			
(No)	Vein No	Dip direction (°)	Dip (°)	Min. Comp (No)	Max. Comp. (No)	Max. Comp/ Drill hole (No)	Search Distances (m)	Min. No. Compo. (No)	Max. No. Comp. (No)	Max. Comp/ Drill hole (No)	Search Distances (m)
	49	328	-22	5	20	2	55	3	20	3	75
	50	332	-28	5	20	2	55	3	20	3	75
	51	336	-31	5	20	2	55	3	20	3	75
	52	329	-33	5	20	2	55	3	20	3	75
	53	327	-33	5	20	2	55	3	20	3	75
	54	326	-28	5	20	2	55	3	20	3	75
	55	333	-30	5	20	2	55	3	20	3	75
	56	346	-22	5	20	2	55	3	20	3	75
	57	341	-30	5	20	2	55	3	20	3	75
65	58	336	-54	5	20	2	55	3	20	3	75
	59	338	-56	5	20	2	55	3	20	3	75
	60	327	-59	5	20	2	55	3	20	3	75
	61	335	-57	5	20	2	55	3	20	3	75
	62	336	-64	5	20	2	55	3	20	3	75
	63	338	-56	5	20	2	55	3	20	3	75
	64	330	-58	5	20	2	55	3	20	3	75
	65	323	-62	5	20	2	55	3	20	3	75
	66	330	-55	5	20	2	55	3	20	3	75
	67	336	-66	5	20	2	55	3	20	3	75
	68	340	-62	5	20	2	55	3	20	3	75
	69	347	-65	5	20	2	55	3	20	3	75
66	70	331	-48	5	20	2	55	3	20	3	75
	71	333	-46	5	20	2	55	3	20	3	75
	72	320	-54	5	20	2	55	3	20	3	75
	73	329	-60	5	20	2	55	3	20	3	75
	74	330	-64	5	20	2	55	3	20	3	75
	75	332	-62	5	20	2	55	3	20	3	75
	76	335	-60	5	20	2	55	3	20	3	75
	77	331	-69	5	20	2	55	3	20	3	75
	78	335	-63	5	20	2	55	3	20	3	75
	79	326	-55	5	20	2	55	3	20	3	75
	80	338	-75	5	20	2	55	3	20	3	75
	81	320	-67	5	20	2	55	3	20	3	75
67	82	332	-65	5	20	2	55	3	20	3	75
	83	329	-63	5	20	2	55	3	20	3	75
	84	333	-56	5	20	2	55	3	20	3	75
	85	335	-59	5	20	2	55	3	20	3	75
	86	341	-58	5	20	2	55	3	20	3	75
	87	334	-61	5	20	2	55	3	20	3	75
	88	330	-62	5	20	2	55	3	20	3	75
	89	329	-63	5	20	2	55	3	20	3	75
	90	328	-61	5	20	2	55	3	20	3	75
	91	334	-63	5	20	2	55	3	20	3	75
	92	327	-59	5	20	2	55	3	20	3	75
	93	332	-56	5	20	2	55	3	20	3	75
68	94	195	-86	5	20	3	55				

Block Model Validation

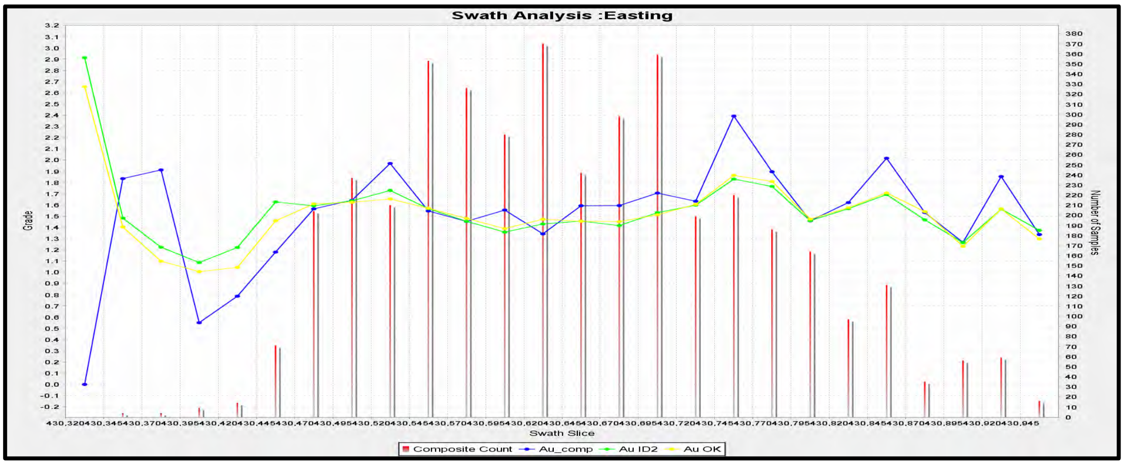
The Kari West block model was validated by visually comparing drilling data and block grades, comparing IDW2 and OK estimated grades (Table 14-56), and by swath plots comparing block grades and composite grades (Figure 14-32). Checks were also undertaken for negative grades and blocks outside the wireframes with grade.

The OK and IDW2 global grade estimates of the Kari West deposit are very similar with a difference of 0.01g/tAu, Table 14-56. The swath plots show a reasonable correlation in sample, composite and block grades in the main portion of the deposit, see Figure 14-32. The validation checks underpin confidence in the block model grade estimate and support its use to quantify Mineral Resources.

Table 14-56: Kari Centre deposit: block model estimate compared to composites

Method	Tonnes (kt)	Mean Grade (g/tAu)
IDW2	20,551	1.58
OK	20,551	1.59
Difference	-	0.01 (0.6%)

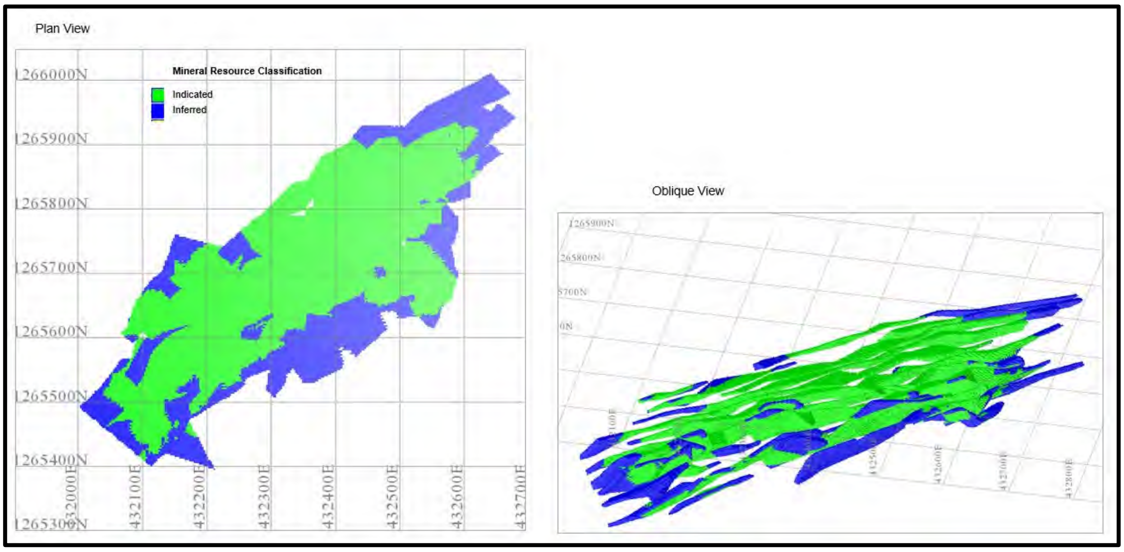
Figure 14-32: Kari West deposit: Block Model Validation by Easting for Domain 61 (source: Endeavour)



Mineral Resource Classification

The Kari West deposit was classified as Indicated and Inferred Mineral Resources. The Indicated classification criteria at Kari West is defined as a block filled by the first pass (55m) and a minimum of 5 informing composites from at least three drill holes. The Kari West Inferred criteria is defined as a block being filled by the second pass (75m), with a minimum of three informing composites from at least three drill holes or informed by a single drill line. The classification applied to the Kari West deposits is shown in Figure 14-33*.*

Figure 14-33: Kari West deposit: Block model coloured by classification (source: Endeavour)



Mineral Resource Statements

The Mineral Resource Statements for the Kari Centre deposit is presented in Section 14.13 of this Technical Report.

14.9 Stockpiles

The stockpiles at Houndé comprise some 950kt at 1.20g/tAu containing 37koz as of 31 December 2019. This material is classified as a Measured Mineral Resource and the stockpiles are composed of material from the Vindaloo-Madras Open-Pit and Bouéré Open Pit and include a combination of oxide, transition, and fresh material. Grade and tonnage estimates for the stockpiles are derived from reconciled estimates based on truck tonnes, topographic surveys and depletion by plant feed tonnages. During mining, the material is separated into grade bins by the mine geologists based on dig-block estimated grades and controlled truck movements.

14.10 Historical Estimates

In accordance with the terms and definitions applied in the Requirements there are no Historical Estimates reported in this Technical Report.

14.11 Grade Control and Reconciliation

Grade Control

The Houndé deposits are systematically infilled by RC grade control ("**GC**") drilling on a 10m by 7.5m or 10m by 10m pattern with holes inclined at -45°. Samples are collected in one metre increments from a cyclone and are split using a riffle splitter to produce samples of approximately 2kg in weight. The same QA/QC protocol is applied as used in the exploration stage, see Section 11. Samples are analysed for gold by fire assay at the mine laboratory run by SGS. GC models are updated after each drill programme applying interpolation by ordinary kriging. The Vindaloo deposits show good overall correlation between the Mineral Resource Estimate ("**MRE**") model and GC model(s). The closer-spaced grade control drilling allows better interpretation of the higher-grade cross-trends along the main shear structure. Figure 14-34 illustrates the Vindaloo Central GC model and drilling

At the Bouéré deposit, grade control drilling and modelling shows that, whilst the broad interpretation of the mineralisation is confirmed, the continuity and volume of higher-grade zones is more variable than estimated in the MRE model, see Figure 14-35. This is understandable given the structural complexity of the Bouéré deposit, where high grade zones have a limited strike extent.

Figure 14-34: Vindaloo Central – Plan showing GC Model and Drilling at 300mRL Elevation (source: Endeavour)

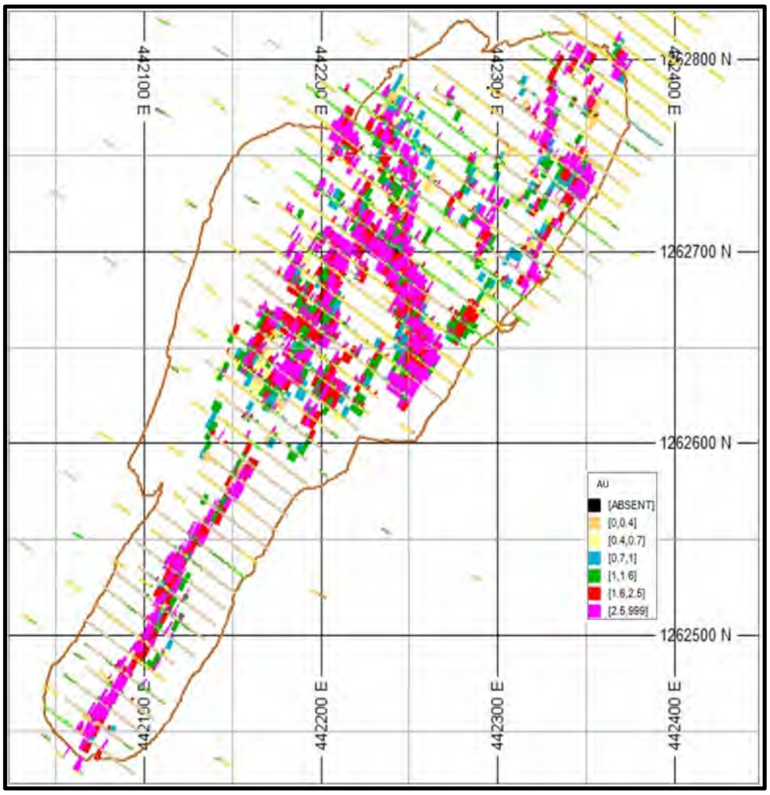
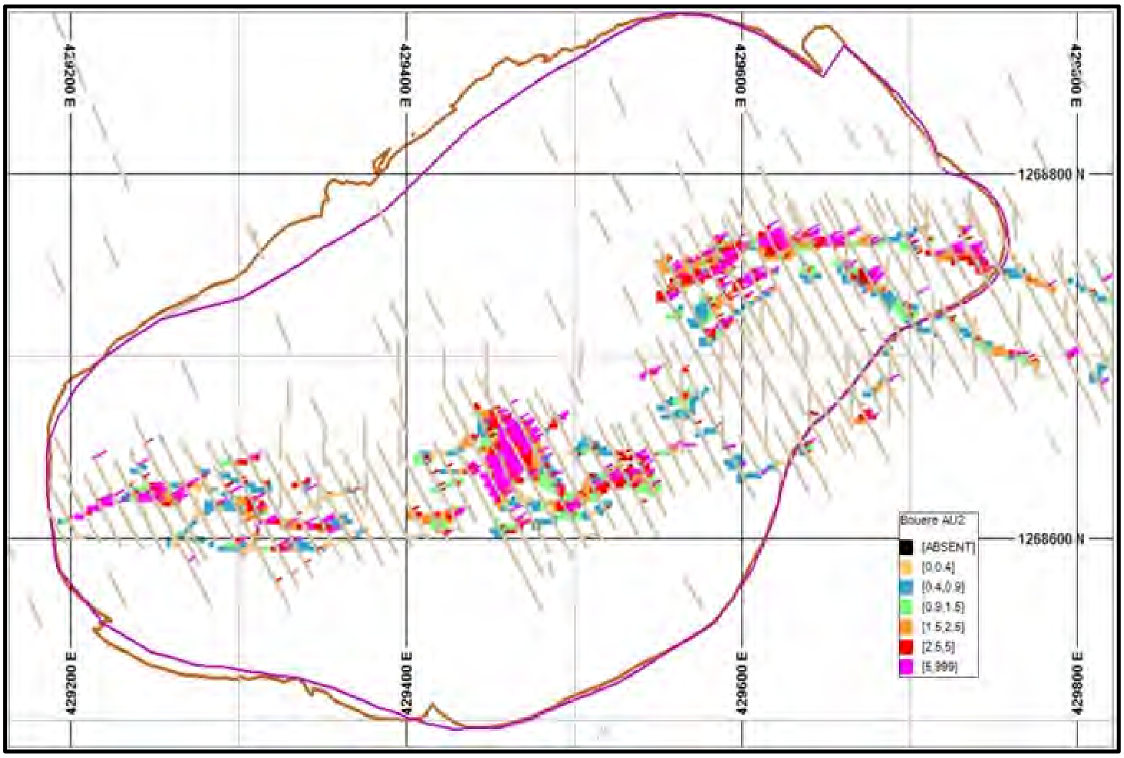


Figure 14-35: Bouéré – Plan showing GC Model and Drilling at 340mRL Elevation (source: Endeavour)



Reconciliation

Monthly reconciliation measures are recorded for Houndé Gold Mine and comparative factors analysed. The measurement of each step in the process in a consistent format provides information that can:

- highlight issues in the Mineral Resource and Grade Control models, the level of data support and methodologies applied, to enable improvement and reduce risk;
- provide measurement of achieved dilution and ore loss to feed back to the Mine Planning design parameters;
- highlight any inefficiencies in the estimation, mining and processing steps so that corrective actions can be implemented;
- enable continual improvement of management and economic decisions across the entire discovery-to-process chain;
- increase the ability to highlight and investigate gold theft or fraud;
- overall increase the level of confidence in mine plans and investment decisions with improved economic outcomes;
- The measured reconciliation factors from January 2018 to February 2020 are summarised in Figure 14-36. Multiple reconciliation measures are calculated each month in order that the relationship between various stages in the model to mine to mill chain can be better understood. Principally, the "*Mining Allocated*" (or declared ore mined, "**DOR**") measure is calculated from the plant accounted tonnes and metal plus the change in stockpiles; this can then be compared to the depletion of the Mineral Resource and grade control models. The resultant factors indicate the net change or relative or loss and dilution from infill grade control drilling, ore perimeter design, and finally the mining process inclusive of blast movement. These factors can be used to modify the factors applied in the short-term and

long-term planning processes;

- The comparison of MRE model depletion to the reconciled Mining Allocated measure produces factors that account for the separate steps of close-spaced grade control drilling, design of mineable ore perimeters and the mining phase. The factors may vary significantly from month to month, but more consistent trends are evident over longer intervals. The trends to 31 December 2019 are shown in Figure 14-37.

The MRE model factors for the period January 2018 through to February 2020 are tonnage (116.1%); grade (83.0%); and metal content (96.4%). The MRE model factors imply that the model has a good estimate of global metal, but it is recovered in mining from a larger volume at lower grade. The metal factor can be seen to have moved lower during the second half of 2019, see Figure 14-37. During this period, the mining of the Bouéré deposit represented part of the feed to the processing plant (Figure 14-38); the relative tonnes were modest, the relative contained metal was more significant due to the higher-grade tenor of the Bouéré deposit.

Figure 14-36: Houndé Reconciliation Measures – January 2018 to February 2020 (source: Endeavour)

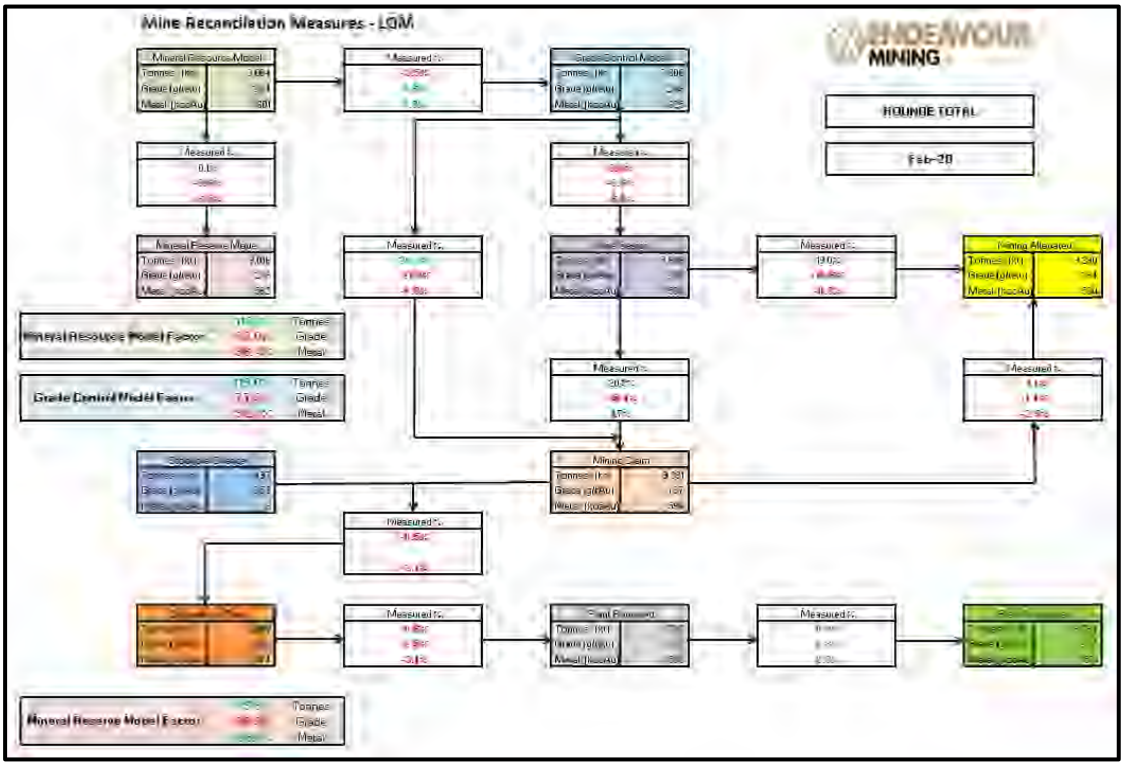


Figure 14-37: Month Moving Average Factors for MRE Model to Mining Allocated (source: Endeavour)

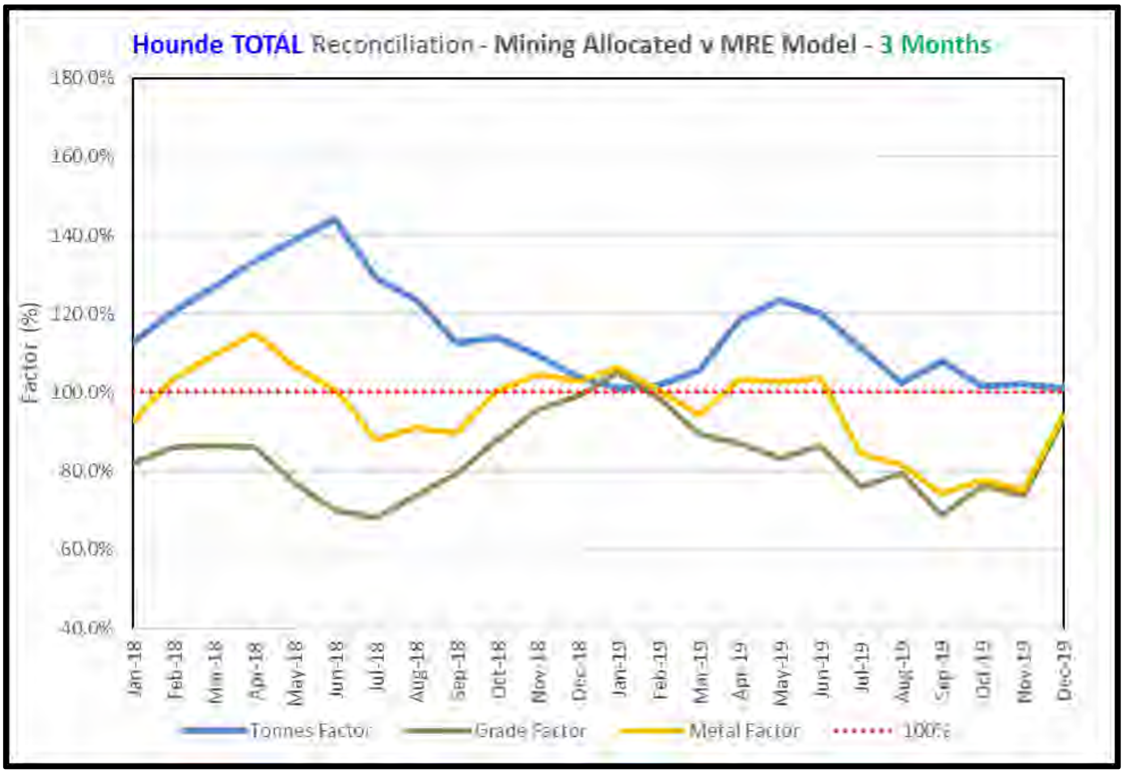


Figure 14-38: Houndé Monthly MRE Model Factors shown against Relative Tonnes Mined (source: Endeavour)

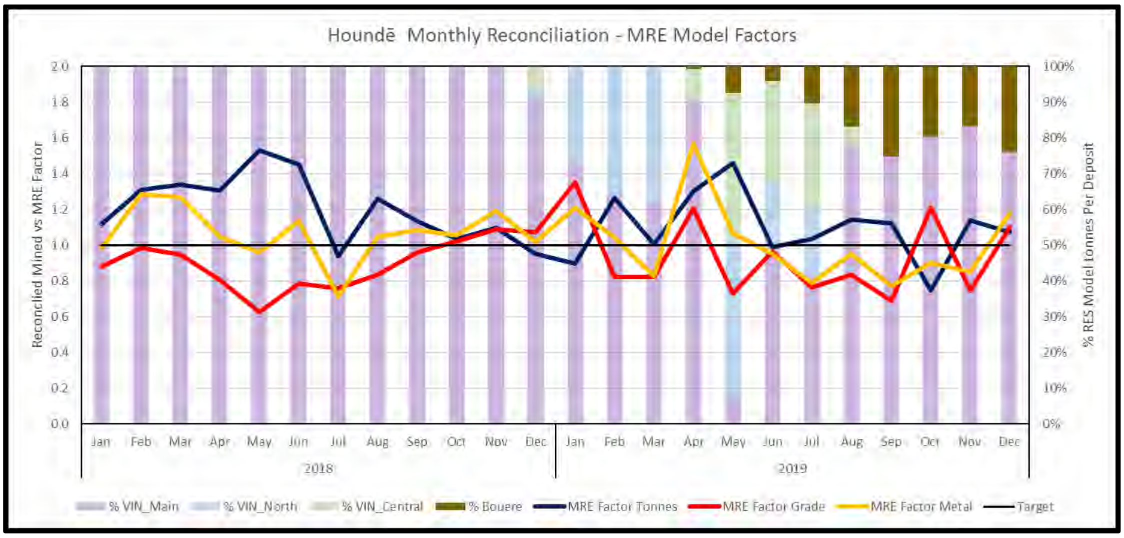


Table 14-57 shows the comparison between the Mineral Resource and Mineral Reserve within the designed pits in order to calculate the overall dilution and recovery factors resulting from the mine planning process to determine the Mineral Reserves.

In comparison, the reconciliation measures, it can be seen that the overall conversion of Mineral Resource to Mineral Reserve is slightly conservative with slightly higher dilution and lower recovery than has been shown from mining to date; however, the proportion of fresh rock mining with additional loss potential from blast movement will increase in future, such that the factors applied are considered reasonable.

The Houndé Gold Mine reconciliation process is being further refined to deliver more robust data, including improved tracking by deposit. This will allow improved determination of appropriate planning factors in future. As additional data becomes available, the Bouéré performance will be better understood and Kari Pump factors adjusted by actual performance rather than assumptions. As more data becomes available, a continuous improvement process will be undertaken to improve the feedback loop between Mineral Resource estimation, mine planning and the grade control and mining process.

Table 14-57: Resource Block Model to Mining Block Model conversion

Pits	Block Model			Dilution	Losses	Mining Schedule		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	(%)	(%)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Vindaloo Main	15,142	2.08	1,010	12.3	4.7	17,002	1.76	962
Vindaloo North	951	1.90	58	18.9	8.9	1,130	1.46	53
Vindaloo Central	2,679	2.27	195	12.9	7.1	3,024	1.87	182
Koho	734	1.54	36	10.4	7.9	810	1.29	34
Madras	393	0.97	12	8.0	8.7	425	0.82	11
Houndé	**19,900**	**2.05**	**1,312**	**12.5**	**5.4**	**22,391**	**1.72**	**1,242**
Bouéré	721	5.19	120	13.0	6.3	814	4.30	113
Dohoun	972	2.39	75	19.3	7.4	1,160	1.85	69
Kari Pump	7,619	3.13	767	(4.1)	8.2	7,308	3.00	704
Total	**29,211**	**2.42**	**2,274**	**8.4**	**6.5**	**31,673**	**2.09**	**2,127**

14.12 Reasonable Prospects for Eventual Economic Extraction

In compliance with the requirements of the Canadian Institute of Mining, Metallurgy and Petroleum ("**CIM 2014**") Definition Standards 2014 the Mineral Resources as reported herein have been reported with due consideration that a Mineral Resource is defined as: *"a concentration or occurrence of natural, solid, inorganic or fossilised organic material in or on the Earth's crust in such form and quantity and of such grade or quality that it has reasonable prospects for economic extraction"*.

Accordingly reporting of Mineral Resources in accordance with the terms and definitions CIM 2014 requires consideration of the economic viability whereby the Mineral Resources are considered to have 'reasonable prospects for economic extraction' under certain assumed criteria. The Company recognise that there exists a wide range of industry practices with respect to such determinations, however it is customary to consider the following as appropriate:

- Constraining the reporting of those Mineral Resources which are potentially economic via open-pit methods to an optimised shell derived from all resource classifications assuming a long-term price which reflects an appropriate premium (say 30% to 50%) to the long-term price adopted for reporting of Ore Reserves or alternatively a reasonable depth limit which is deemed appropriate for the scope and scale of the deposit; and
- Constraining the reporting of those Mineral Resources which are potentially economic via underground methods to the resources reporting external to the optimised shell (noted above) through application of an appropriate cut-off grade for underground mining, reflective of the associated higher operating expenditures.

It should however be clear that the above approach can provide a wide range of results and is therefore subject to a degree of interpretation by the Qualified Person to present that which they consider to be reflective of "**reasonable prospects for eventual economic extraction**". In this instance the Company has based its Mineral Resource statement through consideration open-pit optimisation analysis and selection of a raw optimised shells which incorporate the assumptions as noted in Table 14-58 below.

Table 14-58: Houndé Gold Mine: Reasonable Prospects for Eventual Economic Extraction input assumptions

Statistic	Material Type	Units	Deposits					
			Vindaloo-Madras	Bouéré	Dohoun	Kari Centre	Kari Pump	Kari West
Analysis Date								
Date of estimate		(period)	Dec-14	Dec-14	Dec-14	Sep-19	Nov-18	Oct-19
Commodity Price								

Statistic	Material Type	Units	Deposits					
			Vindaloo-Madras	Bouéré	Dohoun	Kari Centre	Kari Pump	Kari West
Gold Price		(US$/oz)	1,500	1,500	1,500	1,500	1,500	1,500
Physicals								
Mining Recovery		(%)	100.00	98.00	98.00	95.00	95.00	95.00
Mining Dilution		(%)	100.00	8.00	34.00	20.00	20.00	20.00
Overall Slope Angle	Oxide	(°)	31.6 – 38.3	35	35	40	40	40
	Transition	(°)	33.1 – 40.3	35	35	40	40	40
	Fresh	(°)	39.3 – 44.1	50	50	40	40	40
Operating Expenditure								
Base Mining Cost	Oxide	(US$/t)	1.36	4.62	3.72	2.00	2.00	2.00
	Transition	(US$/t)	1.36	4.62	3.72	2.00	2.00	2.00
	Fresh	(US$/t)	1.36	4.62	3.72	2.00	2.00	2.00
Mining Cost and Haulage	Oxide	(US$/t)	1.36	4.62	3.72	2.60	3.00	2.60
	Transition	(US$/t)	1.36	4.62	3.72	3.00	3.80	3.00
	Fresh	(US$/t)	1.36	4.62	3.72	3.50	3.85	3.50
Processing Cost (including G&A)	Oxide	(US$/t)	13.03	13.03	13.03	16.20	16.20	16.20
	Transition	(US$/t)	14.39	14.39	14.39	18.00	17.50	18.00
	Fresh	(US$/t)	17.77	17.77	17.77	20.50	20.50	20.50
Process Recovery	Oxide	(%)	95.4 – 94.7	93.80	98.20	90.00	90.00	90.00
	Transition	(%)	88-1 - 94.1	90.00	96.00	90.00	90.00	90.00
	Fresh	(%)	79.4 – 94.0	84.60	95.50	90.00	90.00	90.00
Selling Cost (Royalty, Refining, and Selling)	Royalty	(%)	7.00	7.00	7.00	7.00	7.00	7.00
	Payability	(%)	99.95	99.95	99.95	99.95	99.95	99.95
	Refining	(US$/oz)	3.35	3.35	3.35	3.35	3.35	3.35
Reporting Cut-off-Grade								
In-Situ Cut-off Grade		(g/tAu)	0.35 and 0.50	0.50	0.50	0.50	0.50	0.50

14.13 Mineral Resource Estimate (31 December 2019)

The Mineral Resource estimate for the Houndé Gold Mine as at 31 December 2019 is reported for each of the individual deposits in Table 14-59 below and includes:

- Measured Mineral Resources totalling 1.7Mt grading 1.75g/tAu for contained metal of 96koz;
- Indicated Mineral Resources totalling 58.6Mt grading 2.07g/tAu for contained metal of 3,797kozAu; and
- Inferred Mineral Resources totalling 6.9Mt grading 2.07g/tAu for contained metal of 456kozAu.

Table 14-60 presents the Mineral Resources for Houndé Gold Mine as at 31 December 2019 inclusive of subdivisions for oxide, transitional and fresh ore types. Furthermore, in reviewing the Mineral Resource statements as reported herein the following notes should also be considered:

- The Mineral Resources have an effective date of 31 December 2019;
- The Qualified Persons responsible for the reporting of the Mineral Resources as at 31 December 2019 are:
  - Kevin Harris (CPG), Vice President Resources, Endeavour Mining Corporation who was responsible for the following deposits, Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit,
  - Mark Zammit (MAIG), Principal Consultant, Cube Consulting Pty Ltd who was responsible for the Vindaloo-Madras Deposits;
- All Mineral Resources are reported within an optimised shell generated assuming a long-term gold price of US$1,500/oz and an in-situ cut-off grade of 0.5g/tAu with the exception of Vindaloo-Madras which ranges from 0.35g/tAu to 0.50g/tAu;
- Mineral resources that are not mineral reserves do not have demonstrated economic viability; and
- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves.

Table 14-59: Mineral Resource Statement for Houndé Gold Mine (split by deposit), as of 31 December 2019

Classification & Deposits	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured			
Vindaloo	761	2.43	60
Stockpiles	950	1.20	37
Subtotal	**1,712**	**1.75**	**96**
Indicated			
Vindaloo	26,002	1.91	1,594
Bouéré	802	4.94	127
Dohoun	1,152	2.35	87
Kari Pump	11,330	2.71	987
Kari West	15,652	1.71	861
Kari Centre	3,705	1.18	140
Subtotal	**58,644**	**2.01**	**3,797**
Measured + Indicated			
Vindaloo	26,763	1.92	1,654
Bouéré	802	4.94	127
Dohoun	1,152	2.35	87
Kari Pump	11,330	2.71	987
Kari West	15,652	1.71	861
Kari Centre	3,705	1.18	140
Stockpiles	950	1.20	37
Total	**60,355**	**2.01**	**3,893**
Inferred			
Vindaloo	2,568	2.63	217
Bouéré	154	3.60	18
Dohoun	68	2.91	6
Kari Pump	282	2.21	20
Kari West	3,370	1.65	179
Kari Centre	412	1.21	16
Total	**6,855**	**2.07**	**456**

Table 14-60: Mineral Resource Statement for Houndé Gold Mine (split by material type), as of 31 December 2019

Classification & Deposit	Oxide			Transitional			Sulphide			Total		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured												
Vindaloo	27	1.84	2	202	1.77	12	532	2.71	46	761	2.43	60
Stockpiles	950	1.20	37	-	-	-	-	-	-	950	1.20	37
Subtotal	**978**	**1.22**	**38**	**202**	**1.77**	**12**	**532**	**2.71**	**46**	**1,712**	**1.75**	**96**
Indicated												
Vindaloo	608	1.47	29	980	1.49	47	24,414	1.93	1,518	26,002	1.91	1,594
Bouéré	1	1.95	0	4	2.67	0	798	4.95	127	802	4.94	127
Dohoun	178	1.87	11	141	1.90	9	833	2.53	68	1,152	2.35	87
Kari Pump	3,651	2.57	302	1,363	2.85	125	6,316	2.76	561	11,330	2.71	987
Kari West	2,973	1.78	170	1,449	1.64	76	11,230	1.70	614	15,652	1.71	861
Kari Centre	2,133	1.17	80	604	1.20	23	968	1.19	37	3,705	1.18	140
Subtotal	**9,544**	**1.93**	**591**	**4,542**	**1.92**	**281**	**44,558**	**2.04**	**2,925**	**58,644**	**2.01**	**3,797**
Measured + Indicated												
Vindaloo	635	1.48	30	1,182	1.54	59	24,946	1.95	1,565	26,763	1.92	1,654
Bouéré	1	1.95	0	4	2.67	0	798	4.95	127	802	4.94	127
Dohoun	178	1.87	11	141	1.90	9	833	2.53	68	1,152	2.35	87
Kari Pump	3,651	2.57	302	1,363	2.85	125	6,316	2.76	561	11,330	2.71	987
Kari West	2,973	1.78	170	1,449	1.64	76	11,230	1.70	614	15,652	1.71	861
Kari Centre	2,133	1.17	80	604	1.20	23	968	1.19	37	3,705	1.18	140
Stockpiles	950	1.20	37	-	-	-	-	-	-	950	1.20	37
Total	**10,521**	**1.86**	**630**	**4,744**	**1.92**	**292**	**45,090**	**2.05**	**2,971**	**60,355**	**2.01**	**3,893**
Inferred												
Vindaloo	115	1.46	5	96	1.32	4	2,357	2.74	208	2,568	2.63	217
Bouéré	-	-	-	1	3.86	0	153	3.60	18	154	3.60	18
Dohoun	5	1.87	0	5	1.87	0	58	3.09	6	68	2.91	6
Kari Pump	123	1.77	7	39	2.08	3	120	2.69	10	282	2.21	20
Kari West	1,162	1.41	53	296	1.34	13	1,912	1.84	113	3,370	1.65	179
Kari Centre	220	1.22	9	66	0.89	2	126	1.35	5	412	1.21	16
Total	**1,625**	**1.42**	**74**	**503**	**1.35**	**22**	**4,727**	**2.37**	**361**	**6,855**	**2.07**	**456**

14.14 Risks and Opportunities

The Qualified Persons confirm that the Mineral Resources as reported for 31 December 2019 for the Houndé Gold Mine are stated in accordance with the guidelines and terminology provided in the CIM Standards. The Mineral Resources have also been established with due recognition for all the necessary multi-disciplinary technical inputs required to ensure compliance with the Requirements as defined herein and are considered to both a reasonable and unbiased estimate at the time of reporting.

Notwithstanding the above, there are number of generic and specific risks which apply:

- **Reasonable Prospects for Economic Extraction:** The current Mineral Resources are reported at fixed in-situ cut-off grade within an optimised shell assuming a long-term price of US$1,500/oz. Whilst the Mineral Resources account for depletion from the date of the last re-estimate to 31 December 2019, the supporting optimisation analysis is in some instances dated (2014 through 2018). Accordingly, there remains a risk that in the event that changed parameters are utilised, which reflect current LoMp assumptions, then the Mineral Resources as reported herein may be different under these updated assumptions. Furthermore, as no detailed sensitivity analysis is undertaken at a range of gold prices it is not possible to assess the impact of these changed assumptions on the Mineral Resource statement as reported herein;

- **Mineral Resource Estimation Dates:** To date there are a number of deposits which have not yet been subject to fundamental re-estimation since the initial estimate was declared and as such only account for depletion to date. Accordingly, it is possible that should the additional geological data gathered since the last prior estimate be incorporated for the deposits which are currently being mined there is a risk that the updated estimates may be different from that reported herein;
- **Grade Control Models and Reconciliation Studies:** The Company is currently undertaking a strategic review of the Grade Control Models and associated reconciliation studies with a view to standardising the approach and seeking to establish both deposit specific and comparable monthly reporting basis. This is in recognition that historical processes for development of exploration models and grade control models are not aligned and furthermore the data supporting the grade control models do not inform the current Mineral Resource estimate.

  Furthermore, where multiple deposits are mined with varying proportions of oxide, transitional and fresh ores fed into a single process plant, plant allocations are inevitably challenging. Accordingly, it may be considered appropriate to supplement the current grade bin-criteria for mining to enable stockpile management in accordance with both degree of weathering and grade bins to facilitate enhanced analysis.

  Following implementation of the grade control and reconciliation recommendations it is therefore possible that reconciliation adjustments may be incorporated into the current exploration model, thereby resulting in changed estimates from that reported herein.

The key opportunities relating to the Mineral Resources reported at Houndé Gold Mine are:

- **Mineral Resources which are potentially economically extractable by underground methods:** the current Mineral Resources are constrained within an optimised shell established at a long-term gold price assumption of US$1,500/oz. Presently no estimate or analysis of the underground mining potential has been completed and as such there remains in certain instances the potential for reporting of additional Mineral Resources which meet the appropriate criteria;
- **Exploration targets:** In the vicinity of the Houndé Gold Mine, the Company is investigating a number of exploration targets (Figure 14-1) for which no Mineral Resources are reported to date. Accordingly, there remains some potential, pending completion of additional exploration drilling that Mineral Resources are established on these exploration targets; and
- **Mineral Resource sensitivity:** Presently only limited sensitivity analysis are undertaken and ultimately reported to confirm the potential beyond the currently assumed long-term gold price. Accordingly, given increasing gold prices, there remains the possibility of increasing the total quantum of Mineral Resources which are economically extractable by open-pit methods.

14.15 Interpretation, Conclusions and Recommendations

The Mineral Resources as reported herein are considered to reflect an unbiased and reasonable estimate given the geological data gathered to date and that are also reported in accordance with the guidelines and terminology provided in the CIM Standards. This aside there are a number of areas of potential improvement which if completed would increase the confidence and transparency relating to the current declarations.

The current Mineral Resource estimate is undertaken by both the internal resource modelling team and external consultants appointed for certain deposits. The grade-control models are presently the responsibility of the mine-based teams and as such future resource models would be further enhanced through greater integration of the knowledge capital established by the various consultants. Furthermore, certain of the Mineral Resource estimates are informed by dated and prior estimates which would benefit from updates to incorporate additional geological information, analysis and understanding developed in the interim period, specifically as the mining operations extend into their fourth year of operations. The key areas of focus include:

- Updating of the resource models with all geological information and analysis completed since the last prior re-estimation;
- Grade control models and reconciliation studies; and
- Basis for reporting potentially economically extractable resources and open-pit optimisation studies.

Accordingly, the principal recommendations pertaining to the reporting of Mineral Resources at Houndé Gold Mine are:

- As appropriate to update the resource models with all additional drilling, grade control and other geological understanding gathered since the last prior complete re-estimation;
- To align the optimisation input parameters with that derived as inputs to the current Mineral Reserve process and as necessary ensure that the sensitivity analysis is completed to enable enhanced transparency with respect to sensitivity analysis;
- To implement the recommendations relating to grade control modelling and reconciliation studies with a view to informing the resource models as deemed appropriate;
- To undertake further analysis of the underground potential at certain areas of the deposits to determine the extent to which any Mineral Resources located below the current final pit designs can be mined by underground methods;
- Following completion of additional drilling at certain areas of the deposits to establish the extent to which the current grade-based domains can be supplemented with lithological and/or structural domains thereby enhancing the confidence and understanding of the mineralisation and grade distribution; and
- To complete the planned exploration programmes currently underway by the Company and following successful outcomes delineation of Mineral Resources which can then be transferred to the operating entities managed by Houndé Gold Mine.

15 MINERAL RESERVES

15.1 Introduction

The following section includes discussion and comment on the basis of the determination of Mineral Reserves reported for Houndé Gold Mine as at 31 December 2019 with specific focus on the following key items: Mineral Reserve estimation approach and methodology; mining geotechnics; pit optimisation and mine designs; waste rock dump design; prior Mineral Reserve statements; Mineral Reserve statements as at 31 December 2019; risks and opportunities; interpretation, conclusions and recommendations.

15.2 Mineral Reserve Estimation Approach

The Mineral Reserve statement for the Houndé Gold Mine dated 31 December 2019 as reported herein is supported by the engineering designs and modifying factors utilised in the Q4 2019 LoMp process. The LoMp incorporates Mineral Reserves reported for the following open pits (Figure 15-1):

- Houndé Open Pit group comprising Vindaloo Main, Vindaloo Central, Vindaloo North, Koho and Madras which are in close proximity to each other on strike and within the same overall mineralisation trend; and
- The satellite deposits of Bouéré, Dohoun and Kari Pump located at distances of 16.0km, 20.7km and 11.4km respectively from the Houndé Processing Plant.

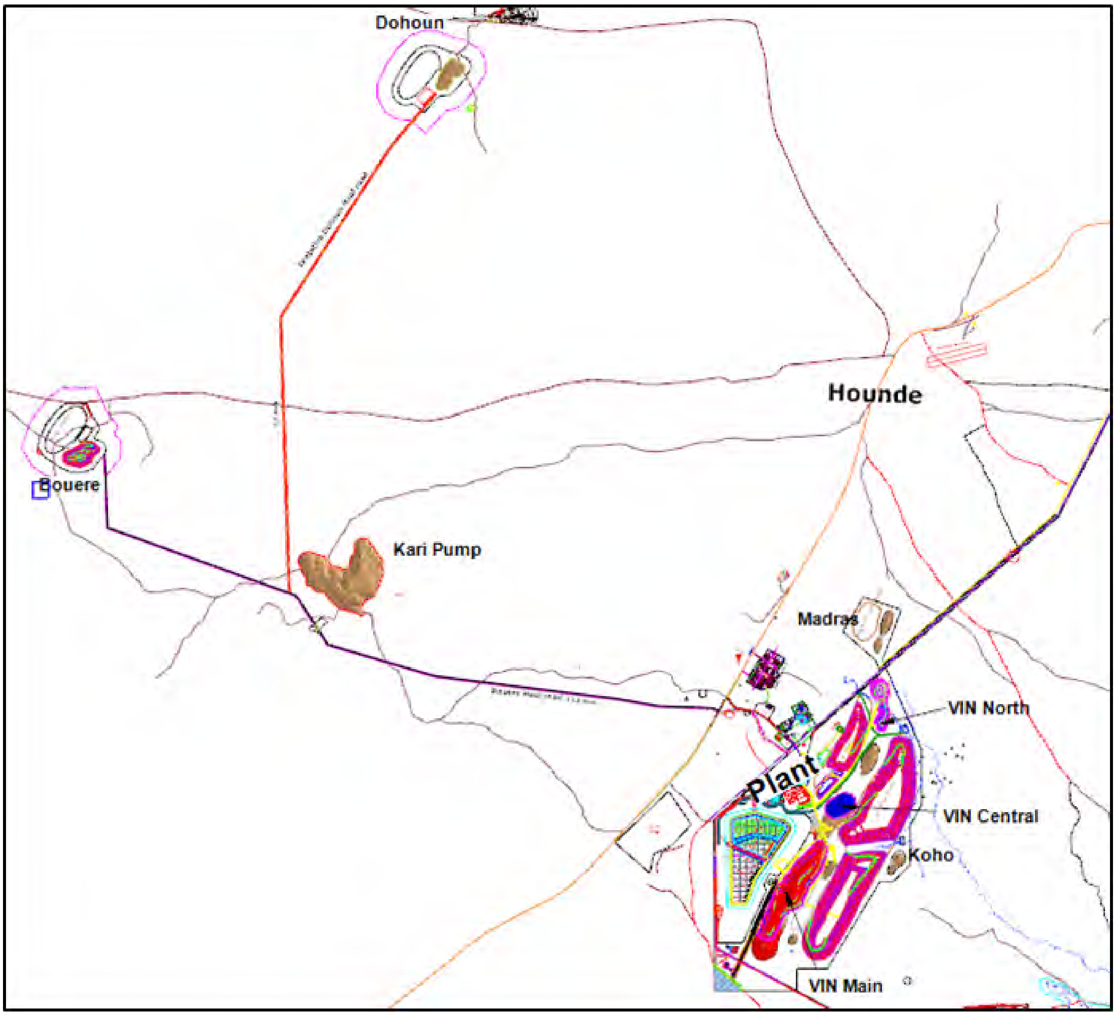
The open pits are designed in various stage pushbacks and current mining activities comprise: Vindaloo Main (Stage 2 and 3); Vindaloo Central (Stage 1); Bouéré with Kari Pump commending operations in 2020. The annual strategic LoMp process at Houndé Gold Mine typically include the following key data inputs and activities:

- Exploration block models which in certain instances are modified to generate mining block models though re-blocking which introduces a degree of dilution;
- The topographic surface reflecting the year end survey position as at 31 December 2019;
- Open Pit optimisation analysis to include:
  - derivation of pit optimisation parameters, inter alia: dilution, diluting grades and losses, metallurgical recovery and refining factors, commodity price and operating expenditure assumptions;
  - for unit mining operating expenditures mining costs were derived from detailed first principle equipment productivity calculations, detailed haulage analysis of each bench elevation, and Original Equipment Manufacturers' ("**OEM**") equipment life cycle cost per operating hour. These costs are then used to derive both waste and ore mining costs relationships with reduced level ("**RL**") elevations and coded into the block models as a specific attribute,
  - derivation of in-situ cut-off grades ("**ISCOG**") and run of mine cut-off grades ("**OCOG**") as appropriate,
  - ultimate pit and staged pit selections;
- Engineering pit design assumptions inclusive of:
  - open pit access including haul road designs,
  - geotechnical design considerations for pit slopes (inter ramp angles, overall slope angles, batter angles, stacked berm configurations and berm widths), which vary as appropriate with azimuth and depth to reflect the geotechnical domains as established for each deposit;

- Mine planning and production scheduling (as referenced in Section 16) inclusive of production rates; stockpiling strategies; grade bin selection criteria; production capacities for mining and processing activities; exploration models and grade control models; and
- Mineral Reserve reporting based on aggregation of all Measured and Indicated Mineral Resource blocks incorporated within the LoMp and reported inclusive of all relevant dilution, dilutant grade and losses to enable reporting of Mineral Reserves.

Notwithstanding the above approach, the process followed for the 31 December 2019 Mineral Reserve reporting did not incorporate any updated pit optimisations for the majority (excepting Kari Pump) of the open pits. The remainder of the open pits relied on pit optimisations undertaken in 2015 by a third-party consultant which incorporated a similar gold price (US$1,300/oz) to that presently incorporated for the 31 December 2019 Mineral Reserve statements. Furthermore, the block models for some of the open pits have in some instances been updated since 2015 through fundamental recalculation in addition to depletion, specifically at Bouéré and Dohoun and some of the deposits (other than for depletion) have not been updated since 2014, specifically at the Vindaloo deposits. The operating assumptions have also changed and as such the resulting pit designs, whilst supporting the reporting of Mineral Reserves and confirming their economic viability may not be 'optimal'.

Figure 15-1: Houndé Gold Mine: location of open pits in relation to the Mine Service Area and the Houndé Process Plant (source: Endeavour)



15.3 Mineral Reserve Assumptions

Block Models and Surfaces

The supporting details for the resource block models are as provided in Section 14 of this Technical Report. The block models incorporate all typical attributes inclusive of gold grades, rock type (facies), weathering (oxidation) status, 'resource' confidence categories (Measured, Indicated and Inferred) and density values. All block models were also depleted with the end of period surface topography reported at 31 December 2019.

In accordance with the CIM Definition Standards all ultimate pit designs are based on historical and current pit optimisation analysis which effectively treated all Inferred Mineral Resources as waste. For the subsequent production scheduling, Inferred Mineral Resources continue to be treated as waste and are not assumed to be separately stockpiled for future processing.

Dilution and Ore Loss

Table 15-1 provides a summary of the effective ore dilution and metal losses resulting from the re-blocking of the resource block models to generate the mining block models used to support mine planning and scheduling process as well as the reporting of Ore Reserves. The estimates as reported in this table are derived by application of the relevant deposit specific cut off grades based on the Sub Ore ("**SO**") assumptions to each block model within the final pit designs.

For the resource block model for the Houndé Open Pit group covers the entire Vindaloo Main, Vindaloo North, Vindaloo Centre, Koho and Madras pits. The remaining other pits have individual resource block models. All the resource block models were sub-blocked with the smallest sub block sizes and parent block sizes shown in Table 15-2. All of the resource models were re-blocked and regularised to the same selective mining unit ("**SMU**") size 5m by 5m by 2.5m along X-direction, Y-direction and Z-direction, respectively.

During the re-blocking process, waste and ore block quantities and gold contents were added together to form one block. When the orebody is formed of small size veins, the re-blocking process results in higher dilution. If the orebody mineralisation is thicker, the blocks located at the central part of the orebody are merged with neighbouring ore blocks, accordingly as ore blocks merge with together, the effective dilution is reduced.

The same re-blocking process may also cause some losses in the gold recovered through mining from the pits. When ore blocks are merged with waste blocks, the overall gold grade of some blocks may become lower than the gold cut-off grade. The regularised block is treated as waste losing the ore and the gold within the smaller sub-blocks.

Additional factors shown in Table 15-3 were applied to Kari pump to account for artisanal mining activities and to Vindaloo Main and Vindaloo Centre pits only to the volume planned to be mined during 2020. An additional 5% ore loss was applied to Bouéré pit, which is planned to be completely mined out during 2020.

Table 15-1: Resource Block Model to Mining Block Model conversion

Pits	Block Model			Dilution	Losses	Mining Schedule		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	(%)	(%)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Vindaloo Main	15,142	2.08	1,010	12.3	4.7	17,002	1.76	962
Vindaloo North	951	1.90	58	18.9	8.9	1,130	1.46	53
Vindaloo Central	2,679	2.27	195	12.9	7.1	3,024	1.87	182
Koho	734	1.54	36	10.4	7.9	810	1.29	34
Madras	393	0.97	12	8.0	8.7	425	0.82	11
Houndé	**19,900**	**2.05**	**1,312**	**12.5**	**5.4**	**22,391**	**1.72**	**1,242**
Bouéré	721	5.19	120	13.0	6.3	814	4.30	113
Dohoun	972	2.39	75	19.3	7.4	1,160	1.85	69
Kari Pump	7,619	3.13	767	(4.1)	8.2	7,308	3.00	704
Total	**29,211**	**2.42**	**2,274**	**8.4**	**6.5**	**31,673**	**2.09**	**2,127**

Table 15-2: Resource model's minimum sub block size and parent block sizes

Open Pit	Subblock Size X (m)	Subblock Size Y (m)	Subblock Size z (m)	Parent blocks X (m)	Parent blocks Y (m)	Parent blocks z (m)
Vindaloo Main	1.25	2.50	3.00	10.00	5.00	6.00
Vindaloo North	1.25	2.50	3.00	10.00	5.00	6.00
Vindaloo Centre	1.25	2.50	3.00	10.00	5.00	6.00
Koho	1.25	2.50	3.00	10.00	5.00	6.00
Madras	1.25	2.50	3.00	10.00	5.00	6.00
Bouéré	2.50	2.50	3.00	5.00	5.00	3.00
Dohoun	2.50	2.50	2.50	5.00	5.00	2.50
Kari Pump	1.25	1.25	2.50	10.00	10.00	5.00

Table 15-3: Modifying factors applied to 2020 Volumes

Open Pit	Tonnage (%)	Grade (%)	Content (%)
Vindaloo Main	(2.00)	(3.00)	(5.00)
Vindaloo Centre	(2.00)	(3.00)	(5.00)
Kari Pump	(8.00)	(2.00)	(10.00)

Gold Price and revenue related assumptions

For derivation of cut-off grades and supporting the economic viability of the Mineral Reserves a gold price of US$1,300/oz was assumed, the supporting analysis for which is incorporated in Section 22 of this Technical Report. The only other factors considered to derive the net sales revenue are the individual government and private royalties which total 7.00%, refinery payability of 99.95% and an assumed refining and transport cost of US$3.35/oz payable. This results in a net gold price of US$1,205/oz payable (US$38.74/g). As previously noted, other than for Kari Pump no pit optimisation studies have been completed since 2015.

Operating Costs

The mining costs were derived assuming first principal owner mining determinations which was subsequently incorporated into the block model as a cost vs depth (reduced level metres) relationship to derive unit mining costs for both ore and waste. The aggregation of these costs are reported in summary form Table 15-4 below for each material type reporting within each open pit (see section 16.5 of the Technical Report for further details). The resulting mining costs address all key mining related activities: including drilling and blasting, excavation, load and haul, ancillary support, dewatering, grade control and over-haul costs with stockpile re-handling costs included in the process plant related operating expenditures. The preliminary mining costs also included a further allowance for mobile mining equipment replacement cost of US$0.28/t which is not included in the waste and ore mining costs reported below as this is already included as sustaining capital amounts as reported in Section 21.3 of this technical report.

Table 15-4: Houndé Gold Mine: waste and ore mining cost summary

Pit	Waste Oxide (US$/t)	Waste Transition (US$/t)	Waste Fresh (US$/t)	Waste Total (US$/t)	Ore Oxide (US$/t)	Ore Transition (US$/t)	Ore Fresh (US$/t)	Ore Total (US$/t)	Total Mined Oxide (US$/t)	Total Mined Transition (US$/t)	Total Mined Fresh (US$/t)	Total Mined Total (US$/t)
Vindaloo Main	1.34	2.05	2.36	2.27	2.16	2.94	3.35	3.35	1.34	2.06	2.52	2.42
Vindaloo North	1.10	1.88	2.16	1.33	2.07	2.88	3.19	2.81	1.12	2.04	2.42	1.44
Vindaloo Central	1.12	1.90	2.14	1.78	2.12	2.95	3.21	3.02	1.22	2.02	2.43	2.01
Koho	1.08	1.81	2.01	1.41	2.11	2.87	3.07	2.73	1.18	1.93	2.37	1.63
Madras	0.98	-	-	0.98	2.21	-	-	2.21	1.21	-	-	1.21
Houndé	**1.17**	**1.98**	**2.34**	**2.10**	**2.14**	**2.91**	**3.33**	**3.24**	**1.22**	**2.04**	**2.51**	**2.26**
Bouéré	1.08	1.84	2.23	2.22	4.36	5.15	5.51	5.51	1.31	1.91	2.48	2.47
Dohoun	1.08	1.84	2.08	1.69	5.32	6.11	6.34	6.12	1.26	2.19	2.52	2.04
Kari Pump	1.14	1.92	2.14	1.37	3.81	4.62	4.88	4.36	1.24	2.16	2.52	1.54
Total	**1.14**	**1.95**	**2.29**	**1.77**	**3.41**	**4.04**	**3.67**	**3.66**	**1.23**	**2.10**	**2.51**	**1.97**

The original processing costs as incorporated into the cut-off grade determinations were applied as constant assumptions per weathering (oxidation ore type) and were inclusive of maintenance operating expenditures of US$1.45/$t_{milled}$ and the unit ore re-handling costs of US$0.67/$t_{milled}$. Table 15-5 includes a summary of the processing cost assumptions as included in the cut-off grade determinations and the resulting unit costs as incorporated into the economic analysis assumptions once the corrections for capitalisation of the maintenance operating expenditures and the incorporation of the stockpile re-handling costs are addressed. This results in marginally lower costs (oxide-US$11.69/$t_{milled}$; transitional-US$12.86/t_{milled}; fresh-US$15.77/$t_{milled}$) when compared with that incorporated into the cut-off grade analysis (oxide-US$14.10/$t_{milled}$; transitional-US$15.27/t_{milled}; fresh-US$18.18/$t_{milled}$). The long ore haul costs for Bouéré, Dohoun and Kari Pump, which are US$2.40/t, US$3.36/t and US$1.68/t, respectively were also added.

Table 15-5: Processing Cost Summary in US$/$t_{milled}$

Ore Type	COG Assumption (US$/t)	Sustaining Capex (US$/t)	GC Drilling (US$/t)	Processing Operating (US$/t)	Rehandle (US$/t)	Direct Processing (US$/t)
Oxide	14.10	1.45	0.96	11.69	0.67	11.02
Transitional	15.27	1.45	0.96	12.86	0.67	12.19
Fresh	18.18	1.45	0.96	15.77	0.67	15.10

The administration costs as incorporated into the economic analysis for the Houndé Gold Mine average a total of US$5.93/$t_{milled}$ which is marginally higher than assumed for derivation of the cut-off grades as reported herein (US$.5.27/$t_{milled}$).

Human Resources

Houndé Gold Mine presently reports a total of 1,125 Total Employees Costed ("**TEC**") with approximately 50 sourced as expatriates and the remainder as nationals. The total number of contractors engaged is 822 which provides a total compliment of 1,947 which are directly responsible for mining, processing, infrastructure and G&A related activities at Houndé Gold Mine (Table 15-6). The annual labour costs amount to US$29m for 2019 reflecting a weighted average labour cost of US$2,112 per month.

Table 15-6: Historical Human Resources at Houndé Gold Mine

Statistic	Units	2018	2019
Total Employees Costed	**(No)**	**1,059**	**1,143**
Expatriates	(No)	57	48
Nationals	(No)	1,002	1,095
Total Employees Costed	**(US$k)**	**26,898**	**28,974**
Total Employees Costed	**(US$pm)**	**2,117**	**2,112**
Absenteeism	(%)	0.8	0.7
Turnover	(%)	2.9	1.5
Contractors	**(No)**	600	723

Processing Recoveries

The assumed process recoveries as included in the current COG determinations are as reported below (Table 15-7). The recovery assumptions for the Houndé Open pit groups are assumed be constant for the specific weathering type categories. For the Houndé open pit group oxide ores the weighted average recovery is reported at 93.81%. This is however influenced by the lower recovery attributed to the SO grade category, otherwise the recovery applied to all other grade categories is 95.2%.

Table 15-7: Process (Gold) Recovery Summary

Deposit	Oxide (%)	Transitional (%)	Fresh (%)
Vindaloo Main	95.2	94.0	92.9
Vindaloo North	95.2	94.0	92.9
Vindaloo Central	95.2	94.0	92.9
Koho	95.2	94.0	92.9
Madras	95.2	94.0	92.9
Houndé	**95.2**	**94.0**	**92.9**
Bouéré	93.8	90.0	84.6
Dohoun	93.8	90.0	84.6
Kari Pump	94.1	89.2	82.0
Total	**94.0**	**90.6**	**89.9**

Cut-off Grade analysis

The cut-off grade analysis completed to support the 2019 Mineral Reserve statements incorporated the various assumptions reported above inclusive of:

- Processing operating expenditures;
- General and administration operating expenditures assumed at 100% for the economic cut-off grade determination and 40% for the Sub-Ore ("**SO**") grade category;

- Deposit specific metallurgical recovery assumptions distinguishing between oxide, transitional and fresh ore;
- Refining charges expressed in US$/oz;
- Long term gold price assumption of US$1,300/oz;
- Recovered gold payability of 99.85%; and
- Government and private royalty assumptions of 7.00%.

Table 15-8: Cut-off Grade analysis

Material Type	Unit	Vindaloo Main	Vindaloo Central	Vindaloo North	Koho	Madras	Bouere	Dohoun	Kari Pump
Economic Cut Off Grade									
Oxide	(g/t)	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
Transition	(g/t)	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6
Fresh	(g/t)	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
Sub-Ore Cut-off Grade									
Oxide	(g/t)	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5
Transition	(g/t)	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
Fresh	(g/t)	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7

Pit Slope Angles

The inter ramp angles (“**IRA**”) as incorporated into the current geotechnical designs are applied to the individual rockmass domains (weathering type) for each open pit and are essentially considered constant for all bearings as noted below. Additional details in respect of the mining geotechnical analysis and assumptions are included in Section 15.7 below.

Table 15-9: Inter Ramp pit slope angles

Deposit	Oxide (°)	Transitional (°)	Fresh °)
Vindaloo Main	38.30	40.40	58.2
Vindaloo North	38.30	40.40	58.2
Vindaloo Central	38.10	40.30	58.2
Koho	38.30	40.40	46.00
Madras	38.10	40.30	58.2
Bouéré	38.10	38.10	51.0
Dohoun	38.10	38.10	54.5
Kari Pump	33.00	33.00	47.50

15.4 Pit Optimisations

The historical pit optimisation analysis was, other than for Kari Pump, undertaken in 2015 and have essentially not been updated since then. Accordingly, the selection of ultimate pits and the stage pushbacks remain unchanged and do not benefit from updated optimisation completed using the current mine design optimisation parameters and the latest available block models. Furthermore, certain of the block models, other than for depletion remain unadjusted and as such it is planned to revisit the pit optimisation during 2020 to inform the 31 December 2020 declarations. Notwithstanding this limitation, the historical optimisation was undertaken assuming a long-term gold price of US$1,300/oz which is equivalent to that used for the current 31 December 2019 declarations.

Certain adjustments have been made to the historical engineered pit designs to accommodate for certain updates to geotechnical assumptions and ramp locations. It is however possible that the current designs may not be ‘optimal’ in the context of any updated optimisation analysis should this be updated using the latest available technical data.

15.5 Mine Design

The engineering pit designs are based on specific design criteria applicable to each open pit as described below, however the general assumptions incorporated into the base designs are as follows:

- ramp gradients of 1 in 10;
- ramp widths for ridged body dump trucks (Komatsu 785) of 22.0m and 16.0m for dual lane and single lane traffic respectively;

- overall pit slope design consideration as reported in Section 15.7;
- minimum mining widths of 220m and turning radius of 10.1m to accommodate Komatsu 785 trucks; and
- waste rock dump slope designs to achieve overall slopes of 20°.

The dual ramp width of 22m is standard in the majority of the designs and is reduced to 16m for single lane operations on reaching the ultimate pit depth limits. For certain of the smaller pits, the single lane ramp width was further reduced in areas that have straight short ramps due to the size of the pit or for specific parts of a section at depth. In such instances it is assumed that these areas will be mined by an ADT fleet which can operate at steeper gradients.

Vindaloo Main Open Pit: stage 2,3 and 4 pit design

The Vindaloo Main Open Pit is situated 1.5km from the Houndé Process Plant and is designed with a number of staged pushbacks:

- Stage 1, which commenced in predominantly the upper eastern part has been depleted and mining is currently progressing in Stage 2;
- Stage 2 (Figure 15-2) focusses on deepening the pit on the north-eastern side (to elevation 155mRL) while progressing south-west. Stage 2 is currently mined up to 236mRL;
- Stage 3 (Figure 15-3) deepens the pit to 125mRL at the north-eastern end, and to 95mRL on the south-western end; and
- Stage 4 (Figure 15-4) mines both sides deeper to a final elevation of 65mRL and a maximum depth of 250m.

The geotechnical and mine design criteria for Vindaloo Main Open Pit Stage 2, Stage 3 and Stage 4 design criteria is provided in Table 15-10.

Table 15-10: Vindaloo Main Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	55.0	60.0	60.0	80.0
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	6.0	6.0	8.0
Inter Ramp Angle	(°)	38.3	38.3	40.4	58.2

Figure 15-2: Vindaloo Main Open Pit: Stage 2 pit design (source: Endeavour)

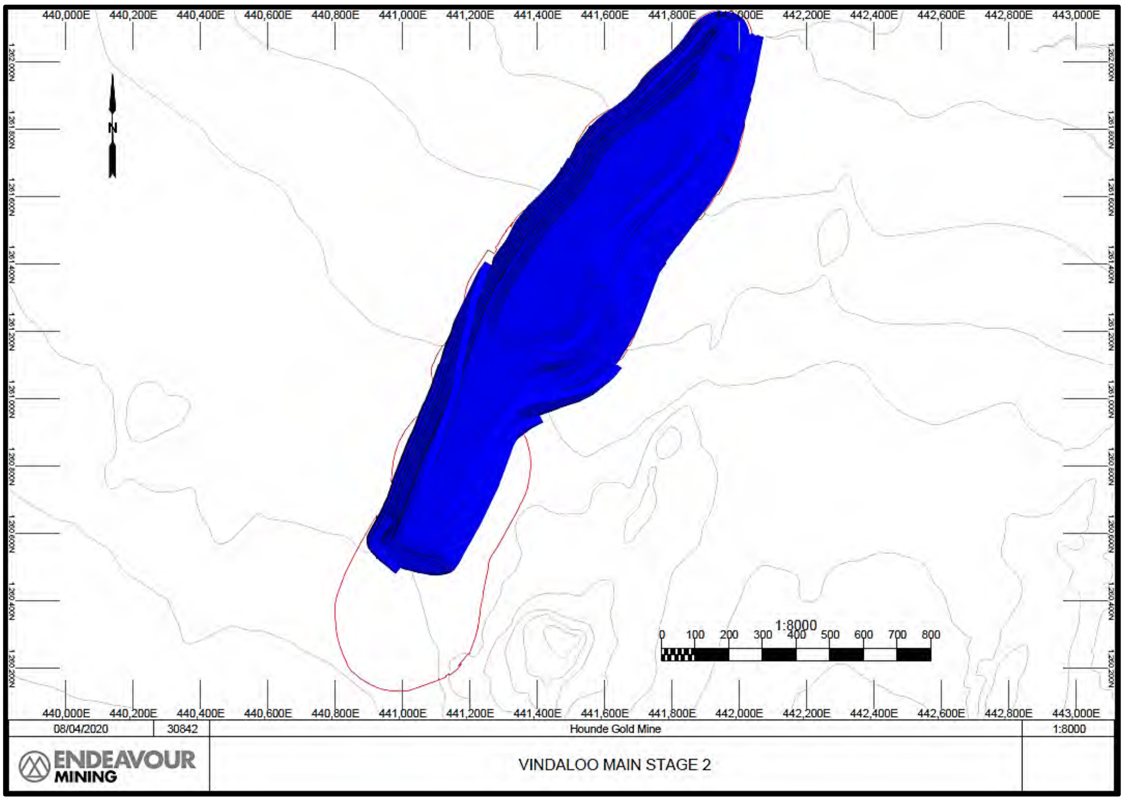


Figure 15-3: Vindaloo Main Open Pit: stage 3 pit design (source: Endeavour)

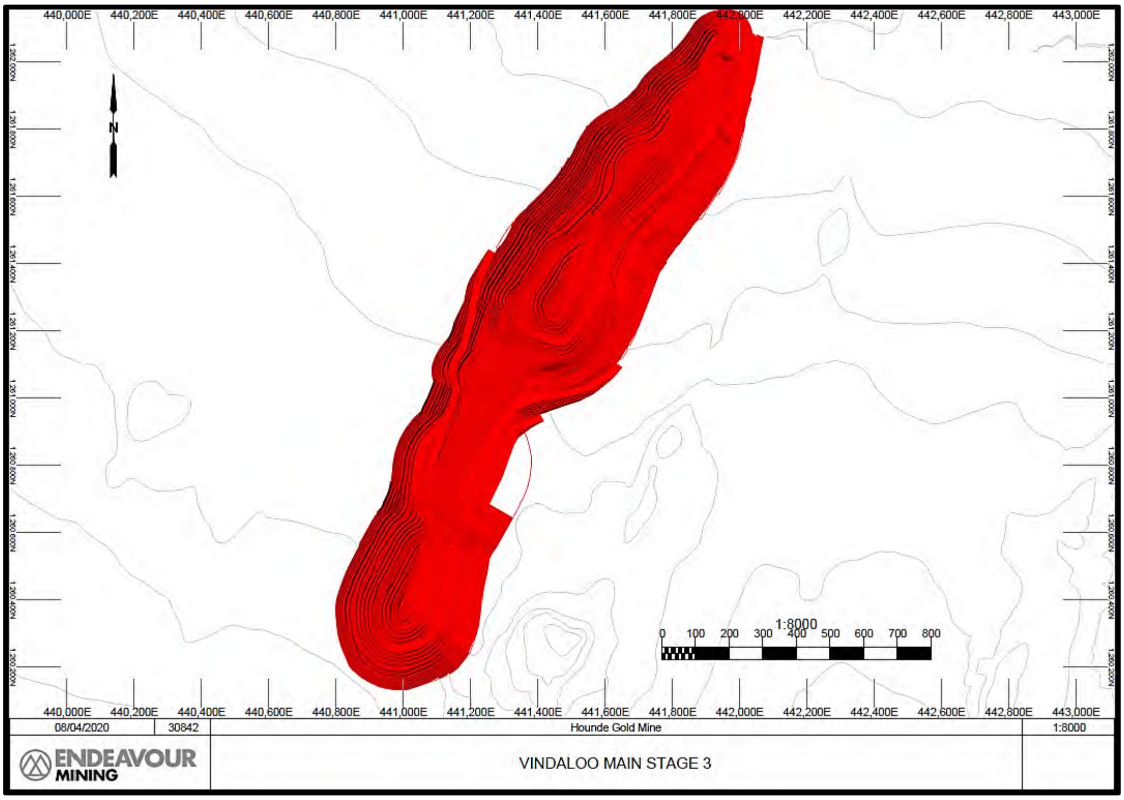
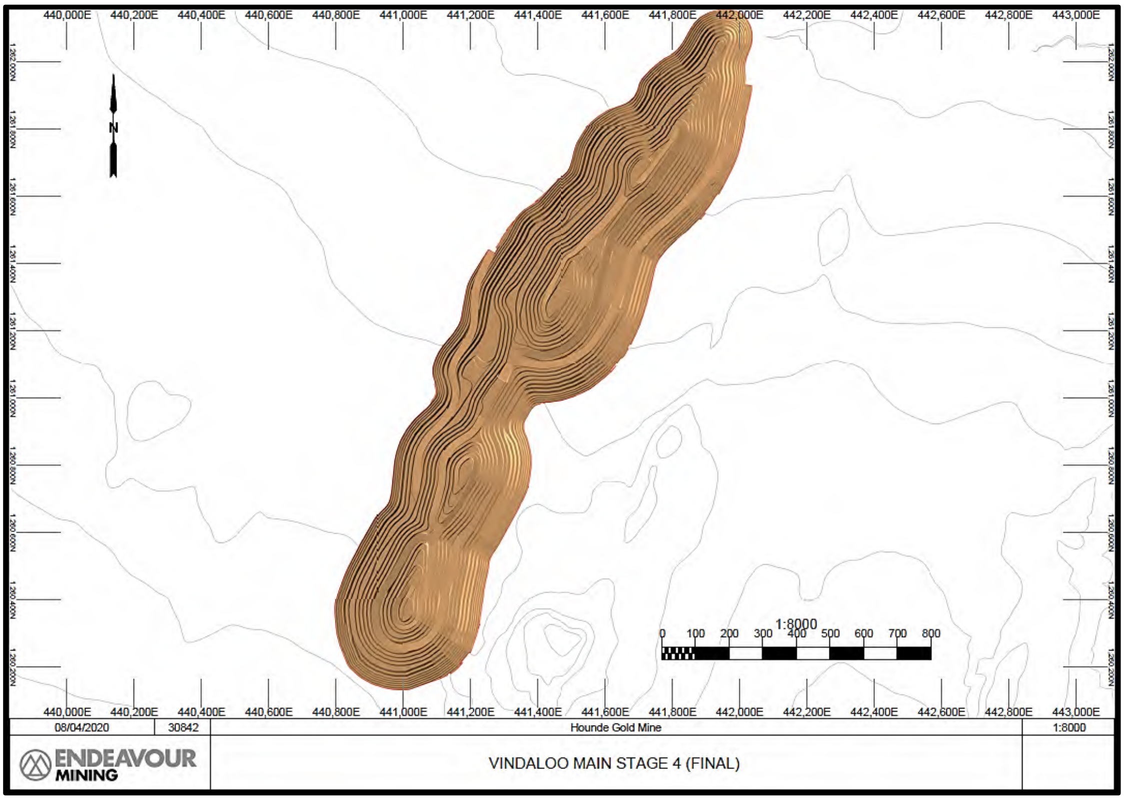


Figure 15-4: Vindaloo Main Open Pit: stage 4 (Final) pit design (source: Endeavour)



Vindaloo North Open Pit: stage 1 and 2 pit design

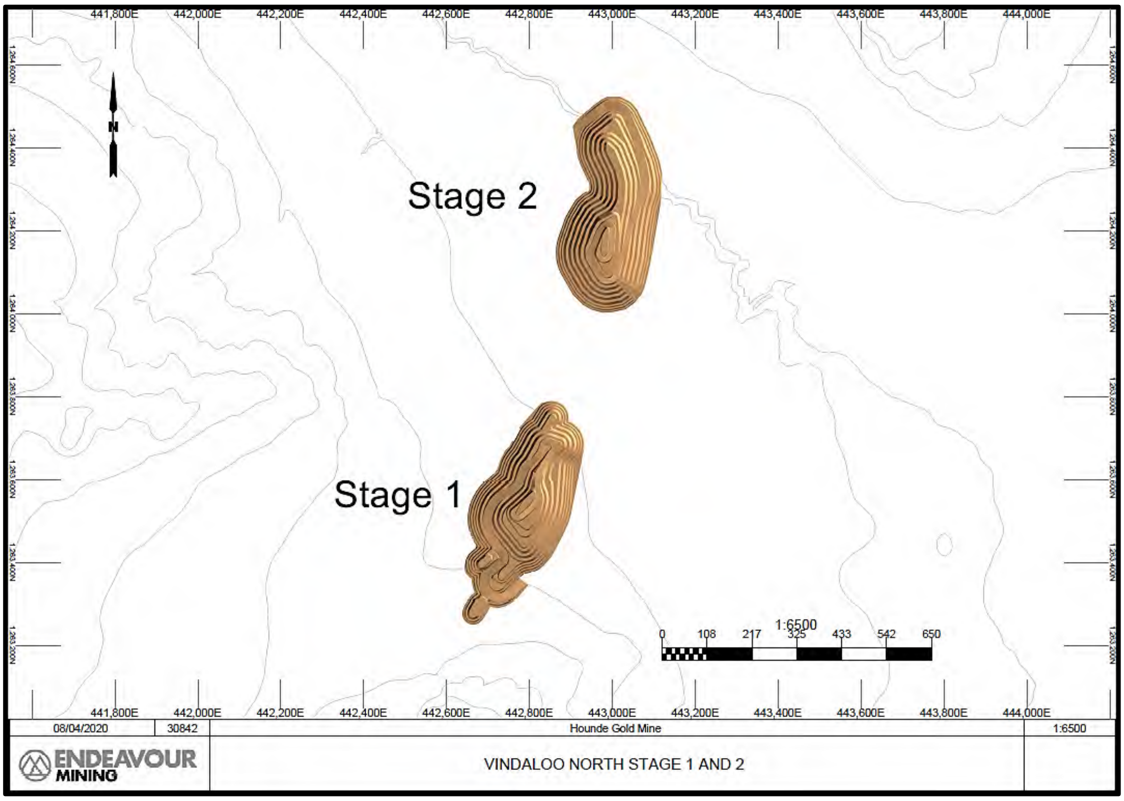
Vindaloo North Open Pit is situated approximately 1.8km to 2.6km from the Houndé Process Plant and consists of two independent stages, Stage 1 and Stage 2 (Figure 15-5). Mining occurred previously at Stage 3, which due to a slope failure (pit close to depletion) stopped further mining:

- Stage 1 is situated 1.8km Houndé Process Plant and has a maximum depth of 71m at elevation 245mRL taken from the highest point on the ramp side at elevation 316mRL; and
- Stage 2 is situated north of Stage 1 approximately 2.6km from the process plant and has a maximum depth of 95m to elevation 205mRL.

Table 15-11: Vindaloo North Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	50.0	55.0	60.0	80.0
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	5.0	6.0	8.0
Inter Ramp Angle	(°)	38.3	38.1	40.3	58.2

Figure 15-5: Vindaloo North Open Pit: stage 1 and 2 pit design (source: Endeavour)



Vindaloo Central Open Pit: stage 1 and 2 pit designs.

Vindaloo Central Open Pit is situated (the closest of all pits) at 0.7km from the Houndé Process Plant. Mining commenced in Stage 1 (Figure 15-6) and has progressed to a depth of 40m to elevation 275mRL. Stage 1 has a ramp access at the northern end of the pit. This ramp will be mined out by Stage 2 that will access from the eastern side by two new ramps (as per Figure 15-7). Table 15-10 summarises the design criteria for Vindaloo Central designs.

Table 15-12: Vindaloo Central Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	55.0	60.0	60.0	80.0
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	4.0	6.0	8.0
Inter Ramp Angle	(°)	38.3	38.3	40.4	58.2

Figure 15-6: Vindaloo Central Open Pit: stage 1 pit design (source: Endeavour)

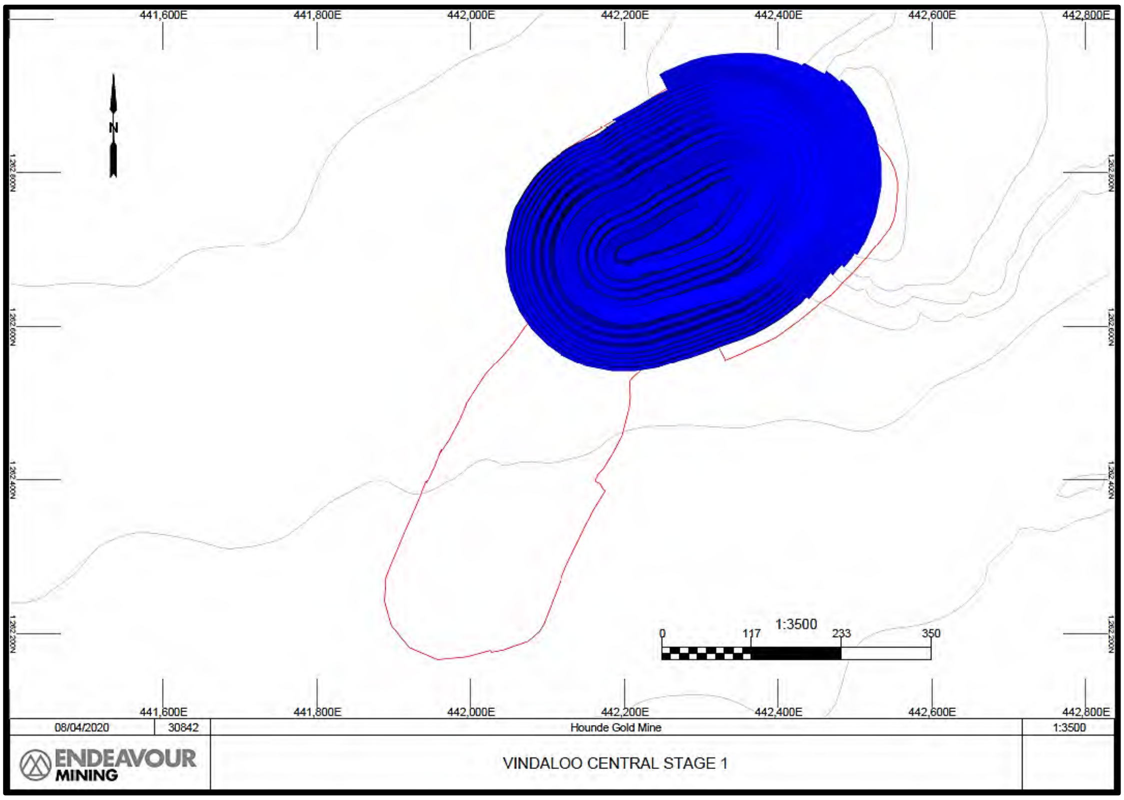
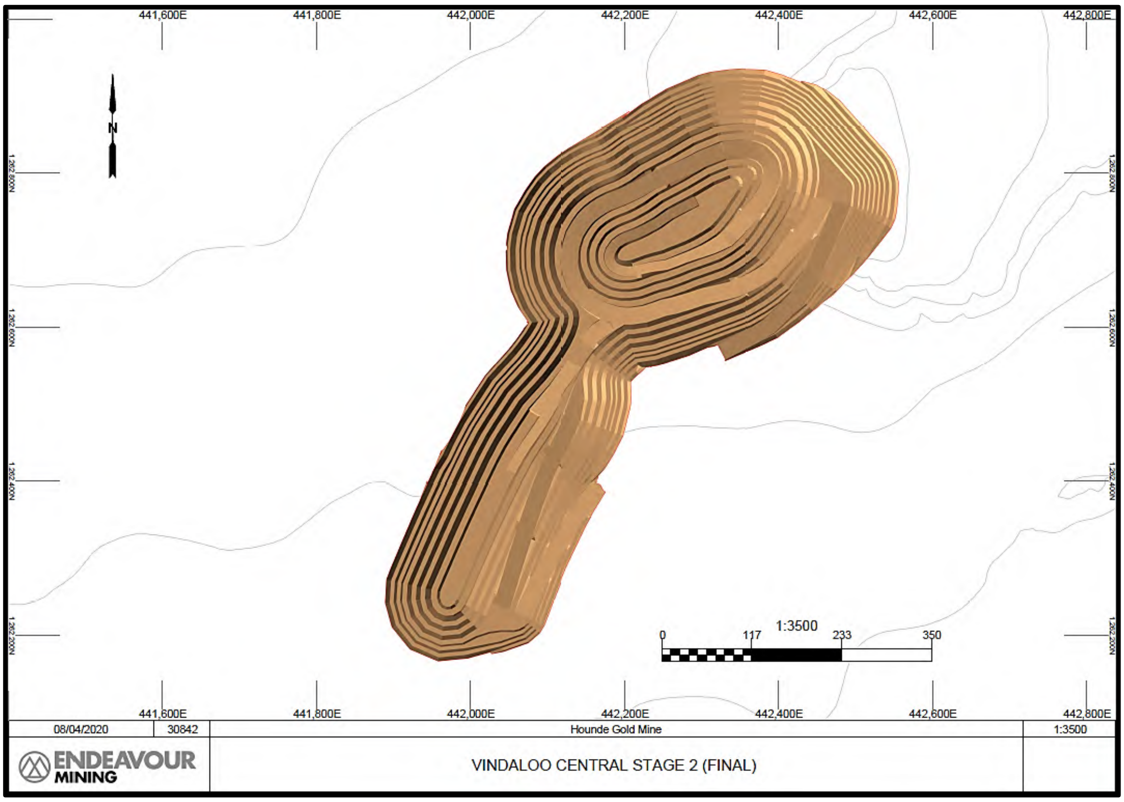


Figure 15-7: Vindaloo Central Open Pit: stage 2 (Final) pit design (source: Endeavour)



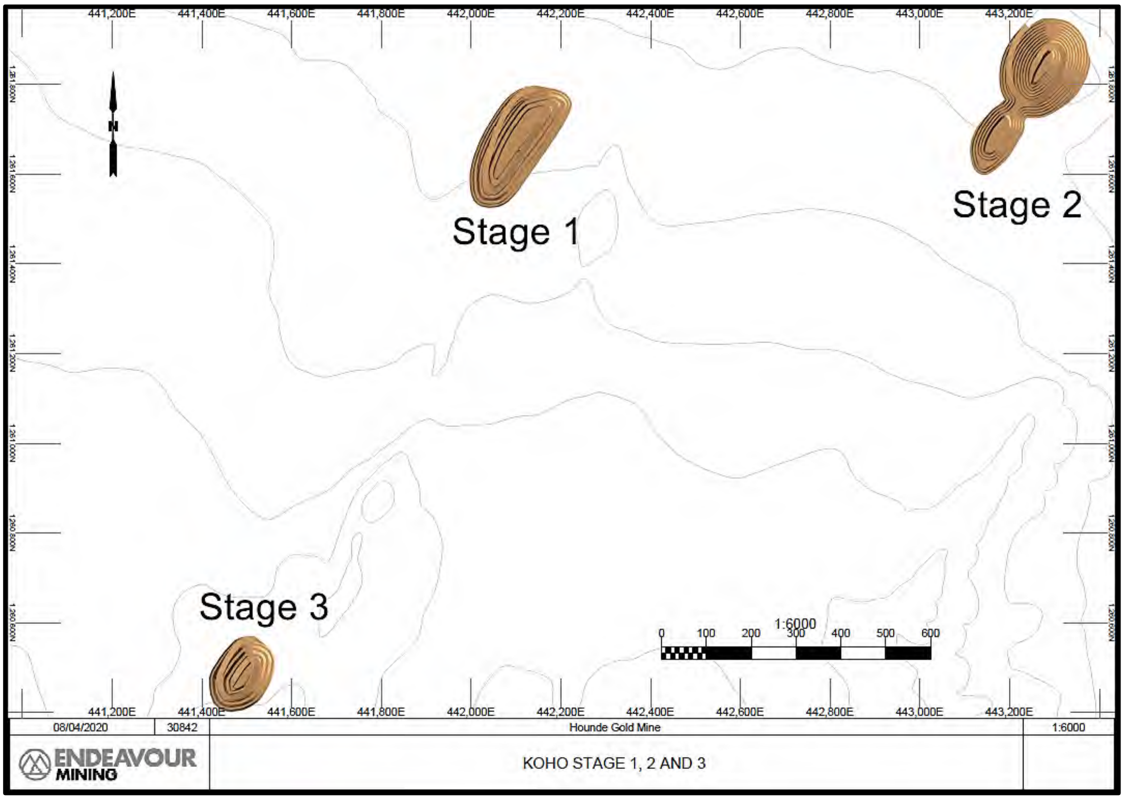
Koho Open Pit: stage 1, 2 and 3 pit design.

Koho Open Pit stages 1, 2 and 3 are situated on the eastern side of Vindaloo Main Open Pit and Vindaloo Central Open Pit (Figure 15-8) approximately 2.6km from the Houndé Process Plant. These are small satellite pits that extend to a depth of 50m with single lane ramps and based on the design criteria as reported in Table 15-13 below.

Table 15-13: Koho Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	55.0	55.0	60.0	75.0
Bench Height	(m)	6.0	6.0	9.0	9.0
Berm Width	(m)	4.0	5.0	5.0	4.0
Inter Ramp Angle	(°)	38.3	38.3	40.4	46.0

Figure 15-8: Koho Open Pit: stage 1,2 and 3 pit design (source: Endeavour)



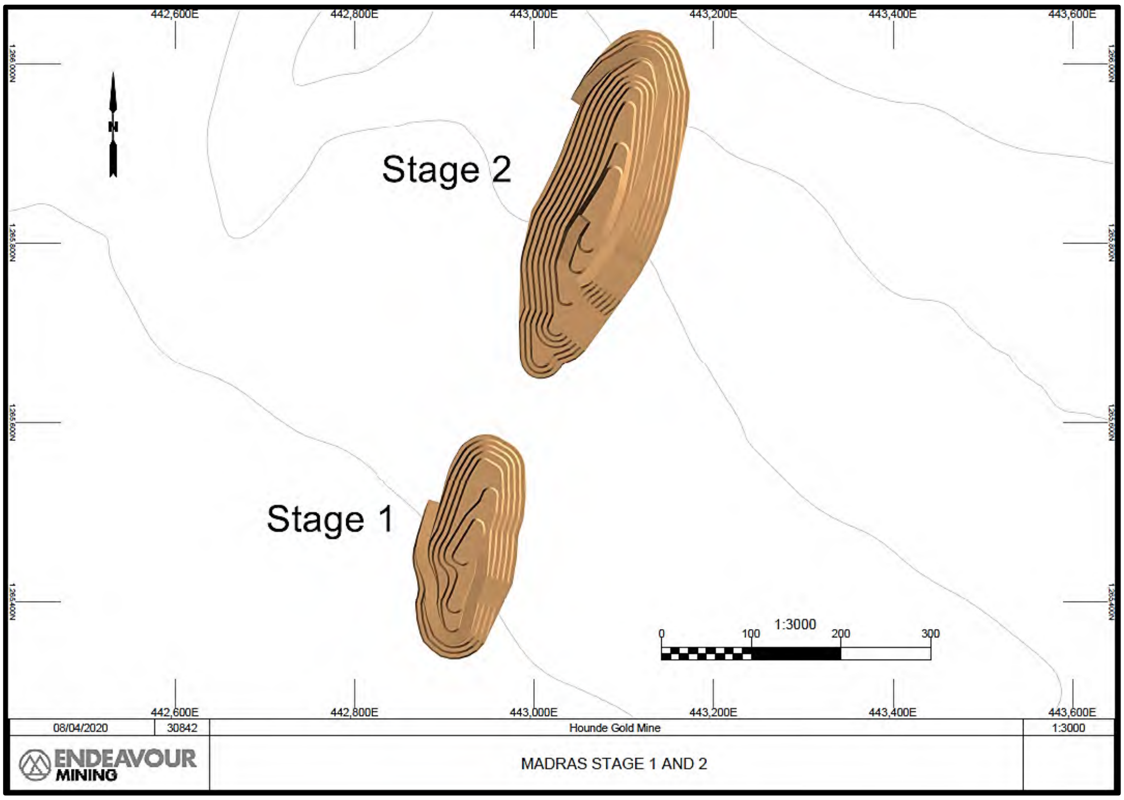
Madras Open Pit: stage 1 and 2 pit design.

Madras Open Pit stages 1 and 2 (Figure 15-9) are on the same strike length as the Vindaloo pits (further north to Vindaloo North) located 3.9km distant from the Houndé Process Plant. These are small satellite pits with Stage 2 having a maximum depth of 60m and Stage 1 at 40m deep. Both pits are designed with single lane ramps in accordance with the design criteria as reported in Table 15-14.

Table 15-14: Madras Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	50.0	55.0	60.0	80
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	5.0	6.0	8.0
Inter Ramp Angle	(°)	38.3	38.1	40.3	58.2

Figure 15-9: Madras Open Pit: stage 1 and 2 pit design (source: Endeavour)



Bouéré Open Pit Design

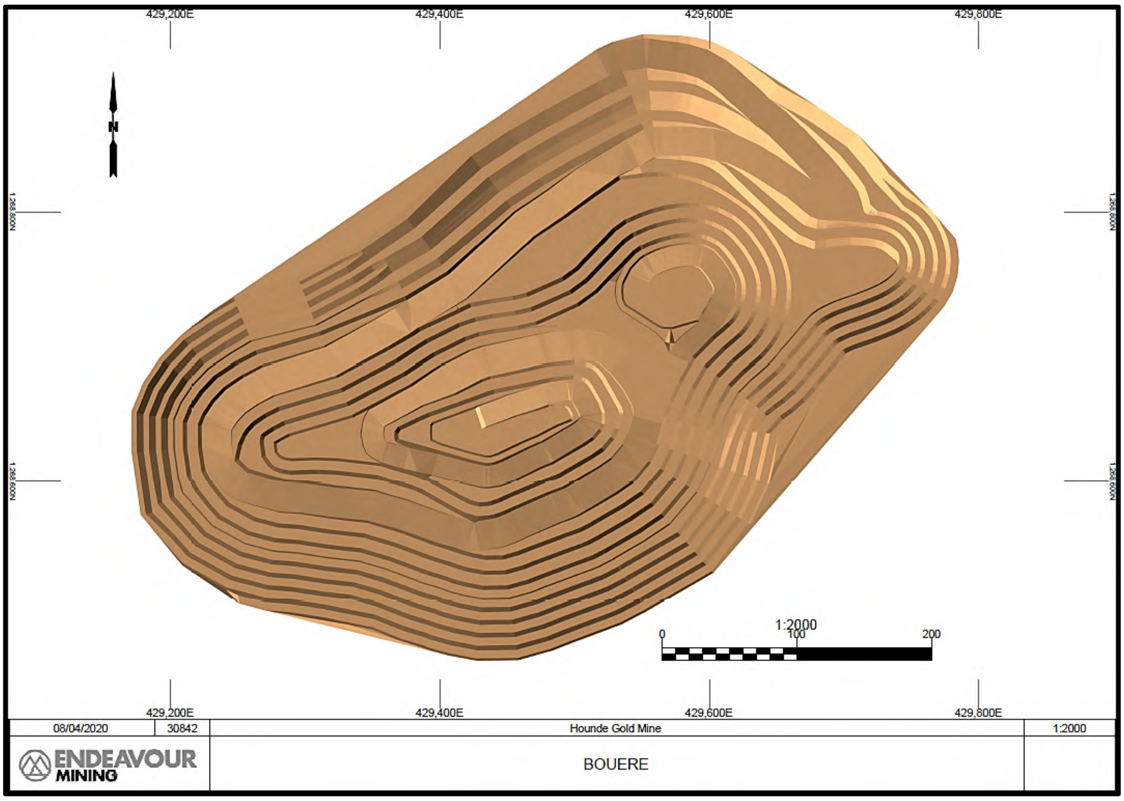
The Bouéré Open Pit is currently being mined and is situated 16km from the Houndé Process Plant. Ore is dumped on a satellite RoM pad, close to the pit, and then re-handled to the process plant. The mining remaining at Bouéré consists of a single stage based on design criteria in Table 15-15, and design shown in Figure 15-10. This pit is planned to be completely mined out during the year 2020.

Bouéré has been mined down to 306mRL and has a final elevation at 207mRL, a maximum depth of 150m. A single ramp at 22m is designed that switchbacks at 336mRL, and then splits at 255mRL again into the two smaller sections. The ramp starts narrowing out to a single lane ramp for the last 30m.

Table 15-15: Bouéré Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	55.0	55.0	60.0	70.0
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	6.0	6.0	8.0
Inter Ramp Angle	(°)	36.0	38.1	38.1	51.0

Figure 15-10: Bouéré Open Pit: final pit design (source: Endeavour)



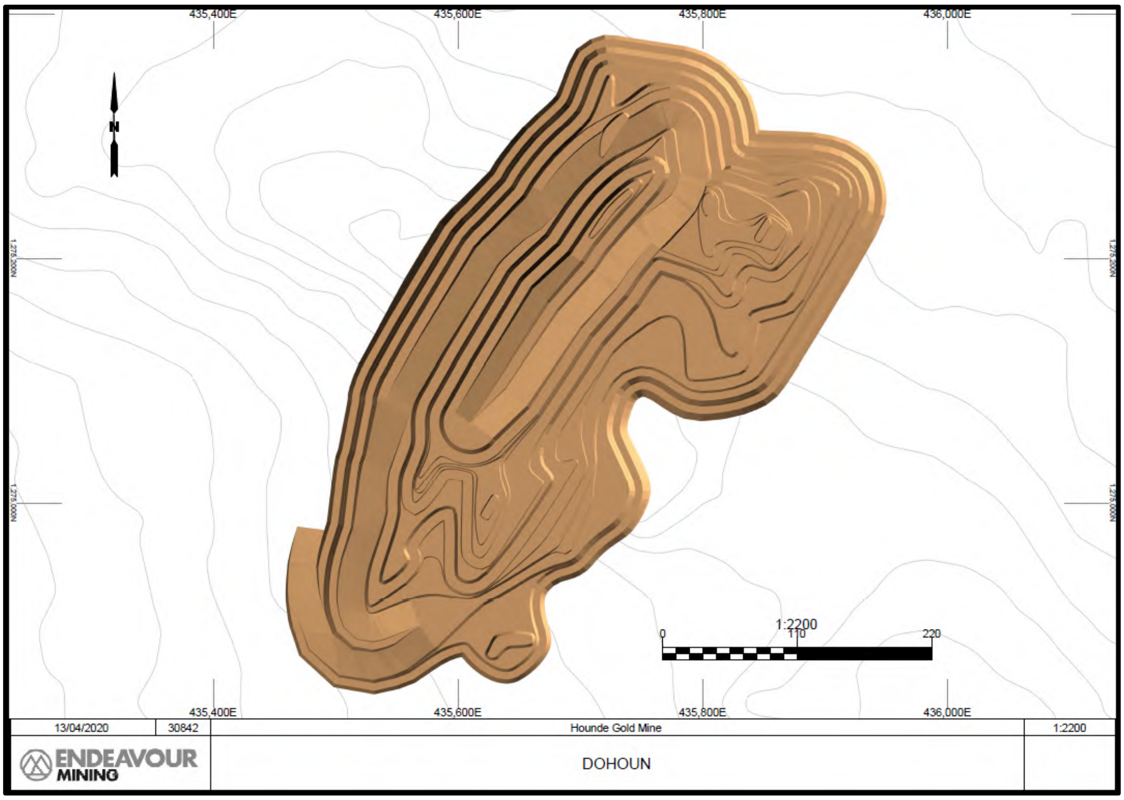
Dohoun Open Pit

Dohoun Pit is a small satellite pit that is 20.7km north of Houndé Process Plant. Dohoun pit consists of a single stage that has a maximum length of 600m and depth of 125m. Ramps are 22m double lane up to elevation 230mRL and then systematically reduces to a final width of 10m to a final elevation of 205mRL. Mining of the final cut will be very narrow and will require trucks to reverse to the excavator for a short duration through to the end of the pit life.

Table 15-16: Dohoun Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	55.0	55.0	60.0	75.0
Bench Height	(m)	6.0	6.0	9.0	18.0
Berm Width	(m)	4.0	6.0	6.0	8.0
Inter Ramp Angle	(°)	36.0	38.1	38.1	54.5

Figure 15-11: Dohoun Open Pit: final pit design (source: Endeavour)



Kari Pump Open Pit Stages 1,2,3 and 4 Designs.

The Kari Pump Open Pit consists of four stages, each divided in a first and second phase denoted A and B) as shown though Figure 15-12 to Figure 15-18. Kari Pump Open Pit is a long-haul pit, situated 11.5km from the Houndé Process Plant. There will be a satellite RoM pad situated close to the pit and ore will be re-handled to the process plant.

Stage 1, (which is far north east), mines and follows the contours leading into Stage 2. Stage 2A will mine the full footprint of Stage 2 and be followed by Stage 2B which is advanced in parallel to commencing Stage 3A. This sequence is maintained through to Stage 4 final pit limits.

The deepest point of the pit will be reached at the end of Stage 3B at 190mRL, at a depth of 160m. Stage 4 pit is slightly shallower at 230mRL, at a depth of 100m. Due to the large extents of the pit (east-west at 1.4km), (north-south at 1.3km) most of the ramps are double lane at 22m until final depth. Table 15-17 below summarises the Kari Pump Open Pit design criteria.

Table 15-17: Kari Pump Open Pit Design Criteria

Item	Units	Laterite	Oxide	Trans	Fresh
Bench Face Angle	(°)	50.0	50.0	50.0	65.0
Bench Height	(m)	10.0	10.0	10.0	10.0
Berm Width	(m)	7.0	7.0	7.0	4.5
Inter Ramp Angle	(°)	33.0	33.0	33.0	47.5

Figure 15-12: Kari Pump Open Pit: stage 1 pit design (source: Endeavour)

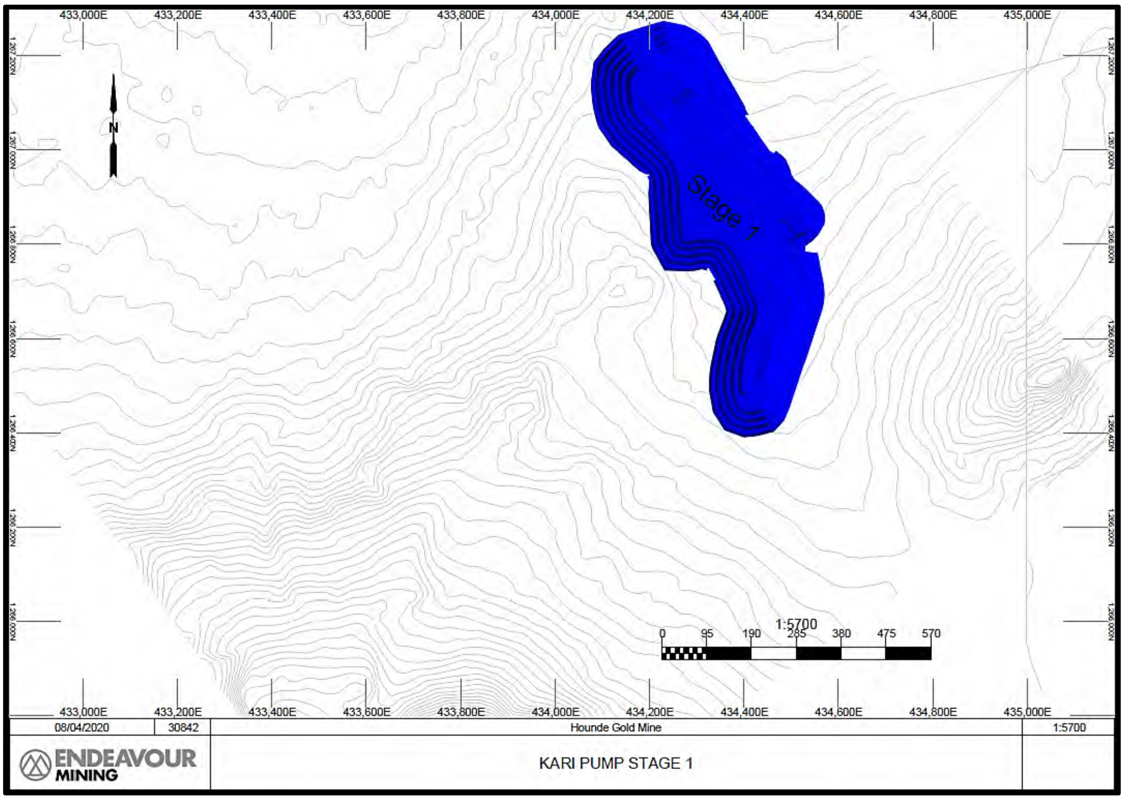


Figure 15-13: Kari Pump Open Pit: stage 1 and 2A pit design (source: Endeavour)

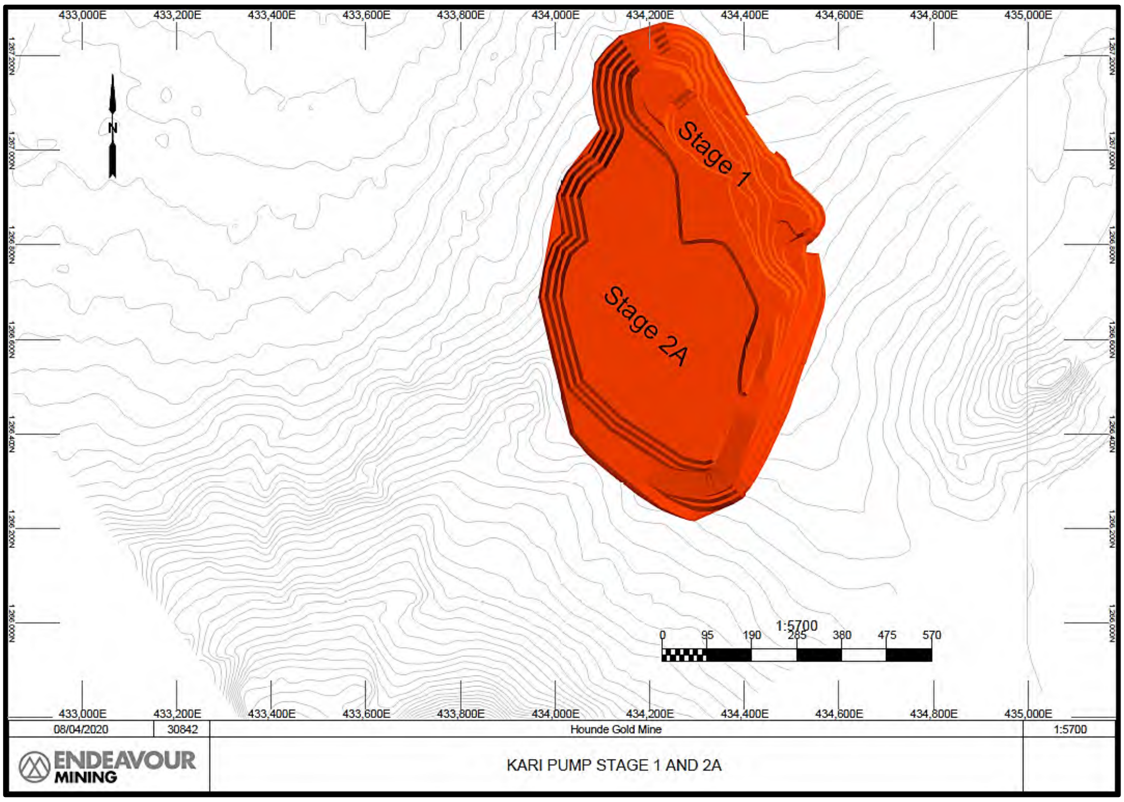


Figure 15-14: Kari Pump Stage 1 and 2B Pit Design (source: Endeavour)

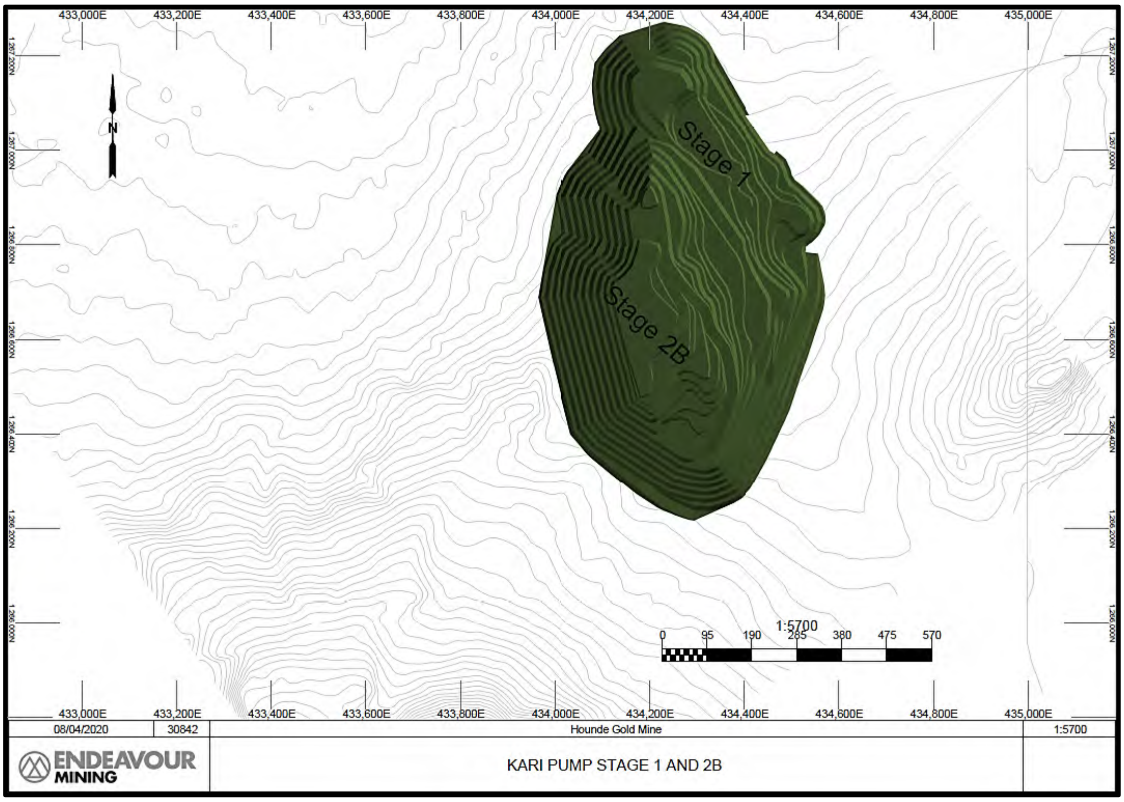


Figure 15-15: Kari Pump Open Pit: stage 2B and 3A pit design (source: Endeavour)

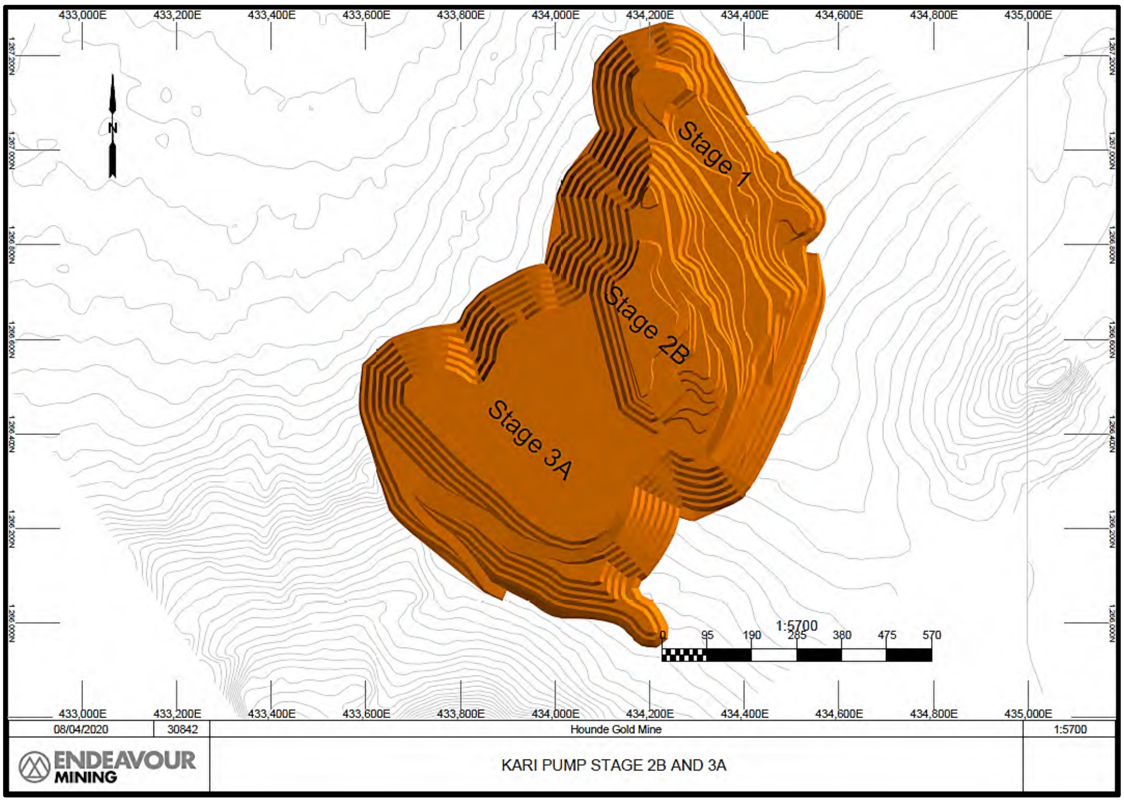


Figure 15-16: Kari Pump Open Pit: stage 2B and 3B pit design (source: Endeavour)

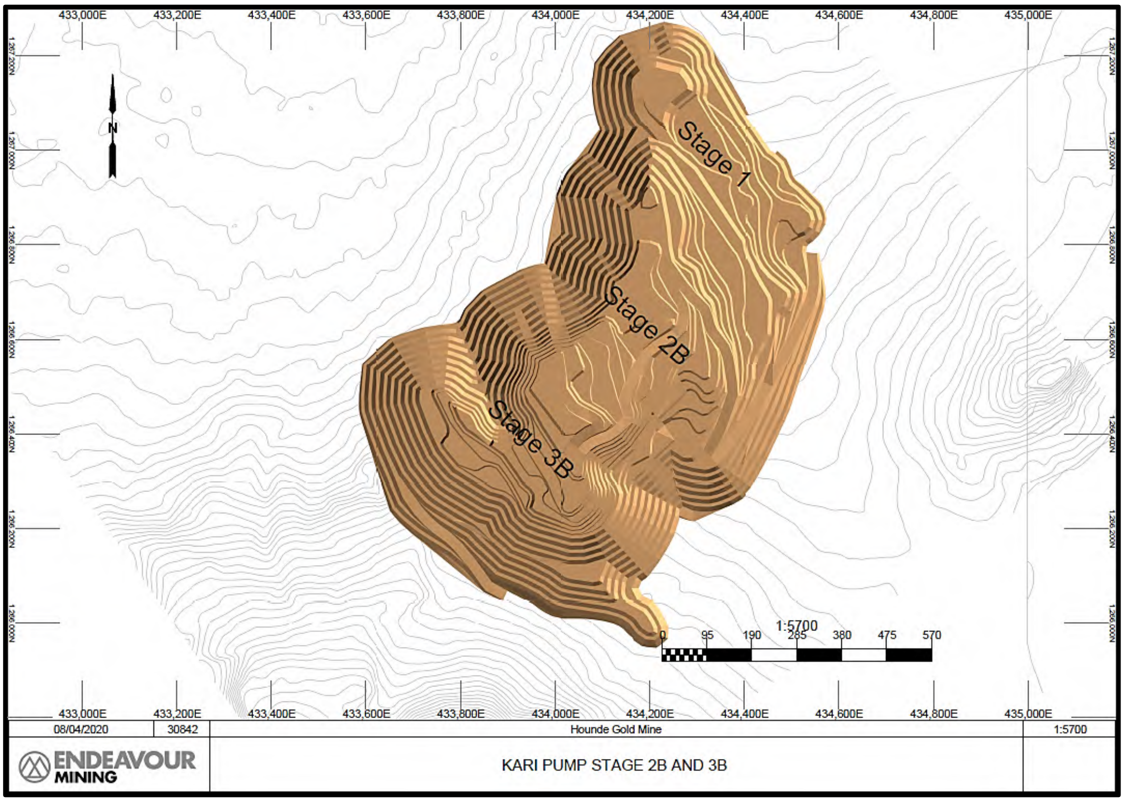


Figure 15-17: Kari Pump Open Pit: stage 3B and 4A pit design (source: Endeavour)

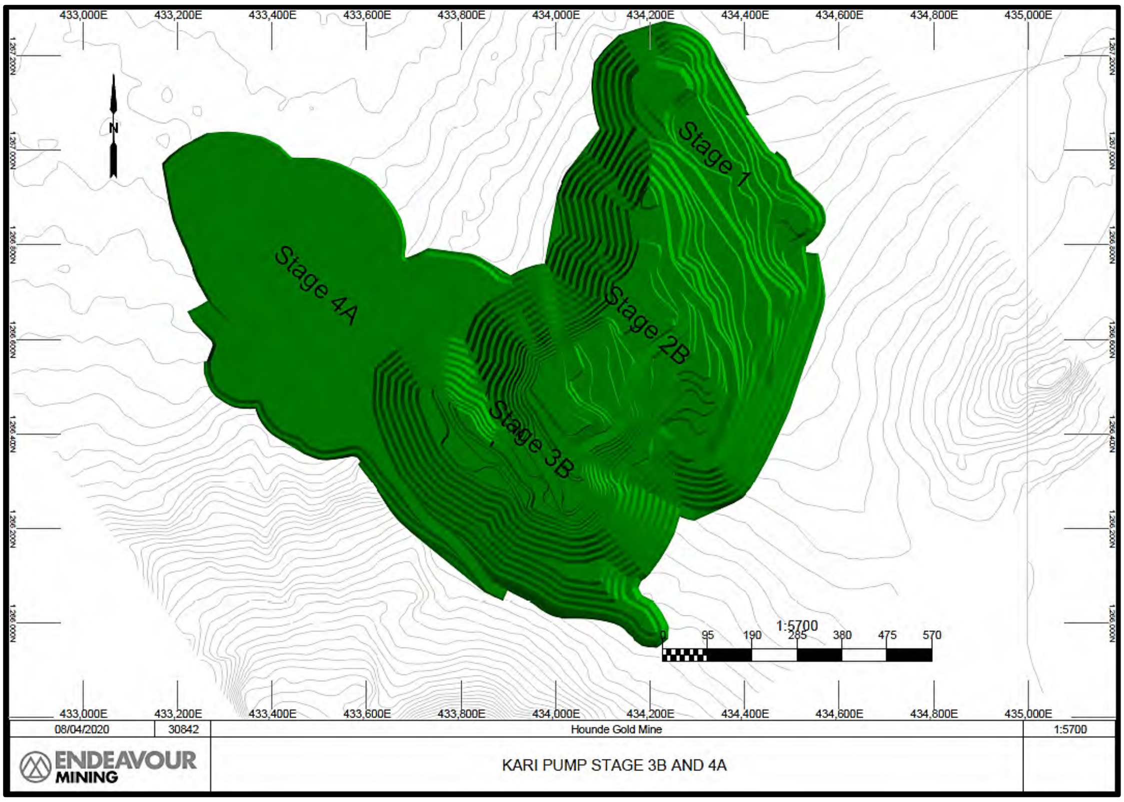
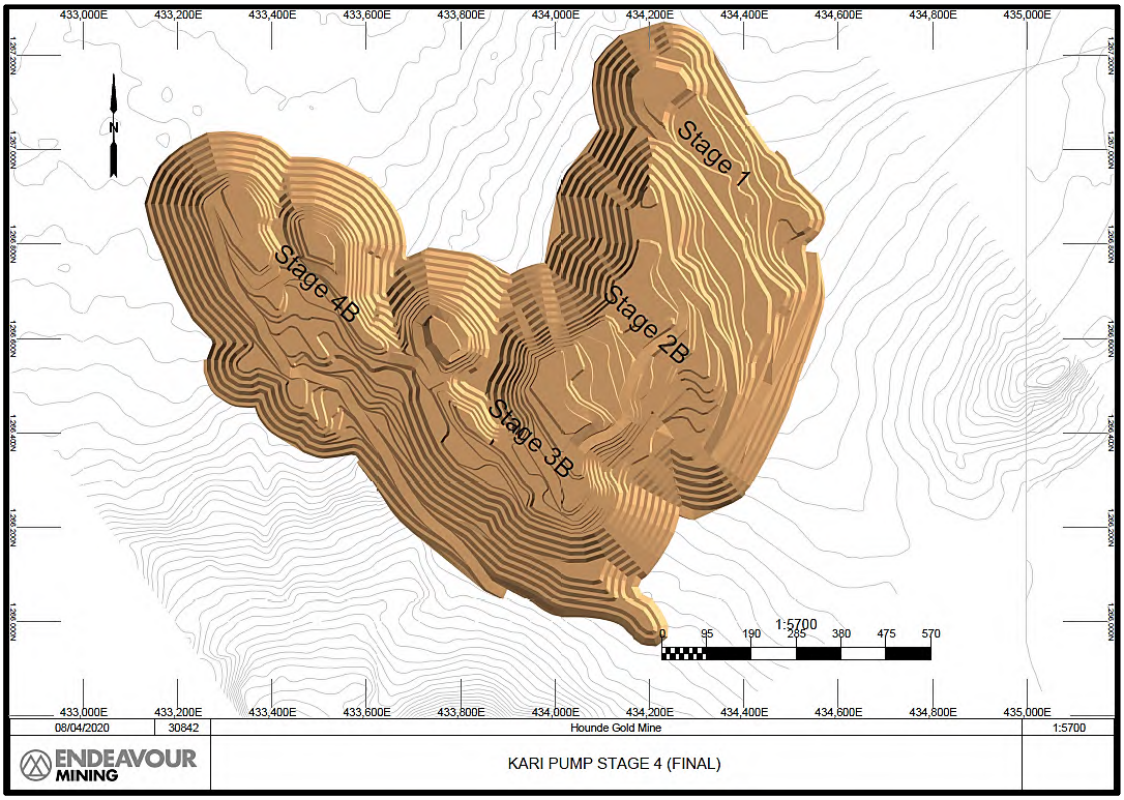


Figure 15-18: Kari Pump Open Pit: stage 3B and 4B pit design (source: Endeavour)



15.6 Mining Inventory Summary

The mining inventory as established for the current LoMp includes a total of 31.7Mt grading 2.09g/tAu with contained metal of 2,127kozAu (Table 15-18) which comprises the total Mineral Reserves reported for Houndé Gold Mine as at 31 December 2019 (Section 15.10 of this Technical Report). The Houndé group of open pits contribute approximately 71% of the total mining inventory with Kari Pump Open Pit contributing a further 23.1% of total ore tonnage mined. The total material mined (Table 15-19) is 309.8Mt which, of which 278.2Mt is waste reflecting an overall stripping ratio of 8.78t_{waste}:t_{ore}.

Table 15-18: Houndé Gold Mine: ore mining inventory as at 31 December 2019) open pits; weathering and grade bins)

Reporting Area	Contribution	Ore Mined		
	(%)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Open-Pit				
Vindaloo Main	75.9	17,002	1.76	962
Vindaloo North	3.6	817	2.02	53
Vindaloo Central	14.9	3,338	1.69	182
Koho	3.6	810	1.29	34
Madras	1.9	425	0.82	11
Houndé	**70.7**	**22,391**	**1.72**	**1,242**
Bouéré	2.6	814	4.30	113
Dohoun	3.7	1,160	1.85	69
Kari Pump	23.1	7,308	3.00	704
Total	**100.0**	**31,673**	**2.09**	**2,127**
Weathering				
Oxide	15.3	4,840	2.01	313
Transitional	7.3	2,317	2.11	157
Fresh	77.4	24,516	2.10	1,657
Total	**100.0**	**31,673**	**2.09**	**2,127**
Grade Bins				
HG	27.4	8,690	4.16	1,164
MG	27.8	8,813	1.80	509
LG	33.4	10,590	1.10	375
SO	11.3	3,580	0.69	80
Total	**100.0**	**31,673**	**2.09**	**2,127**

Table 15-19: Houndé Gold Mine: material type mining inventory as at 31 December 2019

Reporting Area	Ore Mined Tonnage (kt)	Waste (kt)	Mined (kt)	Stripping Ratio (t_{waste}:t_{ore})
		Waste and Total Material Mined		
Open-Pit				
Vindaloo Main	17,002	106,378	123,379	6.26
Vindaloo North	817	9,603	10,420	11.76
Vindaloo Central	3,338	14,368	17,706	4.30
Koho	810	4,119	4,929	5.08
Madras	425	1,873	2,298	4.41
Houndé	**22,391**	**136,341**	**158,732**	**6.09**
Bouéré	814	9,796	10,610	12.04
Dohoun	1,160	13,514	14,674	11.65
Kari Pump	7,308	118,521	125,828	16.22
Total	**31,673**	**278,172**	**309,845**	**8.78**
Weathering				
Oxide	4,840	116,859	121,699	24.15
Transitional	2,317	28,900	31,217	12.47
Fresh	24,516	132,413	156,929	5.40
Total	**31,673**	**278,172**	**309,845**	**8.78**

15.7 Mining Geotechnics

The mining geotechnical design considerations for Houndé Gold Mine are based on a number of technical studies completed as both input to the 2013 FS and subsequent internal and external reports completed to date. The key documents comprise:

- *"Geotechnical Assessment Open Pit Mining - Vindaloo & Madras North-West"* authored by Peter O'Bryan & Associates (June 2013);
- *"Vindaloo Stage 1 Open Pit Geotechnical Review - Technical Memo"* authored by Peter O'Bryan & Associates (April 2017);
- *"Geotechnical Design of Bouéré and Dohoun Pit Slopes"* authored by Golder Associates (February 2013);
- *"Pre-Feasibility Study, Kari Pump Project, Burkina Faso"* authored by the Group Geotechnical Engineer) (July 2019);
- *"Geotechnical Visit – Senior Geotechnical Engineer Site Visit 3-10 May 2018*";
- *"Slope Design Review – Houndé Gold Operations - Internal Memo"* authored by the Group Senior Geotechnical Engineer (November 2019);
- "*Houndé Gold Mine – Hydrogeology Summary Report*"; and
- *"Review of Bench Design for Vindaloo and Recommendations"* authored by Golder Associates (September 2014).

Slope Design

Table 15-20 presents the slope design criteria for each of the open pits at the Houndé Gold Mine. Geotechnical investigations and analysis for both Bouéré and Dohoun were undertaken by Golder Associates who recommended the slope designs for these open pits.

The geotechnical design criteria for the three Vindaloo Open Pits and the Madras Open Pit were originally developed by Peter O'Bryan & Associates in 2013 with inter-ramp angles of 49.1° proposed for the fresh rock slopes. In September 2014 Golder Associate has carried out a Geotechnical study covering all the Vindalou pits (Vindalou main, Vindalou Central, Vindalou North, Koho and Madras) recommending Inter Ramp Slope angle of 60 degrees for the Fresh rock (BFA: 80 degree, BH: 20m and berm width 8m). The site Geotechnical Engineer has changed the 20m bench height (BH) to 18m to match with 6m flitch (mining bench height) size. This resulted in reduction of overall IRA from recommended 60 degrees to 58.2 degrees.

Subsequently, Orelogy has done a study applying the same geotechnical parameters recommended in the Golder's memo with the slight adjustments to bench height corresponding to a 58.2° inter-ramp angle. This steeper configuration has also been assessed by the site geotechnical team and found to be appropriate for the unweathered (fresh) rock.

The Koho Open Pit design does not benefit from any deposit specific geotechnical investigation, however due to its relatively short life and limited contribution, this is not considered a significant risk at this stage. Furthermore, the adopted slope angles are similar to that employed at nearby open pits as the deposit is also located on the same geological structures as these.

The slope design criteria for Kari Pump Open Pit is based on the results of a geotechnical investigation and data evaluation undertaken in-house by the Group's geotechnical engineer. The level of geotechnical investigation and analysis upon which the pit slope designs are based varies in terms of the volume and quality of geotechnical data.

It is important to note that all analysis undertaken to define appropriate pit slope design criteria has assumed that the slopes are depressurised, and that successful slope depressurisation will be required to achieve the proposed slope designs. This is especially relevant for the saprolite and upper sections of slope. Significant pit wall depressurisation work has been carried out on site and weeping holes were constructed wherever considered necessary. The details of the slope dewatering and depressurisation is discussed in Section 15.8.

Table 15-20: Houndé Mining Area – Slope Design Summary

Pit	GT Information	GT Design Criteria		Reserve Pit Design Criteria	
Vindaloo Main	"*Geotechnical Assessment Open Pit Mining - Vindaloo & Madras North-West. Peter O'Bryan & Associates*" (June 2013); "*Vindaloo Stage 1 Open Pit Geotechnical Review*" Peter O'Bryan & Associates (April 2017).	~ Sap IRA (°)	36.0	~ Sap Thickness (m)	43
				~ Sap IRA (°)	38
		~ Rock IRA (°)	49.1	~ Rock Thickness (m)	220
				~ Rock IRA (°)	53 to 60
	Open Pit Summary			~Overall Slope Angle (°)	NW – 50.0
				(OSA)	SE – 48.1
				~Maximum Elevation	320mRL
				~Minimum Elevation	55mRL
				~Max Depth	265m
Vindaloo Central	No specific report for this pit, assumed that GT design criteria extrapolated from: "Geotechnical Assessment Open Pit Mining - Vindaloo & Madras North-West. Peter O'Bryan & Associates" (June 2013.)	~ Sap IRA (°)	38.1	~ Sap Thickness (m)	43
				~ Sap IRA (°)	34
		~ Rock IRA (°)	49.1	~ Rock Thickness (m)	100
				~ Rock IRA (°)	53 to 60
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 46.7
				(OSA)	SE – 41.1
				~Maximum Elevation	320mRL
				~Minimum Elevation	170mRL
				~Max Depth	150m
Vindaloo North	No specific report for this pit, assumed that GT design criteria extrapolated from: "*Geotechnical Assessment Open Pit Mining - Vindaloo & Madras North-West*" Peter O'Bryan & Associates (June 2013).	~ Sap IRA (°)	38.1	~ Sap Thickness (m)	52
				~ Sap IRA (°)	35-40
		~ Rock IRA (°)	49.1	~ Rock Thickness (m)	50
				~ Rock IRA (°)	58
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 43.7
				(OSA)	SE – 42.3
				~Maximum Elevation	307 mRL
				~Minimum Elevation	205 mRL
				~Max Depth	102 m
Madras	Geotechnical Assessment Open Pit Mining - Vindaloo & Madras North-West. Peter O'Bryan & Associates. June 2013.	~ Sap IRA (°)	38.1	~ Sap Thickness (m)	45
				~ Sap IRA (°)	38
		~ Rock IRA (°)	49.1	~ Rock Thickness (m)	No rock slope in reserve pit
				~ Rock IRA (°)	
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 41.4
				(OSA)	SE – 35.3
				~Maximum Elevation	320 mRL
				~Minimum Elevation	275 mRL
				~Max Depth	45 m
Koho	No GT data collection, analysis or report available	~ Sap IRA (°)	n/a	~ Sap Thickness (m)	62
				~ Sap IRA (°)	38
		~ Rock IRA (°)	n/a	~ Rock Thickness (m)	No rock slope in reserve pit
				~ Rock IRA (°)	
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 32.4
				(OSA)	SE – 35.0
				~Maximum Elevation	316 mRL
				~Minimum Elevation	255 mRL
				~Max Depth	60 m
Bouéré	Geotechnical Design of Bouéré and Dohoun Pit Slopes. Golder Associates. February 2013.	~ Sap IRA (°)	43.2	~ Sap Thickness (m)	30
				~ Sap IRA (°)	32
		~ Rock IRA (°)	56.3 (FW) - 60 (HW)	~ Rock Thickness (m)	122
				~ Rock IRA (°)	57 (FW) -60 (HW)
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 44.0

Pit	GT Information	GT Design Criteria		Reserve Pit Design Criteria	
				(OSA)	SE – 44.5
				~Maximum Elevation	357 mRL
				~Minimum Elevation	207 mRL
				~Max Depth	150 m
Dohoun	Geotechnical Design of Bouéré and Dohoun Pit Slopes. Golder Associates. February 2013.	~ Sap IRA (°)	43.2	~ Sap Thickness (m)	Minimal saprolite in slope
				~ Sap IRA (°)	
		~ Rock IRA (°)	60	~ Rock Thickness (m)	100
				~ Rock IRA (°)	60
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 52.1
				(OSA)	SE – 32.8
				~Maximum Elevation	330 mRL
				~Minimum Elevation	205 mRL
				~Max Depth	150 m
Kari Pump	Pre-Feasibility Study, Kari Pump Project, Burkina Faso (in-house GT section by Endeavour GT Engineer)	~ Sap IRA (°)	30.5-36.2	~ Sap Thickness (m)	100
				~ Sap IRA (°)	32
		~ Rock IRA (°)	44.2-54	~ Rock Thickness (m)	40
				~ Rock IRA (°)	50
	Open Pit Design Summary			~Overall Slope Angle (°)	NW – 39.0
				(OSA)	SE – 30.4
				~Maximum Elevation	363 mRL
				~Minimum Elevation	190 mRL
				~Max Depth	154 m

Slope Monitoring

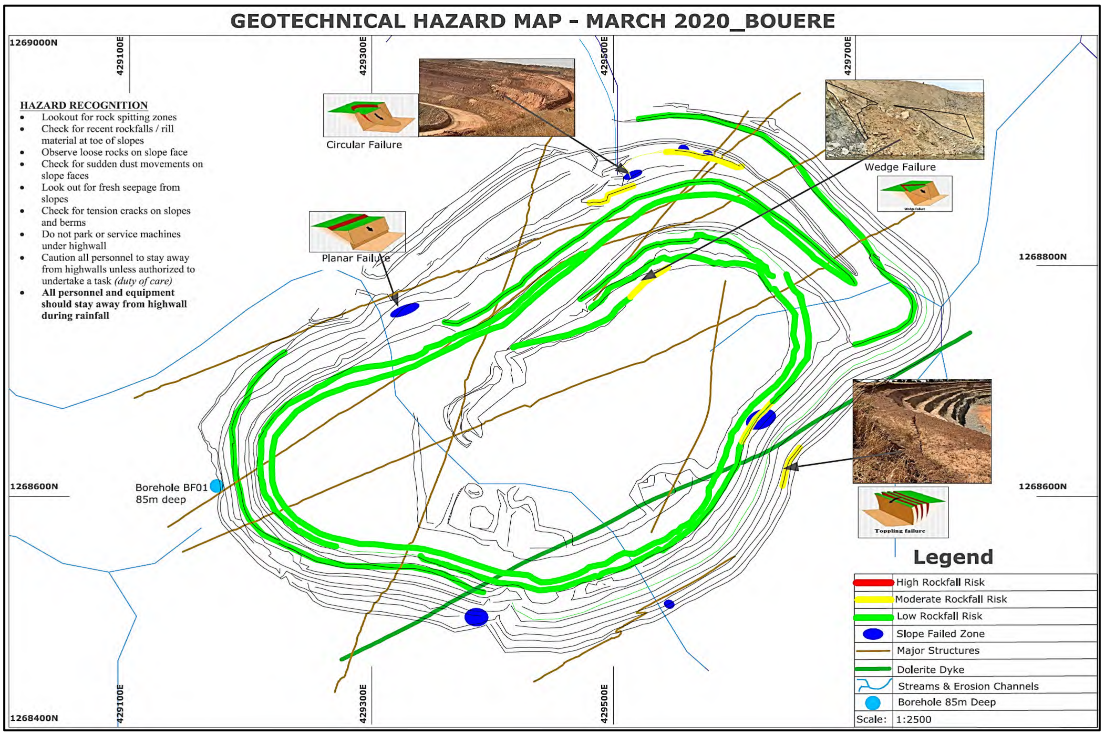
Slope monitoring is a technique put in place to monitor the performance of slopes during and after excavation for unexpected instability and/ or the potential for significant instability. Houndé Gold Mine has implemented strategies for monitoring slope performance and assessing slope displacement detection and warning.

Physical inspection of pit highwalls, berms, ramps, waste dumps and stockpiles are performed routinely to identify all potential hazards in the operational areas. Information from routine inspections is used to generate a monthly geotechnical hazard map for each pit to notify all mining personnel about existing potential hazards. Figure 15-19. is an example of a hazard map for the Bouéré Open Pit. Toe checks are carried out as soon as a bench is fully developed and corrections, if any, are affected to ensure mining achieves design parameters.

Prism networks are installed on final walls to monitor slope displacements in order to give early warning to all mining personnel for emergency evacuation if required. A grid spacing of 75m (plan) by 20m vertical height has been adopted for prism installation. Prism installed on discrete structures / zones with critical stability issues are closely spaced to obtain adequate coverage for effective monitoring. At the Vindaloo Main open Pit, one automated robotic total station (“**RTS**”) has recently been installed to monitor 20 number prisms on the final west wall to alert on imminent slope instability. Survey total station is used to monitor prisms in the other operational pits. Ten (10) number prisms have been installed at Bouéré pit for slope displacement measurements. As the pit sizes and depth increase and final walls are established, the need for further effective and automated slope monitoring techniques like radar and scanners will be assessed and motivated for acquisition. Crack pins and tapes are installed to monitor tension cracks along the pit crests.

Work has commenced for the development of Ground Control management plan for the Houndé Gold Mine. The document will guide all mining stakeholders on the requirement and procedures for managing issues concerning ground stability at the Houndé Gold Mine.

Figure 15-19: Geotechnical hazard map of Bouéré Open Pit (source: Endeavour)



External Audits and ongoing work

In April 2017, Peter O'Bryan and Associates ("**POBA**") undertook a review of the Vindaloo Main Open Pit slope design criteria. The main outcome was an amendment in the batter face angle ("**BFA**") for oxide slopes from 65° to 60° to obtain an IRA of 36°. It was highlighted that, a 55° BFA would significantly minimize the local instabilities though would reduce the IRA to 33.7°; which is conservative. The current 6m benching however provides opportunity to use 55º in oxides while maintaining the 36º IRA recommended by POBA.

Other site audits have come by way of site visit reports by Graham Bell (former Group Senior Geotechnical Engineer). In a May 2018 site visit report, it was recommended that a trial be conducted and results ascertained by using initially 75º BFA in the fresh rock with good wall control blasting. Based on the recommendations from Golder in 2014, in meeting with site Geotechnical teams, the decision was made to apply an 80º BFA angle with overall IRA of 58º as a trial instead of the 60º recommended IRA. A second report in August 2018 indicated satisfactory improvement on final limit blasting.

Recommendations

Based on the geotechnical information and reports provided the following improvements may be considered to improve geotechnical stability of the pits:

- As the pit slopes are developed, undertaking systematic geotechnical data collection and analysis to define the suitability of the existing slope design criteria and where necessary, adjust the approved slope designs;
- Ensure implementation of appropriate depressurisation measures. These could be in the form of external boreholes, weep holes, trenches and sumps; and
- Surface water management procedures and standards should be reviewed to identify improvements areas in water management.

The identified potential risks at the Houndé Gold Mine relating to mining geotechnics are:

- The risk in achieving the proposed slope designs within the saprolite slopes (if sufficient slope depressurisation is not achieved); and
- The risk in achieving the targeted pit depths as a function of not achieving the inter-ramp angles within the fresh rock. Given the foliated nature of the rocks forming some if the pit slopes, planar instability may occur within the footwall slopes and deep flexural toppling within the hanging wall slopes. Such instability may result in step-outs and may reduce mining depth.

15.8 Hydrogeology and Dewatering

Slope design recommendations assumed depressurised slopes and the site team treats this matter as a critical aspect in ensuring the GT design criteria can be achieved.

Knight Piesold ("**KP**") (2013) completed a Vindaloo Pit Groundwater Feasibility study and the former Group Geotechnical Engineer recommended the drilling of eight dewatering boreholes around the Vindaloo Main Open Pit, with the work being in progress. As the mining progresses, weeping holes are drilled at identified key locations to depressurise the water.

Houndé Gold Mine currently operates four Open Pits and has one existing borehole at the Bouéré Open Pit which was recently activated to depressurize the pit wall. There are five actively monitored piezometers around the TSF located near to the west of the Vindaloo Main Open Pit. The closest piezometer to the pit shows groundwater level is about 16m below surface. The 2.2km Vindaloo Main Open Pit will be mined to a depth of 260m for 7 years; hence slope depressurization is necessary to ensure stable slopes for operations.

Historical studies completed for the Houndé Open Pits included various groundwater feasibility studies completed by independent consultants as input to the 2013 Feasibility Study. This indicated preliminary estimated groundwater inflows (excluding incident rainfall and surface water runoff) of 6L/s (22m^3/h, 531m^3/d). The report did not rule out the potential for the existence of water bearing structures which could increase the flow as observed in an existing borehole located near the pit.

During 2018 and independent geotechnical engineer recommended drilling of boreholes around the Vindaloo Main Open Pit and approval was given for the drilling of eight dewatering boreholes around this open pit in late 2019 with installation currently in progress.

For the Kari Pump Open Pit an assessment of borehole requirements was recently undertaken in February 2020. Fourteen boreholes were recommended to be drilled at this open pit in order to implement an effective pit dewatering system. Preparations for drilling work is currently in progress and drilling is expected to commence soon.

The slope design criteria as incorporated into the current engineered pit designs assume depressurized slope conditions, however the degree of hydrogeological modelling and subsequent calibration requires further work to address the requirement for and as appropriate the lack of effective slope depressurization programme in all operational pits. In the weaker saprolite material types several of significant slope failures have occurred which are attributed to the presence of groundwater in these rock formations. To address these circumstances where they have occurred a number of sub-horizontal drilling (weep-holes) were introduced to depressurize high seepage zones observed in the open pits. At the Vindaloo Main Open Pit results within the banded sediments rocks and volcanic tuff / banded sediments contacts yields average of 30L per minute. Table 15-21 below shows weep-holes and dewatering boreholes drilled and planned drilled at Houndé Gold Mine.

Table 15-21: Houndé Gold Mine - Weep-holes and borehole drilling summary

Activity	Plan	Open Pits Vindaloo Main	Vindaloo Central	Vindaloo North	Bouéré	Comments
Weep-holes Drilling	Number Drilled (No)	34	-	0	17	
	Total Depth Drilled (m)		-	0	372	
	Grand Total Depth (m)	1,232			1,604	
Boreholes Drilling	Number Drilled (No)	-	-	-	1	Eight boreholes planned for the Vindaloo Main Pitt. Work is in progress
	Total Depth Drilled (m)	-	-	-	80	

15.9 Waste Rock Dumps and Site Layouts

Houndé Gold Mine presently operates four waste rock dumps ("**WRDs**") servicing the open pit mining operations. The current LoMp assumes waste production of a total of 278.2Mt which equates to a total in situ volume of approximately 124.2Mm³. Assuming a swell factor of 30% this results in a total volume capacity requirement of 161.4Mm³. This compares with a total remaining capacity of 199.7Mm³ which is more than adequate to cater for the waste rock arisings associated with the current LoMp. Table 15-22 presents the key WRD design considerations and capacity for all active and design facilities. Table 15-23 presents the waste rock dump capacity assessment analysis for the current LoMp.

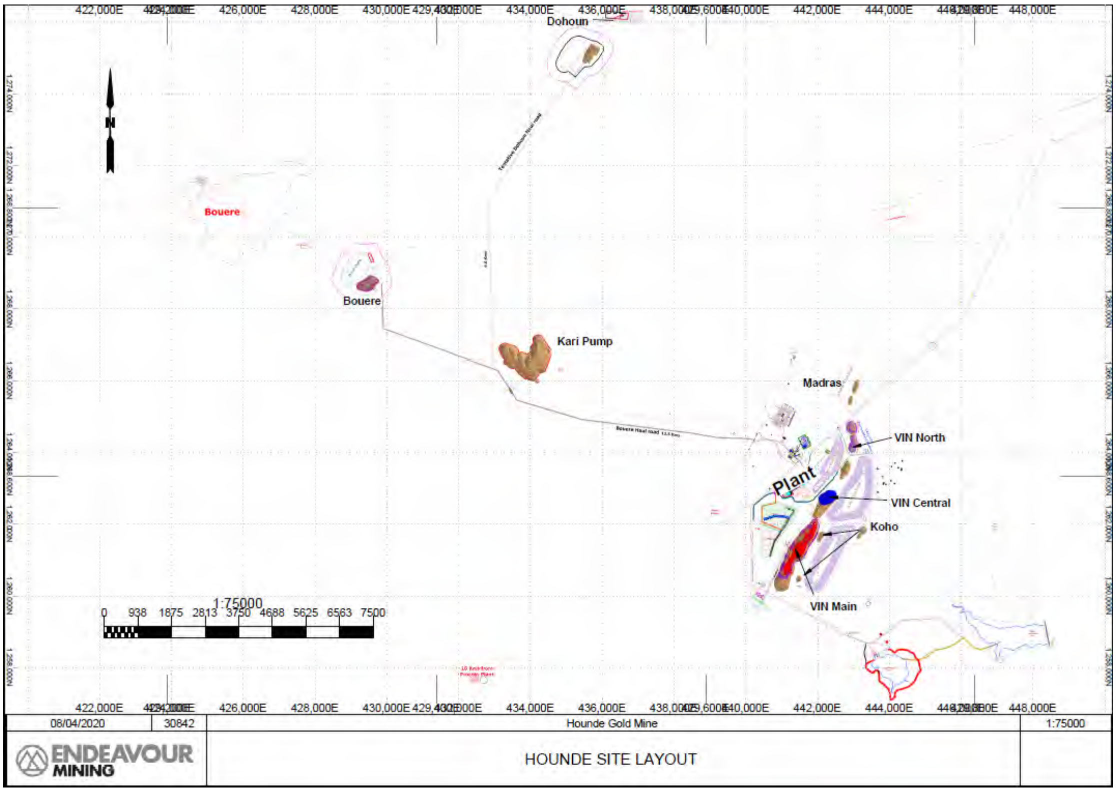
Table 15-22: Waste Rock Dump design considerations

Dump	Bench Face (°)	Overall Slope (°)	Berm Width (m)	Bench Height (m)	Dump Height (m)	Capacity (Mm^3)
Eastern 1-2	37	19.5	15	10	93	51.5
Eastern 3	37	19.5	15	10	85	63.8
Western	37	19.5	15	10	51	10.4
Madras	19.8	17	10	20	27	1.7
Bouéré	37	19.5	15	10	60	9.1
Dohoun	37	19.8	29	20	26	9.3
Kary Pump	37	19.5	15	10	103	81.7

Table 15-23: Waste Rock Dump capacity assessment

Dump	Capacity (Mm^3)	Deposited (Mm^3)	Available (Mm^3)	LoMp (Mm^3)	Utilisation (%)	Status (m)
Eastern 1-2	51.5	14.1	37.4	37.4	100.0	Active
Eastern 3	63.8	6.1	57.7	32.4	56.2	Active
Western	10.4	3.5	6.9	0	-	Active
Madras	1.7	-	1.7	1.3	76.5	Design
Houndé	**127.4**	**23.7**	**103.7**	**71.1**	**68.6**	
Bouéré	9.1	4.1	5.0	4.6	92.0	Active
Dohoun	9.3	-	9.3	7.7	82.8	Design
Kari Pump	81.7	-	81.7	78	95.5	Design
Total	**227.5**	**27.8**	**199.7**	**161.4**	**80.8**	

Figure 15-20: Houndé Gold Mine Site Layout (source: Endeavour)



15.10 Mineral Reserve Statement (31 December 2019)

Table 15-24 below provides the Mineral Reserve Statement for the Houndé Gold Mine as at 31 December 2019 which are reported in accordance with the guidelines and terminology provided in the CIM Standards. The total Mineral Reserves reports a total of 32.6Mt grading 2.06g/tAu for total contained metal of 2,164kozAu comprising:

- Proven Mineral Reserves of 1.8Mt grading 1.57g/tAu with contained metal of 89kozAu; and
- Probable Mineral Reserves of 30.9Mt grading 2.09g/tAu with contained metal of 2,075kozAu.

Table 15-25 presents the detailed subdivision of Mineral Reserves as at 31 December 2019 inclusive of subdivisions for oxide, transitional and fresh ore types. Furthermore, in reviewing the Mineral Reserve statements as reported herein the following notes should also be considered:

- The Mineral Reserves have an effective date of 31 December 2019;
- The Qualified Person responsible for the reporting of the Mineral Resources as at 31 December 2019 is Salih Ramazan (FAusIMM), Vice President Mine Planning, Endeavour Mining Corporation who was responsible for the estimation and reporting of all Mineral Reserves reported for the Houndé Gold Mine;
- All Mineral Reserves are reported assuming a long-term gold price assumption of US$1,300/oz; and
- Details relating to the various modifying factors and deposit specific cut-off grades are reported in Section 15.3 of this Technical Report.

Table 15-24: Mineral Reserve statement for the Houndé Gold Mine (by deposit) as at 31 December 2019

Classification & Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven			
Vindaloo	812	2.01	52
Stockpiles	950	1.20	37
Subtotal	**1,762**	**1.57**	**89**
Probable			
Vindaloo	21,579	1.71	1,189
Bouéré	814	4.30	113
Dohoun	1,160	1.85	69
Kari Pump	7,308	3.00	704
Subtotal	**30,861**	**2.09**	**2,075**
Ore Reserves			
Vindaloo	22,391	1.72	1,242
Bouéré	814	4.30	113
Dohoun	1,160	1.85	69
Kari Pump	7,308	3.00	704
Stockpiles	950	1.20	37
Total	**32,623**	**2.06**	**2,164**

Table 15-25: Mineral Reserve statement for the Houndé Gold Mine (by material type)as at 31 December 2019

Classification & Deposit	Oxide			Transitional			Sulphide			Total		
	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven												
Vindaloo	42	1.14	2	229	1.41	10	540	2.33	41	812	2.01	52
Stockpiles	950	1.20	37	-	-	-	-	-	-	950	1.20	37
Subtotal	**992**	**1.20**	**38**	**229**	**1.41**	**10**	**540**	**2.33**	**41**	**1,762**	**1.57**	**89**
Probable												
Vindaloo	1,310	0.99	42	693	1.29	29	19,576	1.78	1,118	21,579	1.71	1,189
Bouéré	2	0.84	0	3	2.24	0	809	4.32	112	814	4.30	113
Dohoun	216	1.44	10	151	1.49	7	794	2.04	52	1,160	1.85	69
Kari Pump	3,271	2.47	260	1,240	2.77	111	2,797	3.71	334	7,308	3.00	704
Subtotal	**4,798**	**2.02**	**312**	**2,088**	**2.19**	**147**	**23,976**	**2.10**	**1,616**	**30,861**	**2.09**	**2,075**
Ore Reserves												
Vindaloo	1,352	1.00	43	923	1.32	39	20,117	1.79	1,159	22,391	1.72	1,242
Bouéré	2	0.84	0	3	2.24	0	809	4.32	112	814	4.30	113
Dohoun	216	1.44	10	151	1.49	7	794	2.04	52	1,160	1.85	69
Kari Pump	3,271	2.47	260	1,240	2.77	111	2,797	3.71	334	7,308	3.00	704
Stockpiles	950	1.20	37	-	-	-	-	-	-	950	1.20	37
Total	**5,790**	**1.88**	**350**	**2,317**	**2.11**	**157**	**24,516**	**2.10**	**1,657**	**32,623**	**2.06**	**2,164**

15.11 Mineral Reserve Economic Viability Assumptions

An economic analysis of the Mineral Reserves and associated LoMp has been undertaken to assess the degree to which the Mineral Reserves remain economic under assumed commodity price assumptions. The sensitivity analysis undertaken concluded that the Mineral Reserves remains economic for gold price ranges of -30% to + 30% variations to the long-term price assumption used to support the Mineral Reserve declarations as reported herein. In accordance with the exemptions afforded to producing issuers under the Requirements, the results of the economic viability analysis are not reported herein. This aside the economic analysis required consideration of certain key inputs comprising:

- **Corporate Structure:** The corporate structure as at 31 December 2019 reflects the recent revisions whereby the Houndé Gold Mine financial flows are subject to two separate operating companies held by Houndé Holdings Ltd ("**HHL**"), namely Houndé Gold Operations SA ("**HGO**") and Bouéré Dohoun Gold Operations SA ("**BDGO**") whereby HGO holds the licences for the Houndé deposits (Vindaloo main, central and north; Koho, Madras and Kari Pump) and BDGO holds the licences for the Bouéré and Dohoun deposits (Bouéré and Dohoun). As such it is important to note that these separate structures are subject to different taxation and other related assumptions to derive any economic analysis:
- **Attributable Equity** holding in HHL of 100% which in turn holds 90% each in HGO and BDGO;
- **Gold Payability** of 99.95%;
- **Work in Progress ("WIP"):** Opening balances for both gold and silver are assumed to be zero for both Gold in Circuit ("**GIC**") and Finished Goods ("**FG**");

- **Royalty** and other revenue related determinations comprising:
  - Government royalty based on banded rates: ≤US$1,000/oz of 3.00%; >US$1,000/oz and ≤US$1,300/oz of 4.00%; and >US$1,300/oz of 5.00%,
  - Social Development Fund of 1.00% of payable metal,
  - Sandstorm royalty of 2.00% of payable metal;
- **For HGO**:
  - Corporate Income Tax rate of 17.5%,
  - Tax loss carried forward limit of 3 years and an opening balance of US$0.0m,
  - Timing of tax payments every two quarters,
  - Attributable capital expenditure of 60%;
  - Recoverable VAT opening balances of US$5.0m,
- **For BDGO**:
  - A management fee payable to HGO charged on the basis of 20% of the mining and operating expenditures incurred at BDGO for services supplied by HGO,
  - Corporate Income Tax rate of 27.5%,
  - Tax loss carried forward limit of 3 years and an opening balance of US$2.0m,
  - Timing of tax payments every two quarters,
  - Attributable capital expenditure of 40%;
  - Recoverable VAT opening balances of US$1.0m;
- **Value Added Tax ("VAT")**: VAT rate of 18.0%, vatable capital expenditure of 60% and vatable operating expenditure of 80% with an assumed 100% recovery from prior period VAT in the current period;
- **Customs Duties:** Applied to mining, processing, general and administration and other opex on the assumption that 50% is subject to custom duties with an applied rate of 7.5%;
- **Depreciation** with an opening balance as at 1 January 2020 of US$203.1m and depreciable rates of 20% for non-sustaining capital expenditure and sustaining capital expenditure;
- **Equipment Lease Payments** outstanding of US$39.4m assumed payable by no later than Q3 2023; and

Elements excluded from the economic analysis were:

- The impact of outstanding Group shareholder loans of US$153.7m which accrue interest at 6.5% and withholding tax rates of 6.25%;
- Shareholder dividend payments which are subject to a withholding tax rate of 6.5%; and
- Closing cash balances as at 31 December 2019 of US$62m.

A summary of the Technical Economic Parameters are:

- Total gold production and gold sales of 1,960koz and 1,959koz respectively;
- Total sales revenue of US$2,546.6m derived assuming a constant real (1 January 2020) money terms gold price of US$1,300/oz;
- Total operating expenditure (post capitalisation) of US$1,368.4m (real money terms 1 January 2020);
- Total capital expenditure of US$346.2m comprising sustaining capital, capitalised operating expenditures, and mine closure (real money terms 1 January 2020). In addition to this the lease repayments and other outflows amount to US$47.1m which are assumed to be expended from 2020 through 2023 inclusive;

- LoM weighted average unit mining, processing and G&A related operating expenditures (pre capitalisation) of US$1.97/tmined, US$14.89/t_{milled} and US$5.93/$t_{milled}$ respectively; and
- LoM weighted average unit cash costs and AISC of US$734/oz and US$844/oz reported on a sales basis.

Accordingly, the primary conclusions drawn are as follows:

- The Mineral Reserves are demonstrably economic and indicate a significant headroom with AISC of US$875/oz relative to the assumed long-term gold price of US$1,300/oz;
- Strong positive post-tax pre-finance cashflows from 2020 through 2028 prior to implementation of the assumed mine closure programme; and
- Sensitivity analysis which indicates +ve economic viability for all scenarios.

The key recommendations for further assessment comprise:

- Completion of economic benefit analysis to include quantification of the economic benefit attributable to Endeavour and the Government of Burkina Faso;
- Inclusion in the economic analysis of the physical opening balance of Work in Progress, specifically for Gold in Circuit and Finished Goods;
- Inclusion of the impact of silver credits, following re-assessment of the geological and mining models;
- Updating of the economic analysis following refinement of the LoMp cost models for mining, operating and site G&A expenditures;
- The impact of potential carbon tax charges as currently considered in other countries;
- Refinement and inclusion of retrenchment related expenditures in the economic analysis;
- Quantification of the contractor demobilisation costs and as appropriate incorporation into the economic analysis; and
- Reassessment mine closure costs for both immediate closure and upon depletion of the Mineral Reserves following completion of additional technical work to assess geochemistry, waste encapsulation, post closure water treatment, overall “walk away” objectives and to further the supporting engineering designs related to the mine closure plan.

15.12 Risks and Opportunities

The Mineral Reserves as reported for 31 December 2019 for the Houndé Gold Mine are stated in accordance with the with the guidelines and terminology provided in the CIM Standards. The Mineral Reserves have also been established with due recognition for all the necessary multi-disciplinary technical inputs required to ensure compliance with the Requirements as defined herein. Furthermore, the key supporting technical assumptions are for a significant portion of the declarations grounded in recent operational experience which has advanced significantly since commencement of mining and processing operations in 2017.

This aside there certain generic and specific risks are identified and comprise:

- **Pit Optimisation Analysis:** For all open pits, excepting the Kari Pump Open Pit, the prior optimisation analysis is dated in 2015 and has not been updated since that time. This aside the current engineering pit designs have where appropriate been modified to reflect local conditions and updated geotechnical information. Whilst the reported Mineral Reserves remain economic at the assumed LTP of US$1,300/oz it is possible that the current designs are not informed by ‘optimal’ shell selection. Furthermore, certain of the block models have also been updated, however in the main these are only with respect to depletion and not necessarily re-estimation. It is therefore possible that following updating of the block models, the pit optimisation input parameters and completion of revised optimisation analysis, that the Mineral Reserves as reported herein may be different;

- **Sensitivity Analysis:** Presently as no updated optimisation analyses has been completed, there is limited possibility to evaluate Mineral Reserve sensitivity analysis to determine the extent to which the statements would change given changed key input parameters including gold price, metallurgical recoveries, geotechnical pit slope parameters and operating expenditures. Accordingly, it is not possible to analyse and report the upside opportunity and downside risks at this stage to highlight the impact of key assumptions. Furthermore, it is clear that the current Mineral Reserves include a considerable amount of LGO and SO with the latter assuming only 40% of the overall overhead costs. Accordingly, there remains a risk that should commodity prices fall significantly below the assumed LTP assumption of US$1,300/oz part of SO material may no longer be considered economic; and
- **Permitting Risk:** For the Kari Pump Open Pit all necessary regulatory documentation has been authored and submitted to the relevant regulatory authorities. At the date of declaration and the publication date of this Technical Report the submitted documents have not yet been approved. Endeavour has been informed that this is however related to the ongoing challenges associated with communication with and access to regulatory representatives during the COVID-19 period. As such there is an expectation that in due course the submissions will be approved, and the necessary permits granted. Accordingly, in the event that this is not resolved in the coming months there remains a risk that advancement of operations at Kari Pump may not be possible without timely receipt of the necessary regulatory authorizations and permits.
- **Security:** Since 2015 Burkina Faso has fallen victim to a large-scale jihadi insurgency featuring both home-grown extremist networks (such as Ansarul Islam) and transnational terrorist organisations affiliated with either al-Qaida or Islamic State which are mainly based in neighbouring Republic of Mali or Republic Niger). Although the insurgents' units often strike from external havens across the border, they repeatedly demonstrate an ability to exploit local frustrations and disputes. This highlights the presence of a significant Burkinabé nucleus among the various groups' jihadi fighters and commanders. The growing presence of Burkinabé members among the various Sahelian terrorist groups over the past few years exposes the fact that the insurgency there has emerged from a pre-existing crisis of state authority in rural areas.

  Jihadi groups currently operating in Burkina Faso have been able to exploit a widespread breakdown in law and order in rural Burkina Faso stemming from both widespread criminality and a crisis in legal and social relations. Central state authority is weak in the country's peripheries but prior to 2014 the authoritarian regime of Blaise Compaoré long managed an effective patronage system that helped to keep rural conflicts in check. This rural network included local elected officials, traditional chiefs, powerful businessmen and members of the then ruling party, Congrès pour la démocratie et le progrès ("**CDP**"), and Mr Compaoré used it in the absence of strong legal mechanisms to alternatively co-opt or crack down on rural dissent.

  During 2018, Endeavour reinforced the security team under the Senior Vice President for Security who assumes authority over the entire Security Organization. An in-country security manager assesses the situation and liaise with the National Security Authorities. The protection of the personnel working in the mines and the exploration sites is constantly reviewed in order to anticipate the changing situation. On Site Security Managers and their teams, as well as private security contractors and national security forces (police, gendarme and military) at Houndé Gold Mine is overseen by the General Manager and the Country Security Manager. The gendarmes, police and military who reinforce local security remain accountable to their national chain of command and operate closely with security personnel through a mechanism of Memorandums of Understanding signed with the national authorities.

Technological resources installed at Houndé Gold Mine include access control, closed circuit TV system, specialized software and applications, drones, perimeter surveillance sensors and tracking systems on all sites. These technological systems aim to collect accurate information on possible security issues and to limit the risk of violence to the lowest possible level. Wherever it is necessary, security personnel support the National Security and Law Enforcement Forces.

Endeavour conducts training in judicial procedures and Human Rights for the Site Security Managers and Country Security Managers. This training is ongoing and further Human Rights trainings will be rolled out. Endeavour has already identified human rights associations in Burkina Faso to provide human rights training for both its own personnel and third-party security personnel.

- **COVOID-19:** Endeavour's response to COVID-19 is managed by a designated team, supported by a well-regarded epidemiologist, acting as special advisor to Endeavour, and an 11-person medical team from a leading US NGO who have been deployed at each mine and in Abidjan and Ouagadougou. Endeavour has implemented a range of measures to safeguard its workforce and to prevent the spread of the virus including:
  - regular communications on best practice hygiene and health recommendations;
  - temperature screening;
  - strictly monitoring access to site;
  - implemented social distancing measures;
  - providing additional resources such as hand sanitiser and cleaning equipment;
  - intensified cleaning at offices and sites;
  - working from home for all our office staff;
  - restrictions on non-essential visits to site;
  - suspension of all non-essential business travel;
  - mandatory 14-day quarantine for all travellers arriving in West Africa;
  - working closely with local and national health authorities in our operating countries;
  - sensitizing our local communities about the measures taken by the both the Ivorian, Burkinabé and Malian governments to combat COVID-19;
  - supporting the local community health centres around our mines by providing them with protective equipment, including hand sanitizer, hydro-alcoholic gel, gloves, masks, laser thermometers, etc; and
  - supporting the government's COVID-19 campaign by broadcasting awareness information in local languages on our local radio stations.

The key opportunities relating to the Mineral Reserves as reported for Houndé Gold Mine are largely focused on the potential to increase the currently reported Mineral Reserves through:

- Completion of additional technical studies for the Kari Centre and Kari West deposits which in conjunction with additional infill drilling may enable upgrading of sufficient Mineral Resources to a minimum of the Indicated category to support declaration of Mineral Reserves;
- Upgrading of Inferred Mineral Resources to the Indicated category through completion of

additional infill drilling specifically targeting Inferred Mineral Resources reporting within the current engineered pit designs and presently consider as waste in the current LoMp;

- Completion of additional extensional drilling outside of the current engineered pit designs to extend current mineralisation and upgrade Inferred Mineral Resources to the Indicated category, thereby enabling potential expansion of the engineered pit designs as reported herein; and
- Increased commodity prices leading to expansion of the open pits through depth extensions.

15.13 Interpretation, Conclusions and Recommendations

In summary the Mineral Reserves as reported herein are demonstrably economic and are supported by the appropriate level of technical studies to support their declaration in accordance with guidelines and terminology provided in the CIM Standards. This aside there are certain areas of the supporting technical work which can be considered as historic (2015), specifically with respect to the pit optimisation analyses for all open pits other than the Kari Pump open Pit.

Furthermore, opportunities exist to optimise the design and reporting process, specifically with respect to completion of additional sensitivity analyses as part of the optimisation process and as appropriate with respect to the current cut-off grade strategy employed for the Sub-Ore. In addition, certain assumptions, notably the increased IRA assumptions at the Houndé group of pits are not yet supported by site specific data and further work is required to support this changed design assumption.

Based on the above the key recommendations relating to Mineral Reserves at the Houndé Gold Mine are:

- Ensuring that the necessary regulatory approvals are obtained in respect of the Kari Pump Open Pit planned operations specifically as mining operations are scheduled to commence in H2 2020;
- Completion of updated pit optimisation analysis incorporating the latest available geological models and operating/design assumptions as reported in this Technical Report; and
- Updating all engineered pit designs following completion of the updated pit optimisation including revisiting of the staged push backs and ultimate shell selections.

16 MINING METHODS

16.1 Introduction

The following section focuses on the mining engineering aspects and associated assumptions as incorporated into the current LoMp with specific comment on mining methods; mining equipment; historical performance; mining LoMp and associated assumptions; risks and opportunities; interpretation, conclusions and recommendations.

16.2 Mining Methods

The mining method employed at Houndé Gold Mine is conventional open pit excavator-truck operation with the production unit operations (drilling, blasting, loading, hauling and dumping) carried out by mixed owner contractor mining personnel and equipment. Load and haul activities are owner operated and contract service providers, SFTP Mining and African Explosive Limited (“**AEL**”), carry out drilling and blasting activities.

Mining and processing of transition/fresh ore began in Q4 2017. Mining activities transitioned from mainly oxides in early 2018 to mainly fresh ore by the end of 2019. Ore was mined from the Vindaloo Main Pit Stages 1, 2 and 3 and Vindaloo Central and Bouéré pits to feed the process plant in 2019. Additional oxide will be mined in 2020 and 2021 as Kari Pump comes into production.

The capacity of the mining fleet owned by Houndé Gold Mine and other service providers meets the earthmoving requirements of the mining schedule as per the LoM and budget plans for 2020. The in-pit material excavation is conducted by a fleet of eight Komatsu excavators consisting of one PC3000-8R, three PC 2000-8R and four PC 1250-8R. Material haulage is done by thirty-one Komatsu HD785-7 rear dump trucks. Key items of the ancillary fleet are seven D375A-6R track dozers (two D375A track dozers are being mobilised from Ity Gold Mine in April/May 2020) and four GD825A-2 motor graders. Ore mined is hauled to the RoM pad and near RoM stockpiles. Waste mined from the pit is hauled to the waste dumps and other projects requiring waste material for construction (i.e. tailing storage facility, haul roads etc.).

The ore control strategy targeting delineation of ore and waste uses RC holes piercing multiple benches. The geological and assay information, obtained from 32m deep inclined holes are sampled and assayed every 1m to generate wireframes from sectional interpretation, for grade control block modelling and ore outlines generation. The ore outlines are then used by geologists and surveyors for final ore/waste discrimination and in-pit mark-up. In 2018 Houndé Gold Mine introduced blast movement simulation technology (“**BMT**”) to better predict movement of ore resulting from blasting as a key measure in reducing ore loss and dilution.

Production drilling and blasting is performed on contract by SFTP with Sandvik DP1500s drill rigs on 9m benches with one-meter sub-drill using 115mm diameter drill bits. Blasted material is excavated in 3m high flitches. African Explosives Limited (“**AEL**”) provides in-the-hole blasting services. The AEL plant on site consists of an ammonium nitrate mixing shed for the manufacturing of bulk explosives and four 30 tonne capacity iso-tank containers for storage. The supply of detonators, boosters, bulk explosives, initiating systems and other explosives material into the site-based magazines for storage is the responsibility of AEL.

Waste rock dumps associated with mining operations are constructed to meet the stipulated guidelines of the Burkina Faso Mining and Explosive and Environmental Regulations. All areas earmarked for waste dumps are sterilized before dumping commences.

In 2019, the total material mined was 38.2Mt including 3.0Mt of ore at an average grade of 2.16g/tAu containing 206kozAu. As per the water management plan, eight boreholes are planned in 2020 in the vicinity of Vindaloo Main pit and 14 boreholes are planned in 2020 and

2021 in the vicinity of Kari Pump pit. The plan also includes a proposal to purchase an assortment of medium to large submersible pit dewatering pumps in 2020 and 2021.

16.3 Mining Equipment

Mobile Mining Equipment

The mobile mining equipment employed at Houndé Gold Mine comprise both primary earthmoving equipment represented by excavators and trucks which are supported by various ancillary equipment. All equipment employed at Houndé Gold Mine are provided by Komatsu and as at 31 December 2019 comprise a fleet total of 66 comprising: 8 excavators; 31 trucks; and 27 ancillary equipment. Drill and blast equipment are contracted out and comprise Sandvik DP1500s drill rigs.

Table 16-1: Heavy Mining Equipment Fleet

Activity	Equipment Specification	Equipment Model	Current Quantity
Excavators			
Excavating	100 tonne Hydraulic Backhoe Excavator	Komatsu PC1250SP-8R	4
Excavating	200 tonne Hydraulic Backhoe Excavator	Komatsu PC2000SP-6R	3
Excavating	250 tonne Hydraulic Backhoe Excavator	Komatsu PC3000SP-8	1
Subtotal			**8**
Trucks			
Pit material Haulage	Rigid chassis dump truck – 90t payload	Komatsu HD785-7	31
Ancillary			
Track Dozers	70t operating weight track type tractor	Komatsu D375A-6R	9
Wheel Dozers	50t operating weight wheel dozer	Komatsu WD600-6	2
Ore SP Re-handle FEL	100t operating weight front end wheel loader	Komatsu WA800-3	2
Ore SP Re-handle FEL	50t operating weight front end wheel loader	Komatsu WA600-6R	3
Ore SP Re-handle FEL	30t operating weight front end wheel loader	Komatsu WA500-6R	2
Ore SP Re-handle FEL	11t operating weight front end wheel loader	Komatsu WA320-5	2
Graders	Motor Grader – 16-foot blade	Komatsu GD825A-2	4
Water Cart	Rigid chassis dump truck fitted with 50kL capacity water body	Komatsu HD465-7R	4
Service Truck	Rigid chassis dump truck fitted as service truck	Komatsu HD465-7R	2
Subtotal			**30**
Total			**69**

Targeted equipment effective utilisation is determined assuming a 90.0% availability and 80.0% utilisation equating to 72.0% effective utilisation and was applied to all primary and secondary Heavy Mining Equipment ("**HME**"). The effective annual utilization translates to 6,307 operating hours per year.

Historical annual equipment effective utilisation compared to target is represented in the flowing graphs. Figure 16-2 shows the cumulative effective utilisation of the primary production excavators for the last two years against target. Current data show that the excavators are consistently achieving utilisations above the 72.0% target with an average effective utilisation of 78.0% between April 2018 to March 2020. Utilisations decrease in the first quarter of 2019, but subsequently recovered and maintained above 80% with a similar decrease seen for the first quarter 2020.

Figure 16-1: Excavator effective utilisation: planned (orange) vs actual (blue) (source: Endeavour)

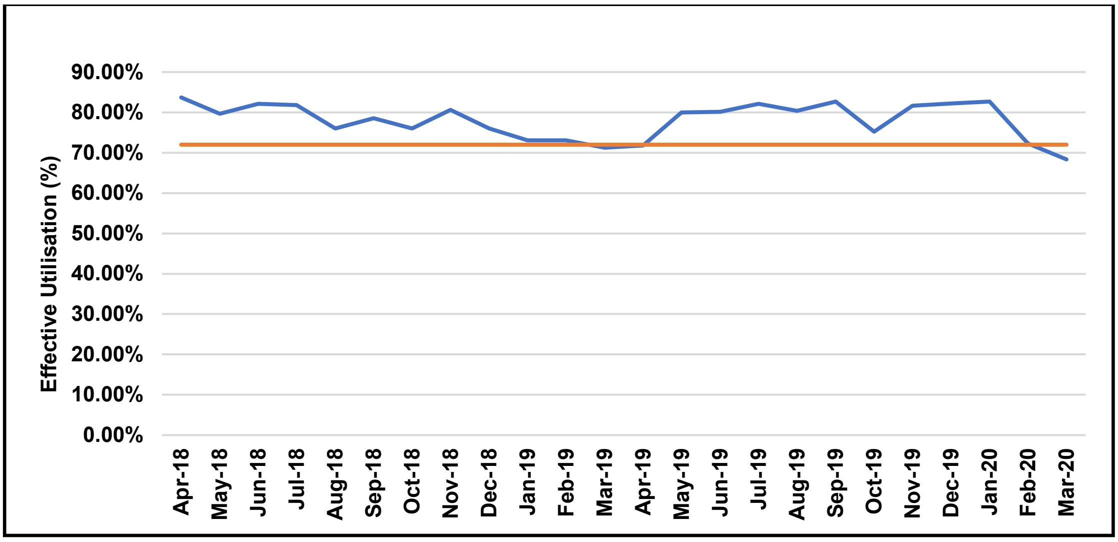
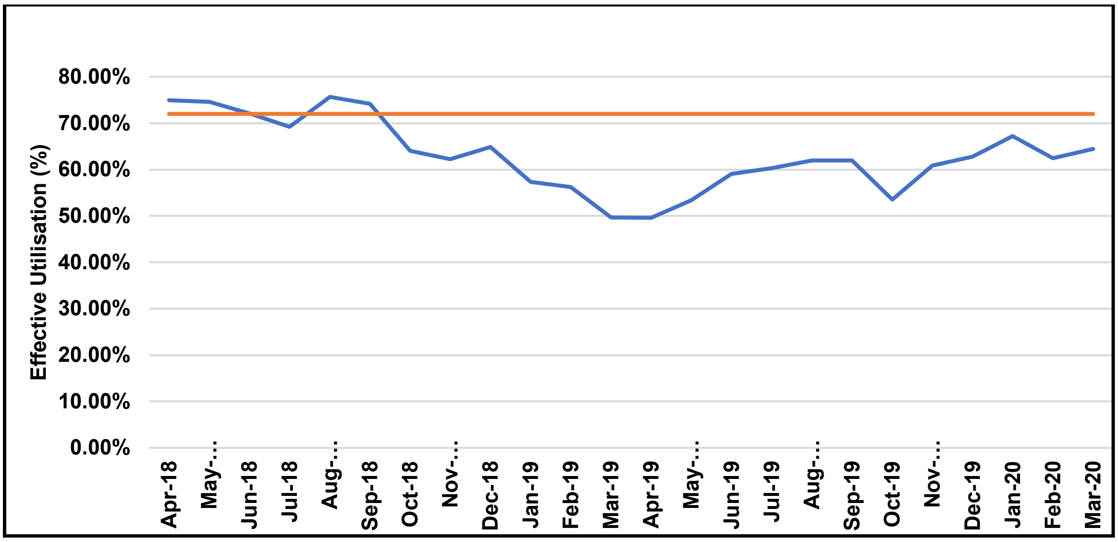


Figure 16-2 show the truck effective utilisation for the last two years. Effective utilisation is consistently under target with an average of 63.0% between April 2018 and March 2020. The systematic decrease seen from September 2018 is a result of an additional 7 Komatsu HD785 trucks added to the fleet in combination with shorter haulage distances resulting in excavators being over trucked. The additional trucks were acquired to sustain production when long haul operations started from Bouéré Pit beginning in 2019. Truck demand is shown to be increasing with increased haulage distances due to increasing pit depth etc.

Figure 16-2: Truck effective utilisation: planned (orange) vs actual (blue) (source: Endeavour)



Blasting

The production drilling and blasting operations are carried out at 9m benches that is then double battered to 18m double benches in fresh rock. Each 9m bench is then excavated in 3m flitches to ensure maximum selectivity and equipment productivity. The average blasting powder factor is between 0.90kg/bcm to 0.98kg/bcm (ammonium nitrate/fuel oil "**ANFO**" equivalent) for the transitional and fresh rock with a density above 2.0t/m^3 and emulsion is used in both wet and dry blasting. The highly weathered zone (clays and laterites) and transitional zone with a density below 2.0t/m^3 is classed as free dig as per the current mining practice.

The supply of explosives and blasting accessories are contracted out directly to an approved explosives supplier. The explosives contractor provides, in addition to the supply of primary explosives and blasting accessories, mixing equipment and technical blasting advice when needed.

Dust Suppression

Dust suppression is undertaken by water carts fitted with spray bars. Water for dust suppression is available from sumps in the pits in first instance and from the Turkeys Nest on the surface if the pit sumps run dry.

Grade Control

The deposits at Houndé Gold Mine are systematically infilled by RC grade control drilling on a 10m by 7.5m, or 10m by 10m pattern with holes inclined at -45°. Samples are collected in 1m increments from a cyclone and are split using a riffle splitter to produce samples of approximately 2kg mass. The same QAQC protocol are applied as are used in the exploration stages. Samples are analysed for gold by fire assay at the site laboratory run by SGS. GC models are updated after each drill programme applying interpolation by ordinary kriging. Additional information regarding Grade Control and Reconciliation practices in place at Houndé Gold Mine is included in Section 14.11 of this Technical Report.

16.4 Historical Performance

Mining operations at Houndé Gold Mine commenced in 2017 with operations focused at the Vindaloo Main Pit, thereafter, extending to Vindaloo Central Pit and Vindaloo North Pit and Bouéré Pit in 2019. Mining operations from 2017 through 2019 (Table 16-2) inclusive reports total mined of 97.6Mt of which 87.6Mt reports as waste and ore mining contributing 10.0Mt at an average grade of 2.12g/tAu for total contained gold of 681kozAu and an average stripping ratio of 8.75t_{waste}:t_{ore}. Mined volumes increased to 41.5Mt and for the 12-month period ending 31 December 2019 reported a total of 28.2Mt with total mined monthly production reporting an average of 3.2Mtpm for the same period (Table 16-3). Reported mining operating expenditures have largely increased with increased mining depth and ore haulage distances from the more distant pits (Bouéré). For the period ending 31 December 2019 the unit operating expenditure for mining operations at Houndé Gold Mine reports a total of US$2.27/$t_{mined}$ (US$5.22/BCM) which includes drill and blast, excavation and loading, hauling (waste and ore), grade control and other support ancillary services. In 2019 ore tonnes were reduced by 47% due to establishment of new pit pushbacks and open pits where the initial focus is on waste mining. Gold grades have marginally improved as mining progressed deeper at Vindaloo Central and Main, in addition to the ore mining from Bouéré.

Table 16-2: Houndé Gold Mine: mining operations historical physical performance

Statistics		Total	2017	2018	2019
Mined Volume					
Vindaloo Main	('000m^3)	32,423	8,939	13,841	9,643
Vindaloo Central	('000m^3)	3,551	-	2,918	633
Vindaloo North	('000m^3)	3,563	-	2,399	1,164
Subtotal	**('000m^3)**	**39,537**	**8,939**	**19,158**	**11,439**
Bouéré	('000m^3)	5,146	-	-	5,146
Total	**('000m^3)**	**44,682**	**8,939**	**19,158**	**16,585**
Stripping Ratio					
Vindaloo Main	(t_{waste}:t_{ore})	8.58	13.67	5.49	14.08
Vindaloo Central	(t_{waste}:t_{ore})	6.00	-	7.21	3.28
Vindaloo North	(t_{waste}:t_{ore})	8.48	-	14.38	4.80
Subtotal	**(t_{waste}:t_{ore})**	**8.30**	**13.67**	**6.12**	**10.89**
Bouéré	(t_{waste}:t_{ore})	15.62	-	-	15.62
Total	**(t_{waste}:t_{ore})**	**8.75**	**13.67**	**6.12**	**11.87**
Mined Tonnage					
Vindaloo Main	(kt)	73,519	17,933	31,509	24,077
Vindaloo Central	(kt)	6,891	-	5,593	1,298
Vindaloo North	(kt)	7,034	-	4,379	2,655
Subtotal	**(kt)**	**87,445**	**17,933**	**41,481**	**28,031**
Bouéré	(kt)	10,163	-	-	10,163

Statistics		Total	2017	2018	2019
Total	**(kt)**	**97,608**	**17,933**	**41,481**	**38,194**
Waste					
Vindaloo Main	(kt)	65,844	16,711	26,653	22,481
Vindaloo Central	(kt)	5,907	-	4,912	995
Vindaloo North	(kt)	6,292	-	4,094	2,198
Subtotal	**(kt)**	**78,043**	**16,711**	**35,659**	**25,674**
Bouéré	(kt)	9,552	-	-	9,552
Total	**(kt)**	**87,595**	**16,711**	**35,659**	**35,225**
Ore Tonnage					
Vindaloo Main	(kt)	7,675	1,222	4,856	1,597
Vindaloo Central	(kt)	985	-	682	303
Vindaloo North	(kt)	742	-	285	458
Subtotal	**(kt)**	**9,402**	**1,222**	**5,822**	**2,357**
Bouéré	(kt)	612	-	-	612
Total	**(kt)**	**10,013**	**1,222**	**5,822**	**2,969**
Ore Grade					
Vindaloo Main	(g/tAu)	2.15	2.95	1.99	2.04
Vindaloo Central	(g/tAu)	1.71	-	1.50	2.17
Vindaloo North	(g/tAu)	1.96	-	1.73	2.11
Subtotal	**(g/tAu)**	**2.09**	**2.95**	**1.92**	**2.07**
Bouéré	(g/tAu)	2.51	-	-	2.51
Total	**(g/tAu)**	**2.12**	**2.95**	**1.92**	**2.16**

Table 16-3: Houndé Gold Mine: mining operations summary physical and operating expenditure performance

Statistic	Units	Total	2017	2018	2019
Production					
Mined	**('000m^3)**	**44,682**	**8,939**	**19,158**	**16,585**
Houndé	('000m^3)	39,537	8,939	19,158	11,439
Bouéré	('000m^3)	5,146	-	-	5,146
Mined	**(t/m^3)**	**2.18**	**2.01**	**2.17**	**2.30**
Houndé	(t/m^3)	2.21	2.01	2.17	2.45
Bouéré	(t/m^3)	1.98	-	-	1.98
Mined	**(kt)**	**97,608**	**17,933**	**41,481**	**38,194**
Houndé	(kt)	87,445	17,933	41,481	28,031
Bouéré	(kt)	10,163	-	-	10,163
Mined	**(ktpm)**	**2,575**	**1,514**	**3,457**	**3,183**
Stripping Ratio	**(t_{waste}:t_{ore})**	**8.77**	**13.86**	**6.13**	**11.87**
Houndé	(t_{waste}:t_{ore})	7.56	13.86	5.22	10.09
Bouéré	(t_{waste}:t_{ore})	27.35	-	-	18.69
Waste	**(kt)**	**87,839**	**16,947**	**35,667**	**35,225**
operating	(kt)	71,113	16,947	30,371	23,795
capitalised	(kt)	16,726	-	5,296	11,430
Ore Tonnage	**(kt)**	**10,013**	**1,222**	**5,822**	**2,969**
Houndé	(kt)	9,402	1,222	5,822	2,357
Bouéré	(kt)	612	-	-	612
Ore Grade	**(g/tAu)**	**2.12**	**2.95**	**1.92**	**2.16**
Houndé	(g/tAu)	2.09	2.95	1.92	2.07
Bouéré	(g/tAu)	2.51	-	-	2.51
Content	**(kozAu)**	**681**	**116**	**359**	**206**
Houndé	(kozAu)	632	116	359	157
Bouéré	(kozAu)	49	-	-	49
Operating Expenditure					
Total Mining Expenditure	(US$k)	175.8	10.20	79.05	86.56
Unit Rates	(US$/t)	1.80	0.57	1.91	2.27
	(US$/BCM)	3.93	1.14	4.13	5.22

16.5 Mining LoMp and Associated Assumptions

LoMp Production Scheduling

The LoMp production scheduling process at Houndé Gold Mine was undertaking using MineSched software and developed an integrated multi-pit mining schedule which established, mined volumes, stockpile movements, WRD deposition and process plant feed and incorporated the following schedule design basis and constraints:

- final mining block models and grade control models for each deposit;
- final pit designs and incremental pit designs and the survey topography as at 31 December 2019 for the following pits:
  - the Houndé Open Pits comprising Vindaloo Main, Vindaloo North, Vindaloo Central, Koho and Madras,
  - Bouéré Open Pit,
  - Dohoun Open Pit,
  - Kari Pump Open Pit;
- mining inventories for both ore and waste reported by pit and for weathering ore type and grade categories as reported in Table 16-4 and Table 16-5. It should also be noted that the

final pit designs also capture Inferred Mineral Resources totalling 482kt grading 1.69g/tAu which is presently considered as waste in the current LoMp schedules;

- stockpile opening balances as at 31 December 2019 of 950kt grading 1.20g/tAu with the majority of this apportioned to the Houndé Open Pits at 856kt grading 1.04g/tAu and the balance to the Bouéré Open Pit;
- final waste rock dump designs and ex-pit haul road designs to establish travelled distances for both ore and waste,
- mining geometry constraints which cumulatively inform the overall sink rates for the individual pits comprising:
  - maximum active benches of three benches in any given period,
  - a lag of 200m which controls the minimum distances between faces and adjacent benches mined,
  - a lag of 50m (applied in all directions) which controls the availability of blocks based on other block son the same horizontal plane;
- maximum Houndé Process Plant capacity of 4.0Mt per annum;
- grade bins which prioritise processing of high grade ore ("**HGO**") and medium grade ore ("**MGO**") on an equal basis, followed by low grade ore ("**LGO**") and finally sub-ore ("**SO**") defined as follows: HGO ≥ 2.22g/tAu; MGO ≥ 1.4g/tAu, <2.22g/tAu; LGO (oxide) ≥ 0.60g/tAu, <1.4g/tAu; LGO (transitional) ≥ 0.70g/tAu, <1.4g/tAu; LGO (fresh) ≥ 0.80g/tAu, <1.4g/tAu; SO (oxide) ≥ 0.40g/tAu, <0.6g/tAu; SO (transitional) ≥ 0.50g/tAu, <0.80g/tAu; and SO (fresh) ≥ 0.60g/tAu, <0.80g/tAu; and
- an assumption that all ore is delivered to a RoM pad stockpile to process plant with re-handling set at 100% with no direct feed.

The production schedule was developed on a monthly basis for 2020, quarterly for 2021 and annually thereafter. The resulting open-pit development schedule for start and end dates of each pit and for each development stage are included in Table 16-6 and Table 16-7 respectively. The annual waste and ore production statistics, summarised by the open-pit groupings for the Houndé, Bouéré, Dohoun and Kari Pump open pits are presented in Table 16-8, the salient aspects of which are:

- oxide ore, transitional ore and fresh ore contributing 15.3%, 7.3% and 77.4% respectively;
- 55.3% of the Mineral Reserves sourced from HGO and MGO combined with the balance from LGO and SO;
- total volumes mined capped at a maximum of 55.6Mt (25.5MBCM) in 2026 and thereafter reducing to less than 25Mt in 2025 and to 8.2Mt on depletion of the Mineral Reserves in 2028;
- total ore mined peaking at 6.6Mtpa in 2022, thereafter declining to less than 3.0Mtpa from 2026 onwards;
- average ore grades which generally decline over the operating life to less than 2.00g/tAu except for 2020, 2024 and 2025;
- an overall mining scheduled focused on the Houndé Open Pits which contributes approximately 71% of the total ore mined, of which most of the contribution to is sourced from Vindaloo Main Pit; and
- following depletion of the Bouéré Open Pit in 2020, the mainstay of ore production outside of the Houndé Open Pits is sourced from Kari Pump which is planned for depletion in 2025

with limited and relatively short life production schedules from the Vindaloo North, Vindaloo Central, Koho and Dohoun Open Pits;

- generally high sink rates which trend around 80m to 100m and which tend to increase above 80m per annum as pits mature and narrow towards depletion. These sink rates are achievable as volumes tend to reduce in alignment with reduced stripping ratios;
- inclusion of a further gold contained adjustment factor of 0.95 applied to 2020 production which is not applied for subsequent periods; and
- closing balances of stockpiled material reporting from the grouped open pit areas indicated that totals increase significantly from approximately 1Mt to in excess of 6Mt by 2023. This is largely attributable to the stockpiling of the LGO and SO material which is then planned to be processed as the open pits are depleted and ore tonnage mined reduces below the nominal capacity of the Houndé Process Plant from 2024 onwards. The current LoMp assumes the all ore grade bin categories are separately stockpiled and recovered from these stockpiles with an assumed 100% re-handling and no direct feeding of ore.

Table 16-4: Houndé Gold Mine: ore mining inventory as at 31 December 2019 (open pits; weathering and grade bins)

Reporting Area	Contribution	Ore Mined		
		Tonnage	Grade	Content
	(%)	(kt)	(g/tAu)	(kozAu)
Open-Pit				
Vindaloo Main	75.9	17,002	1.76	962
Vindaloo North	3.6	817	2.02	53
Vindaloo Central	14.9	3,338	1.69	182
Koho	3.6	810	1.29	34
Madras	1.9	425	0.82	11
Houndé	**70.7**	**22,391**	**1.72**	**1,242**
Bouéré	2.6	814	4.30	113
Dohoun	3.7	1,160	1.85	69
Kari Pump	23.1	7,308	3.00	704
Total	**100.0**	**31,673**	**2.09**	**2,127**
Weathering				
Oxide	15.3	4,840	2.01	313
Transitional	7.3	2,317	2.11	157
Fresh	77.4	24,516	2.10	1,657
Total	**100.0**	**31,673**	**2.09**	**2,127**
Grade Bins				
HG	27.4	8,690	4.16	1,164
MG	27.8	8,813	1.80	509
LG	33.4	10,590	1.10	375
SO	11.3	3,580	0.69	80
Total	**100.0**	**31,673**	**2.09**	**2,127**

Table 16-5: Houndé Gold Mine: material type mining inventory as at 31 December 2019

Reporting Area	Ore Mined	Waste and Total Material Mined		
	Tonnage	Waste	Mined	Stripping Ratio
	(kt)	(kt)	(kt)	(t_{waste}:t_{ore})
Open-Pit				
Vindaloo Main	17,002	106,378	123,379	6.26
Vindaloo North	817	9,603	10,420	11.76
Vindaloo Central	3,338	14,368	17,706	4.30
Koho	810	4,119	4,929	5.08
Madras	425	1,873	2,298	4.41
Houndé	**22,391**	**136,341**	**158,732**	**6.09**
Bouéré	814	9,796	10,610	12.04
Dohoun	1,160	13,514	14,674	11.65
Kari Pump	7,308	118,521	125,828	16.22
Total	**31,673**	**278,172**	**309,845**	**8.78**
Weathering				
Oxide	4,840	116,859	121,699	24.15
Transitional	2,317	28,900	31,217	12.47
Fresh	24,516	132,413	156,929	5.40
Total	**31,673**	**278,172**	**309,845**	**8.78**

Table 16-6: Houndé Gold Mine: open-pit mining schedule (open pit start/end dates)

Open Pit	Ore Mining		Waste Mining		Waste Mining	
	Start	End	Start	End	Start	End
Vindaloo Main	2020	2025	2020	2025	2020	2025
Vindaloo North	2020	2028	2020	2025	2020	2028
Vindaloo Central	2020	2028	2020	2028	2020	2028
Koho	2021	2022	2021	2022	2021	2022
Madras	2027	2027	2027	2027	2027	2027
Houndé	**2020**	**2028**	**2020**	**2028**	**2020**	**2028**
Bouéré	2020	2020	2020	2020	2020	2020
Dohoun	2027	2028	2027	2028	2027	2028

Open Pit	Ore Mining		Waste Mining		Waste Mining	
	Start	End	Start	End	Start	End
Kari Pump	2020	2027	2020	2027	2020	2027
Total	**2020**	**2028**	**2020**	**2028**	**2020**	**2028**

Table 16-7: Houndé Gold Mine: open-pit mining schedule (open pit stage start/end annual dates)

Open Pit/Stage	2020	2021	2022	2023	2024	2025	2026	2027	2028
Vindaloo Main 2	■	■	■	■					
Vindaloo Main 3		■	■	■	■	■			
Vindaloo Main 4				■	■				
Vindaloo North 1						■			
Vindaloo North 2	■								
Vindaloo Central 1	■	■							
Vindaloo Central 2									■
Koho 1		■							
Koho 2			■						
Koho 3			■						
Madras 1								■	
Madras 2								■	
Bouéré 1	■								
Dohoun 1								■	■
Kari-Pump 1	■								
Kari-Pump 2	■	■	■	■					
Kari-Pump 3			■	■	■	■			
Kari-Pump 4				■	■	■	■	■	

Table 16-8: Houndé Gold Mine: open-pit mining production schedule

Statistics	Units	Total
Mining Areas		
Volume Mined	**(kBCM)**	**136,865**
Houndé	(kBCM)	63,184
Bouéré	(kBCM)	3,888
Dohoun	(kBCM)	6,405
Kari Pump	(kBCM)	63,389
Density Mined	**(t/m³)**	**2.26**
Houndé	(t/m³)	2.51
Bouéré	(t/m³)	2.73
Dohoun	(t/m³)	2.29
Kari Pump	(t/m³)	1.99
Tonnage Mined	**(kt)**	**309,845**
Houndé	(kt)	158,732
Bouéré	(kt)	10,610
Dohoun	(kt)	14,674
Kari Pump	(kt)	125,828
Waste Tonnage	**(kt)**	**278,172**
Houndé	(kt)	136,341
Bouéré	(kt)	9,796
Dohoun	(kt)	13,514
Kari Pump	(kt)	118,521
Ore Tonnage	**(kt)**	**31,673**
Houndé	(kt)	22,391
Bouéré	(kt)	814
Dohoun	(kt)	1,160
Kari Pump	(kt)	7,308
Ore Grade	**Grade**	**2.09**
Houndé	(g/tAu)	1.72
Bouéré	(g/tAu)	4.30
Dohoun	(g/tAu)	1.85
Kari Pump	(g/tAu)	3.00
Ore Grade Bins		
Ore Tonnage	**(kt)**	**31,673**
HG	(kt)	8,690
MG	(kt)	8,813
LG	(kt)	10,590
SO	(kt)	3,580
Ore Grade	**(g/tAu)**	**2.09**
HG	(g/tAu)	4.16
MG	(g/tAu)	1.80
LG	(g/tAu)	1.10
SO	(g/tAu)	0.69
Weathering		
Ore Tonnage	**(kt)**	**31,673**
Oxide	(kt)	4,840
Transitional	(kt)	2,317
Fresh	(kt)	24,516
Ore Grade	**(g/tAu)**	**2.09**
Oxide	(g/tAu)	2.01
Transitional	(g/tAu)	2.11
Fresh	(g/tAu)	2.10

Table 16-9: Houndé Gold Mine: closing stockpile level as at 31 December 2019

Equipment	Units	2019
Tonnage (Closing)		
Houndé	(kt)	856
Bouéré	(kt)	94
Total	**(kt)**	**950**
Grade		
Houndé	(g/tAu)	1.04
Bouéré	(g/tAu)	2.69
Total	**(g/tAu)**	**1.20**
Content (Closing)		

Equipment	Units	2019
Houndé	(kozAu)	29
Bouéré	(kozAu)	8
Total	**(kozAu)**	**37**

Figure 16-3 through Figure 16-6 provide graphical representations of various LoMp production related statistics comprising: annual material moved (Figure 16-3); annual ore mined (Figure 16-4); vertical advance rates per pushback and open pit (Figure 16-5); and closing stockpile balances (Figure 16-6).

Figure 16-3: Houndé Gold Mine: annual material moved (source: Endeavour)

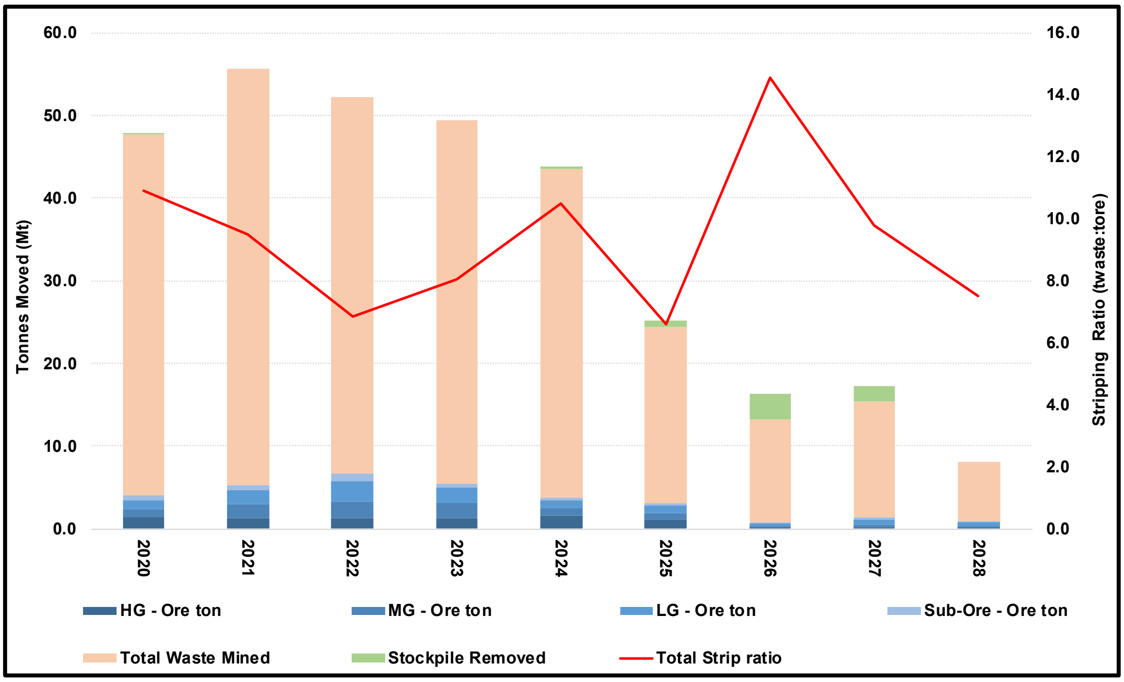


Figure 16-4: Houndé Gold Mine: annual mined ore tonnage and grade (source: Endeavour)

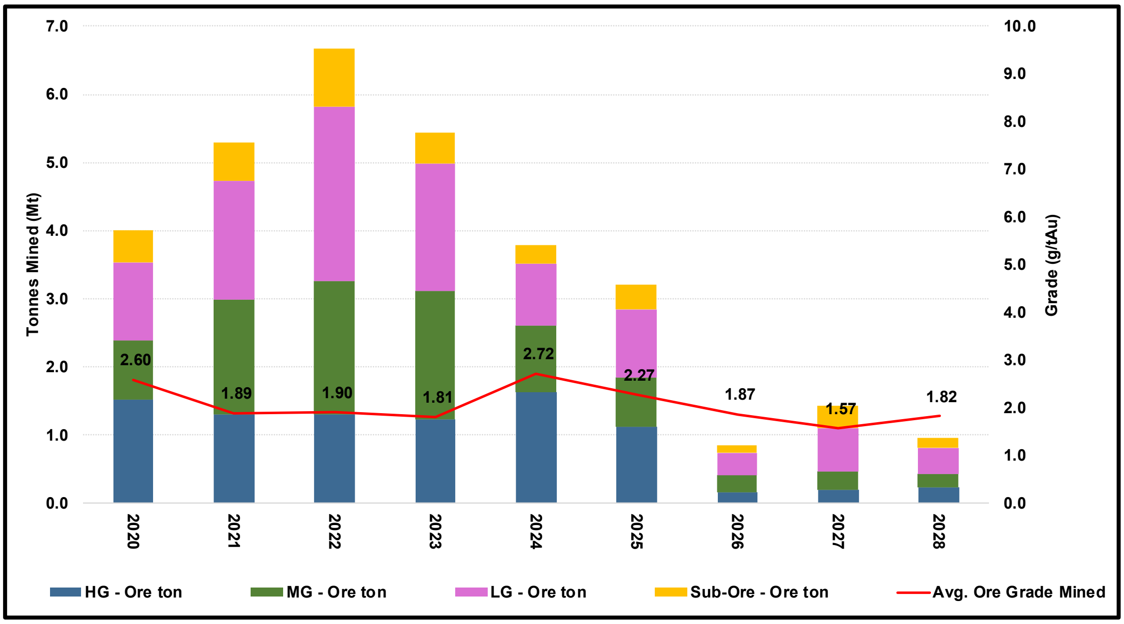


Figure 16-5: Houndé Gold Mine: vertical advance rate per mining pushback per pit (source: Endeavour)

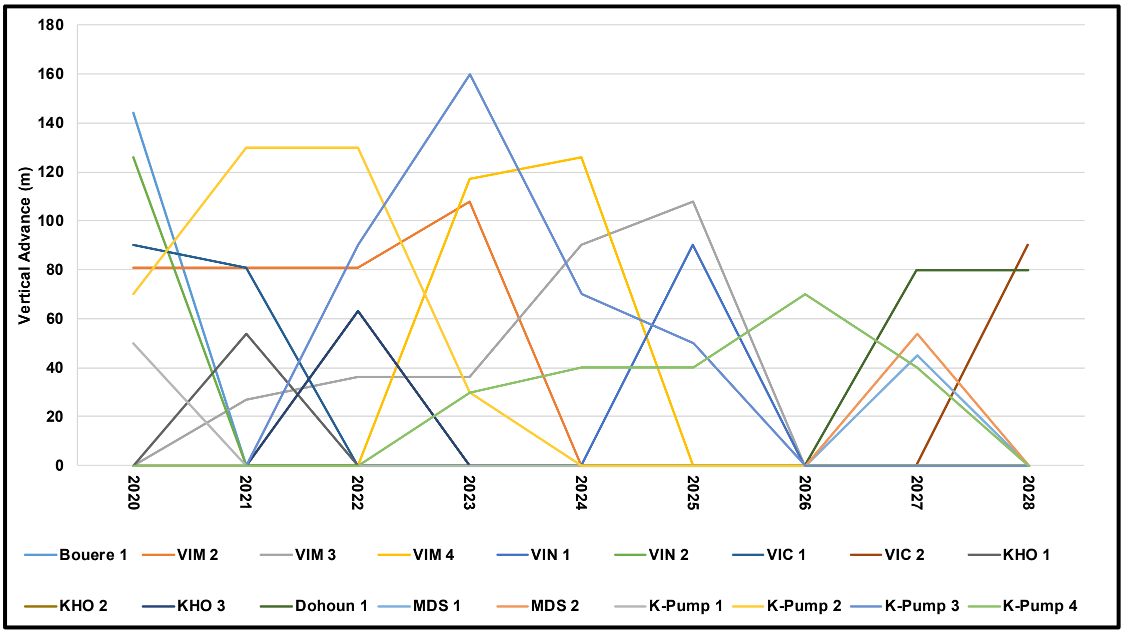
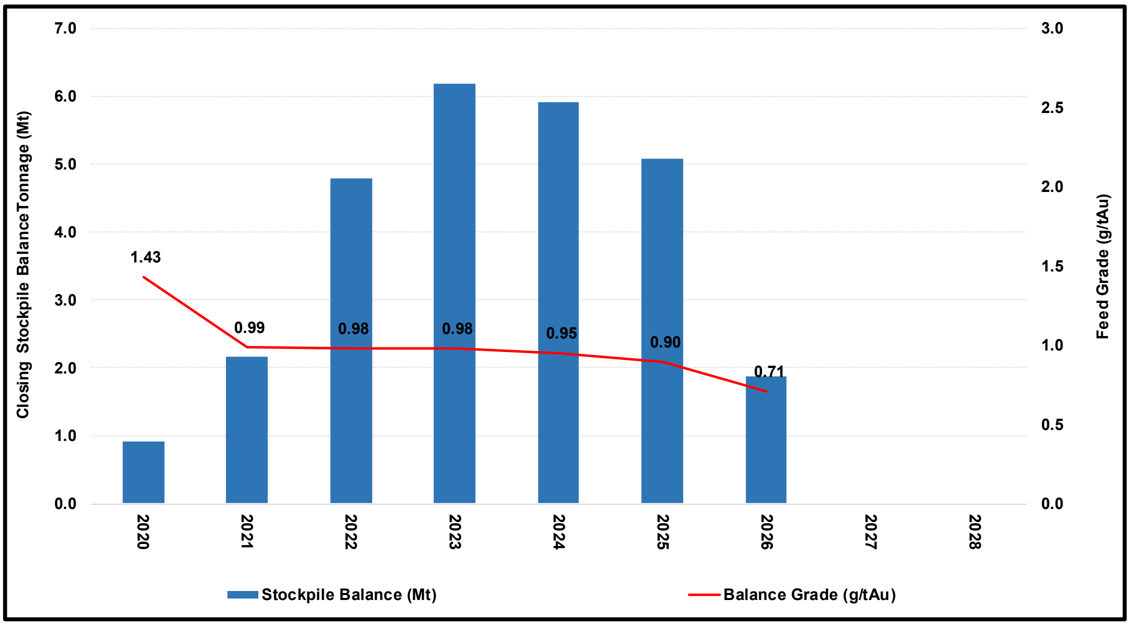


Figure 16-6: Houndé Gold Mine: closing stockpile balances (source: Endeavour)



Primary Mobile Equipment Schedules

The resulting production schedules are exported to Excel and are then analysed with respect to equipment requirements based on various Original Equipment Manufacturer ("**OEM**") specifications and where appropriate adjusted for site specific conditions and operating experience. The determinations for primary (excavators and trucks) mobile mining equipment requirements incorporated:

- loading unit productivity rates in line with industry standards, based on equipment specifications, adjusted to site operating factors, including weather and skill levels;
- truck productivity rates by pit and bench is based on pre-determined haulage profiles, assigned truck speeds for various segments at target payloads. Overall truck productivity

rates based on truck and excavator matching with an allowance for load and dump static times; and

- ancillary equipment (dozers, graders, watercarts) based on allocated proportions of the loading units.

In addition to the above the mining fleet productivity was developed base on the various loading equipment matched to the truck fleet specification referenced in Table 16-10. The primary excavator productivity and truck payloads determinations are as reflected in Table 16-10 and Table 16-11. The resulting equipment profiles for the LoMp schedules are provided in Table 16-12 below which reflects the number of equipment required per operating period. For 2020 and 2021 these determinations are made on a monthly and quarterly basis respectively and as such the totals reflect the average number of equipment and not the maximum which for these two years are reflected in the accompanying footnotes.

Table 16-10: Mining Excavator Productivity Assumptions

Attribute	PC1250			PC3000			PC2000		
	Oxide	Transitional	Fresh	Oxide	Transitional	Fresh	Oxide	Transitional	Fresh
Permitted Overload (%)	100	100	100	100	100	100	100	100	100
Density (t/m^3)	1.80	2.10	2.90	1.80	2.10	2.90	1.80	2.10	2.90
Moisture content (%)	20	15	5	20	15	5	20	15	5
Bulking Factor	1.40	1.35	1.40	1.40	1.35	1.40	1.40	1.35	1.48

Table 16-11: Primary Mobile Mining Equipment Assumptions

Excavators Dump Truck	Units	PC1250 HD785			PC3000 HD785			PC2000 HD785		
		Oxide	Trans.	Fresh	Oxide	Trans.	Fresh	Oxide	Trans.	Fresh
Permitted Truck Load	(%)	100	100	100	100	100	100	100	100	100
Dry In-Situ Density	(t/m^3)	1.80	2.10	2.90	1.80	2.10	2.90	1.80	2.10	2.90
Avg. Moisture Content	(%)	20.0	15.0	5.0	20.0	15.0	5.0	20.0	15.0	5.0
Wet In-Situ Density	(t/m^3)	2.16	2.42	3.05	2.16	2.42	3.05	2.16	2.42	3.05
Bulking Factor		1.40	1.35	1.40	1.40	1.35	1.40	1.40	1.35	1.48
Truck Density	(t/m^3)	1.54	1.79	2.18	1.54	1.79	2.18	1.54	1.79	2.06
Rated Truck Load	(t)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Actual Truck Load	(t)	92.6	100.4	98.7	92.6	91.2	97.9	92.6	94.0	95.4
Heaped Truck Volume	(m^3)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Overload	%	-7.4	0.4	-1.3	-7.4	-8.8	-2.1	-7.4	-6.0	-4.6
Actual Truck Volume	(m^3)	60.0	56.1	45.4	60.0	51.0	45.0	60.0	52.5	46.4
BCM per Truck	(BCM)	42.9	41.6	32.4	42.9	37.8	32.1	42.9	38.9	31.3
Excavator Bucket Volume	(m^3)	6.7	5.5	5.5	15.0	12.0	12.0	12.0	10.3	10.3
Bucket Fill Factor	%	85.0	85.0	75.0	85.0	85.0	75.0	85.0	85.0	75.0
Actual Bucket Volume	(m^3)	5.7	4.7	4.1	12.8	10.2	9.0	10.2	8.8	7.7
Rated bucket Load	(t)	9.0	9.0	9.0	26.7	26.7	26.7	21.6	21.6	21.6
Actual bucket Load	(t)	8.8	8.4	9.0	19.7	18.2	19.6	15.7	15.7	15.9
Overload	(%)	-2.4	-7.1	-0.3	-26.3	-31.7	-26.7	-27.1	-27.5	-26.4
BCM per Bucket	Bcm	4.1	3.5	2.9	9.1	7.6	6.4	7.3	6.5	5.2
No. of Buckets per Truck	(No)	11	12	11	5	5	5	6	6	6
Slew Time	(Sec)	24	24	24	31.00	31.00	31.00	31.00	31.00	31.00
Load Time	(min)	4.40	4.80	4.40	2.58	2.58	2.58	3.10	3.10	3.10
Bucket Load	(t)	8.8	8.4	9.0	19.7	18.2	19.6	15.7	15.7	15.9
Production per 50 min hr	(BCM/h)	472	423	357	751	662	563	643	584	470
	(tdry/h)	850	889	1,036	1,351	1,389	1,633	1,157	1,226	1,362

Table 16-12: Houndé Gold Mine: primary earthmoving equipment numbers (based on annual averages for 2020 and 2021[1, 2]

Equipment	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028
Excavators										
Vindaloo Main	(No)	4	5	4	4	5	3	0	0	0
Vindaloo North	(No)	2	0	0	0	0	2	0	0	0
Vindaloo Central	(No)	2	1	0	0	0	0	0	0	1
Koho	(No)	-	1	1	-	-	-	-	-	-
Madras	(No)	-	-	-	-	-	-	-	1	-
Houndé	**(No)**	**5**	**6**	**5**	**4**	**5**	**5**	**-**	**1**	**1**
Bouéré	(No)	2	-	-	-	-	-	-	-	-
Dohoun	(No)	-	-	-	-	-	-	-	2	1
Kari Pump	(No)	4	4	4	3	3	2	2	2	0
Total	**(No)**	**7**	**8**	**8**	**7**	**7**	**5**	**2**	**3**	**2**
Trucks										
Vindaloo Main	(No)	13	21	22	21	25	7	-	-	-
Vindaloo North	(No)	5	-	-	-	-	3	-	-	-
Vindaloo Central	(No)	9	4	-	-	-	-	-	-	3
Koho	(No)	-	2	1	-	-	-	-	-	-
Madras	(No)	-	-	-	-	-	-	-	1	-
Houndé	**(No)**	**27**	**27**	**23**	**21**	**25**	**10**	**-**	**1**	**3**
Bouéré	(No)	7	-	-	-	-	-	-	-	-
Dohoun	(No)	-	-	-	-	-	-	-	6	2
Kari Pump	(No)	12	20	16	20	12	12	13	2	-
Total	**(No)**	**31**	**41**	**39**	**41**	**38**	**21**	**13**	**8**	**5**

(1) Note that the maximum number of excavators required in 2020 and 2021 is 7 and 8 respectively.

(2) Note that the maximum number of trucks required in 2020 and 2021 is 31 and 41 respectively. Truck numbers don't add up due to timing of pits.

LoMp Mining Operating Expenditures

The derivation of the LoMp mining operating expenditures relies on a number of assumptions which are essentially incorporated into the block model and then reported out as part of the MineSched production outputs. The principal assumptions comprise:

- Unit waste and ore mining costs for excavation, load and haul activities derived from individual equipment operating cost models and applied with allowances for RL elevations in the block models.
- Secondary ore haulage cost to address the additional haul distances relating to the Bouéré (US$2.40/t; 16km), Dohoun (US$3.36/t; 20.7km) and Kari Pump (US$1.68/t; 11.5km) open pits assuming a unit rate of USc15/tkm; and Grade control costs of US$0.96/t.

The following tables provide the basis of derivation for each of the ore and waste weathering material types operating expenditures for each sub-pit and the open pit groupings, specifically:

Table 16-13 provides a summary of the waste and ore mining inventories; Table 16-14 provides a summary of the waste mining operating expenditures; Table 16-15 provides the ore mining cost derivation for drill and blast, excavation and load an haul; Table 16-16 provides a summary of the total ore mining cost inclusive of secondary haulage and grade control costs; Table 16-17 provides a summary of the unit mining cost for ore and waste; and Table 16-18 provides the annual schedule of mining operating expenditures express per tonne and BCM mined.

Table 16-13: Houndé Gold Mine: mining production LoMp inventory

Pit	Waste				Ore				Total Mined			
	Oxide (kt)	Transition (kt)	Fresh (kt)	Total (kt)	Oxide (kt)	Transition (kt)	Fresh (kt)	Total (kt)	Oxide (kt)	Transition (kt)	Fresh (kt)	Total (kt)
Vindaloo Main	7,293	8,906	90,179	106,378	5	38	16,959	17,002	7,298	8,943	107,138	123,379
Vindaloo North	7,272	1,889	755	9,916	173	378	266	817	7,445	2,267	1,021	10,733
Vindaloo Central	4,284	3,092	6,678	14,054	487	404	2,447	3,338	4,771	3,496	9,126	17,392
Koho	2,469	806	844	4,119	262	103	445	810	2,731	909	1,289	4,929
Madras	1,873	-	-	1,873	425	-	-	425	2,298	-	-	2,298
Houndé	**23,191**	**14,693**	**98,457**	**136,341**	**1,352**	**923**	**20,117**	**22,391**	**24,543**	**15,616**	**118,574**	**158,732**
Bouéré	4,850	1,719	6,945	13,514	216	151	794	1,160	5,065	1,870	7,738	14,674
Dohoun	88,795	12,335	17,391	118,521	3,271	1,240	2,797	7,308	92,066	13,575	20,187	125,828
Kari Pump	22	154	9,621	9,796	2	3	809	814	24	157	10,430	10,610
Total	**116,859**	**28,900**	**132,413**	**278,172**	**4,840**	**2,317**	**24,516**	**31,673**	**121,699**	**31,217**	**156,929**	**309,845**

Table 16-14: Houndé Gold Mine: waste mining cost summary

Open Pit	Mining (Waste)				Sustaining capex	Mining waste opex			
	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)	(US$/t)	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)
Vindaloo Main	1.62	2.33	2.64	2.54	0.28	1.34	2.05	2.36	2.27
Vindaloo North	1.38	2.15	2.43	1.61	0.28	1.10	1.88	2.16	1.33
Vindaloo Central	1.40	2.17	2.41	2.05	0.28	1.12	1.90	2.14	1.78
Koho	1.36	2.09	2.28	1.69	0.28	1.08	1.81	2.01	1.41
Madras	1.26	1.26	1.26	1.26	0.28	0.98	0.98	0.98	0.98
Houndé	**1.45**	**2.26**	**2.62**	**2.38**	**0.28**	**1.17**	**1.98**	**2.34**	**2.10**
Bouéré	1.36	2.12	2.50	2.49	0.28	1.08	1.84	2.23	2.22
Dohoun	1.36	2.12	2.36	1.97	0.28	1.08	1.84	2.08	1.69
Kari Pump	1.42	2.19	2.41	1.64	0.28	1.14	1.92	2.14	1.37
Total	**1.42**	**2.22**	**2.57**	**2.05**	**0.28**	**1.14**	**1.95**	**2.29**	**1.77**

Table 16-15: Houndé Gold Mine: ore mining cost summary

Open Pit	Ore/Waste (Differential)				Ore			
	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)
Vindaloo Main	(0.14)	(0.07)	0.03	0.03	1.20	1.98	2.39	2.39
Vindaloo North	0.01	0.05	0.08	0.05	1.11	1.92	2.23	1.85
Vindaloo Central	0.04	0.10	0.11	0.10	1.16	1.99	2.25	2.06
Koho	0.07	0.10	0.10	0.09	1.15	1.91	2.11	1.77
Madras	0.27	0.27	0.27	0.27	1.25	1.25	1.25	1.25
Houndé	**0.11**	**0.07**	**0.04**	**0.05**	**1.18**	**1.95**	**2.37**	**2.28**
Bouéré	(0.08)	(0.06)	(0.08)	(0.08)	1.00	1.79	2.15	2.15
Dohoun	(0.08)	(0.06)	(0.06)	(0.06)	1.00	1.79	2.02	1.80
Kari Pump	0.03	0.06	0.10	0.06	1.17	1.98	2.24	1.72
Total	**0.05**	**0.06**	**0.04**	**0.04**	**1.16**	**1.96**	**2.33**	**0.57**

Table 16-16: Houndé Gold Mine: ore mining cost including secondary ore over haulage and grade control costs summary

Open Pit	Ore				Secondary	Grade	Ore			
	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)	Ore Haulage (US$/t)	Control (US$/t)	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)
Vindaloo Main	1.20	1.98	2.39	2.39	-	0.96	2.16	2.94	3.35	3.35
Vindaloo North	1.11	1.92	2.23	1.85	-	0.96	2.07	2.88	3.19	2.81
Vindaloo Central	1.16	1.99	2.25	2.06	-	0.96	2.12	2.95	3.21	3.02
Koho	1.15	1.91	2.11	1.77	-	0.96	2.11	2.87	3.07	2.73
Madras	1.25	1.25	1.25	1.25	-	0.96	2.21	2.21	2.21	2.21
Houndé	**1.18**	**1.95**	**2.37**	**2.28**	**-**	**0.96**	**2.14**	**2.91**	**3.33**	**3.24**
Bouéré	1.00	1.79	2.15	2.15	2.40	0.96	4.36	5.15	5.51	5.51
Dohoun	1.00	1.79	2.02	1.80	3.36	0.96	5.32	6.11	6.34	6.12
Kari Pump	1.17	1.98	2.24	1.72	1.68	0.96	3.81	4.62	4.88	4.36
Total	**1.16**	**1.96**	**2.33**	**0.57**	**0.57**	**0.96**	**3.41**	**4.04**	**3.67**	**3.66**

Table 16-17: Houndé Gold Mine: waste and ore mining cost summary

Pit	Waste				Ore				Total Mined			
	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)	Oxide (US$/t)	Transition (US$/t)	Fresh (US$/t)	Total (US$/t)
Vindaloo Main	1.34	2.05	2.36	2.27	2.16	2.94	3.35	3.35	1.34	2.06	2.52	2.42
Vindaloo North	1.10	1.88	2.16	1.33	2.07	2.88	3.19	2.81	1.12	2.04	2.42	1.44
Vindaloo Central	1.12	1.90	2.14	1.78	2.12	2.95	3.21	3.02	1.22	2.02	2.43	2.01
Koho	1.08	1.81	2.01	1.41	2.11	2.87	3.07	2.73	1.18	1.93	2.37	1.63
Madras	0.98	-	-	0.98	2.21	-	-	2.21	1.21	-	-	1.21
Houndé	**1.17**	**1.98**	**2.34**	**2.10**	**2.14**	**2.91**	**3.33**	**3.24**	**1.22**	**2.04**	**2.51**	**2.26**
Bouéré	1.08	1.84	2.23	2.22	4.36	5.15	5.51	5.51	1.31	1.91	2.48	2.47
Dohoun	1.08	1.84	2.08	1.69	5.32	6.11	6.34	6.12	1.26	2.19	2.52	2.04
Kari Pump	1.14	1.92	2.14	1.37	3.81	4.62	4.88	4.36	1.24	2.16	2.52	1.54
Total	**1.14**	**1.95**	**2.29**	**1.77**	**3.41**	**4.04**	**3.67**	**3.66**	**1.23**	**2.10**	**2.51**	**1.97**

Table 16-18: Houndé Gold Mine: mining operating expenditure

Statistics	Units	Total
Production		
Volume		
Houndé	(kBCM)	63,184
Bouéré	(kBCM)	3,888
Dohoun	(kBCM)	6,405
Kari Pump	(kBCM)	63,389
Total	**(kBCM)**	**136,865**
Tonnage		
Houndé	(kt)	158,732
Bouéré	(kt)	10,610
Dohoun	(kt)	14,674
Kari Pump	(kt)	125,828
Total	**(kt)**	**309,845**
Operating Expenditure		
Houndé	(US$k)	361,215
Bouéré	(US$k)	25,948
Dohoun	(US$k)	30,134
Kari Pump	(US$k)	194,386
Total	**(US$k)**	**611,682**
Unit Expenditure		
Houndé	(US$/BCM)	5.72
Bouéré	(US$/BCM)	6.67
Dohoun	(US$/BCM)	4.71
Kari Pump	(US$/BCM)	3.07
Total	**(US$/BCM)**	**4.47**
Houndé	(US$/$t_{mined}$)	2.28
Bouéré	(US$/$t_{mined}$)	2.45
Dohoun	(US$/$t_{mined}$)	2.05
Kari Pump	(US$/$t_{mined}$)	1.54
Total	**(US$/$t_{mined}$)**	**1.97**

Table 16-19 provides a summary of the overall outcomes of the mining LoMp production and operating expenditures which indicates an average LoMp unit mining cost of US$1.97/$t_{mined}$ (US$4.47/BCM).

Table 16-19: Houndé Gold Mine: mining LoMp summary

Statistic	Units	Total
Production		
Total Mined	('000m^3)	136,865
	(t/m^3)	2.26
	(kt)	309,845
Mined	(ktpm)	2,575
Stripping Ratio	(t_{waste}:t_{ore})	8.78
Waste	(kt)	278,172
Ore Tonnage	(kt)	31,673
Ore Grade	(g/tAu)	2.09
Content	(kozAu)	2,127
Operating Expenditure		
	(US$k)	611.7
	(US$/t)	1.97
	(US$/BCM)	4.47

Capital Expenditure

The estimation of capital expenditure associated with mining related activities are included in Section 21.2 of this Technical Report. The scope of the capital estimate for the mobile mining fleet includes major components and undercarriage costs; asset replacements costs; disposal/scrap costs; and purchase/acquisition costs for all major Heavy Mining Equipment ("**HME**") and ancillary support equipment. The total capital expenditure for HME and related aspects is US$131.1m comprising: major components (US$81.52m); undercarriage (US$8.7m); light vehicles (US$1.3m); asset replacement (US$31.0m); and additional mining fleet costs (US$16.3m). Excluded from these expenditures are the outstanding lease re-payments of US$39.4m relating to the initial mobile mining fleet acquisition costs.

16.6 Risks and Opportunities

The mining methods, operational practices and equipment employed at the Houndé Gold Mine are well established with a reasonable degree of operational historical support. This aside there are several risks and opportunities identified to date:

- **Hydrogeological Modelling and Dewatering:** historical hydrogeological modelling has until recently been largely limited to the investigations completed as part of the 2013 FS. The engineering pit designs as reported herein assume open-pit slopes with low pore water pressure and as such effectively drained to attain the appropriate factors of safety. Since completion of the earlier 2013 FS additional deposits have been included in the current pit designs and operational experience has highlighted localised issues requiring installation of additional active dewatering systems. Accordingly, and despite the recent proactive measures enacted, there remains a risk that further/enhanced measures are required pending updating of hydrogeological models to incorporate the operating experience performance noted to date;
- **LoMp Production Scheduling:** the current LoMp production schedules incorporate various constraints relating to push-back and pit progression. The current process has in certain instances resulted in relatively high sink rates which exceed 80m per annum, specifically in the smaller pits or at the end of operating lives. Accordingly, further work is required to re-assess the schedules in accordance with revised criteria (vertical and horizontal lags) to ascertain any impact and the extent to which adjustments to the current schedules are required; and
- **Stockpile Strategy:** the current LoMp production scheduling is focused on mining in accordance with the four grade bins and the order of processing for these. The stockpiling logic monitors the closing balances of the stockpiled material per grade bin for each open pit grouping. Furthermore, the operating expenditures for the Houndé Process Plant assumes that all ore mined is re-handled and as such no direct feed is assumed. The current process plant capacity assumes a limited proportion of fresh ore and at present, this constraint is not explicitly incorporated into the production scheduling process. As such there remains a risk, if the application of these constraints and a change in stockpiling strategy to focus on both grade bins and ore types may result in a change profile from that presently reported in the current LoMp. This aside inclusion of a more sophisticated scheduling process may also indicate a possibility for direct feed, thereby reducing the quantum of re-handling currently practiced at Houndé Gold Mine.

The principal opportunities relating to mining methods and operations at the Houndé Gold Mine are:

- Inferred Mineral Resources: The current open-pit designs capture a portion of the Inferred

Mineral Resources which are presently classified as waste in the current LoMp production schedules. The Inferred Mineral Resources classified as waste total 482kt grading 1.69g/tAu: Vindaloo Main Pit (81kt grading 1.22g/tAu); Vindaloo Central Pit (15kt grading 1.59g/tAu); Koho Pit (79kt grading 0.80g/tAu); Madras Pit (20kt grading 0.62g/tAu); Bouéré Pit (106kt grading 2.82g/tAu); Dohoun Pit (51kt grading 1.72g/tAu); and Kari Pump (131kt grading 1.76g/tAu);

- **Smaller Pit Engineering Designs:** The current open pit designs incorporate a range of ramp widths which include 22m for double lane and 16m for single lane. In certain instances, these are adjusted to 13m as pits advance to the final depth limits. This aside there remains an opportunity for the smaller, shorter life open pits to consider utilising articulated dump trucks ("**ADTs**") thereby resulting in lower overall ramp widths, ramp gradients and potentially stripping ratios for the lowest benches of the pits
- **Equipment Scheduling:** the current LoMp equipment scheduling is developed on a monthly basis for 2020, quarterly for 2021 and annually thereafter. In certain instances, the monthly schedules reflect 'spiked' increases in equipment requirements for short periods and as such there is an opportunity to smooth these in parallel to consideration to development of a detailed stand-alone mine cost model (see below);
- **Mining Operating Expenditure:** the derivation of the mining operating expenditures is based on a detailed inventory analysis with resulting excavation, load and haul costs incorporated into the underlying block models based on established relationships which vary with RL. The MineSched process utilises these values to report out the overall mining cost per period on a pit by pit basis which is then incorporated into the economic analysis for the Houndé Gold Mine. This process would benefit from further review and optimisation through development of a stand-alone mine cost model which could then be integrated with the outputs from the physical production schedules to drive equipment requirements and operating expenditures on an activity and element basis. Whilst there is limited risk that such a process would result in increased operating expenditures, the benefits include a more dynamic and efficient approach to mine cost modelling which facilitates more rapid integration with other LoMp processes.

16.7 Interpretation, Conclusions and Recommendations

In summary the mining method and operating assumptions as incorporated into the mining LoMp at Houndé Gold Mine are well established following commissioning and commencement of operations in 2017. The current LoMp is focused on the Houndé open pits and the Kari Pump open pit, with these providing most of the ore production sourced from the Mineral Reserves reported at 31 December 2019. The mobile mining equipment fleet is relatively new and operational performance to date is broadly aligned with expectations. This aside the projections for 2020 and 2021 note a significant increase in total material mined reaching a peak of 55.6Mt in 2022 which is supported by establishment of mining operations at the Kari Pump open pit. The current LoMp is also dependent on production from several satellites open pits which have short operating lives and contribute significantly less than the three main mining operations at Vindaloo Main Pit, Vindaloo Central Pit and Kari Pump.

The current scheduling process supporting the 2019 Mineral Reserves, except for Kari Pump, relies on partial modification of historical pit designs, the majority of which were based on pit optimisation studies completed in 2015. Accordingly, whilst the mining inventories and production schedules are derived from the current block model, no updated optimisation studies have been completed using the latest block models and the updated parameters as incorporated into the LoMp process utilised to support the Mineral Reserves as reported herein.

This aside, it is worth noting the gold price assumptions as incorporated for 2015 is similar (US$1,300/oz) to that assumed for the 2019 Mineral Reserves US$1,300/oz.

Furthermore as the open pit mining operations mature, increase in operating depth and extend to the as yet unmined deposits the focus on geotechnical and hydrogeological aspects will naturally increase and in certain areas additional technical studies are planned to advance these beyond that originally considered in the 2013 FS and to calibrate these with operational experience to date.

Based on the above the key recommendations relating to mining methods and practices at the Houndé Gold Mine are:

- Develop a detailed mobile mining equipment and mine cost model which is integrated with the output of the mine production schedules;
- Reassess the current mining and processing constraints as incorporated into the mine scheduling, specifically with respect to those factors which impact sink rates for the smaller open pits and as the larger pits approach the final pit limits, process plant capacity for given weathered ore type contributions (notably fresh ore);
- Update the mining production schedules following completion of updated optimisation analysis;
- Consider the possibility for introduction of ADTs for some of the smaller open pits which may intron enable reduced stripping ratios due to narrower ramp access and steeper gradients; and
- Reassess the current stockpiling strategy, specifically with regards expanding the current approach of focusing on grade bins to also include weathering ore types for each of the mined deposits.

17 RECOVERY METHODS

17.1 Introduction

The following section includes discussion and comment on the metallurgical processing aspects in operation at the Houndé Gold Mine with specific focus on the following items: process selection; process and plant description; electrical supply; control system; electrical supply; control system; metallurgical accounting; historical performance; metallurgical LoMp and associated assumptions; risks and opportunities; interpretation, conclusions and recommendations.

17.2 Houndé Process Plant

The "**Houndé Process Plant**" consists of a Carbon-in-Leach ("**CIL**") plant with a nameplate capacity of 3.0Mt per annum (now operating at 4.0Mtpa) with Semi-Autogenous Ball Mill Crusher ("**SABC**") milling circuit to produce an 80% passing 90-micron grind size. Ground fresh ore is fed to continuous centrifugal gravity concentrators to recover free and occluded gold in heavy particles (pyrite) to a low mass gravity concentrate. This gravity concentrate is processed through an intensive cyanide leach reactor followed by electrowinning to recover the gold. The CIL feed has the potential to be thickened and fed into a standard CIL circuit, with leach tails passing into a cyanide destruction process before being pumped to the Tailings Storage Facility ("**TSF**").

- **Crushing:** The run of mine ore is delivered to a jaw crusher which reduces the ore to less than 200mm. The crushed ore is then transferred to a surge bin with a 30-minute capacity, or, when needed, to an emergency stockpile. During normal operation, the crushed ore from the surge bin is transported to the grinding circuit via a conveyor. In case of a breakdown or maintenance of the crushing circuit, crushed ore is recovered from the emergency stockpile by a loader and directed to the surge bin.
- **Grinding:** The primary grinding circuit consists of a standard Semi-Autogenous Grinding ("**SAG**")/Ball and Scats Crushing circuit which was originally designed treat 3.0Mtpa (now operating at 4.0Mtpa) to produce a product where 80% is sub 90µm in size. A portion of freshly ground ore is directed to the gravity circuit where coarse liberated gold in recovered and leached via an intensive leach reactor, followed by electrowinning and eventual gold recovery;
- **Leaching:** Ore that is not recovered via the gravity circuit is screened to remove any extraneous trash (wood, plastic, etc.) then can either be sent to a thickener to increase the percentage solids in the leach slurry, or pumped directly to a conventional carbon in leach circuit ("**CIL**"). The CIL circuit consists of a series of six agitated tanks where gold is dissolved in the presence of cyanide and oxygen as the slurry flows sequentially from Tank 1 to 6. The dissolved gold adsorbs on the coarse activated carbon particles which are pumped in a counter-current direction from Tank 6 to 1, becoming progressively more loaded with gold in the process;
- **Carbon Recovery:** Once sufficiently loaded by the time the carbon reaches Tank 1, the carbon granules are pumped from the primary tank over a screen to remove the slurry. The clean carbon is then washed with hydrochloric acid to remove any acid soluble base metals and impurities, before being transferred to the elution circuit;
- **Elution and Gold Production:** Concentrated cyanide solution is circulated in the elution column and heated to 120 degrees Celsius. After sufficient time to enable the gold to be released from the carbon, the gold bearing solution is sent for electrowinning and eventual gold bullion production; and

- **Tailing Detoxification and Disposal:** The leached slurry, with minimal leachable gold remaining exits the CIL where the free and weak acid dissociable cyanide ("**WAD**") are destroyed through a cyanide detoxification process using sulphur dioxide and oxygen with a copper catalyst to destroy the remaining cyanide complexes. The detoxified tailings are pumped to a plastic lined TSF, where the solid and liquid phases separate. The liquid phase is recycled back to the process plant and the solids allowed to dry and compact in the TSF.

17.2.1 Process Selection - Design Philosophy

The plant design for the Houndé Gold Mine was based on the process testwork, flowsheet selection and established engineering practices targeting optimal recovery and operating expenditures. The key criteria for the initial equipment selection was the suitability for duty and the projected mine life of the operation without unnecessarily compromising reliability and ease of maintenance. The plant layout provides ease of access to all equipment for operating and maintenance requirements while maintaining a compact footprint which aided in minimising the initial construction costs.

The Processing Plant processes a range of ore types (oxide, transition and fresh) with variable ore characteristics, gold grades and metallurgical treatment requirements and the primary ores are significantly more competent than the oxide ores. The plant design assumptions included the following key throughput criteria:

- 3Mtpa throughput with an ore blend comprising 88% fresh ore and 12% oxide/transitional;
- process plant mechanical availability of 80.0% for the crusher section and 91.3% for the remaining sections supported by crushed ore storage and stand-by equipment in critical areas; and
- sufficient automated plant control to minimise the need for continuous operator intervention and allow manual override and control if and when required.

Subsequent amendments to key operating components and operating practices facilitated an increase to 4.05Mtpa throughput and is currently operating at approximately 500tph with availability and utilisation of 96.2% and 98.0% respectively.

17.2.2 Process Flowsheet

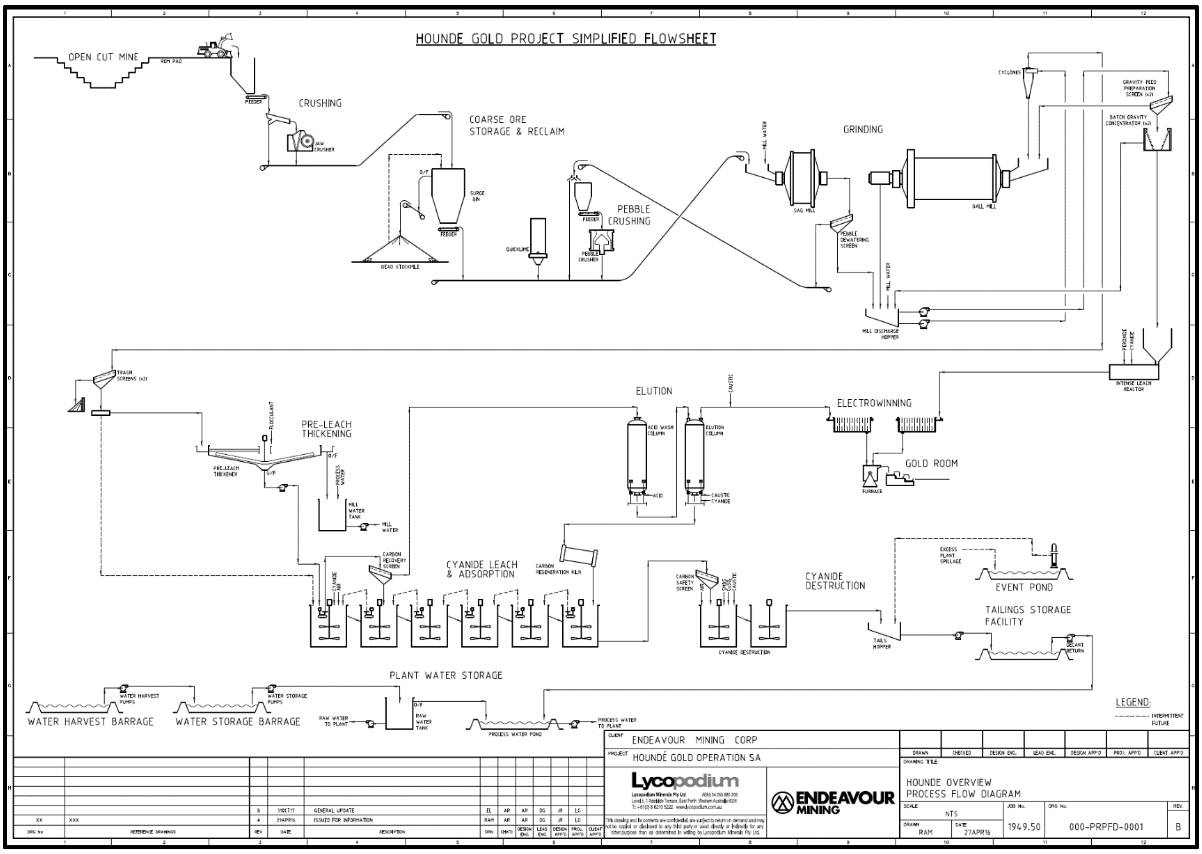
The Houndé Process Plant flowsheet design incorporates the following unit process operations:

- single stage primary crushing to produce a product size of 80% (P80) passing 160mm;
- transfer conveyor feeding a surge bin (30 minutes live capacity) and is reclaimed via an apron feeder. The overflow from the bin feeds to a coarse ore stockpile, ore from which is reclaimed via Front End Loader ("**FEL**") as required.
- two stage Semi-Autogenous Grinding ("**SAG**")/ Ball milling in closed circuit with hydrocyclones to produce a P80 grind size of 90µm and including re-crushing and return to the SAG Mill of pebbles;
- gravity concentration and removal of coarse gold from the milling circuit recirculating load and treatment of gravity concentrate by intensive cyanidation and electrowinning to recover gold to doré;
- pre-leach thickener to increase the slurry density to the carbon in leach ("**CIL**") circuit to minimise CIL tankage, improve slurry mixing characteristics and reduce overall reagent consumption. Note that the pre-leach thickener was not commissioned due to the poor operation on high oxide blend during plant start up. A Subsequent attempt in January 2018 was halted due to volumetric constraints at the higher than design throughput;

- a CIL circuit incorporating six CIL tanks containing carbon for gold and silver adsorption;
- 10 tonne capacity split Anglo ("**AARL**") elution circuit, electrowinning and gold smelting to recover gold from the loaded carbon to produce doré;
- tailings treatment incorporating cyanide destruction using sodium metabisulfite/air; and
- tailings pumping to the TSF.

A simplified flow diagram depicting the unit operations incorporated in the selected process flowsheet is shown in Figure 17-1.

Figure 17-1: Houndé Processing Plant Flowsheet (source: Endeavour)



17.3 Process and Plant Description

The following section provides a description of the HPP, reagents and services area. A summary of the major equipment sizes is provided in Table 17-1.

Table 17-1: Summary of Major Equipment

Item	Units	Value
ROM Bin	(t)	250
Primary Crusher (w x l)	(mm)	1,400 x 1,070
Coarse Ore Stockpile	(t)	15,000
SAG Mill (dia x EGL)	(m)	8.50 x 4.35
Ball mill (dia x EGL)	(m)	6.10 x 9.05
Pebble Crusher Capacity	(tph)	100
Gravity Concentrator Capacity	(tph)	400
Intensive Cyanidation Reactor Capacity	(t/d)	5
Hydrocyclones - (No. x dia)	(mm)	15 x 380
Pre-Leach Thickener diameter	(m)	26
CIL Tanks - (No. x dia)	(m)	6 x 2,900
Intertank Screens - (No. x dia)	(m)	6 x 2.4
Cyanide Destruction Tanks - (No. x dia)	(m)	2 x 550
Elution Circuit Type		Split AARL
Elution Circuit Capacity	(t)	6.5
Elution Heater Capacity	(kW)	5,000
Pregnant Solution Capacity	(m^3)	210
Electrowinning cells (No. x size)		3 x 1m sq x 22 cathode
Smelting Furnace Capacity	(l)	67
Cyanide Storage	(m^3)	190
Lime Storage	(t)	275
Raw Water Storage	(m^3)	2,200

Item	Units	Value
Process Water Storage	(m^3)	1,200
Potable Water Plant Capacity	(m^3/h)	13

Run-of-Mine ("RoM") Pad

Haul trucks operating directly from the pit deliver run-of-mine ("**RoM**") ore to the RoM pad where it is dumped in blending 'finger' stockpiles arranged by ore grade and lithology. A front-end loader ("**FEL**") is used to reclaim and tram ore from the various stockpiles to the RoM bin. Ore is blended under the guidance of mine geologists and process personnel to maintain a relatively constant feed grade and ore hardness to the process plant.

Crushing Circuit

RoM ore is generally loaded into the crushing circuit feed bin (RoM bin) by FEL from the RoM pad stockpiles. The system is flexible enough for direct tipping of the mined material if required. A grizzly is fitted to the RoM bin to protect the downstream equipment from oversize material. A mobile rock breaker is utilised to break oversize rocks.

RoM ore is drawn from the RoM bin at a controlled rate by an apron feeder which discharges over a vibrating grizzly. The vibrating grizzly oversize reports to the jaw crusher. The vibrating grizzly undersize and jaw crusher discharge gravitates to the primary crushing product conveyor. The primary crushing product conveyor discharges onto a transfer conveyor which runs up to surge bin, the overflow rills on to a coarse ore stockpile feed conveyor. A weightometer on the surge bin feed conveyor measures the crusher product.

Coarse spillage in the crusher area is cleaned up by FEL and transported to the RoM pad for drying or fed directly to the primary crusher. Water sprays are installed for dust suppression as required. A 10t hoist is provided over the jaw crusher to facilitate regular maintenance.

The crushing circuit is controlled locally and the FEL driver ensures feed is maintained to the crushing circuit and communicates with the crushing operator using a two-way radio to supply information on crusher feed operation. The speed of the primary feeder is controlled to a target set-point and measured using the crushing weightometer.

Ore Storage and Reclaim

The surge bin feed conveyor discharges onto a 180t live capacity surge bin and this provides a nominal 30 minutes feed to the milling circuit to allow for regular short duration operational maintenance on the crusher. Water sprays are installed to facilitate dust suppression as required. The crusher output is set to outpace the mill feed setpoint this additional material overflows the surge bin and transferred to a coarse ore stockpile with more than 15kt capacity.

Primary ore is reclaimed from the surge bin via a single variable speed apron feeder. In addition, ore can be reclaimed via FEL from the coarse ore stockpile in the event of an extended crusher shutdown. Each of the feeding options is rated to reclaim at the full mill feed rate but may be run together to ensure a regular feed to the SAG mill. The surge bin is fitted with air blasters to reduce hang ups.

Quicklime, used for pH control in the leach circuit, is added directly onto the mill feed conveyor. The Quicklime is stored in a silo and is metered onto the belt using a variable speed feeder, the speed of which is varied according to the mill feed tonnage. The silo is loaded pneumatically from bulk lime trucks and is fitted with a dust collector. An emergency back-up system using lime in bulk bags provides an alternative if bulk lime deliveries are delayed.

A conveyor weightometer is installed on the SAG mill feed conveyor to provide accurate total instantaneous and accumulated mass flow feed into the plant. SAG mill grinding media is loaded by FEL directly into the surge bin. The reclaim circuit is controlled from the main control room and area shift operators monitor the overall circuit.

Grinding and Classification Circuit

The grinding circuit consists of an SABC circuit with classification hydrocyclones comprising:

- **SAG Mill:** A 8.50m diameter x 4.35m EGL SAG mill complete with a 6,000kW variable speed drive operates at up to a maximum 18% volumetric ball loading. Variable speed control of the mill, accomplished through a Slip Energy Recovery ("**SER**") system, provides flexibility for processing of the various ore types. A speed range of 60% to 80% critical speed is available.

  SAG mill grinding media, typically 100mm to 125mm diameter balls, is stored in drums or bags in the plant. SAG mill grinding media is fed into the surge bin using a FEL and transferred to the SAG mill feed conveyor. The SAG mill liners and grates are handled by a mill liner handling machine capable of managing the new liners;

- **Pebble Crushing:** The SAG mill product discharges to a vibrating single deck heavy duty pebble dewatering screen fitted with a nominal 15mm aperture polyurethane screen deck. Undersize from the screen feeds the mill discharge hopper. The oversize pebbles (nominally +15mm) are transferred via a transfer conveyor to a pebble crusher feed bin ahead of a single 250kW pebble crusher.

  A single stage of tramp metal removal via a self-cleaning belt magnet across the pebble transfer conveyor is used to remove mill balls and any other magnetic steel debris discharged from the SAG mill. Tramp metal ejected is deposited in a bunker area with concrete walls on three sides which provides access for metal removal and protection to personnel in the area. Metal detection provides a final level of protection against metal entering the pebble crusher. Upon detection of metal, the flop gate at the head of the transfer conveyor is activated and the ore stream bypasses the pebble crusher surge bin for a predetermined period and is deposited directly onto the SAG mill feed conveyor.

  The pebble crusher surge bin holds approximately 25 minutes capacity to improve steady state operation of the pebble crusher. The nominal design allows for use of a single pebble crusher to meet the expected pebble load as the competence of the ore is moderate.

  A variable speed pebble crusher vibrating feeder transfers the pebbles at a controlled rate from the pebble crusher surge bin into the pebble crusher. Pebbles are crushed from a nominal top size of 75mm to a P80 of approximately 12mm. The pebble crusher operates at a closed side setting of 11mm, depending on the competency of the ore, moisture content and crusher power draw. Product from the pebble crusher is transferred to the SAG mill feed conveyor and an overhead hoist is provided to facilitate crusher maintenance; and

- **Ball Mill:** A 6.10m diameter x 9.05m effective grinding length ("**EGL**") overflow ball mill complete with a 6,000kW fixed speed motor operates at up to 35% volumetric ball loading. Product size from the grinding circuit is 80% passing 90µm on 100% primary ore. The ball mill is fixed, operating at 75% of critical speed. Ball mill grinding media is 50mm diameter balls and is stored in drums or bags within the plant. Ball mill grinding media is transferred to a kibble and loaded into the ball mill via a dedicated ball charging chute which directs the balls to the ball mill feed box from where the grinding media enters the ball mill.

Classification and Trash Screening

The discharge from the SAG and ball mills is combined in a common mill discharge hopper and diluted with process water prior to classification. The combined mill discharge slurry is pumped using duty / stand-by pumps, to the classifying cyclones. The cyclone cluster comprises 15 x

380mm diameter hydrocyclones operating at 100kPa. The number of operating cyclones depends on the ore type and throughput being treated.

Cyclone overflow, at 35% w/w solids, flows by gravity to the trash screen and the trash screen oversize gravitates to a trash collection bin. The trash screen has been located to allow the underflow to gravitate to the 25m diameter pre-leach thickener feed box or to bypass the thickener and feed the CIL circuit directly.

Gravity

Feed for the gravity circuit is taken from the common mill discharge using a duty/standby pump arrangement. The gravity circuit feed stream is pumped to one of two single deck 'vibrating 'degritting' screen to remove coarse (+2mm) material and fragments of broken mill balls and this oversize is returned to the ball mill feed. The screen undersize stream gravitates to one of two (duty/standby) 48" Knelson centrifugal concentrators and the tails slurry from the centrifugal concentrator gravitates to the mill discharge hopper. The concentrator is operated on a semi-batch basis with periodic discharge of the coarse high SG material (gravity concentrate) to the concentrate storage hopper as part of the intensive leach reactor.

The intensive leach reactor ("**ILR**") processes the concentrate once per day in a rotating drum leach vessel. Cyanide and caustic together with oxygen are introduced into the slurry and the drum is rotated for up to 20 hours to leach out gold and silver. At the end of this time the pregnant liquor is separated from the solids and pumped to the dedicated pregnant liquor tank. Reactor tails is pumped back to the mill discharge hopper for additional milling to recover any remaining entrained gold and silver.

A dedicated pregnant liquor pump feeds the gravity electrowinning cell in the goldroom with gold and silver recovered onto stainless steel cathodes and barren liquor returned to the pregnant liquor tank. The cathodes from the gravity electrowinning cell are treated separately to assist in metallurgical accounting and spent electrolyte is recycled to the head of the CIL circuit.

Mill Area

A davit crane is provided over the cyclones for maintenance. A seven-axis liner handler is installed for mill liner change outs. The mill basement floor slab is sloped towards either the large drive in collection sump at the discharge end of the mills where submersible pumps return spillage to the mill discharge hopper or to a small drive-in basement sump below the feed end of the mills and a sump pump has been installed in this area. Scats from the ball mill are collected in a scats bunker to facilitate bulk scats removal via a small FEL for disposal. The scats bunker drains into the mill area drive in collection sump.

Trash Screening and Pre-leach Thickening

Trash screen underflow from the grinding circuit is pumped to the CIL circuit and at this stage the thickener is not utilised.

Leach and Carbon Adsorption Circuit

Slurry from the trash screen underflow hopper by-passes the thickener and into the CIL Circuit. The circuit consists of six tanks interconnected with launders and slurry flow is assisted by use of pumped inter-tank screens through the tank train. Each tank is fitted with a dual impeller mechanical agitator to ensure uniform mixing and a mechanically swept woven wire inter-tank screen to retain the carbon. All tanks are fitted with bypass facilities to allow any tank to be removed from service for agitator or screen maintenance.

Quicklime is added directly to the mill feed conveyor to ensure that the slurry pH is suitable for cyanidation. Sodium cyanide solution is metered into the CIL feed box and if needed tank 3, from a ring main system. Low pressure compressed air is sparged down the agitator shafts to provide the oxygen required for the cyanidation reaction.

Fresh/regenerated carbon is returned to the circuit at CIL Tank 6 and is advanced counter current to the slurry flow by pumping slurry with a recessed impeller slurry pump and carbon from CIL Tank 6 to CIL Tank 5 and so on. The single inter-tank screen in CIL Tank 5 retains the carbon whilst allowing the slurry to flow by gravity back to Tank 6. This counter-current process is repeated until the carbon eventually reaches CIL Tank 1. A recessed impeller pump is used to transfer slurry to the loaded carbon recovery screen mounted above the acid wash column in the elution circuit. The carbon is washed and dewatered on the recovery screen prior to reporting to the acid wash column. The associated slurry and wash water is returned to CIL Tank 1.

Slurry from the last CIL tank (CIL tailings) gravitates to the carbon safety screen to recover any carbon leaking from worn screens or overflowing tanks. The screen underflow gravitates to the detoxification circuit and the screen oversize (recovered carbon) is collected in the fine carbon bin for return to the circuit. Barren carbon returning to the adsorption circuit from the carbon regeneration kiln is screened on the carbon sizing screen to remove fine carbon and quench water and the sized and regenerated carbon reports directly to CIL Tank 6

Stripping Plant and Gold Room Operations

The following operations is carried out in the stripping and gold room areas: aid washing of carbon; stripping of gold from loaded carbon using the split Anglo-American Research Laboratories (“**AARL**”) method; electrowinning of gold from pregnant solution; and smelting of electrowinning products. The split AARL stripping circuit is automated and contains a separate acid wash and an elution column. The total daily carbon movement around the elution circuit is approximately 10t, with a solution flow rate in the elution circuit of 2BV/h (42m^3/h).

- **Acid Wash:** Loaded carbon is received into the 10t capacity acid wash column. During acid washing, a dilute solution of hydrochloric acid is pumped into the bottom of the column to remove contaminants, predominantly carbonates, from the carbon. After the soak period of 30 minutes has elapsed, the loaded carbon is rinsed with water. Dilute acid and rinse water are pumped to the tailings hopper for disposal. Washed carbon from the acid wash column is pressure transferred from the acid wash column to the elution column and the water is drained out;
- **Pre-soak and Elution:** The split AARL elution process is used to recover gold adsorbed onto carbon recovered from the CIL circuit. Initially lean eluate from the lean eluate tank is heated to approximately 95°C and pumped into the base of the elution column using the strip solution pump. Sodium hydroxide (“**NaOH**”) and sodium cyanide (“**NaCN**”) is pumped from the respective storage tanks and injected into the suction line of the strip solution pump. The loaded carbon is pre-soaked in the cyanide / caustic solution for 30 minutes to elute gold.

  The pregnant eluate is then rinsed from the carbon by up to ten bed volumes of solution heated to approximately 135°C. The first five bed volumes of the elution are drawn from the lean eluate tank and directed to the pregnant solution tank for recovery of gold by electrowinning. The last five bed volumes of the elution are drawn from the treated water tank and is directed to the lean eluate tank for re-use during the next elution cycle.

  Strip solution is heated indirectly by diesel fired oil heaters and a heat input heat exchanger. Heat recovered from solution exiting the elution column is used to pre-heat solution prior to the heat input circuit. Solution samplers are provided to collect pregnant and stripped eluant for assay;

- **Electrowinning and Gold Room:** Once the elution cycle is complete, recovery of gold and silver by electrowinning proceeds. Direct current is passed through stainless steel anodes and stainless-steel mesh cathodes within the electrowinning cells. Electrolytic action causes the gold and silver in solution to plate out on the cathodes and three electrowinning cells arranged in parallel are in operation with electrowinning taking approximately 8 to 12 hours. An overhead crane (2t capacity) is provided to assist with handling of cathodes and anodes. The cathodes are washed with high pressure spray water and the gold sludge is recovered in a vacuum pan filter. The gold sludge filter cake is dried in an oven and direct smelted with fluxes in an electric induction furnace to produce doré bars.

  A fume extraction system is provided to remove fumes and dust from the electrowinning cells, calcine ovens, barring furnace and flux mixing area. In addition to this, fresh air fans are provided to ensure there is adequate ventilation inside the gold room;

- **Site Security:** The gold room design is based on full security surveillance by a security guard and a second level of surveillance by remote control CCTV cameras with remote viewing and recording facilities. Additional cameras are located at key locations to maintain surveillance particularly regarding gravity gold processing and to assist with operational monitoring; and

- **Carbon Regeneration:** After completion of the elution process, the barren carbon is transferred to a horizontal diesel-fired regeneration kiln circuit. The carbon is hydraulically transferred to a dewatering screen prior to entering the feed hopper of the regeneration kiln. In the feed hopper any residual and interstitial water is drained from the carbon before it enters the kiln. The carbon is heated to 650°C to 750°C and held at this temperature for 15 minutes to allow effective regeneration to occur. Regenerated carbon from the kiln discharges to a quench tank. The quenched carbon is pumped, using a recessed impeller pump, to the carbon sizing screen. Carbon sizing screen oversize enters the CIL tanks and screen undersize joins the CIL tailings flow which passes over the carbon safety screens.

Tailings Treatment

- **Cyanide Destruction:** HGM is committed to meeting or exceeding the ICMC requirements and an SO_2/oxygen cyanide destruction circuit is utilised to meet this requirement. The SO_2/oxygen destruction circuit reduces the weak acid dissociable cyanide ("**CNWAD**") in the slurry discharged from the CIL circuit to less than 50mg/L prior to pumping to the TSF.

  The cyanide destruction circuit consists of two tanks providing 1.6 hours residence time and the tanks are interconnected with launders to allow the circuit to be run in parallel or series. Underflow from the CIL circuit carbon safety screen gravitates to the cyanide destruction circuit. Copper sulphate and sodium metabisulphite ("**SMBS**") solutions is added to provide the required copper and sulphur dioxide for the cyanide destruction process. Low pressure, high volume air is sparged down the shafts of the cyanide destruction agitators to provide oxygen to the slurry. Provision is made for caustic solution to be added to maintain a slurry pH 8.0 to 9.0;

- **Tails Disposal and Decant System:** CIL tailings slurry, spent acid from the elution and other waste streams are combined in the tailings hopper and pumped to the TSF. Tailings is deposited into the TSF using a peripheral discharge method. Excess water is recovered using a decant method. Cyclic spigot deposition at various locations is used to allow consolidation and drying of deposited material into beaches to direct supernatant water to a pond around the decant tower. Supernatant water is recovered from the TSF and returned as process water for the plant.

Reagents

- **Quicklime:** Quicklime is delivered to site in bulk tankers and pneumatically transferred into the silo. Quicklime is metered via a rotary valve directly onto the mill feed conveyor for circuit pH control. A dust collector minimises dust emissions during loading of quicklime into the storage silo. There is also an emergency lime addition system for bulk bags which has an enclosed bag breaker and hopper with a rotary valve;
- **Cyanide:** Cyanide is delivered to site in one tonne boxes containing bulk bags of cyanide briquettes. The briquettes are added to the cyanide mixing tank using an electric hoist and enclosed bag breaker and dissolved in process water to achieve the required solution strength.

  The cyanide solution is transferred to the storage tank for use in the process. Cyanide is reticulated to the CIL circuit via a ring main and dosed to the CIL tanks as required. A dedicated pump provides cyanide solution to the elution circuit and intensive leach reactor as required;
- **Caustic Soda:** Caustic soda (sodium hydroxide) is delivered to site in bulk bags of 'pearl' pellets. Caustic is added to the mixing tank by electric hoist via a bag breaker and screw feeder on the receiving hopper and dissolved in raw water to the required solution strength. The caustic solution is pumped to the elution circuit and intensive leach reactor as required, with separate dedicated pumps for the cyanide destruction;
- **Hydrochloric Acid:** Concentrated hydrochloric acid (32%w/w) is delivered to site in 1,000L isotainers. The concentrated hydrochloric acid is pumped into the acid mixing / storage tank where it is diluted with the correct quantity of raw water to achieve the required acid wash concentration. The dilute acid solution is pumped to the elution circuit as required;
- **Activated Carbon:** Activated carbon is delivered to site in 500kg bulk bags. Carbon is added to the carbon quench tank as required for carbon make-up to the CIL inventory. Carbon is added directly to the last adsorption tank, or via the regeneration kiln to allow fines removal on the sizing screen;
- **Grinding Media:** Grinding balls are delivered to site in bulk and are loaded to the SAG and ball mill as required to achieve the target power draw. Grinding balls are charged to the SAG mill via the surge bin and then the SAG mill feed conveyor. Grinding balls are charged to the ball mill by loading the balls using a forklift with a hydraulic drum tipper attachment into ball charging kibbles and lifting the kibble via a hoist into the ball mill feed chute;
- **Flocculant:** Flocculant is delivered to site in 750kg bulk bags. Flocculant is added to the flocculant plant storage hopper using an electric hoist and bag breaker. The flocculant mixing plant automatically mixes batches of flocculant with filtered water and transfers the mixed flocculant to a separate storage tank after each mixing cycle is complete. The flocculant solution is pumped to the pre-leach thickener and intensive leach reactor as required;
- **Sodium Metabisulphate (“SMBS”):** SMBS powder is delivered in bulk bags and is mixed with filtered water and transferred to a storage tank. SMBS solution is metered to the cyanide destruction circuit by dosing pumps as required to meet ICMC requirements;
- **Copper Sulphate:** Copper sulphate is delivered in 25kg bags and is mixed with filtered water. Copper sulphate solution is metered to the cyanide destruction circuit by dosing

pumps as required to meet ICMC requirements;

- **Fluxes:** Sodium borate (borax), silica flour, sodium nitrate (nitre) and sodium carbonate (soda ash) are used as fluxes for gold smelting. The fluxes are delivered in 25kg bags and mixed in small quantities with the gold sludge prior to smelting;
- **Diesel:** Diesel is delivered to site by bulk tankers and stored at the fuel farm. Diesel for plant use is transferred using a service truck to the bulk storage tank in the plant. The diesel is used in the mine, the process plant, for backup generators and to refuel site vehicles. Diesel is used in the strip solution heater and carbon regeneration kiln;
- **Reagents Storage:** Reagents are received on site either in bulk (grinding media) or in shipping containers, with a minimum of one months' capacity stored on site, to ensure that supply interruptions do not restrict production. Reagent containers are offloaded from the delivery truck by the site crane and the contents either stacked in a lay-down area until required or placed in a dedicated shed. There are dedicated storage sheds for boxed cyanide, SMBS and other acidic reagents and bulk hydrated lime. The empty containers are returned with the next delivery, whilst wooden cyanide boxes are incinerated on site.

Services

- **Raw Water:** Water is pumped from the Water Storage Dam ("**WSD**") to the to the raw water tank inside the plant area. Raw water can be used to top up the plant process water pond. Water from the raw water tanks is used for fire water and filtered to provide filtered water supply. Duty/stand-by water pumps are provided for the raw water distribution to the plant;
- **Fire Water:** Fire water for the process plant is drawn from the raw water tank. Suctions for other water services fed from the raw water tank is at an elevated level to ensure a fire water reserve always remains in the raw water tank. The fire water pumping system contains:
  - an electric jockey pump to maintain fire ring main pressure,
  - an electric delivery pump to supply fire water at the required pressure and flowrate,
  - a diesel driven pump that starts automatically if power is not available for the electric fire water pump or that the electric pump fails to maintain pressure in the fire water system.

  Fire hydrants and hose reels are placed throughout the process plant, fuel storage and plant offices at intervals that ensure complete coverage in areas where flammable materials are present;
- **Filtered Water:** Filtered water for the process plant is produced by treating raw water in the filtered water treatment plant. The treatment plant consists of clarification through flocculant addition, sand filtration, carbon filtration and biocide dosing. Filtered water reports to the filtered water storage tank and is distributed to the plant as required using duty/stand-by filtered water pumps;
- **Gland Water:** Water from the filtered water storage tank is distributed as gland service water using duty / stand-by gland water pumps;
- **Mill water:** With the thickener presently in by-pass mode the mill is supplied by water pumped from the process water pond;
- **Process Water:** Water is pumped from the TSF decant to the plant process water tank. The plant process water consists of TSF decant return water and raw water tank overflow. The process water tank is located such that the raw water tank overflows to the process water tank allowing the process water tank to be kept full at all times. Duty/stand-by process water pumps are provided for the plant process water supply. A separate water pump is provided for fluidisation water supply to the gravity concentrator. Anti-scalant is added as

required to condition the water and reduce fouling of pipelines, spray nozzles and screen decks;

- **Potable Water:** Potable water is supplied via a pipeline from the water treatment plant located in the accommodation camp. The plant water treatment facility includes ultra-violet sterilisation and chlorination. Potable water is stored in the plant potable water tank and is reticulated to the site ablutions, safety showers and other potable water outlets; and
- **Plant and Instrument Air Supply:** Plant and instrument air is supplied from duty / stand-by air compressors. The air is filtered and dried before distribution with separate air receivers. A check valve on the instrument air supply ensures the integrity of instrument air supply such that air from the plant air system serves as a back-up for instrument air, but plant air cannot draw down the instrument air system; and

17.4 Electrical Supply

Installed Load and Maximum Demand

The plant site-wide electrical power requirements for infrastructure, mining and processing were determined based on the initial preliminary equipment sizing and the installed load and maximum demand for the Houndé Process Plant is summarised below. The maximum demand is based on an average load factor of 80% for all areas except the mill drive, which was given a load factor of 95%. The Houndé Process Plant represents approximately 97% of the total electrical load for the mine giving an overall average load factor of 95%.

Table 17-2: Installed Load and Maximum Demand

Installed Load		Maximum Demand		Average Demand	
(MW)	(MVA @ 0.85pf)	(MW)	(MVA @ 0.85pf)	(MW)	(MVA @ 0.85pf)
21	25	16	18.82	13.46	15.83

Power Supply

Power is sourced from the national grid by an extension to the Pa substation and construction of a 36km 90kV overhead power line. The Houndé substation, includes a 90/11kV transformer with an 11kV feeder taken to the main plant switchboard.

A backup diesel generator power plant ("**Power Plant**") consisting of 16x Caterpillar 3516B Gensets, each rated to 2275KVA has been installed and operates as required. The electricity grid network supply reliability is in the range of 90% to 95% and the current LoMp assumes that this will be bound to the lowermost range of 90% with the balance supplied from the Power Plant.

Switchboards

One 11kV switchboard is installed in the plant and one is supplied with the grid supply switchyard inside the Power Plant. The 11kV switchboard is a fully withdrawable design complete with protection, metering and earthing facilities. The design fault level and circuit breaker ratings adopted are: 11kV switchboard busbar: 2,000A, 25kA at 3s; and 11kV circuit breakers rated at 630A. Protection is provided by microprocessor-based protection relays.

Earthing System and Lightning Protection

Earth leakage protection is applied to circuits with GPOs (General Purpose Outlets, i.e. power points) and for lighting circuits. The earthing system within the plant is designed in accordance with relevant Australian Standards (i.e. AS 3000, AS 3007 and Australian Communications Authority ("**ACA**")). The following method of system earthing is implemented at various voltage levels: 11kV - Earthed via earthing transformers; 415V solidly earthed system/Multiple Earthed Neutral (MEN)/(T-N-C-S) where the following applies T (Terre French for earth), N (Neutral), C

(Combined), S (Separate).

Lightning protection is provided for all plant building structures. Plant substations/ switch rooms and structural high points is fitted with lightning masts of sufficient quantity to ensure that all exposed points are covered as per 'Rolling Sphere Method' of AS1768. Lightning protection systems have their own independent earthing electrodes and are interconnected with the power earthing system.

Lighting

All lighting around the process plant was designed in a fit for purpose manner to suit the operational requirement for each area.

17.5 Control Philosophy

The general control philosophy for the plant is to provide a moderate level of automation and remote-control facilities. Instrumentation is provided within the plant to measure and control key process parameters, while still requiring manual inspection of equipment before starting.

The main control room houses two PC based operator interface terminals ("**OIT**"). Both OITs act as the control system supervisory control and data acquisition ("**SCADA**") servers as well as configuration / operator stations. The control room provides a central area from where the plant is operated and monitored and from which the regulatory control loops is monitored and adjusted. All key process and maintenance parameters are available for trending and alarming on the process control system ("**PCS**").

The process control system used for the plant is a programmable logic controller ("**PLC**") based SCADA system. The PCS controls the process interlocks and PID control loops for non-packaged equipment. Control loop set-point changes for non-packaged equipment are made at the OIT.

In general, the plant process drives report their ready, run and start pushbutton status to the PCS and are displayed on the OIT. Local control stations are located in the field in proximity to the relevant drives. These contain start and latch-off-stop ("**LOS**") pushbuttons which are hard-wired to the drive starter. Plant drives are predominantly started by an operator in the field after inspecting the local equipment.

The OITs allow drives to be selected to Local or Remote or Maintenance modes via the drive control popup. Statutory interlocks such as emergency stops and thermal protection are hardwired and apply in all three modes of operation. All PLC generated process interlocks apply in local and remote modes. Process interlocks are disabled or bypassed in Maintenance mode except for critical interlocks such as lubrication systems on the mill.

Local selection allows each drive to be operated in the field via the local start pushbutton which is connected to a PLC input. Remote selection enables the equipment to be started from the control room via the drive control pop-up. Maintenance selection allow each drive to be operated by maintenance personnel in the field via the local start push-button which is connected to a PLC input. A PLC output is wired to each drive starter circuit for starting and stopping drives. Status indication of process interlocks as well as the selected mode of operation are displayed on the OIT.

Vendor supplied packages use vendor standard control systems throughout the project and these are generally operated locally with limited control or set-point changes from the PCS system. General equipment fault alarms from each vendor package are monitored by the PCS system and displayed on the OIT. Fault diagnostics and troubleshooting of vendor packages are performed locally.

17.6 Metallurgical Accounting

Weightometers are located on the following conveyors throughout the plant: crushed ore transfer conveyor to measure primary crushed ore tonnage; SAG mill feed conveyor to measure mill feed tonnes; and pebble conveyor to measure the pebbles being recirculated to the SAG mill feed. The tonnage of crushed ore reporting to the stockpile is estimated from the difference between the crushed ore tonnage and the mill feed tonnes.

Manual sampling of the leach feed stream and the final plant tailings allows composite shift samples for leach head grade and tails solution and residue grades. The current capital expenditure programme assumes installation of automatic CIL feed and tail samplers and these are planned for installation during H1 2021.

Density and flow meters on the leach feed and tailings lines allows the dry tonnage of solids pumped to the leach circuit and TSF to be determined as a cross check on the mill feed tonnage determined from the mill feed weightometer. In conjunction with the leach feed and plant tails samples, the mass flow measurements enables the gold recovered in the leach / CIL to be calculated.

A dedicated electrowinning cell is provided for recovery of the gold leached by intensive leaching of gravity concentrate and the recovered gravity gold sludge can be smelted separately. The plant head grade is back calculated from the gravity and leach head grade.

Regular gold 'in circuit' surveys allows reconciliation of precious metals in feed compared to doré production. Water supplied and used in the various areas is continuously monitored.

Reconciliation of the amounts of reagents used over relatively long periods is achieved by delivery receipts and stock takes. On an instantaneous basis, reagent usage rates of cyanide, elution and detoxification reagents and diesel flow rates to unit operations is measured (L/min) and accumulated (m^3) using flow meters.

17.7 Historical Performance

Construction of the Houndé Process Plant commenced in 2015 followed with hot commissioning in October 2017 and attainment of nameplate capacity (annualised basis) within three weeks. The pre-leach thickener was removed from circuit at commissioning due to the poor performance on oxide ore being treated at that time. A subsequent attempt at re-commissioning the thickener in January 2018 was abandoned as the required thickening could not be achieved at the relatively high throughput at that time (Jan 2018: 4Mtpa). Mill feed to date has been a mixture of oxides and fresh rock in varying proportions with the design blend of 88% fresh not being tested to any extent to date. Nevertheless, throughput in excess of 4Mtpa has been achieved on blends of 80% fresh and below.

To 31 December 2019 the analysis of the annual operating statistics indicates:

- total material processed of 8.9Mt grading 2.13g/tAu;
- total gold production of 572kozAu, gold poured of 569kozAu and reported gold in circuit ("**GIC**") of 4kozAu as at 31 December 2019;
- weighted average metallurgical recovery of 93.70% and a tailings grade of 0.13g/tAu;
- generally reducing recovery (from 95.45% to 92.68%) with reducing head grades (from 2.81g/tAu to 1.83g/tAu);
- increasing availability from 95.6% to 96.2% and increasing utilisation from 95.6% to 98.0% coupled with increased throughput from 408tph in 2017 to 502tph in 2019;
- weighted average direct processing and maintenance expenditures of US$11.89/t and US$1.33/t respectively. Reporting statistics for 2019 indicated significant (+30%; +55%)

increases from 2017 through 2019 with direct processing and maintenance at US$12.48/t and US$1.11/t respectively.

Table 17-3: Houndé Processing Plant: historical operating statistics

Statistic	Units	Total	2017	2018	2019
Production					
Milled	(kt)	8,905	813	3,948	4,144
	(g/tAu)	2.13	2.91	2.29	1.83
	(kozAu	610	76	291	243
MRF	(%)	93.70	95.45	94.10	92.68
Recovered	(kozAu)	572	73	274	226
Poured	(kozAu)	569	69	277	223
Sold	(kozAu)	564	61	276	227
GIC	(kozAu)	4	6	2	4
Tailings (Arisings)	(kt)	8,905	813	3,948	4,144
	(g/tAu)	0.13	0.13	0.14	0.13
	(kozAu	38	3	17	18
Tailings (Cumulative)	(kt)	8,905	813	4,762	8,905
	(g/tAu)	0.13	0.13	0.13	0.13
	(kozAu	38	3	21	38
Efficiencies					
Calendar	(hrs)	19,728	2,208	8,760	8,760
Available	(hrs)	18,784	2,083	8,277	8,423
Utilised	(hrs)	18,365	1,992	8,118	8,256
Availability	(%)	95.2	94.4	94.5	96.2
Utilisation	(%)	97.8	95.6	98.1	98.0
Throughput	(tph)	485	408	486	502
Operating Expenditure					
Processing	**(US$m)**	**117.8**	**8.4**	**53.1**	**56.3**
Direct	(US$m)	105.9	7.85	46.37	51.70
Maintenance	(US$m)	11.9	0.58	6.71	4.58
Processing	**(US$/t)**	**13.23**	**10.37**	**13.44**	**13.58**
Direct	(US$/t)	11.89	9.66	11.74	12.48
Maintenance	(US$/t)	1.33	0.71	1.70	1.11

17.8 Metallurgical LoMp and Associated Assumptions

The metallurgical LoMp is developed as part of the integrated mine planning process which assumes processing of a total of 32.6Mt grading 2.06g/tAu for a total gold content of 2,164kozAu with oxide, transitional and fresh material contributing 16%, 7% and 77% respectively. The current mining schedule provides a total of 31.7Mt grading 2.09g/tAu with the balance sourced from the closing balance of the Vindaloo and Bouéré deposit stockpiles estimated at 950kt grading 1.20g/tAu.

The LoMp mining and processing schedule was developed assuming a detailed deposit by deposit mining and stockpile management schedule to derive process plant feed which prioritises high grade ore (“**HGO**”) and medium grade ore (“**MGO**”) on an equal basis, followed by low grade ore (“**LGO**”) and finally sub-ore (“**SO**”) defined as follows: HGO ≥ 2.22g/tAu; MGO ≥ 1.40g/tAu, <2.22g/tAu; LGO (oxide) ≥ 0.60g/tAu, <1.4g/tAu; LGO (transitional) ≥ 0.70g/tAu, <1.4g/tAu; LGO (fresh) ≥ 0.80g/tAu, <1.4g/tAu; SO (oxide) ≥ 0.40g/tAu, <0.6g/tAu; SO (transitional) ≥ 0.50g/tAu, <0.80g/tAu; and SO (fresh) ≥ 0.60g/tAu, <0.80g/tAu.

The resulting contributions by deposit, weathering profile and grade categories are shown in Table 17-4 below which indicates as follows: the majority (95%) of processed ore from Vindaloo and Kari Pump deposits; 77% of processed ore from fresh material; and 54% from HGO and MGO grade bins.

The key assumptions incorporated into the metallurgical LoMp (Table 17-5) incorporate weathering and deposit specific assumptions for metallurgical recoveries, weathering based operating expenditure assumptions reflecting the increased cost of processing harder fresh ore compared with the softer oxide material. Table 17-6 presents a summary of the LoMp metallurgical schedules used to derive the production schedules which underpin the Mineral Reserves as reported herein. The elements of the current LoMp processing production schedules comprise:

- Assumed annual throughput of approximately 4.0Mtpa;
- Annual gold production averaging 280kozAu and declining from 2026 onwards during processing of LG and SO grade categories;

- Stockpile closing balances increasing from 950kt grading 1.20g/tAu at 31 December 2019 to a maximum of 6.18Mt grading 0.98g/tAu in 2023 and declining thereafter;
- Weighted average metallurgical recoveries of 90.47% overall and comprising 94.04% for oxide ore, 90.62% for transitional ore and 89.68% for fresh ore;
- No assumed movement of work in progress ("**WIP**") either through gold in circuit ("**GIC**") or finished goods ("**FG**"); and
- Total tailings arisings of 32.63Mt with a weighted average tailings residue grade of 0.18g/tAu.

Table 17-7 presents the expenditure profiles associated with the current metallurgical LoMp which includes, direct operating expenditure for processing (processing and ore stockpile re-handling costs) and a sustaining capital allowance of US$1.45/t. Section 21 consolidates the capital expenditure and operating expenditure determinations for the Houndé Gold Mine.

Table 17-4: Houndé Gold Mine metallurgical LoMp ore feed

Category	Tonnage	Processing			Stockpiles			Mining		
	(%)	Tonnage (Mt)	Grade (g/tAu)	Content (kozAu)	Tonnage (Mt)	Grade (g/tAu)	Content (kozAu)	Tonnage (Mt)	Grade (g/tAu)	Content (kozAu)
Deposit										
Vindaloo	71.3	23,247	1.70	1,270	856	1.04	29	22,391	1.72	1,242
Bouéré	2.8	908	4.14	121	94	2.69	8	814	4.30	113
Dohoun	3.6	1,160	1.85	69	-	-	-	1,160	1.85	69
Kari Pump	22.4	7,308	3.00	704	-	-	-	7,308	3.00	704
Total	**100.0**	**32,623**	**2.06**	**2,164**	**950**	**1.20**	**37**	**31,673**	**2.09**	**2,127**
Weathering										
Oxide	16.4	5,345	1.91	329	505	0.98	16	4,840	2.01	313
Transitional	7.1	2,317	2.11	157	-	-	-	2,317	2.11	157
Fresh	76.5	24,961	2.09	1,678	445	1.46	21	24,516	2.10	1,657
Total	**100.0**	**32,623**	**2.06**	**2,164**	**950**	**1.20**	**37**	**31,673**	**2.09**	**2,127**
Grade										
HG	26.8	8,745	4.16	1,171	54	4.04	7	8,690	4.16	1,164
MG	27.1	8,850	1.80	511	37	1.89	2	8,813	1.80	509
LG	33.5	10,943	1.10	387	353	1.02	12	10,590	1.10	375
SO	12.5	4,085	0.73	96	505	0.98	16	3,580	0.69	80
Total	**100.0**	**32,623**	**2.06**	**2,164**	**950**	**1.20**	**37**	**31,673**	**2.09**	**2,127**

Table 17-5: Houndé Gold Mine metallurgical LoMp assumptions

Deposit	Weathering	Tonnage		Grade	Content	Recovery	Production	Processing	S/P Re.	Maint.	Total
		(%)	(kt)	(g/tAu)	(kozAu)	(%)	(kozAu)	(US$/t)	(US$/t)	(US$/t)	(US$/t)
Vindaloo	Oxide	8.0	1,857	0.99	59	93.8	55	11.02	0.67	1.45	13.14
	Transitional	4.0	923	1.32	39	94.0	37	12.19	0.67	1.45	14.31
	Fresh	88.0	20,468	1.78	1,172	92.9	1,088	15.10	0.67	1.45	17.22
	Subtotal	**100.0**	**23,247**	**1.70**	**1,270**	**92.9**	**1,181**	**14.66**	**0.67**	**1.45**	**16.78**
Bouéré	Oxide	0.2	2	0.84	0	93.8	0	11.02	0.55	1.45	13.02
	Transitional	0.4	3	2.24	0	90.0	0	12.19	0.55	1.45	14.19
	Fresh	99.5	903	4.15	120	85.0	102	15.10	0.55	1.45	17.10
	Subtotal	**100.0**	**908**	**4.14**	**121**	**85.0**	**103**	**15.08**	**0.55**	**1.45**	**17.09**
Dohoun	Oxide	18.6	216	1.44	10	93.8	9	11.02	0.61	1.45	13.08
	Transitional	13.0	151	1.49	7	94.0	7	12.19	0.61	1.45	14.25
	Fresh	68.4	794	2.04	52	84.6	44	15.10	0.61	1.45	17.16
	Subtotal	**100.0**	**1,160**	**1.85**	**69**	**86.9**	**60**	**13.96**	**0.61**	**1.45**	**16.02**
Kari Pump	Oxide	44.8	3,271	2.47	260	94.1	244	11.02	0.67	1.45	13.14
	Transitional	17.0	1,240	2.77	111	89.2	99	12.19	0.67	1.45	14.31
	Fresh	38.3	2,797	3.71	334	82.0	274	15.10	0.67	1.45	17.22
	Subtotal	**100.0**	**7,308**	**3.00**	**704**	**87.6**	**617**	**12.78**	**0.67**	**1.45**	**14.90**
All	Oxide	16.4	5,345	1.91	329	94.0	309	11.02	0.67	1.45	13.14
	Transitional	7.1	2,317	2.11	157	90.6	142	12.19	0.67	1.45	14.31
	Fresh	76.5	24,961	2.09	1,678	89.9	1,508	15.10	0.67	1.45	17.22
	Total	**100.0**	**32,623**	**2.06**	**2,164**	**90.6**	**1,960**	**14.22**	**0.67**	**1.45**	**16.34**

Table 17-6: Houndé Gold Mine metallurgical LoMp: physical production

Statistic	Units	Total
Milled	**(kt)**	**32,623**
Oxide	(kt)	5,345
Transitional	(kt)	2,317
Fresh	(kt)	24,961
Grade	**(g/tAu)**	**2.06**
Oxide	(g/tAu)	1.91
Transitional	(g/tAu)	2.11
Fresh	(g/tAu)	2.09
MRF	**(%)**	**90.57**
Oxide	(%)	94.04
Transitional	(%)	90.62
Fresh	(%)	89.88
Recovered	**(kozAu)**	**1,960**
Oxide	(kozAu)	309
Transitional	(kozAu)	142
Fresh	(kozAu)	1,508
Poured	**(kozAu)**	**1,960**
Sold	**(kozAu)**	**1,959**

Statistic	Units	Total
GIC	**(kozAu)**	**0**
Tailings (Arisings)	**(kt)**	**32,623**
Oxide	(kt)	5,345
Transitional	(kt)	2,317
Fresh	(kt)	24,961
Grade	(g/tAu)	0.19
Tailings (Cumm.)	**(kt)**	**41,528**
Oxide	(kt)	14,250
Transitional	(kt)	2,317
Fresh	(kt)	24,961
Grade	(g/tAu)	0.18

Table 17-7: Houndé Gold Mine metallurgical LoMp: operating expenditure

Statistic	Units	Total
Production		
Weathering		
Oxide	(kt)	5,345
Transitional	(kt)	2,317
Fresh	(kt)	24,961
Total	**(kt)**	**32,623**
Deposit		
Houndé	(kt)	23,247
Bouéré	(kt)	908
Dohoun	(kt)	1,160
Kari Pump	(kt)	7,308
Total	**(kt)**	**32,623**
Expenditure		
Processing	**(US$k)**	**485,780**
Unit Costs		
Weathering		
Oxide	(US$/t)	11.68
Transitional	(US$/t)	12.85
Fresh	(US$/t)	15.77
Total	**(US$/t)**	**14.89**
Deposit		
Houndé	(US$/t)	15.33
Bouéré	(US$/t)	15.64
Dohoun	(US$/t)	14.57
Kari Pump	(US$/t)	13.45
Total	**(US$/t)**	**14.89**

A summary of the metallurgical LoMp comprising production, plant efficiencies, ore type contribution and operating expenditures is included in Table 17-8 below where the key aspects are:

- assumed process plant throughput of 4.0Mtpa with fresh ore exceeding 80% from 2024 through 2026 inclusive;
- metallurgical recoveries which range in accordance with weathering ore type feed by deposit; and
- operating expenditures which vary in accordance with weathering type and increasing with fresh ore contribution.

Table 17-8: Houndé Gold Mine metallurgical LoMp: summary production and operating expenditures

Statistic	Units	Total
Production		
Milled	**(kt)**	**32,623**
	(g/tAu)	2.06
MRF	(%)	90.57
Recovered	**(kozAu)**	**1,960**
Poured	(kozAu)	1,960
Sold	(kozAu)	1,959
GIC	(kozAu)	4
Tailings (Arisings)	(kt)	32,623
	(g/tAu)	0.19
Tailings (Cumm.)	(kt)	41,528
	(g/tAu)	0.18
Efficiencies		
Availability	(%)	96.2
Utilisation	(%)	98.0
Throughput	(tph)	439
Ore Type Tonnage		
Oxide	(%)	16
Transitional	(%)	7
Fresh	(%)	77
Operating Expenditure		
Processing	**(US$m)**	**485.75**
Processing	**(US$/t)**	**14.89**

17.9 Risks and Opportunities

The principal risks regarding metallurgical processing at Houndé Gold Mine are:

- **Process Plant Throughput:** The risk that the projected throughput of 4.0Mtpa is not achieved when fresh ore throughput increases beyond 80%. Historical throughput above the original design capacity of 3.0Mt was achieved due to higher than anticipated oxide feed tonnages and in addition certain modifications to the plant flowsheet and operating practices. Accordingly, with a fresh ore design capacity of 3.0Mt set at 88% fresh feed, there remains a risk that where the proportion of fresh ore feed exceeds 80% (2024 through 2026 inclusive) may not be achieved as envisaged;
- **Metallurgical Recoveries:** the risk that the metallurgical recoveries as projected may not be achieved due to the following items:
  - that metallurgical recoveries are assumed as constant per ore type within each deposit and do not vary with grade bins within each ore type,
  - that the leach kinetics for the sulphide material as originally envisaged for 3.0Mtpa capacity may be different at the increased throughput of 4.0Mtpa,
  - that the metallurgical recoveries noted in 2026 through 2027 are lower than projected following further technical work to assess the impact of reduced feed grade (from >2.0g/tAu to < 1.2g/tAu) as lower grade stockpile material is processed,
  - that process assumptions for certain deposits rely solely on testwork results and do not benefit from bulk processing experience to date, specifically for certain of the deposits, notably: the Vindaloo deposits of Koho and Madras; and the Kari Pump deposit; and
- the risk that the operating expenditures assumed as constant per ore type within each deposit are more variable due to fluctuations in hardness and other physical and geochemical properties.

The principal opportunities regarding metallurgical processing at Houndé Gold Mine are:

- The opportunity to account for WIP, specifically with respect to GIC and FG where the closing balance of GIC as at 31 December 2019 is estimated at 4kozAu;
- The opportunity to improve water management through operating the currently standby thickening capacity, increasing the tailings solids content and reducing the volumes of water returned to the TSF;
- The opportunity to implement and realise the benefits of the process plant strategic initiatives referenced in Section 24.2, specifically:
  - the Mill Expert Control system, which is installed with commissioning underway,
  - increase motor/gearbox size for the vibrating feeder system coming from surge bin to match increased throughput at crusher and increase throughput to SAG Mill planned for implementation in 2020,
  - installation of automatic feed and tailings samplers in 2021,
  - installation of Historian software for Supervisory Control and Data Acquisition ("**SCADA**") system in 2021 which facilitates storage and retrieval of time-series database for analogue data, digital readings, process data, quality information, aggregate data and alarm information,
  - optimisation of the Pebble Crusher through modification of the SAG Mill discharge trommel grate size in order to maximise pebble crusher throughput. This also requires review of pebble crusher feed bin arrangement in order to choke feed,
  - investigation of the benefits of the "**RECYN Project**" being undertaken at Ity Gold Mine for potential application at the Houndé Process Plant with potential savings in cyanide consumption. RECYN is a specialist technology, which facilitates recovery of cyanide and dissolved metals from precious metal plant process streams; and

- The opportunity to establish the likelihood of additional gold recovery during the mine closure programme during plant decommissioning and rehabilitation which is in excess of the GIC estimates. Typical industry experience is either based on estimates focused on determining the quantum of 'clean-up gold' that can be anticipated on closure of a plant is uncertain. Reported figures for South African plants have shown an order of magnitude difference, varying between 0.04% and 0.40% of the total gold produced through the plant during its life. The following factors affect the quantity of gold that is eventually recovered: plant age; process treatment route installed; plant layout and detailed design features; plant housekeeping during operations; and the procedure and efficiency of the plant clean-up.

17.10 Interpretation, Conclusions and Recommendations

In summary the metallurgical assumptions as incorporated into the metallurgical LoMp for Houndé Gold Mine are well established following commissioning and commencement of operations in 2017. The original technical studies have also been supplemented by additional testwork for the additional deposits now incorporated into the Ore Reserve statements reported in the 31 December 2019 declarations. Operational performance to date has, specifically with respect to overall plant throughput, exceeded the original nominal design capacity of 3.0Mtpa and the plant is currently operating in excess of 4.0Mtpa with increased availability and utilisation to achieve hourly throughput exceeding 500t. This performance is however supported by higher than planned proportion of feed sourced from oxide material which physical properties facilitates higher throughput due to reduced milling requirements.

In addition to the above, Houndé Gold Mine is also investigating and in certain aspects implementing several strategic initiatives focused on various operational improvements, the benefits of which are not factored into the current LoMp metallurgical plan.

Notwithstanding the above the following areas are noted as the key areas of focus:

- Current process throughput exceeds the original nominal design capacity by some 30% and is currently exceeding 4.0Mtpa. The ability to sustain this at increased fresh ore tonnage contributions (>80% at 4.0Mtpa) for a lengthy period remains untested and as such further technical work and or a degree of mine planning and scheduling may be required to maintain production throughput at this rate;
- The current LoMp however incorporates ore sources which to date have not been historically processed and are entirely reliant on bench scale testwork results; and in addition, lower grade stockpile material which are processed at grades <1.2g/tAu;
- The original leach kinetics of various ore source blends were based testwork and assuming a nameplate capacity of 3.0Mtpa. Accordingly, further work may be required to test the impact of leach kinetics of sulphide ore on required residence time and recoveries at the increased throughput of 4.0Mtpa assuming no further change to process plant configuration and operating practices;
- Historical reporting to date is generally focused on monthly reporting at a relatively high level which is then used to inform the metallurgical LoMp assumptions. Accordingly, there remains an opportunity to collate and analyse historical physical (ore feed, gravity recovery, CIL feed etc), consumable stores, power consumption and operating expenditures to establish predictive performance relationships to finesse the projections as reported herein; and
- Operating expenditure assumptions which assume unit process rates per weathering ore type which remain static between individual deposits. These are largely based on original estimates as reflected in historical technical studies tempered by recent operational

experience. Further work however is required to refine the estimates with specific focus on assessment of physical consumable stores, power consumption and other detailed activity and element costing within the various sections of the process plant.

Accordingly, the principal recommendations reflect the principal conclusions highlighted above. These include:

- Undertaking further technical work to assess the appropriate limit to fresh ore contribution measured as a percentage of total plant feed at the increased plant throughput of 4.0Mtpa;
- Undertaking further technical work to refine metallurgical recovery assumptions, specifically:
  - to confirm the leach kinetics (recovery and residence time) of sulphide ore at the increased throughput of 4.0Mtpa),
  - to reassess metallurgical recoveries of lower grade bin ores, specifically <1.2g/tAu; and
- To further analyse historical performance statistics to support establishment of performance relationships for production assumptions (gravity recovery, CIL feed recovery and tails grades, residence time and total recovery), consumable stores consumption rates, power consumption, water usage, and operating expenditure assessments; and
- To assess the potential benefits of various strategic initiatives underway and the extent to which this can be included as direct measurable improvements to the LoMp metallurgical assumptions.

18 INFRASTRUCTURE

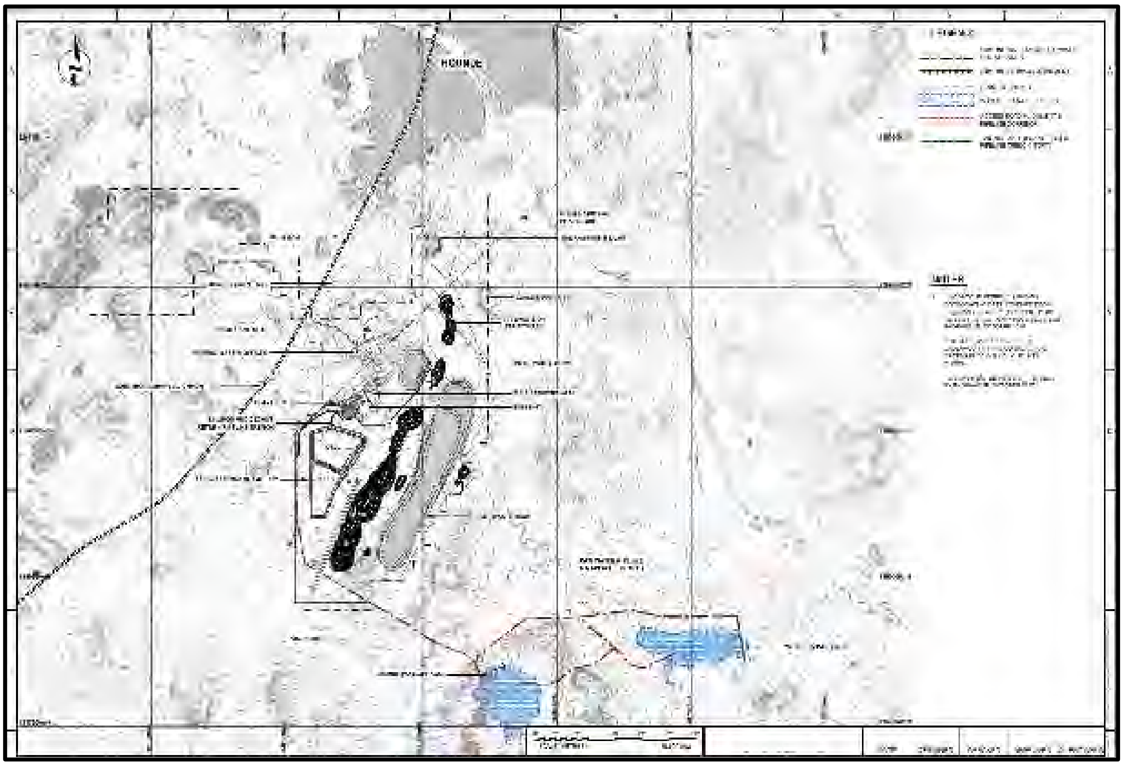
18.1 Introduction

The following section includes discussion and comment on the supporting on-mine and off mine infrastructure in place at Houndé Gold Mine with specific focus on: road access; rail and port connections; water supply; tailings storage facility (“**TSF**”); surface water management; electrical power demand, supply/generation and distribution; fuel supply; and general site development and other services. The overall site development plan is shown in Figure 18-1 which includes the mine site and associated infrastructure including the process plant, tailings storage facility, accommodation camp, roads, mine services area, mine open pit and mine waste dump.

The process plant and tailings storage facility are located on the western side of the open pit, just outside the 500m blast zone. The RoM pad location has been selected for its centralised location close to major pits, as well as proximity to mine services area (“**MSA**”). The accommodation camp is located northwest of the Houndé Process Plant. The main access road approaches the site from the west and the layout provides easy access for personnel and material movements.

The permit perimeter is fenced to prevent animal access and deter access by unauthorised persons and monitored high security fencing surrounds the Houndé Process Plant. Road access into the fenced area is through a manned checkpoint and security fencing surrounds the accommodation camp and general site infrastructure.

Figure 18-1: Overall Site Layout (source: Endeavour)



18.2 Roads

Road Types

A range of road types have been established at the Houndé Gold Mine and are constructed to meet a wide range of duties. The hierarchy of road types includes dedicated mine haul roads, main access roads, general access roads and minor use roads and tracks. Some of the roads border service corridors, e.g. raw water supply pipelines and tailing pump line access and road alignments therefore incorporate both transport and service requirements. The road widths and construction specification match the required duties as noted below and the total constructed lengths of the main road types are: 8.5km of haul roads; 3.0km of main access roads; 2.7km of plant roads; and 19km of access tracks. Constructed roads generally follow existing tracks or contours where no direct route was available in order to minimise disruption to local villages and crop fields.

Field investigations, interpretation of geotechnical test results and ground conditions indicate that the local soils are typically clayey/gravely silt with low plasticity and less than ideal for road pavement construction. Accordingly, laterite gravel material, to form the base course for minor roads and the sub-base for heavy use roads, was sourced from borrow pits along the main roads within the purchased property area and/or within the open pit mine footprint.

Access to Site

Initial road access to the Houndé Process Plant site from the N1 Highway was from on an unsealed track for 1.5km which was subsequently upgraded to a sealed 9m wide road. The Houndé Gold Mine camp is approximately 1km from the main access road (7m wide unsealed road).

Project Site Roads

- **Mine Haul Roads:** Mine haul roads are designed and constructed by the mining department to access the pits, waste dumps and Run-of-Mine pad. The mine services facilities were originally designed and constructed by the EPCM contractor;
- **Main Access Road:** The 1.5km section of access track was reconstructed, widened, and sealed to form the main access road and has a width of 9m with two 3.5m wide sealed lanes and 1m shoulders. The road follows the natural grade of the ground and designated crossing points for farm machinery, herding or walking is provided near where current, well used trails exist.

  The road alignment passes under the 225kV power line near to a cable tower in order to provide a clearance envelope of 10m to 12m under the minimum 5.5m clearance to the lowest power cable. The intersection of the main access road with the N1 Highway, is designed for a speed limit of 60km/h and includes a centre island with dedicated turning lanes for vehicles entering the main access road. Street lighting was also installed at the junction approaches to improve visibility and safety;
- **Camp Access Road:** The camp access road is 7m wide and is constructed as a sealed all-weather road with appropriate drainage provisions where necessary;
- **Plant Roads:** Plant site internal roads are 7m wide and are constructed flush with the bulk earthworks pad to ensure that storm water sheet flow is achieved across the site, avoiding the need for deep surface drains and culvert crossings within this area; and
- **Access Tracks:** A number of tracks are constructed to access infrastructure such as the water storage facility, bore pumps and tailings dam which are remote from the plant site. These access tracks generally followed the alignment of existing tracks and were cleared and graded natural earth tracks. Pipeline routes have generally followed the access tracks.

18.3 Rail and Port Connections

The main railway line between Abidjan, the chief port in Cote d'Ivoire, and Ouagadougou passes approximately 28km to the north of the site along the D40 main road heading north west from Houndé town. There is a major station at Bobo-Dioulasso that is in active use for freight, plus a minor station at Béréba (26km from Houndé) which services the local cotton producers, and with minor modifications would be suitable as a terminal to receive construction materials and equipment and ongoing operational supplies, especially those that can be containerized for security of shipment and ease of handling.

The main ports serving project are Abidjan, in Cote d'Ivoire and Tema in Ghana. Both ports are connected to Burkina Faso by main roads and provide the prime entry point for importation of equipment and fabrications. Both ports can to handle all types of cargo required for the mine. Freight from Abidjan can be sent via rail through to Bobo-Dioulasso, which is around 20% less expensive than road, though takes longer due to scheduling constraints.

In 2019, there were 434 container deliveries to Houndé coming from all ports, of which 328 came from Abidjan. Of this number, 122 arrived by rail. In the first quarter of 2020, 85 containers have been received, of which 52 came from Abidjan. 49 of these containers came via rail, which is the preferred route provided delivery times can be achieved.

18.4 Water Supply

Water Demand

A water balance model is utilised to estimate the demand for raw water on site, considering the process water demand, losses and gains from the tailings storage facility, pit dewatering and dust suppression and runoff from the RoM pad and plant site. Utilisation of ground water resources from boreholes is also incorporated into the model. Any potential shortfall is assumed to be supplied from the water storage dam which feeds from a water harvesting dam.

The total water demand for the site is estimated at 3.3Mm^3 per year and the water demand for the process plant amounts to 2.85Mm^3, which includes the minimum raw water requirement of 0.49Mm^3 but excludes water in ore. Other water demands include an estimate of 0.54 Mm3 for dust suppression. The demand is met from the TSF decant, pit dewatering (including precipitation on the pit area), runoff from the RoM pad and sub-ore stockpiles. Potable water demand for the mine is directly related to the number of persons working and living on site.

Decant from Tailings Storage Facility

The water balance modelling indicates that for tailings pumped to the TSF at 50% solids, the pond on the TSF increases during the wet season and reduces to the minimum pre-set level during the following dry season. Recovery from the TSF decant is assumed to gradually increase to supply up to 79% of the process water demand, or up to 2.3Mm^3 per year, in the later years of operation.

Groundwater Investigation

Historical investigation into groundwater sources in the project area focused on the estimation of the likely volumes of water arising from open pit mine dewatering and the availability of water to meet the project demand. These concluded that the contribution from pit dewatering, including external groundwater sources of 8l/s and precipitation on the pit surface is estimated to be up to 1.5Mm^3 per year, depending on the extent of the pit development.

Surface Water

The water balance model indicates that any water demand which cannot be met from the tailings storage facility (the "**TSF**"), pit dewatering or groundwater sources, is met from surface water sources. The current models are run on a monthly basis for the life of mine for average climatic conditions and tested for a 1 in 100-year dry event and 1 in 100-year wet event occurring when each would have the greatest impact on operations. Under average climatic conditions, the water demand from surface water sources decreases as the tailings beach in the tailings storage facility increases, resulting in higher recovery of precipitation on the tailings storage facility. The recovery from pit dewatering also increases as the pit surface increases.

The demand from surface water sources was highest in the year that the process plant was commissioned, when 1.75Mm^3 was required from the water storage dam. Later in the LoMp the demand for surface water is assumed to decrease to 1.2Mm^3.

Water Harvest Dam

A water harvest dam was constructed east of the Houndé open pit. The mean annual runoff at the dam site is estimated to be 4.8Mm^3 from a catchment area of 21,850ha. The required earth fill embankment is 8m high and 760m long to create a storage capacity of 1.8Mm^3. The surface area of the dam at full supply is 120ha. A spillway was provided to safely pass a 1 in 100-year peak flood. The embankment was constructed from material excavated from the basin. The embankment consists of several zones, including a low permeability core, a chimney drain, a structural layer and, on the upstream face, a layer of non-dispersive material covered by an erosion protection layer. The embankment slopes are 2.5H:1V on both upstream and downstream faces.

Due to the flat topography at the dam site, the water harvesting facility may not meet the project water demand on a sustainable basis; therefore, a supplementary water storage dam was identified and constructed. The water harvest dam was initially utilised to fill the water storage dam to ensure that there was sufficient water for the processing plant in year 1 until there was good water return from the TSF.

Water Storage Dam

A water storage site was identified approximately 5km west of the water harvest dam site. This storage dam has a catchment area of only 400ha and so could not replace the harvest dam, but due to its more efficient storage characteristics and relatively small embankment, it was selected as a storage facility to be supplied from the harvest dam during the wet season. The water storage dam has a capacity of 1.5Mm^3 and has a surface area of 58ha at full capacity. The required earth fill embankment is 10m high and 130m long. The embankment construction is similar to that described for the water harvest dam.

Water is pumped from a decant structure in the water harvest dam to the water storage dam at a rate of 600m^3/h to build up storage capacity for use during the dry season, when the water harvest dam could be empty. The peak annual demand for surface water is estimated at approximately 2.4Mm^3. Raw water is required for numerous applications including the Knelson concentrators which utilise in the order of 0.5Mm^3 per year.

18.5 Tailings Storage Facility

The Tailings Storage Facility ("**TSF**") at the Houndé Gold Mine is a two-cell paddock storage located less than 1km south of the Houndé Process Plant. The TSF is formed by multi-zoned earth-fill embankments (surrounded by waste rock on all four sides; the crest width of the embankment is generally around 24m). It comprises a cleared and grubbed basin, a composite soil/HDPE liner, a basin underdrainage system and a pump out decant system and an emergency spillway.

The facility is designed to be raised in annual stages over the mine life using downstream embankment construction techniques. The total footprint area (including the basin area) is 107Ha and the long-term footprint of the raised facility is approximately 210Ha. The initial TSF was constructed in 2015 with an upstream toe drain and system of finger drains and commissioned in 2017. A network of underdrains was incorporated into the basin area to reduce the seepage potential and increase the tailings density. The underdrainage system drains by gravity to collection sumps located at the embankment upstream toe. Solution recovered from the underdrainage system is pumped on to the tailings via a submersible pump, reporting to the supernatant pond.

Tailings is deposited by multi-point spigotting and the discharge points are moved regularly to distribute the tailings over the entire area. Average operating parameters relevant to tailings management are:

- current annual deposition of 4.15Mtpa (original nameplate throughput was 3.0Mtpa);
- percent solids of 44% (c.w. design of 47%) and in-situ tailings density of 1.0t/m^3 due to: higher proportion of oxide material (c.w. design of 1.25t/m^3); increased throughput leading to lower drying/consolidation times for the tailings beach;
- estimated tailings beach slope = 110 horizontal ("**H**") to 1 vertical ("**V**") compared to a design value = 100H:1V;

Stage 1 construction of the TSF commenced in 2015 which was constructed using fill materials won from within the basins and excavations (e.g. cut-off trench and spillway) and mine waste. Stage 2 Cell 1 construction commenced in January 2018 and was completed in April/May 2018 thereby establishing a common elevation for Cell 1 and Cell 2 level. The maximum height of Stage 2 was approximately 16.5m. Stage 3 construction was completed to RL335.6m, a maximum embankment height of 22m. The Stage 3 raise of the TSF (both cells 1 and 2) was constructed in Q2, 2019 to provide sufficient storage capacity to the end of May 2020. Stage 4 raise is being constructed in H1, 2020 and the timeline for the Stage 4 follows completion of Zone C (mine waste) placement in December 2019; stockpiling Zone A mine waste on the mine waste dump for future construction of Zone A; cell 1 raise in Q1 2020; and construction completion in Q2 2020.

Capacity and Location

A TSF with an initial capacity of approximately initial 25Mt was required to store the tailings generated by the process plant over a period of about 8 to 9 years, at a rate of approximately 3Mtpa. The TSF was designed to international standards to provide a facility to safely contain the tailings and reduce the potential effect thereof on the environment in the form of dusting, seepage or runoff from the tailings surface during operation and post closure. The design complies with the guidelines proposed by the International Committee on Large Dams ("**ICOLD**") and Guidelines on Tailings Dams: Planning, Design, Construction, Operation and Closure ("**ANCOLD 2012**"). Provision was made for the effects of seismic events and probable maximum precipitation events during operation and post closure. To support the design and improve the safety of the facility, a dam break analysis, seepage analysis and stability analysis were performed on the embankments. A water balance model was prepared to determine the impact of extreme rainfall events on the TSF pond. If built and operated in accordance with the principles and design concepts outlined in this document, this facility would contain the tailings generated from the project and the effects on the environment would be within acceptable limits as defined by international standards.

Seven locations were evaluated as potential sites for the TSF. The selected site, a valley storage facility approximately 5km to the west of the process plant site was constructed with its main embankment 668m long and 23m high and three smaller saddle embankments respectively 130m long and 10m high, 755m long and 15.5m high, 1,116m long and 7m high. It is estimated that the tailings surface at full capacity will cover approximately 200ha.

Table 18-1 provides the TSF design parameters as envisaged inclusive of the reference to the planned expansions to accommodate the requirements of the current LoMp. Table 18-2 provides a summary of the as built construction volumes and planned future embankment volume requirements as well as the deposition storage capacity. Presently the TSF is operating at Stage 3 with Stage 4&5 construction in progress and with a total of 8.91Mt of tailings stored to date. The total volume of embankment material placed of approximately 10.3Mm^3 for a total capital expenditure of US$41.2m inclusive of the additional US$28.4m planned for expenditure from 2020 through 2026 inclusive in the current LoMp (Table 18-2) .

The current LoMp requires deposition of a further 32.6Mt of material for a total placed tonnage of 41.5Mt which is approximately 9% (Table 18-3) more than the current estimated design capacity which is within the presently estimated design volume contingency estimate of 20%.

Table 18-1: TSF Design Parameters

Design Criteria	Total
Operations	
Capacity (Stage 1 through Stage 10)	• Original design capacity of 25Mt (Stage 7) expanded to 38.9Mt (Stage 10)
Tailings Arisings Rate	• Initially 3.0Mtpa expanded to 4Mtpa.
Production Days	• 333 (81.3% availability).
Slurry Characteristics	• 12% oxide / transitional and 88% primary ore. • 48% to 50% solids by weight. • SG = 2.73-2.77. • Slurry settled density = 1.4t/m^3 to 1.55t/m^3. • Permeability of 4 x 10-7m/s (primary and oxide).
Fluid Management	• Basin underdrainage system reports (via gravity) into a collection sump within each cell, pumped to supernatant pond. • Decant tower removal of supernatant solution via pipeline to the plant. Decant towers located adjacent to divider embankment within each cell. Decant towers raised annually. • Collect surface water (runoff) via decant. • Leachate collection and recovery system ("**LCRS**") installed beneath basin liner in the TSF basin, discharging to a collection sump, pumped to supernatant pond.
Embankments	
General	• Deposition towards decant tower in each cell. • Minimum tailings freeboard of 0.5m. • Minimum freeboard of 0.5m to critical pond, the greater of: • average annual rainfall plus 1 in 100-year recurrence interval, 72hr duration storm event. • 1 in 100-year recurrence interval annual rainfall series.
Construction	• Upstream cut-off trench and toe drain. • Zoned embankment comprising low permeability and structural fill zones. HDPE lining on the upstream face of embankments. • Minimum 6m crest width.
Materials	• Remove unsuitable foundation soils from entire embankment footprint for use as embankment fill (if suitable). • Erosion protection (Zone E) and coarse rockfill (Zone G) may be sourced from site mining operations, site borrow areas or imported from off site. Filter sand (Zone F) may be sourced from site borrow areas or imported from off site. • Low permeability material (Zone A), Transition fill (Zone B) and Structural fill (Zone C) from borrow areas located within the TSF basin where possible. • Structural fill (Zone C1) sourced from mining operations as mine waste.
Tailings Basin	
Basin Line	• Composite liner over entire TSF basin area, comprising compacted soil liner overlain by 1.5mm smooth high-density polyethylene ("**HDPE**") geomembrane liner. Compacted soil liner comprises primarily in situ soils, scarified and re-compacted throughout basin area to form a 200mm thick soil liner. Where in-situ materials are unsuitable for soil liner, low.
Leachate Collection and Recovery System	• Drains excavated in alluvial sands with slotted pipe, backfilled with sand (Zone F) and capped with low permeability material (Zone A) below basin soil liner. • Collection sump within Cell 1 and abstraction system to discharge into supernatant pond.
Tailings Underdrainage System	• Collector drains and finger drains throughout TSF basin area, with water collected from the tailings mass and discharged to a collection sump, then pumped to the supernatant pond.

Table 18-2: TSF Construction Volumes

TMF Stage	Construction (date)	Crest RL (m)	Storage Capacity (Mt)	Incr. Capacity (m^3)	Zone A (m^3)	Zone C (m^3)	Total (m^3)	Capital (US$k)	Status	Lift Cost (US$/m^3)	Capacity Cost (US$/t)
1[(1)]	03-2017	326.6	5.39	5.39	-	-	-	-	Built		-
2	06-2018	330.1	10.61	5.22	0.14	1.19	1.33	5,569	Built	4.20	1.07
3	03-2020	335.6	13.00	2.39	0.15	1.74	1.89	7,245	Built	3.84	3.03
4&5	12-2020	341.2	19.39	6.39	0.15	1.01	1.16	4,628	In-Progress	4.00	0.72
6	07-2022	344.5	23.39	4.00	0.08	0.58	0.66	2,640	LoMp	4.00	0.66
7	07-2023	347.7	27.39	4.00	0.08	1.00	1.08	4,320	LoMp	4.00	1.08
8	07-2024	350.3	30.88	3.49	0.07	1.29	1.36	5,428	LoMp	4.00	1.56
9	07-2025	352.9	34.37	3.49	0.07	1.29	1.36	5,428	LoMp	4.00	1.56
10	07-2026	355.5	38.19	3.82	0.08	1.41	1.48	5,940	LoMp	4.00	1.56
Total			**38.19**	**38.19**	**0.82**	**9.49**	**10.31**	**41,198**		**4.00**	**1.08**

(1) Stage 1 details for embankment construction and associated expenditure breakdowns not available.

Table 18-3: TSF Arisings, Capacity and Utilisation

Year	Tailings Arisings (Mt)	Cumulative Placed (Mt)	Capacity (Mt)	Utilisation (%)
2017	0.81	0.81	5.39	15.1
2018	3.95	4.76	10.61	44.9
2019	4.14	8.91	10.61	83.9

Year	Tailings Arisings (Mt)	Cumulative Placed (Mt)	Capacity (Mt)	Utilisation (%)
2020	4.04	12.95	19.39	66.8
2021	4.05	17.00	19.39	87.7
2022	4.05	21.05	23.39	90.0
2023	4.05	25.10	27.39	91.6
2024	4.06	29.16	30.88	94.4
2025	4.05	33.21	34.37	96.6
2026	4.05	37.26	38.19	97.6
2027	3.31	40.57	38.19	106.2
2028	0.96	41.53	38.19	108.7

Design Considerations

Tailings are pumped to the TSF as a slurry at 48% to 50% solids and is deposited sub - aerially to facilitate drying and consolidation of the tailings mass. A density of approximately 1.4t/m^3 was achieved initially, increasing to 1.6t/m^3 during normal operation to give an overall final dry density of 1.55t/m^3 placed.

The preliminary static tailings acid base accounting indicated that the tailings would be acid consuming. The assay results showed that the tailings solids had a low number of elemental enrichments, with arsenic, selenium and antimony significantly enriched and chromium slightly enriched. A comparison with soil intervention guidelines indicated that the element concentrations for chromium, manganese, nickel, sulphur, sulphate and vanadium significantly exceed the soil intervention guidelines. The sample also marginally exceeded the guidelines for arsenic and copper. The results of this comparison indicate that a cover system designed to isolate the tailings facility from the environment will be required on closure to prevent migration of tailings. The cost of an appropriate cover system has been included in the current design and closure costs (Section 20.6).

The tailings supernatant was tested against reference water quality standards for release of water from mining operations and livestock drinking water. A cyanide destruction unit was installed as part of the Houndé Process Plant construction, which reduces the WAD cyanide to below 50ppm at the spigot discharge into the dam, as recommended by the ICMC. Arsenic and antimony are present at levels which would require dilution before releasing into aquatic systems as surface flows. It will therefore be required to store a minimum of a 1 in 100-year wet event on the TSF without release to the environment (this minimum only occurs in the dry season when the tailings are at the maximum level prior to the next embankment lift being constructed). It is estimated that the concentration of substances in the tailings water will be diluted more than 50 times for a 1 in 100-year event. When compared with background groundwater quality, the tailings supernatant contained arsenic at levels higher than the groundwater and the release standards. A suitable seepage reduction system has therefore been installed for the TSF to reduce the risk of tailings supernatant affecting the groundwater.

Geotechnical

A geotechnical investigation on the tailings site indicated that the laterite was on average 1m thick, followed by more than 5m of saprolite, overlying the saprock or transition material. Seepage analysis undertaken for the TSF site indicated that the saprolite provided a low permeability layer with an effective permeability which varied between 2.0 x 10-10m/s for Stage 1 to 4.6 x 10-11m/s for the final stage. The unit seepage rate was calculated at 0.17kL/ha/day for stage 1 and 0.07kL/ha/day for the final stage. These rates are lower than the Australian guideline value of <1kL/ha/day, which is currently the most stringent guideline (a seepage rate of 1kl/ha/day is equivalent to a base permeability of 1 x 10-9m/s with 1m of water head). The seepage analysis further indicated that due to the low effective permeability of the layer of saprolite below the facility there would be minimal benefit to installing drains other than toe-drains at the embankments.

A seismic analysis was done for the site, which indicated that the maximum credible earthquake would be a M5.8 shallow crustal earthquake occurring within 53km of the site, causing peak ground acceleration ("**PGA**") of 0.10g. Comparison with the probabilistic analysis results indicates this acceleration to be similar to the PGA calculated for the 1 in 20,000-year return interval. The site is considered to have a low seismic hazard rating.

A dam break analysis was carried out on the TSF embankments, (see Figure 18-2) which resulted in the classification of the facility as a "**High**" consequence rating. Embankment 2, which has the largest potential impact in the event of a failure, is built using the downstream construction method to mitigate the 'high' consequence rating, while Embankment 1 and Embankment 3 are built downstream for Stage 1 and centreline for subsequent stages. The earth fill embankments are constructed with engineered zones, comprising a low permeability upstream face with a cut-off trench extending through the laterite into the underlying saprolite, followed by a downstream structural zone. For embankments of downstream geometry, the upstream slopes are 2H:1V, an operating downstream slope of 3H:1V and a crest width of 6m. The final downstream embankment profile will consist of 3H:1V slopes with 5m wide benches at 10m height intervals, producing an overall slope of 3.5H:1V for ease of rehabilitation.

Operation

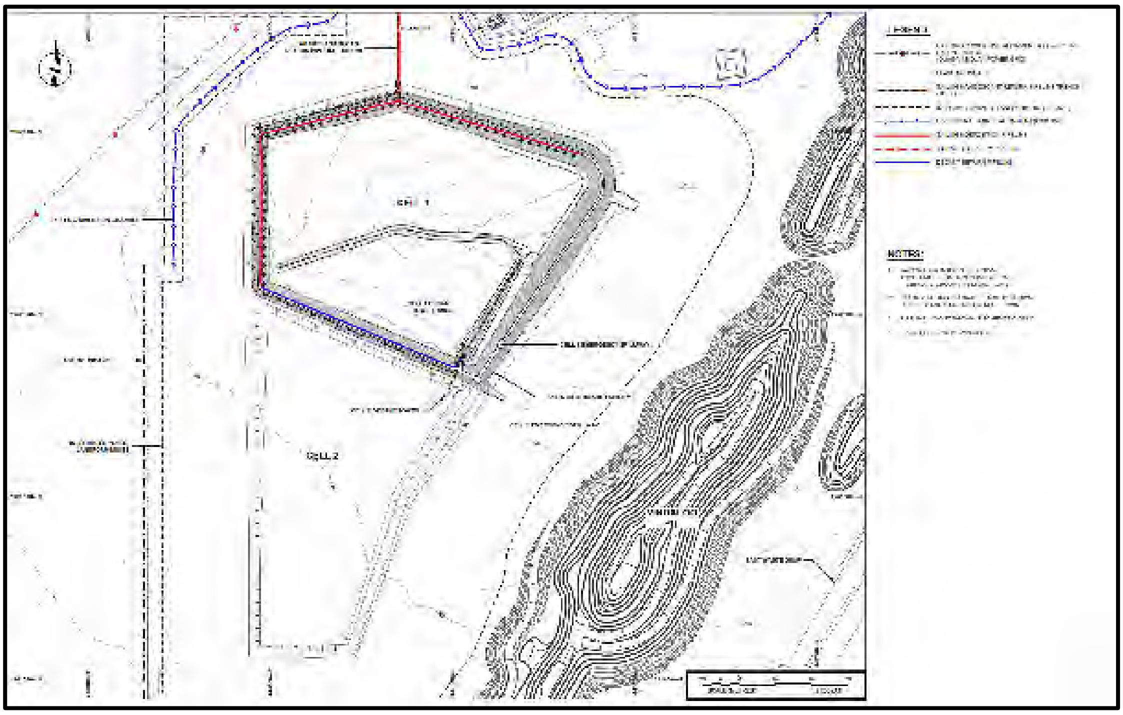
Tailings is deposited off the embankments and the north-western ridge to form a decant pond away from the embankments, against the ridge forming the western limit of the TSF.

The tailings settling performance is monitored regularly from density and flow measurements, and piezometers were installed to measure the phreatic surface in the embankment to ensure the stability is not compromised. Survey pins were installed to detect potential movement of the embankment. Six boreholes were installed downstream of the embankments to monitor seepage from the facility.

The TSF site has a catchment area of 320ha, which includes the tailings surface of 200ha at full capacity. Emergency spillways are constructed for each construction stage to provide for events exceeding the designed storage capacity. (If such a release occurs, the concentration of metals in the supernatant liquor will be diluted to such an extent as to be safe for release). The spillway for the final stage will also be used as the post-closure spillway for the facility and will be designed to safely discharge the Probable Maximum Flood ("**PMF**").

At closure, the embankments will be rehabilitated and revegetated and the TSF surface will be covered with a layer of waste rock to prevent root growth into the tailings and finished with a soil layer, shaped to be free draining towards the closure spillway

Figure 18-2: TSF Final Stage General Arrangement (source: Endeavour)



Recent External Audit Findings

- **TSF Water Balance:** The supernatant pond is located around the decant towers in the south-east corner of Cell 1 and north-east corner of Cell 2 in accordance with the design intent, but the supernatant pond areas are larger than intended and is close to all of the embankments. This was largely attributed to:
  - the inspection being conducted during the wet season with annual rainfall from August 2018 to July 2019 (1,140.8mm), being 34% higher than the long-term average of 849mm;
  - increased (4.15Mtpa) throughput (+30%) when compared with the original design placement capacity of 3Mtpa;
  - additional raw water was being utilised for the Knelson concentrators which was amended in mid-July 2019, reducing the raw water input by approximately 1,600m^3/day (0.53Mm^{3}pa).

  Monthly plant data indicates a reasonable decant reclaim of approximately 69%, which is consistent when compared to the last audit period (decant return of 77% of water to TSF). At the time of the 2019 audit inspection, the tailings freeboard at the western embankment was generally around 5m to 6m, indicating about 13-14 months of available tailings storage in Cell 1 and Cell 2 based on the current nominal throughput (48 tph). Accordingly, the audit findings highlighted the importance of controlling the pond and facility water balance;
- **Engineer of Record ("EoR"):** Knight Piesold (Perth) have been associated with the Houndé Gold Mine TSF from initial designs, construction of the starter dam, operations and subsequent lifts. They fulfil the role of EoR for Houndé Gold Mine. Endeavour considers that this is an essential requirement for operating tailings storage facilities and maintains a regular dialogue with their principle engineer and design engineer;
- **TSF capacity:** the original TSF was designed with a capacity of approximately 25Mt at an original design rate of 3Mtpa over an initial period of 9 years with an assumed design settled density of 1.4t/m^3. During this initial period, the settled density of the oxide material was noted at a reduced value of 1.25t/m^3. The increased deposition capacity total of 41.5Mt has

predicated an estimate of additional lifts required to facilitate this, however further engineering work (stage capacity analysis) and design stability analysis is required to further refine the preliminary estimates as reported herein;

- **Water Quality:** Monitoring of water quality in the TSF pond and downstream boreholes is undertaken in accordance with a schedule and in some cases, the data has been found to exceed acceptable limits. Groundwater downstream of the TSF does contains naturally elevated turbidity and concentrations of iron and aluminium. Concentrations of arsenic, lead and manganese in have found to be elevated, compared to drinking water standards, in some samples but there is no evidence of an increasing trend. Cyanide concentrations are monitored and below limit values; and
- **General Findings:** In addition to the above the audit made a number of important and appropriate recommendations based upon observed conditions and monitoring data. These are however mainly operational continuity and/or repair and maintenance tasks.

18.6 Surface Water Management

Design Objectives

The surface water management at the site incorporates control measures in order to reduce impacts to downstream environments for all aspects of the Houndé Gold Mine, from initial development through to completion of rehabilitation. The main objectives / outcomes of the management of surface water on the site are summarised as follows:

- Maximising the internal recycle of contact and process waters in ore processing and thereby minimising the use of external water sources;
- Minimise the impact of the proposed mining activities on the quality and quantity of surface water. This is achieved by routing clean surface water runoff around disturbed areas and minimising sediment discharge from the site to the environment by entrapping and retaining eroded sediment as close as possible to disturbed areas;
- Protect internal infrastructure and personnel from the uncontrolled effects of surface water runoff during storm events, thereby enhancing the safety of project personnel and reducing maintenance costs; and
- Provide long-term post-mining erosion and sediment control measures, including where practical the establishment of fully stabilised and protected final reclaimed surfaces that require minimal maintenance.

The following four categories of water were identified on the site: “**Undisturbed**” water as runoff from undisturbed catchments; “**Contact Clean**” water as runoff from disturbed catchment areas with some sediment pickup; “**Contact Dirty**” as runoff from disturbed catchment areas with potential for contamination sources including runoff from sub-ore stockpiles, RoM pad and plant site; and “**Process**” with water that has passed through the process or come into contact with process water.

Key Water Management landforms

Based on the above classifications, the following main components are required:

- **Diversion Structures:** To alter the flow path of surface water flows to reduce the potential for harm to people or infrastructure or to minimise the potential for mixing clean water with runoff from disturbed sites. The following structures were constructed.
  - **Stream Diversions:** The Vindaloo North pit extends across one of the drainage channels feeding the water harvest dam. A stream diversion was installed to divert the

flow of Undisturbed water around the northern tip of the pit.

- **Diversion Berms/Channels:** A series of diversion berms and/or channels will be constructed over the life of the mine, as development progresses, to separate Undisturbed water from other water categories at the plant site, RoM pad, sub-ore stockpiles, pit and waste rock dumps.

* **Collection and Control Structures:** Runoff from areas designated as Contact Clean water and Contact Dirty water is directed to Sediment Control Structures and Collection Structures, respectively. The sediment control structures provide adequate retention to allow settling of medium sized silt but have spillways to pass flows larger than 1 in 10-year recurrence interval.
  - **Collection Structures:** Runoff from the RoM pad and sub-ore stockpiles is directed to a Collection Structure downstream of the stockpiles. The quality of the water collected from these areas is tested and the water either released to the environment after providing time for solids to settle or pumped to the process plant as process water.
  - **Sediment Control Structures:** Runoff from Contact Clean disturbed areas such as the waste rock dumps is collected and directed to one of eight proposed Sediment Control Structures to provide retention time for sediment to settle, before water is released to the environment. It is noted that the water harvest dam is situated downstream of the site in such a position that it can capture sediment not settled in other structures upstream thereof. The dimensions of the water harvest dam are such that it would provide adequate retention time for medium sized silt (>20µm) to settle.

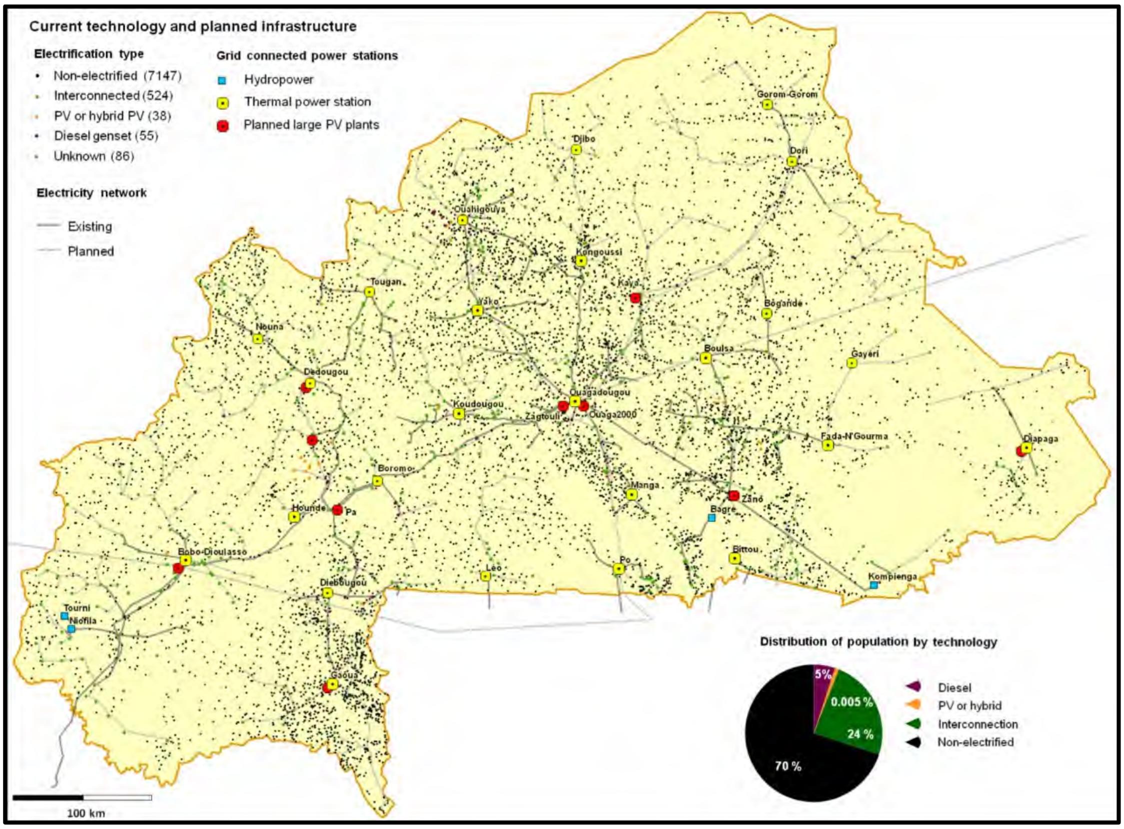
18.7 Electrical Power

The total installed electrical power generation in Burkina Faso in 2019 reports a total of 318MW with thermal plants (diesel and heavy fuel oil) contributing 253MW and hydropower and solar 32MW and 33MW respectively. The hydroelectric power stations comprise two facilities, the Kompienga Hydroelectric Power Station (1989) and the Bagré Hydroelectric Power Station (1994) with generating capacity of 18MW and 16MW respectively (Figure 18-3). The thermal power stations are all diesel powered and operated by the national electricity company of Burkina Faso known as Société Nationale d'électricité du Burkina Faso (“**SONABEL**”). There is one operating power station (Zagtouli) with a further (Kona-22MW) in development.

Burkina Faso currently has some of the most expensive electricity in the region, with cost of production at USc22/kWh to USc28kWh. The country has had limited experience with private sector development in the energy sector, but the GoBF has set forth a bold national plan and has taken steps to introduce legislation to encourage private-sector investment and to liberalize electricity generation and distribution.

Burkina Faso is aiming to increase its electricity access rate from 20% to 80% as part of its National Plan for Economic and Social Development, doubling the number of customers to 1 million, and increasing installed capacity to 1GW. By 2025, Burkina Faso seeks to lower its cost of energy, increase the access rate to 95%, increase installed capacity to 2GW, and begin exporting oil and gas to nearby countries. A new law adopted in April 2017 removes market segmentation and the single-buyer model, liberalizes production and distribution, and adopt provisions relating to renewable energy and energy efficiency. In 2017, Burkina Faso inaugurated the Zagtouli solar power plant with support from the European Union and the French Development Agency (“**AFD**”).

Figure 18-3: Current electrical power generation technology and planned infrastructure (2014) (source: Endeavour)



Power Supply

The high voltage power supply for the Houndé Gold Mine is a tap off from the existing 225kV line interconnecting between the Kodeni and Pa substations. Two tension towers were erected at close proximity to the 225kV line tap off point, allowing 225kV supply to be fed to the Houndé switchyard. This switchyard is located about 70m from the process plant HV switch room. The grid network stability analysis conducted revealed that the 225kV supply provides more stable operation for the mill drives, with only infrequent to rare outages likely to be experienced.

In addition to grid supply (presently assumed at 90%), an emergency power supply facility was constructed to counter grid supply reliability issues. This comprises a light fuel oil ("**LFO**") power generation plant (the "**Houndé Power Plant**") which contributes approximately 10% of power supply to the Houndé Gold Mine. The power plant has an installed capacity of 25.6MW and includes eighteen Caterpillar 3516B diesel engines, each providing approximately 1.6MW of power. The power plant start-up has been synchronized with the high voltage switch yard at the Houndé Gold Mine; variations in incoming loads triggers soft start of the power station and supply to the main incomer, limiting operational down time as much as possible.

The Houndé Power Plant has a standalone fuel storage facility, which allows diesel tankers to offload independent of the contracted fuel facility located at the Mine Services Area. Storage capacity of the fuel facility is approximately 30kL.

Power Distribution

The main distribution voltages are 11kV and 415V for the process plant. The 225kV supply is stepped down to 11kV via a single 225kV/11kV, 25MVA/35MVA, ONAF main transformer, feeding the plant 11kV main switchboard. The 11kV supply is distributed to various process plant load centres, support facilities, remote facilities and accommodation camp. A standby transformer has been installed in the switchyard and put on 'soak' via the 11kV supply. In case of a failure of the duty unit, the standby unit will be relocated to the duty position to replace the defective unit during a relatively short outage for the transformer replacement work to be carried out.

A 415V, 2.5MVA diesel emergency generator supply with a step-up transformer has been allowed for the essential loads of the process plant during grid power outages. The change over from the grid to the emergency power supply is undertaken manually. The process plant load includes a semi-autogenous grinding ("**SAG**") mill of 6MW and a ball mill of 6MW. These mills are fed at 11kV and the mill drives include: Wound Rotor Induction Motors ("**WRIM**"); Liquid Resistor Starters ("**LRS**") for starting; and heat exchanger for speed control, in the range of 65% to 75% mill critical speed for the SAG mill only.

The 415V supply to the plant motor control centres ("**MCCs**"), plant buildings and remote MCCs are fed from the plant 11kV main switchboard via separate 11kV/433V distribution or "transformer kiosks" (high voltage/low voltage outdoor prefabricated substations). The supply to the remote electrical loads such as the water harvest barrage, water storage barrage, accommodation camp site, boreholes and tailings dam are taken from the mining services kiosk transformer via 11kV overhead power lines constructed using steel or concrete poles, steel cross arms and earth shield wire, acceptable to the Local Power Authority's requirements/ and standards. No overhead power lines have been installed within the plant perimeter area, and insulated cables are installed on above ground cable ladders.

Electrical power distribution and transmission at the Houndé Gold Mine also comprises:

- **Total Installed Load and Maximum Demand** represented by the maximum power demand of the process plant at approximately 18.3MW and a total connected load of 26.5MW;
- **Electrical Substation Buildings:** The three plant electrical substation buildings were prefabricated flat pack type construction on concrete columns for bottom entry cables. The buildings are insulated, furnished with air- conditioners, fire detection and alarm systems, lighting and small power. The remote MCCs/control panels at the water storage barrage, water harvest barrage, boreholes and tailings dam are installed in outdoor substations with roof covers;
- **11 kV Switchboard:** The plant main switchboards are metal-clad type with fully withdrawable circuit breakers complete with protection, metering and earthing facilities. Protection is provided by microprocessor-based protection relays;
- **Power Factor Correction Capacitor:** One unit of 11kV power factor correction capacitor bank was installed at the plant 11kV main switchboard to correct the power factor to 0.9 or better as required by the power supply authority;

18.8 Fuel Supply, pipelines and other services

Fuel Supply and usage

Total fuel consumption at Houndé Gold Mine amounts to some 24.8MLpa with 92% consumed in mining activities, 2% for power generation and the remainder in ancillary services. Total purchase for 2020 is noted at 27.7ML for a unit purchase price of US$1.02/l exclusive of certain on costs. The current contract supplies diesel fuel on a consignment basis and a one ML storage facility has been established at the Mine Services Area.

Pipelines

- **Tailings and Decant Return Pipelines:** The tailings pipeline is above ground and follows the alignment of the access road to the TSF in a bunded zone towards the tailings storage facility to the north. This acts as a barrier to movement of stormwater and a culvert crossing under the pipeline and road has been established; and

- **Water Supply Pipelines:** The HDPE pipelines from the water dams to the process plant were laid on surface, running alongside the access track. Crossings are provided for pedestrian, light vehicle traffic and livestock.

Internet Fibre Optic Line

The Houndé Gold Mine is connected to the internet via a fibre optic line from a local carrier. The same fibre optic cable is used for telephone connections, using Voice Over Internet Protocol ("**VOIP**") for fixed telephone connections. Mobile telephone services are also available in the area.

18.9 General Site Development and Other Services

Site Topography and Ground Conditions

Geotechnical investigations to determine ground conditions and material properties for the various components of the proposed infrastructure were carried out by independent consultants. The investigations concluded that at the tailings dam site, the ground conditions encountered typically comprised a shallow depth of laterite (gravel or silt) overlying saprolite (silt). The materials are suitable for the construction of embankments as the design incorporates measures to mitigate against the dispersive nature of the soils, Sand for drainage layers is trucked in from local quarries or screened. Historical analysis also noted that the strength and stiffness characteristics of the ground was sufficient for the majority of the plant site's structures to be founded on shallow spread foundations.

The topography at the Houndé Gold Mine is generally open and undulating with the main process plant and mine services facilities located on ground with a gradual natural slope towards the south. The plant is inset into a cut surface with a 3m high western wall; which assists in reducing ground level noise from the plant to the community located 1km west of the plant area.

There are no major watercourses in the vicinity of the plant site area and the surface water drains naturally toward the valley south east of the site.

Sewage and Solid Waste Management

- **Sewage Treatment:** Sewage from the accommodation camp, process plant and mining services areas is collected and treated in two package sewage treatment plants. Sludge is suitable for direct landfill burial in unlined pits. Treated effluent from the accommodation camp is discharged to a leach field, while the treated effluent from the plant site and mining services area is discharged into the tails hopper;
- **Solid Wastes:** General solid wastes are deposited into a landfill, in accordance with local regulations, but dangerous materials such as cyanide packaging, is incinerated on site to prevent unauthorised use. Other materials unsuited to landfill is stored on site for later disposal;

Explosive Storage and Handling

A contract was entered into with a recognised supplier of mining explosives, this contractor established its own facilities in the southern end of the eastern waste dump, well away from the local population and mine activities, and to supply emulsion as needed.

Accommodation Camp

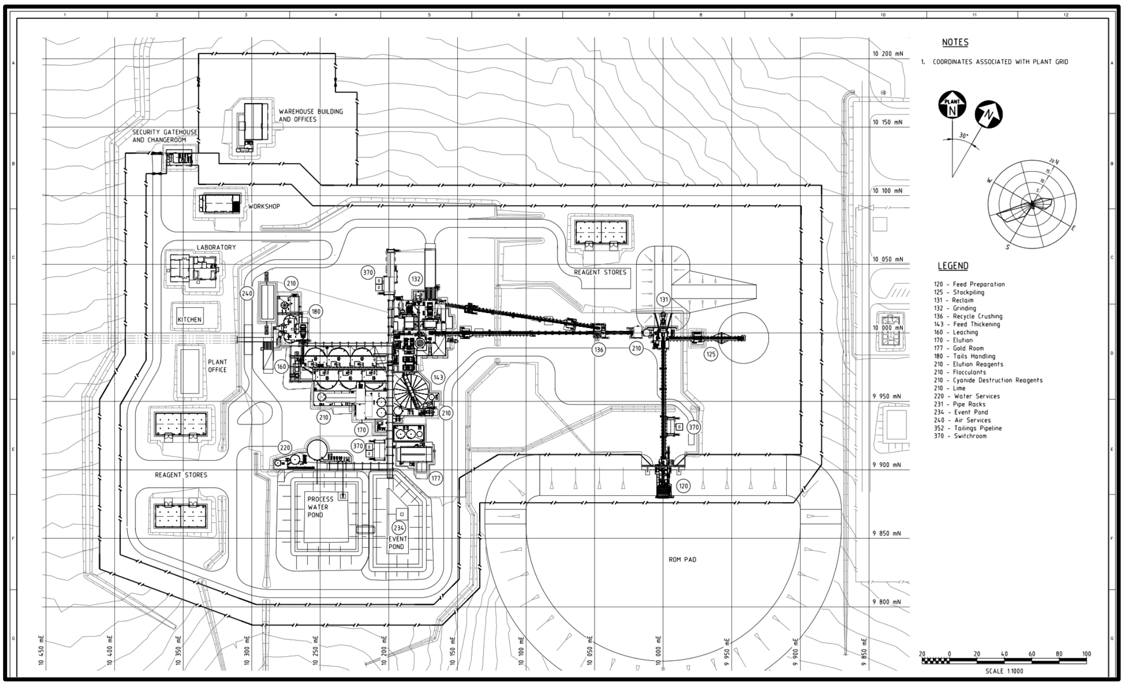
A significant proportion of the workforce is recruited from and continue to reside in Houndé town; however, permanent accommodation to house 200 senior operations and mining workforce personnel was provided approximately one kilometre to the north of the process plant for expatriates and personnel from outside the local district. The camp is accessed from a new road that links to the mine access road.

The camp has a mix of building types with blockwork construction on concrete slabs and steel trussed roofs for the larger rooms supplemented with converted sea containers for additional rooms. All buildings are single storey. For fit-out and finishes within buildings, preference was given to locally available equipment and materials subject to availability and quality constraints.

Process Plant Facilities

The process plant support facilities are generally industrial type structures constructed of a concrete slab on ground with structural steel frame and metal cladding. Office and amenity areas associated with the main structures are generally of blockwork construction. The process plant and its support facilities are shown in Figure 18-4.

Figure 18-4: Houndé Process Plant general arrangement (source: Endeavour)



Mine Services Area Facilities

The mine services area ("MSA") facilities include: heavy vehicle workshop (5 bays); washdown bay, with water recycle; mining services administration building; shift change house, complete with showers and ablutions; and a warehouse.

Plant Area

The process plant support facilities are generally industrial type structures. Most are constructed of a concrete slab on ground with structural steel frame and metal cladding. Office and amenity areas associated with the main structures are generally prefabricated construction. The primary facilities are:

- main administration building, with annexe for first aid clinic and emergency services;
- laboratory, including sample preparation area, wet and dry areas and environmental section;
- plant offices, mess and ablutions;
- electrical switchrooms (three), prefabricated construction, mounted on plinths for bottom

cable entry;

- gatehouse for entry boom gate control;
- security building and change room, for all access control functions, including washrooms and laundry;
- plant control / titration room (prefabricated structure) located above the CIL tanks;
- reagent stores (two);
- plant workshop; and
- plant warehouse and stores, with secure storage for smaller items and outdoor yard for larger items.

Other Support Facilities – Water Services

Raw water is pumped to the plant site from the water harvest and storage dams and discharges into the raw water tank for distribution around the plant.

Fire water for the process plant is drawn from the raw water tank. Suctions for other water services fed from the raw water tank are at an elevated level to ensure a fire water reserve always remains in the raw water tank. Fire hydrants and hose reels are placed throughout the process plant, fuel storage and plant offices at intervals that ensure complete coverage in areas where flammable materials are present.

Raw water directly from bores, is supplied to the plant potable water treatment plant for filtration, ultra-violet sterilisation and chlorination. Potable water is reticulated to the plant buildings, site ablutions, safety showers and other potable water outlets. Additional ultra-violet sterilisation units were installed on outgoing potable water distribution headers.

18.10 Risks and Opportunities

Principal risks relating to infrastructure applicable to Houndé Gold Mine are directly related to:

- Tailings Storage Facilities, specifically in respect of the following items:
  - the reduced storage capacity arising from the lower than expected placed densities during the early period of oxide processing operations,
  - the current water storage levels on the TSF which requires monitoring and further management measures to ensure that this does not increase further,
  - geochemical monitoring in the TSF pond and downstream boreholes to determine whether any further management measures are required,
  - a best practice requirement to formally appoint an Engineer of Record;
- Security in respect of the ongoing jihadi insurgency from home-grown extremist networks (such as Ansarul Islam) and transnational terrorist organisations affiliated with either al-Qaida or Islamic State (and mainly based in neighbouring Republic of Mali or the Republic of Niger); and
- Operational disruptions due to COVOID-19 transportation limitations for personnel, consumables and maintenance supplies;

The principal opportunities are directly related to the various strategic initiatives either under investigation or being implemented at Houndé Gold Mine as described in Section 24.2 of this Technical Report.

18.11 Interpretation, Conclusions and Recommendations

In summary the infrastructure aspects at the Houndé Gold Mine are well established following commissioning and commencement of operations in 2017. The asset integrity programmes including ongoing maintenance and replacement is well established and supports all aspects of key operational activities resulting in relatively high availability and utilisation for remote mining and processing operations.

Notwithstanding the above the following areas are noted:

- **Electrical Power Supply:** Recent improvements in the reliability of electrical power supply from the national grid network has facilitated a reduced demand from the Power Plant and should this continue there remains a further opportunity to reduce reliance on electrical power generated from the LFO Power Plant.
- **TSF Management:**
  - increased Mineral Reserves, a 33% increase in mill capacity and the lower density noted for drained tailings conditions has resulted in reduced capacity and the requirement for additional tailings lifts for the current LoMp,
  - Excess water storage requires further management controls to ensure that this does not exceed design and operational criteria,
  - Stored water and downstream borehole water geochemistry indicates exceedances in certain quality measures and further work is required to assess whether any further remediation measures are required to address this; and
- **External Threats** from security related issues and COVOID-19 require continued management focus to mitigate the risks posed to ensure security and safety as well sustainable production due to supply chain disruptions and personnel movement.

Accordingly, the principal recommendations reflect the principal conclusions highlighted above. These include:

- Further work to integrate the tailings lift construction with the mining plan in order to develop an almost continuous construction programme for the bulk waste, essentially treating this as a waste dump and therefore reducing construction costs; and
- Continued management focus in monitoring and managing potential external threats from the ongoing security related issues in Burkina Faso and operational disruption related to the current global COVOID-19 pandemic.

19 MARKET STUDIES AND CONTRACTS

19.1 Introduction

The following section includes discussion and comment on the commodity market studies and key contracts related to the operations of Houndé Gold Mine.

The forecast commodity prices and macro-economic assumptions as reported in this Technical Report were compiled from Endeavour's determinations which in turn was based on that assumed by mining and metals market peer companies and consensus market forecasts where available. These forecasts are not directly supported by detailed analysis undertaken by recognised commodity market specialists which typically short, medium- and long-term demand-supply-price analysis to support their determinations. As such all forecasts should be considered on a relative basis and compared to that reflect by the consensus market forecasts ("**CMF**"). Where possible historical data has been collated and reported through to 31 March 2020 and the latest CMF was also sourced from consensus data obtained in March 2020. All historical real terms data has been based dated to 31 March 2019.

The commodity price assumptions as relied upon for the economic analysis of the LoMp constrained to depletion of Mineral Reserves are as reflected in Table 19-1 below. The only other key macro-economic assumptions are the exchange rates against the US$ which assumed: US$1.11 to one Euro ("**€**"); US$1.25 to one Great British Pounds; Canadian Dollar ("**C$**") of 1.30 to one US$; '*Coopération financière en Afrique centrale*' ("**CFA**") issued by 'Banque des États de l'Afrique Centrale' ("**BEAC**") hereinafter CFA BEAC ("**XOF**") of 600 to one US$; and Australian Dollar ("**A$**") of 1.50 to one US$. For comparative proposes certain commodity prices are also presented in nominal terms and are derived assuming a constant consumer price inflation ("**CPINF**") of 2.00% per annum. The commodity price forecasts reflect the assumption as incorporated for the derivation of the Mineral Reserves as reported herein and include a constant 1 January 2020 real terms price of US$1,300/oz and US$15.00/oz for gold and silver respectively.

Table 19-1: Summary Assumptions – Commodity Prices and Macro-Economics

Commodity	Source	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	LTP
Real(1)												
Gold	Endeavour	(US$/oz)	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
	CMF	(US$/oz)	1,520	1,490	1,420	1,310	1,280	1,350	1,350	1,350	1,350	1,350
	3Y Average	(US$/oz)	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375
Silver	Endeavour	(US$/oz)	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
	CMF	(US$/oz)	17.50	16.75	18.25	18.00	17.75	18.75	18.75	18.75	18.75	18.75
	3Y Average	(US$/oz)	16.45	16.45	16.45	16.45	16.45	16.45	16.45	16.45	16.45	16.45
Nominal(2)												
Gold	Endeavour	(US$/oz)	1,326	1,326	1,326	1,326	1,326	1,326	1,326	1,326	1,326	1,326
	CMF	(US$/oz)	1,550	1,520	1,448	1,336	1,306	1,377	1,377	1,377	1,377	1,377
	3Y Average	(US$/oz)	1,403	1,403	1,403	1,403	1,403	1,403	1,403	1,403	1,403	1,403
Silver	Endeavour	(US$/oz)	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.30
	CMF	(US$/oz)	17.85	17.09	18.62	18.36	18.11	19.13	19.13	19.13	19.13	19.13
	3Y Average	(US$/oz)	16.78	16.78	16.78	16.78	16.78	16.78	16.78	16.78	16.78	16.78

(1) Real terms prices as at 1 January 2020 money terms.

(2) Nominal prices assuming annual US$ CPI of 2.00%.

19.2 Gold Market

Table 19-2 present the analysis of gold Consensus Market Forecasts ("**CMF**") for annual periods from 2020 through 2024 and in addition the Long-Term Price ("**LTP**") assumptions in real terms (31 March 2019, assumed as 1 January 2020). The CMF LTP derived from the March 2020 analyst pole which indicates a median of US$1,350/oz based on nine analysts with a range of US$1,110/oz to US$1,620/oz. Table 19-3 presents the historical gold price statistics on an annual basis from 2000 through to 2019 and for the three-month period ended 31 March 2020. For the 12-month period ended 31 December 2019, the gold price ranged from a low of US$1,270/oz to a high of US$1,552/oz with an average of US$1,393/oz and a three-year moving daily average of US$1,292/oz. For the three-month period ended 31 March 2020, the gold price ranged from a low of US$1,470/oz to a high of US$1,680/oz with an average of US$1,580/oz and a three-year moving daily average of US$1,375/oz.

Figure 19-1 presents historical and forecast gold price trends from 1970 through to 2030 for: nominal and real daily closing prices; three year daily moving average; historical nominal and real Long-Term Price assumptions; and forecast CMF in nominal and real terms where the real base date is noted as 1 April 2021. As at 12 April 2020, the "**Reuters Poll**" forecast reported a median gold of US$1,546/oz and US$1,500 for 2020 and 2021 respectively.

Table 19-2: Gold Consensus Market Forecast analysis (31 March 2020 real terms): 2020 through 2027 and the LTP[(1)]

Statistics	Units	2020	2021	2022	2023	2024	LTP
High	(US$/oz)	1,766	1,682	1,665	1,681	1,765	1,620
Median	(US$/oz)	1,520	1,490	1,420	1,310	1,280	1,350
Average	(US$/oz)	1,539	1,472	1,442	1,388	1,352	1,346
Low	(US$/oz)	1,404	1,331	1,288	1,209	1,093	1,110
STDEV	(US$/oz)	111	106	114	140	168	163
Analysts	(No)	27	15	22	19	19	9

(1) Consensus Market Forecast as sourced from on-market data.

Table 19-3: Historical gold price statistics for annual periods commencing 2000 through 31 March 2020[(1)]

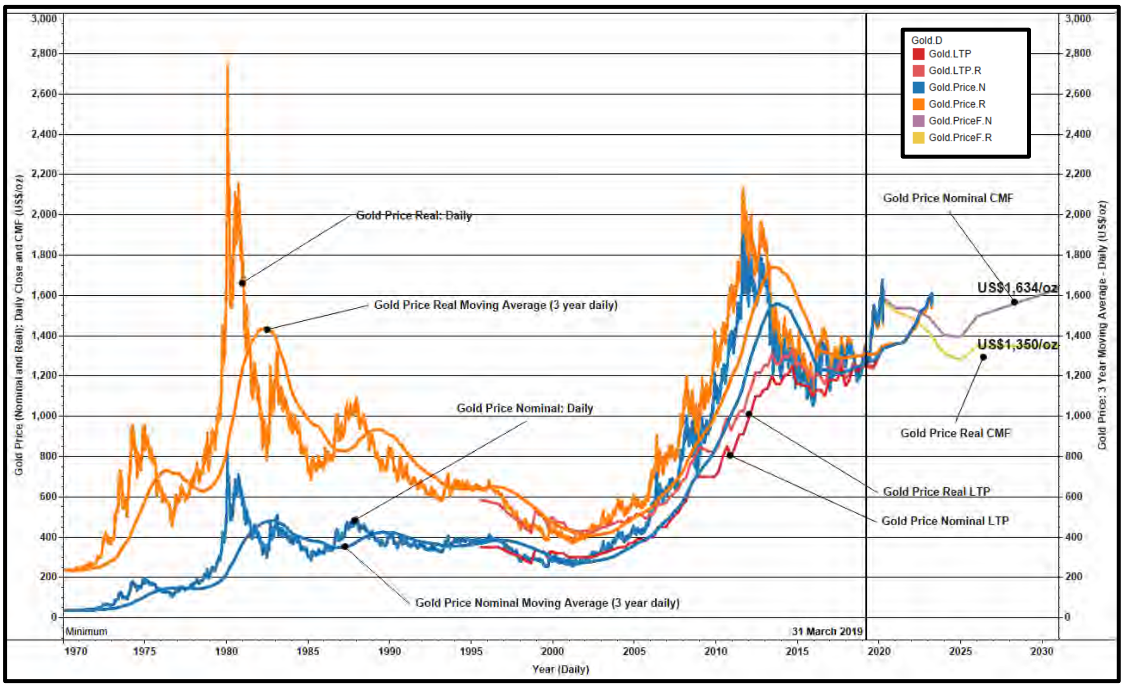
Period	Min (US$/oz)	Max (US$/oz)	Average (US$/oz)	3YDMAV (US$/oz)	Nominal Close (US$/oz)	Real Close[(2)] (US$/oz)	LTP Real[(2, 3)] (US$/oz)
2000	264	316	279	296	272	398	438
2001	255	293	271	281	279	401	432
2002	278	349	310	285	347	487	449
2003	323	416	364	306	415	572	479
2004	375	455	410	339	438	585	503
2005	412	528	445	382	517	668	517
2006	517	719	604	456	636	802	579
2007	607	839	697	539	833	1,008	686
2008	710	1,002	871	654	878	1,062	846
2009	810	1,215	973	787	1,096	1,290	836
2010	1,063	1,423	1,226	942	1,419	1,646	947
2011	1,311	1,899	1,572	1,160	1,564	1,761	1,115
2012	1,538	1,789	1,669	1,360	1,674	1,854	1,255
2013	1,190	1,692	1,410	1,469	1,205	1,314	1,280
2014	1,141	1,382	1,266	1,479	1,184	1,281	1,256
2015	1,051	1,301	1,160	1,376	1,061	1,140	1,193
2016	1,060	1,366	1,248	1,271	1,151	1,212	1,242
2017	1,151	1,349	1,258	1,233	1,302	1,343	1,196
2018	1,174	1,358	1,269	1,234	1,283	1,298	1,265
2019	1,270	1,552	1,393	1,292	1,517	1,501	1,302
2020	1,470	1,680	1,580	1,375	1,571	1,571	1,350

(1) Historical data to 31 March 2020.

(2) Real terms prices as at 1 January 2020 money terms.

(3) Historical Long-Term Price derived from median of Consensus Market Forecasts.

Figure 19-1: Historical Gold Spot Market Prices (nominal and real 1 April 2020): daily; three-year average daily



Analysis of peer group gold price assumptions used by gold mining companies indicates that

- For reporting of Mineral Reserves gold price assumptions published in a survey based on 2018 data published in 2019 indicated ranges from US$975/oz to US$1,250/oz (Table 19-4). Analysis of more recent date reported by a number of peer group mining companies (Table 19-5: US$1,100/oz to US$1,300/oz with a median of US$1,200/oz); and
- For reporting Mineral Resources gold price assumptions published in a survey based on 2018 data published in 2019 indicated ranges from US$1,200/oz to US$1,500/oz with a median of US$1,400/oz (Table 19-4). Analysis of more recent date reported by a number of peer group mining companies (Table 19-5: US$1,200/oz to US$1,500/oz with a median of US$1,300/oz).

The analysis reported in Table 19-5, comprises 10 peer group mining companies, which represents 32.2% and 36.4% of global gold production and total Mineral Resources respectively. For impairment testing the Houndé Gold Mine was assessed assuming the following commodity price assumptions: US$1,500/oz for gold; and US$17/oz for silver.

Table 19-4: Mining Company gold price assumptions: Impairment testing; Mineral Reserves; and Mineral Resources[(1)]

Aspect	Range	Gold Price (US$/oz)			
Period		**2019**	**2020**	**2021**	**LTP**
Impairment Testing	Low	1,200	1,200	1,200	1,200
	Average	1,243	1,239	1,241	1,243
	High	1,303	1,320	1,317	1,313
Period		**2015**	**2016**	**2017**	**2018**
Mineral Reserves	Low	1,000	1,100	1,100	975
	Average	1,170	1,212	1,226	1,173
	High	1,300	1,260	1,300	1,250
Period		**2015**	**2016**	**2017**	**2018**
Mineral Resources	Low	1,100	1,125	1,100	1,200
	Average	1,295	1,285	1,322	1,300
	High	1,500	1,400	1,500	1,500

(1) Source: Gold and Copper Price Survey, December 2018 (PWC).

Table 19-5: Mineral Resource and Ore Reserve gold price assumptions (2020)

Company	2P (US$/oz)	3R (US$/oz)	2019 Prdn (MozAu)	Global Prdn (%)	2P (MozAu)	3R (MozAu)	Global: 3R (%)
Newmont Goldcorp Corp.	1,200	1,400	7.45	6.9	100.2	177.0	5.3
Barrick Gold Corp.	1,200	1,500	7.32	6.8	71.0	169.0	5.0
AngloGold Ashanti Ltd.	1,100	1,400	3.45	3.2	43.9	175.6	5.2

Company	2P (US$/oz)	3R (US$/oz)	2019 Prdn (MozAu)	Global Prdn (%)	2P (MozAu)	3R (MozAu)	Global: 3R (%)
Kinross Gold Corp.	1,200	1,400	2.45	2.3	24.3	65.7	2.0
Newcrest Mining Ltd.	1,200	1,300	2.33	2.2	52.0	110.0	3.3
PJSC Polyus	1,250	n/a	2.40	2.2	64.4	191.5	5.7
Freeport-McMoRan Inc.	1,200	1,200	2.22	2.1	29.1	58.4	1.7
Gold Fields Ltd.	1,200	1,400	1.91	1.8	49.3	104.0	3.1
Agnico Eagle Mines Ltd.	1,200	1,200	1.78	1.7	21.6	61.1	1.8
Sibanye Gold Ltd.	1,300	n/a	0.93	0.9	15.4	104.6	3.1
Subtotal	**1,200**	**1,400**	**32.2**	**30.0**		**1,217.0**	**36.4**
Global			**107.6**			**3,346.8**	

19.3 Silver Market

Table 19-6 present the analysis of silver CMF for annual periods from 2020 through 2024 and in addition the LTP assumptions in real terms (31 March 2019, assumed as 1 January 2020). The CMF LTP derived from the March 2020 analyst pole which indicates a median of US$18.75/oz based on nine analysts with a range of US$13.05/oz to US$20.66/oz. Table 19-7 presents the historical gold price statistics on an annual basis from 2000 through to 2019 and for the three-month period ended 31 March 2020. For the 12-month period ended 31 December 2019, the silver price ranged from a low of US$14.35/oz to a high of US$19.57/oz with an average of US$16.19/oz and a three-year moving daily average of US$16.50/oz. For the three-month period ended 31 March 2020, the gold price ranged from a low of US$11,98/oz to a high of US$18.62/oz with an average of US$16.89/oz and a three-year moving daily average of US$16.45/oz.

Figure 19-2 presents historical and forecast silver price trends from 1970 through to 2030 for: nominal and real daily closing prices; three year daily moving average; historical nominal and real Long-Term Price assumptions; and forecast CMF in nominal and real terms where the real base date is noted as 1 April 2021. As at 12 April 2020, the Reuters Poll forecast reported a median silver of US$18.28/oz and US$19.13 for 2020 and 2021 respectively.

Table 19-6: Silver Consensus Market Forecast analysis (31 March 2020 real terms): 2020 through 2027 and the LTP[(1)]

Statistics	Units	2020	2021	2022	2023	2024	LTP
High	(US$/oz)	21.59	20.52	20.77	20.77	20.84	20.66
Median	(US$/oz)	17.50	16.75	18.25	18.00	17.75	18.75
Average	(US$/oz)	17.52	17.45	17.75	17.51	17.38	18.19
Low	(US$/oz)	14.70	14.55	14.18	13.70	13.37	13.05
STDEV	(US$/oz)	1.71	1.81	1.94	2.14	2.20	2.37
Analysts	(No)	22	11	17	15	15	9

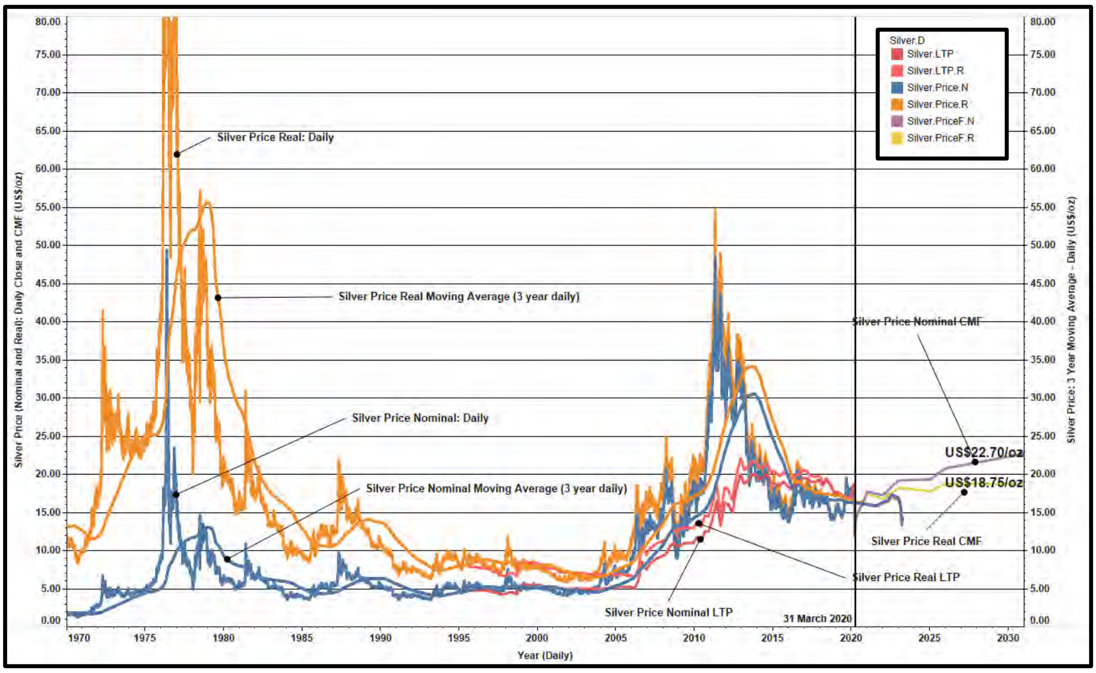
(1) Consensus Market Forecast as sourced from on-market data.

Table 19-7: Historical silver price statistics for annual periods commencing 2000 through 31 March 2020

Period	Min (US$/oz)	Max (US$/oz)	Average (US$/oz)	3YDMAV (US$/oz)	Nominal Close (US$/oz)	Real Close[(1)] (US$/oz)	LTP Real[(1, 2)] (US$/oz)
2000	4.57	5.50	4.95	5.15	4.59	6.71	5.25
2001	4.05	4.80	4.37	5.02	4.61	6.63	5.00
2002	4.23	5.07	4.60	4.78	4.76	6.69	5.00
2003	4.34	5.96	4.88	4.70	5.93	8.18	5.00
2004	5.54	8.22	6.66	5.13	6.79	9.07	5.08
2005	6.41	8.98	7.31	5.86	8.81	11.38	5.17
2006	8.72	14.74	11.56	7.60	12.87	16.21	7.75
2007	11.54	15.48	13.37	9.73	14.77	17.88	9.33
2008	8.95	20.75	14.93	11.79	11.30	13.66	10.58
2009	10.53	19.20	14.67	13.63	16.83	19.81	11.25
2010	15.01	30.86	20.16	15.78	30.86	35.79	13.08
2011	26.82	48.41	35.27	21.26	27.69	31.19	16.17
2012	26.34	36.89	31.13	25.31	30.31	33.56	19.58
2013	18.45	32.24	23.79	27.59	19.41	21.17	19.58
2014	15.33	21.96	19.03	27.31	15.66	16.95	18.75
2015	13.70	18.29	15.69	22.41	13.83	14.86	18.33
2016	13.79	20.61	17.08	18.90	15.93	16.78	19.50
2017	15.58	18.52	17.04	17.21	16.95	17.47	19.00
2018	13.96	17.57	15.68	16.37	15.48	15.66	17.50
2019	14.35	19.57	16.19	16.50	17.83	17.64	17.58
2020[(3)]	11.98	18.62	16.89	16.45	13.97	13.97	18.75

(1) Real terms prices as at 1 January 2020 money terms.
(2) Historical Long-Term Price derived from median of Consensus Market Forecasts.
(3) Historical data to 31 March 2020.

Figure 19-2: Historical Silver Spot Market Prices (nominal and real 1 April 2020): daily; three-year average daily



Analysis of peer group silver price assumptions used by gold mining companies indicates that

- For reporting of Mineral Reserves silver price assumptions reported by a number of peer group mining companies (Table 19-8) indicated a range from US$15.00/oz to US$18.00/oz with a median of US$15.00/oz); and
- For reporting of Mineral Resources silver price assumptions reported by a number of peer group mining companies (Table 19-8) indicated a range from US$15.00/oz to US$18.00/oz with a median of US$15.00/oz)

The analysis reported in Table 19-8, comprises 9 peer group mining companies, which represents 30.4% and 34.5% of global silver production and total Mineral Resources respectively.

Table 19-8: Mineral Resource and Ore Reserve silver price assumptions (2020)

Company	2P (US$/oz)	3R (US$/oz)	2018 Prdn (MozAg)	Global Prdn (%)	2P (MozAg)	3R (MozAg)	Global: 3R (%)
Fresnillo plc.	17.00	17.00	58.1	6.8	397.8	2,146.0	5.6
Glencore plc.	15.00	15.00	34.9	4.1	487.9	3,027.9	7.9
KGHM Polska Miedz S.A. Group	15.00	15.00	33.9	4.0	1,688.6	4,571.0	12.0
Cia. De Minas Buenaventura S.A.A.	15.00	15.00	26.2	3.1	264.4	419.1	1.1
Polymetal International plc.	15.00	15.00	25.3	3.0	116.0	463.8	1.2
Pan American Silver Corp.	17.00	17.00	24.8	2.9	557.2	1,099.5	2.9
Hochschild Mining plc.	16.00	16.00	19.7	2.3	42.8	345.5	0.9
Hindustan Zinc Ltd.	18.00	18.00	19.6	2.3	279.7	1,011.1	2.6
Southern Copper Corp.	15.00	15.00	17.3	2.0	52.5	110.1	0.3
Subtotal	**15.00**	**15.00**	**259.8**	**30.4**		**13,193.9**	**34.5**
Global			**855.7**			**38,230.0**	

19.4 Macro Economics

The Financial Model for the Houndé Gold Mine has been established in real terms and as such does not explicitly model the impact of inflation and purchase price or non-purchase price parity determination of nominal exchange rates. This aside the forecast expenditures incorporate the impact of assumed real terms exchange rates for both operating and capital expenditures. Accordingly, the following includes a summary of the key macro-economic parameters which directly or indirectly impact both the projection of expenditures and the economic analysis of the Mineral Reserves.

Exchange Rates

The budgeting process and LoMp expenditure forecasts in corporate assumed long-term real terms exchange rates measured against the US$ of: 1.11€ to one US$; Great British Pounds ("**GBP**") of 0.80 to one US$; Canadian Dollar ("**C$**") of 1.30 to one US$; '*Coopération financière en Afrique centrale*' ("**CFA**") issued by 'Banque Centrale des États de l'Afrique de l'Ouest' ("**BCEAO**") hereinafter CFA BCEAO ("**XOF**") of 600 to one US$; and Australian Dollar ("**A$**") of 1.50 to one US$.

Table 19-9 presents a historical (2000 through 2019 annually; 2020 – 3 months to 31 March 2020) timeline of the key exchange rates relied upon for informing certain aspects of the current LoMp. During the twelve-month period ended 31 December 2019 (Figure 19-3; Figure 19-4) the individual exchange rates reviewed noted:

- For the Euro ("**€**") an exchange rate which ranged from 1.09 to a maximum of 1.15 with an average for the period of 1.12;
- For the Great British Pound ("**GBP**") an exchange rate which ranged from 1.20 to a maximum of 1.33 with an average for the period of 1.28;
- For the Canadian Dollar ("**C$**") an exchange rate which ranges from 1.30 to a maximum of 1.36 with an average for the period of 1.33;
- For the CFA BEAC ("**XOF**") an exchange rate which ranges from 565 to a maximum 604 with an average for the period of 582; and
- For the Australian Dollar ("**A$**") an exchange rate which ranged from a low of 1.38 to a maximum of 1.49 with an average for the period of 1.44.

Table 19-9: Historical exchange rates[1]

Year	Annual Average					End of Period				
	(€)	(GBP)	(C$)	(XOF)	(A$)	(€)	(GBP)	(C$)	(XOF)	(A$)
2000	0.92	1.52	1.48	710	1.79	0.94	1.50	1.50	699	1.79
2001	0.90	1.44	1.55	731	1.96	0.89	1.45	1.59	735	1.96
2002	0.95	1.50	1.57	691	1.78	1.05	1.61	1.57	629	1.78
2003	1.13	1.64	1.40	579	1.33	1.26	1.79	1.30	520	1.33
2004	1.24	1.83	1.30	527	1.28	1.36	1.92	1.20	484	1.28
2005	1.24	1.82	1.21	527	1.36	1.18	1.72	1.16	554	1.36
2006	1.26	1.84	1.13	522	1.27	1.32	1.96	1.17	497	1.27
2007	1.37	2.00	1.07	478	1.14	1.46	1.98	1.00	449	1.14
2008	1.47	1.85	1.07	448	1.41	1.40	1.46	1.22	467	1.41
2009	1.39	1.57	1.14	471	1.11	1.43	1.62	1.05	457	1.11
2010	1.33	1.55	1.03	495	0.98	1.34	1.56	1.00	490	0.98
2011	1.39	1.60	0.99	471	0.98	1.29	1.55	1.02	507	0.98
2012	1.29	1.59	1.00	510	0.96	1.32	1.63	0.99	496	0.96
2013	1.33	1.56	1.03	494	1.12	1.37	1.66	1.06	476	1.12
2014	1.33	1.65	1.10	495	1.22	1.21	1.56	1.16	538	1.22
2015	1.11	1.53	1.28	591	1.37	1.09	1.47	1.38	603	1.37
2016	1.11	1.36	1.32	592	1.39	1.05	1.23	1.34	625	1.39
2017	1.13	1.29	1.30	583	1.28	1.20	1.35	1.26	561	1.28
2018	1.18	1.33	1.30	557	1.42	1.15	1.28	1.36	569	1.42
2019	1.12	1.28	1.33	582	1.42	1.12	1.33	1.30	582	1.42
2020[2]	1.10	1.28	1.34	590	1.63	1.10	1.24	1.41	589	1.63

(1) €: United States Dollars to one Euro; GBP: US$ to one GBP; C$: Canadian Dollar to one US$; XOF: CFA BEAC to one US$; A$: Australian Dollar to one US$.

(2) Historical data to 31 March 2020.

Figure 19-3: Historical exchange rates (Australian Dollar, Canadian Dollar, CFA Franc BCEAO, Euro and South African Rand)

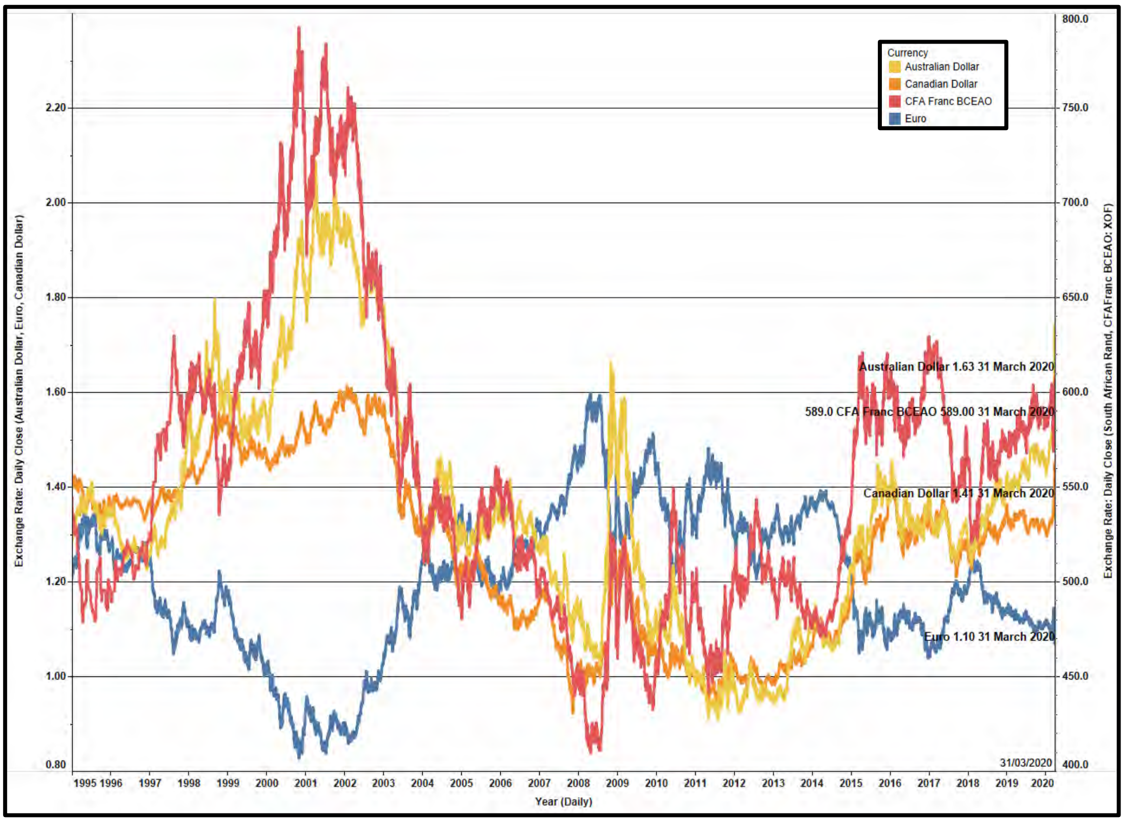


Figure 19-4: Historical exchange rates (CFA Franc BCEAO and South African Rand)

Consumer Price Inflation

Historical CPI statistics for the period 2000 through 31 December 2019 for the principal corresponding country currencies are reflected in Table 19-10 and Figure 19-5 below:

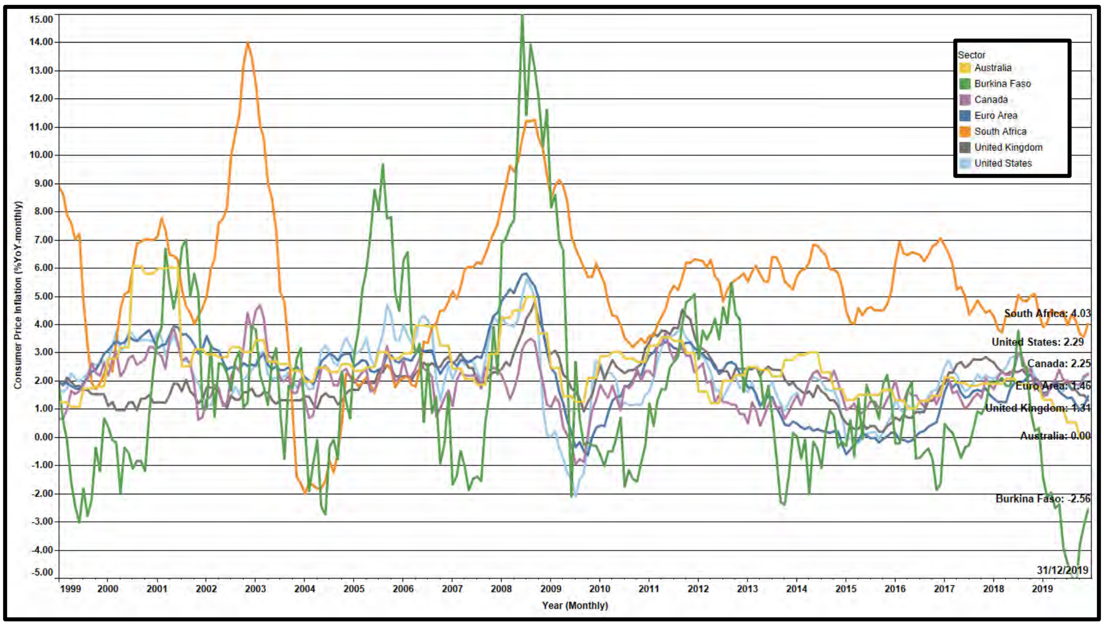
- For the 12-month period ended 31 December 2019, the YoY CPI for Burkina Faso is recorded as negative 2.56%;
- For the 12-month period ended 31 December 2019, the YoY CPI for the United States is recorded as 1.18% which compares with a Reuters Poll median forecast of 1.60% for 2020;
- For the 12-month period ended 31 December 2019, the YoY CPI for Australia is recorded as 1.57% which compares with a Reuters Poll median forecast of 1.90% for 2020;
- For the 12-month period ended 31 December 2019, the YoY CPI for Canada is recorded as 2.35% which compares with a Reuters Poll median forecast of 1.90% for 2020;
- For the 12-month period ended 31 December 2019, the YoY CPI for the Euro Zone is recorded as 1.46% which compares with a Reuters Poll median forecast of 1.20% for 2020;
- For the 12-month period ended 31 December 2019, the YoY CPI for the United Kingdom is recorded as 1.31% which compares with a Reuters Poll median forecast of 1.40% for 2020; and
- For the 12-month period ended 31 December 2019, the YoY CPI for South Africa is recorded as 4.03% which compares with a Reuters Poll median forecast of 4.20% for 2020.

For comparative proposes certain commodity prices are also presented in nominal terms and are derived assuming a constant consumer price inflation ("**CPINF**") of 2.00% per annum.

Table 19-10: Historical Consumer Price Inflation

Year	YoY 12-month CPI							Year Average CPI						
	BF (%)	US (%)	AU (%)	CA (%)	EZ (%)	GB (%)	ZA (%)	BF (%)	US (%)	AU (%)	CA (%)	EZ (%)	GB (%)	ZA (%)
2000	2.36	3.39	5.80	3.20	3.47	1.23	6.99	2.36	3.39	5.80	3.20	3.47	1.23	6.99
2001	1.01	1.55	3.12	0.72	3.12	1.35	4.59	1.01	1.55	3.12	0.72	3.12	1.35	4.59
2002	3.93	2.38	3.03	3.80	2.58	1.73	13.51	3.93	2.38	3.03	3.80	2.58	1.73	13.51
2003	3.16	1.88	2.37	2.08	2.31	1.31	(1.63)	3.16	1.88	2.37	2.08	2.31	1.31	(1.63)
2004	0.68	3.26	2.59	2.13	2.96	1.68	2.20	0.68	3.26	2.59	2.13	2.96	1.68	2.20
2005	4.48	3.42	2.80	2.09	2.65	2.16	2.02	4.48	3.42	2.80	2.09	2.65	2.16	2.02
2006	1.54	2.54	3.25	1.67	2.68	2.86	4.82	1.54	2.54	3.25	1.67	2.68	2.86	4.82
2007	2.23	4.08	2.96	2.38	4.42	2.30	7.57	2.23	4.08	2.96	2.38	4.42	2.30	7.57
2008	11.62	0.09	3.69	1.16	3.06	3.08	9.31	11.62	0.09	3.69	1.16	3.06	3.08	9.31
2009	(0.30)	2.72	2.11	1.32	0.34	2.07	6.16	(0.30)	2.72	2.11	1.32	0.34	2.07	6.16
2010	(0.30)	1.50	2.68	2.35	2.63	3.15	3.34	(0.30)	1.50	2.68	2.35	2.63	3.15	3.34
2011	5.08	2.96	2.99	2.30	3.17	3.60	6.32	5.08	2.96	2.99	2.30	3.17	3.60	6.32
2012	1.61	1.74	2.20	0.83	2.10	2.42	5.81	1.61	1.74	2.20	0.83	2.10	2.42	5.81
2013	0.16	1.50	2.75	1.24	0.56	1.95	5.24	0.16	1.50	2.75	1.24	0.56	1.95	5.24
2014	(0.16)	0.76	1.72	1.47	(0.24)	0.71	5.34	(0.16)	0.76	1.72	1.47	(0.24)	0.71	5.34
2015	1.31	0.73	1.69	1.61	0.17	0.50	5.18	1.31	0.73	1.69	1.61	0.17	0.50	5.18
2016	(1.66)	2.07	1.48	1.50	1.04	1.79	7.07	(1.66)	2.07	1.48	1.50	1.04	1.79	7.07
2017	1.98	2.11	1.91	1.87	1.50	2.74	4.50	1.98	2.11	1.91	1.87	1.50	2.74	4.50
2018	0.34	1.91	1.78	1.99	1.65	2.00	4.40	0.34	1.91	1.78	1.99	1.65	2.00	4.40
2019	(2.56)	1.18	1.57	2.25	1.46	1.31	4.03	(2.56)	1.18	1.57	2.25	1.46	1.31	4.03

Figure 19-5: Historical consumer price inflation and index (Burkina Faso, United States, Australia, Canada, Euro Zone, South African and United Kingdom)



Consumable Commodity Input Costs

The principal consumable commodity consumed at the Houndé Gold Mine is diesel which is consumed at an annual rate of approximately 28Mlpa which for 2019 was delivered by an in-country supplier at a unit rate of US$1.02/l and reported on a delivered basis and inclusive of all necessary freight and taxes (VAT, export duties and fuel levies). The benchmark price assumption typically incorporate into the derivation of diesel price is a combination of ICE Brent Crude and Low Sulphur Gas Oil price. Analysis of CMF of both crude and gasoil prices Table 19-11 indicates an LTP (median) of US$57/bl for West Texas Intermediate, US$60/bl for Brent and US$655/t (US$0.78/l) for European Gas Oil. Comparison on a per litre basis of Brent Crude and European Gas Oil indicates a factor of approximately 2. Typically pricing determinations are derived from consideration of: a Low Sulphur Gas Oil (“**LSGO**”) benchmarked by a commodity market specialist advisor (S&P Global Platts Energy Company: “**Platts**”); and determination of all related freight, wharf age, storage, local levies, VAT, excised duties and fuel levies.

Based on the following unit conversion factors: 42 United States gallons per barrel; 3.785412 litres per United States Gallon; and a diesel specific gravity of 0.8350 a volume to mass conversion factor of 7.53 is determined for conversion of prices per barrel to prices per tonne. Based on public domain reporting the cost of refining diesel is approximately US$0.49/gallon and crude oil refining of 1 barrel typically yields 20 gallons of gasoline/petroleum and 11 gallons of distillate fuel oil where the latter represents a yield of approximately 26%. Accordingly, this reflects a diesel refining cost of approximately US$5.40/barrel of crude oil. Assuming an LTP US$60/bl, adding the refining cost then this translates to diesel cost of US$493/t or US$0.59/l. The closing price for Brent crude oil as at 31 December 2019 was US$66/bl which results in a diesel cost of US$538/t or US$0.64/l.

For the current LoMp the diesel price assumption was US$1.19 with the variance between and the refine costs being attributed to freight, import duties, fuel levies, Value Added Tax (“**VAT**”) and fuel levies as appropriate. By comparison the local diesel price in Burkina Faso as at 06 April 2020 was reported at US$0.54/l.

Table 19-11: Consensus Market Forecast Crude Oil and Fuel pricing

Statistics	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	LTP
WTI											
High	(US$/bl)	63	68	63	62	61	61	61	61	61	61
Median	(US$/bl)	43	54	51	53	55	57	57	57	57	57
Average	(US$/bl)	45	52	51	54	54	55	55	55	55	55
Low	(US$/bl)	26	33	41	41	38	44	44	44	44	44
STDEV	(US$/bl)	9	10	7	7	7	7	7	7	7	7
Analysts	(No)	23	15	16	13	12	5	5	5	5	5
Brent											
High	(US$/bl)	67	71	67	67	64	65	65	65	65	65
Median	(US$/bl)	47	55	54	57	57	60	60	60	60	60
Average	(US$/bl)	48	56	55	57	58	59	59	59	59	59
Low	(US$/bl)	28	38	42	46	43	49	49	49	49	49
STDEV	(US$/bl)	10	9	7	7	6	6	6	6	6	6
Analysts	(No)	23	16	17	14	13	6	6	6	6	6
European Gas Oil											
High	(US$/t)	661	616	635	649	656	680	680	680	680	680
Median	(US$/t)	530	485	625	645	650	655	655	655	655	655
Average	(US$/t)	501	486	624	644	649	655	655	655	655	655
Low	(US$/t)	286	356	614	639	642	629	629	629	629	629
STDEV	(US$/t)	156	184	15	7	10	36	36	36	36	36
Analysts	(No)	4	2	2	2	2	2	1	2	2	2
European Gas Oil											
High	(US$/l)	0.78	0.73	0.75	0.77	0.78	0.80	0.80	0.80	0.80	0.80
Median	(US$/l)	0.63	0.57	0.74	0.76	0.77	0.78	0.78	0.78	0.78	0.78
Average	(US$/l)	0.59	0.57	0.74	0.76	0.77	0.77	0.77	0.77	0.77	0.77
Low	(US$/l)	0.34	0.42	0.73	0.76	0.76	0.74	0.74	0.74	0.74	0.74
STDEV	(US$/l)	0.19	0.22	0.02	0.01	0.01	0.04	0.04	0.04	0.04	0.04
Analysts	(No)	4	2	2	2	2	2	1	2	2	2
Conversion											
Brent	(US$/bl)	47	55	54	57	57	60	60	60	60	60
	(US$/gallon)	1.12	1.31	1.29	1.36	1.36	1.43	1.43	1.43	1.43	1.43
	(US$/l)	0.30	0.35	0.34	0.36	0.36	0.38	0.38	0.38	0.38	0.38
Gas Oil	(US$/l)	0.63	0.57	0.74	0.76	0.77	0.78	0.78	0.78	0.78	0.78
Gas Oil/Brent	(US$/l)	2.12	1.66	2.18	2.13	2.15	2.05	2.05	2.05	2.05	2.05

Other key consumable cost assumptions include those utilised in the processing plant comprising activated carbon, lime, steel balls, caustic soda (Sodium Hydroxide), hydrogen peroxide (60%), cyanide, hydrochloric acid (325) and copper sulphate. The unit costs are defined per tonne and based on current contractual arrangements in place as at 31 December 2019 with adjustments for reductions/increases as deemed warranted.

Electricity costs assumptions reported on a USc/kWh basis reflect a blended rate of grid power and site generated power which results in LoMp unit price assumption of USc27.0/kWh.

Material Contracts

The principal contracts in place at Houndé Gold Mine are:

- The contract relating to grade control drilling services as supplied by Geodrill Limited;
- The contract relating to drilling and blasting services as supplied by SFTP Mining;
- The contract relating to grade control drilling as supplied by Forages Technic-d'Eaux Burkina SARL ("**FTE**");
- The contract relating to assaying of geological and metallurgical samples as supplied by Société Générale de Surveillance ("**SGS**");
- The contract relating to the provision and repair of heavy mining equipment tyres by Kal Tire Mining Services ("**Kal Tire**");
- The contract relating to supply of diesel and lubricants from Total;
- The contract relating to supply of electrical power from Société Nationale d'électricité du Burkina Faso ("**Sonabel**");
- The contract relating to in-hole blasting services as supplied by African Explosives Limited ("**AEL**"); and
- The refining services for HGO and BDGO as supplied by METALOR Technologies S.A dated 11 October 2017.

In addition to the above, Houndé Gold Mine also has a number of other contracts relating to various services including the supply of operating and maintenance consumables, external laboratory testing services, consultancy services, communication services, camp management services, Gendarme Deployment services, legal services, accounting services and internet related services.

19.5 Risks and Opportunities

The principal risks relating to market studies and contracts applicable to Houndé Gold Mine are directly related to:

- Variations in the commodity prices, specifically in respect of gold where the current economic analysis assumes a long-term price assumption of US$1,300/oz which is consistent with that assumed for derivation of the Mineral Reserves as reported herein; and
- The risk of variation in commodity input costs specifically with respect of the Houndé Process Plant consumables and diesel prices. It should also be noted that with the budgeting processes assumes reductions in unit costs of the order of 5% for key consumables when compared to prior reporting periods, based on new supply contracts.

The principal opportunities relating to market studies and contracts applicable to Houndé Gold Mine are directly related to:

- The potential for inclusion of by-product revenues from the recovery and sale of silver as historically noted following completion of additional technical work to incorporate this into the estimation process; and
- The opportunity to rationalise contractual services and supply agreements as part of the annual strategic review process.

19.6 Interpretation, Conclusions and Recommendations

Given the mature nature of the gold market there are no significant concerns pertaining to ongoing demand and current pricing assumptions as included in the economic analysis given the conservatively assumed LTP of US$1,300/oz when compared to current spot market prices. Furthermore, the contractual agreements in place for key services are well established and subject to any political risk or current limitations relating to the global Covoid-19 crisis, there does not appear to be any significant risks relating to continuation of these at present.

Notwithstanding the above it is recommended that further work be pursued to address the following:

- The determination of silver in the underlying block models; and
- An assessment of the potential demobilisation costs/liabilities to be incurred on cessation of services.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Introduction

The following section includes discussion and comment on the environmental studies, permitting and Social or community impact aspects relating to the Houndé Gold Mine. Specifically, the following items are addressed: environmental and social setting; legislation and permitting; governance; key issues; closure plan and costs; risks and opportunities; and interpretation, conclusions and recommendations.

20.2 Environmental and Social Setting

The Houndé Gold Mine deposits are situated in the municipality/ commune of Houndé, within the province of Tuy, one of three provinces of the Hauts-Basins region. The Houndé Gold Mine is located approximately 250km south-west of Ouagadougou and about 100km from Bobo-Dioulasso. The Houndé Gold Mine (Figure 20-1) is located almost adjacent to the town of Houndé. The Bouéré Open Pit and the Dohoun Open Pit are located about 16km and 20.7km west of the Houndé Processing Plant (Figure 20-2) by road, respectively. A new 12.5km bituminised road has been constructed to link the Bouéré Open Pit (Figure 20-3) to the Houndé Process Plant (note that the bituminised section is shorter than the total haul road length). This will also service the Kari Pump Open Pit (Figure 20-4), whilst a small spur road will be constructed when required to link the Dohoun Open Pit (Figure 20-5) to the Bouéré road.

The climate in the vicinity of the mine sites is Sudano-Sahelian, with distinct hot and rainy and cool and dry seasons and with annual evaporation exceeding rainfall. The wet season extends from April to October and brings most of the annual rainfall, which averages about 900mm and ranges between 470mm and 1,200mm per annum. There is high interannual variability in rainfall and August is generally the wettest month, with rainfall of up to 250mm and some downpours producing 90mm to 130mm in 24 hours.

Maximum temperatures generally range from 22°C to 35°C, with the coolest months being the dry months, whilst the wettest months (around August) are the hottest.

Two wind regimes dominate. The West African Monsoon comes from the southwest and south, blowing moist air from the Atlantic and can bring torrential rain. The dry and dusty Harmattan comes from the north-northeast in the dry season.

The terrain is undulating with flat-topped and rounded hills. The concessions are in the Volta watershed, in the lower Mouhoun sub-basin. The Volta River flows into Ghana, into Lake Volta and then ultimately into the Atlantic Ocean. The mine sites are drained by tributaries of the Tuy River (also called the "*Grand Bale*" River) and the Bougouriba River. The streams draining the mine sites flow only during the rainy season. Some streams comprise a series of locally interconnected ponds. Erosion gulleys develop rapidly in soils denuded by human activities during heavy rains.

Prior to mining, the surface water was found to be somewhat polluted, with elevated suspended solids, nitrates and coliform bacteria in many samples and elevated mercury in a few samples (attributable to artisanal mining). The quality of borehole and well water in surrounding villages was found to be suitable for drinking, but lead was elevated in some samples and coliforms in others.

The natural vegetation is shrub savanna, with some tree savanna. Tree and bush densities are variable, with the highest densities in drainage areas. Natural habitats have been degraded by agriculture, bush fires, woodcutting and artisanal mining. Large mammals are not common though include buck and primates. Elephants are rare. Small mammals such as rats (Gambian and cane rates), burrowing squirrels and white-bellied hedgehogs are more common.

Figure 20-1: Location of Houndé mine and the sites of the Bouéré, Kari Pump and Dohoun satellite mines including existing and proposed haul roads (source: Endeavour)

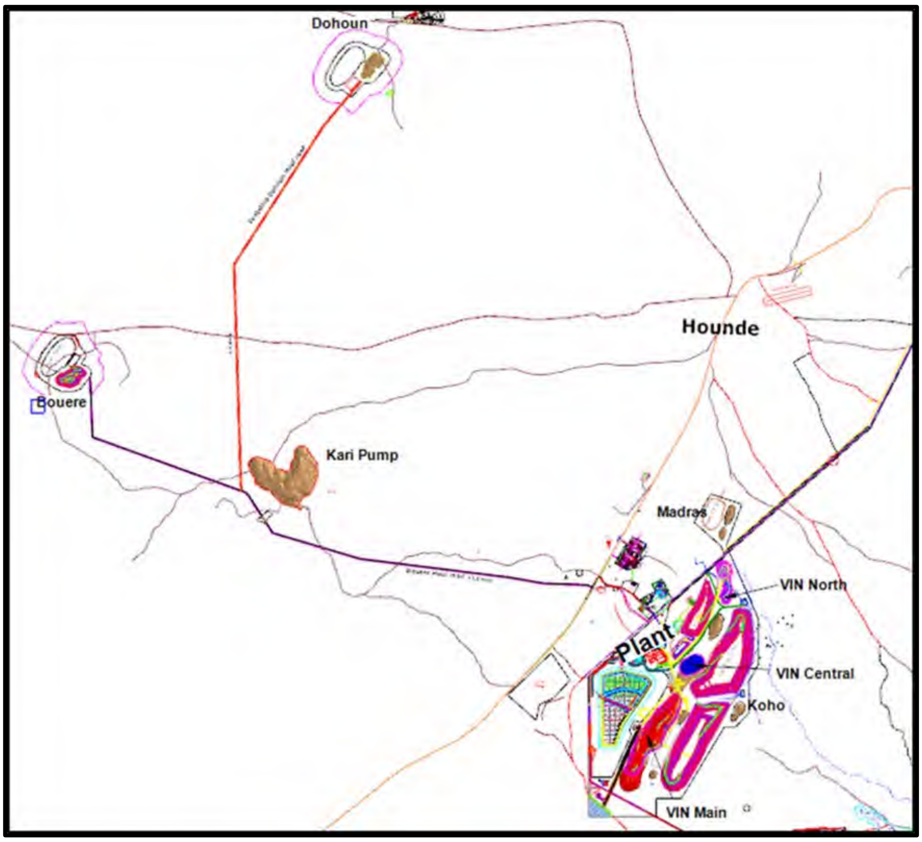


Figure 20-2: Houndé mine site infrastructure map (source: Endeavour)

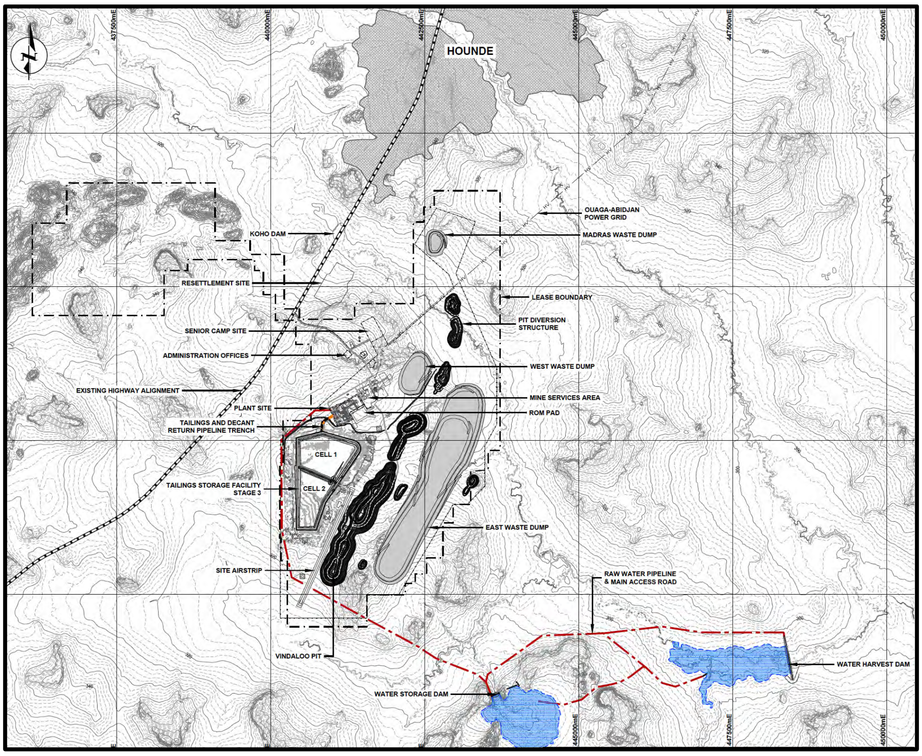


Figure 20-3: Sites of the Bouéré pit and waste rock dump (source: Endeavour)

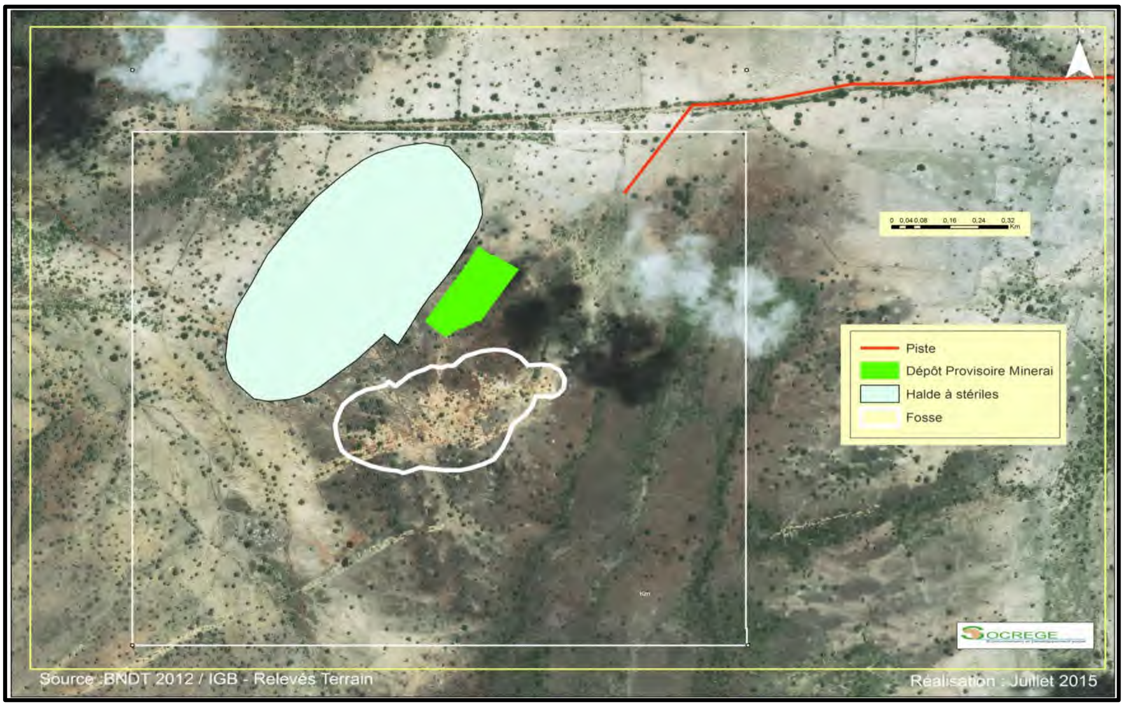
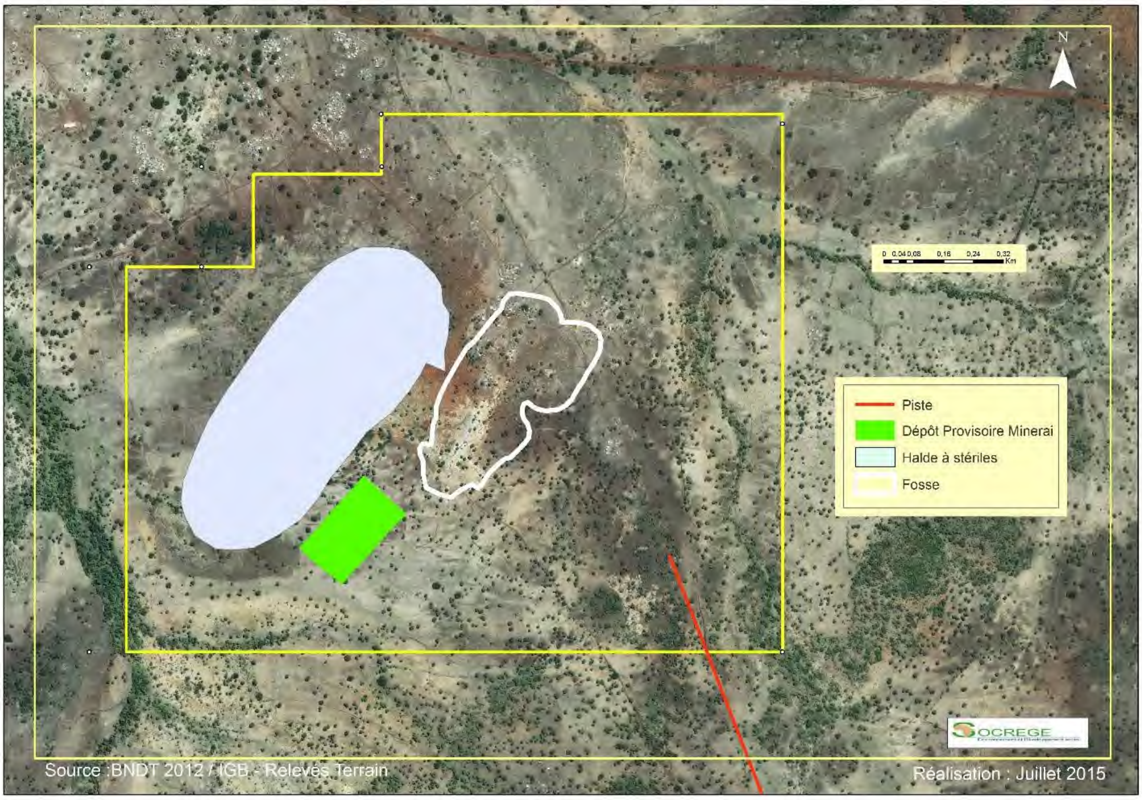


Figure 20-4: Sites of the Kari Pump pit and waste rock dump (source: Endeavour)

Figure 20-5: Sites of the Dohoun pit and waste rock dump (source: Endeavour)



The Houndé municipality comprises 16 settlements (Boho Kari, Bombi, Bouahoun, Bouende, Bouéré, Daboui, Dankari, Dohoun, Doufien Kari, Kiéré, Laho, Ponnonré, Sieni, Tiombomi, Touaho and Houndé). Most are small villages and Houndé is the urban centre. The main market is in Houndé, which is accessible via national and regional roads and benefits from regular freight, bus, car, motorcycle and bicycle movements.

The main industries in the region of the mine are agriculture and artisanal and small-scale mining. Many households have a family member who is involved in artisanal mining.

The agriculture includes crop cultivation and livestock farming. The main crops produced are cereal (maize, millet and sorghum), oilseed (sesame, groundnut and cowpea) and cotton crops. The livestock includes goats, sheep, cattle and poultry. The local communities also have fruit trees (mango, orange, lemon, papaya, guava and banana) and use leaves, bark and wood of trees, such as shea and African locust bean trees. Several major landowners own the bulk of the land, however, numerous subsistence farmers rent portions of the land from the landowners.

The houses in the vicinity of the mine sites are a mix of various traditional and modern styles, using adobe materials, carved stone, steel and cement (Figure 20-6). Waste management and sanitation infrastructure and services are generally lacking. Many houses do not have latrines. The main source of energy is firewood used for cooking. Water is obtained from boreholes and wells.

Services and infrastructure are not well developed in the Houndé municipality. Several primary health facilities, called "*Centre de Santé et de Promotion Social*", provide basic preventive and curative care. Many of these facilities are dilapidated with inadequate supplies and medical technology. These facilities refer cases requiring further medical assistance to the Houndé medical centre, a district hospital called "*Centre Médical avec Antenne chirurgicale de Houndé*".

Malaria and respiratory illnesses are prevalent in the area. Dysentery, urinary tract infections, skin and eye ailments are among the more common illnesses.

There are numerous primary schools in the Houndé municipality (about 46 schools, many near Houndé town), only four secondary schools and several vocational training centres for skills such as mechanics, metal construction, building, electrics and sewing. There are many adult literacy centres. Literacy programmes running in Burkina Faso have significantly increased the adult literacy rate in the last decade (to 41.2% in 2018) and have targeted increasing female literacy, which was historically very low.

Migration in and out of the local communities has been common for decades. Consecutive droughts brought people from the north and central regions of the country to the area in search of agricultural land. Young people still migrate with work opportunities, often related to harvesting and mining. Many of the artisanal miners active in the area are migrants from other countries. Some artisanal miners live in the local communities and others live in temporary camps.

Figure 20-6: Housing styles (source: Endeavour)

20.3 Legislation and Permitting

20.3.1 Mining Legislation

Mineral rights are granted in Burkina Faso in the form of exploration and exploitation licences and authorisations for quarrying and artisanal mining. The rights are now granted under the 2015 Mining Code (Law 036-2015/NTC of 26 June 2015), which replaced the 2003 Mining Code (Law 031-2003/AN of 8 May 2003).

Exploitation licences are granted by the Council of Ministers after consultation with the Minister of Mines and the National Commission. An exploitation licence for a large-scale mine is valid for a 20-year period and is then renewable for consecutive periods of five years until the relevant deposits are exhausted. An exploitation licences is coupled with an agreement between the government and the licence holder referred to as a "**mining convention**". This agreement is valid for the same period as the industrial exploitation licence. It includes terms applying to stabilisation of mining taxes and royalties and can also include other rights and obligations.

The 2015 Mining Code transposes provisions in regional initiatives that promote sustainable mining. These initiatives include the Economic Community of West African States ("**ECOWAS**") Directive No. C/DIR3/05/09 dated 27 May 2009 that aims to harmonise policies in the mining sector and the West African Economic and Monetary Union ("**WAEMU**") mining code regulation

(Regulation 18/2003/CM/WAEMU dated 23 December 2003).

The following legislation is also relevant to large-scale mines:

- Decree 2017-023, which covers mining taxes and royalties;
- Decree 2017-024, which covers the local development fund;
- Decree 2017-0035, which presents the model mining convention;
- Decree 2017-036, which covers management of mining titles and authorisations;
- Decree 2017-068, which covers closure planning and provisions;
- Decree Scheduling Transactions Applicable to Offenses Committed in Violation of the 2018 Mining Code;
- Decree 2015-1200, which covers environmental audits; and
- Law 2017-028/AN on trade of gold and other precious minerals in Burkina Faso.

An application for an exploitation licence must include:

- A draft mining convention to be signed with the state;
- A commitment to grant the state 10 % free equity participation in the company holding the exploitation licence;
- A feasibility study;
- A training and promotion plan for local managers and staff;
- An environmental approval; and
- A mine closure plan.

The Mining Code enables state acquisition of additional equity if it reaches an agreement with the investor. The state's dividend must be paid before any other allocation of the distributable profit. Under the Mining Code, holders of exploitation licences must make annual contributions to three funds. The contributions are tax free. The funds are:

- A local development fund (Article 26);
- A rehabilitation and closure fund (Articles 27 and 141); and
- A research and training fund (Article 29) - for financing geological and mining research and supporting training in the earth sciences.

The local development fund is financed by both the state (15% of the collected proportional royalties) and exploitation licence holders (1% of turnover before tax). It is administered jointly by the Ministry of Mining and the Ministry of Finance.

Annual contributions to the rehabilitation and closure fund are based on the closure cost estimate divided by the years of operational life. The exploitation licence holder is required to open and maintain an account trustee at the Central Bank of West African States or in a commercial bank in Burkina Faso to set up the fund for rehabilitation and closure. Decree No. 2017-068 requires that closure plans and cost estimates are updated annually and submitted to a government technical committee for review. The committee is formed by the Minister of Mines, the Minister of the Environment and the relevant local authorities. At least one year before the end of the exploitation activity a final plan and costs must be submitted. The decree repeals previous legislation on funding rehabilitation and closure.

The fund for financing geological and mining research and supporting training in the earth sciences is funded by 15% of proportional royalties, surface taxes, fixed fees and fees for application for approval to purchase and of gold sales collected.

The holder of an exploitation licence must set up a legal entity governed by Burkinabé law and have its registered office in Burkina Faso.

The Mining Code promotes preferential local employment and procurement (Article 102). Both holders of mineral rights and their suppliers (service providers and subcontractors) must preferentially employ Burkinabé executives. Applications for exploitation licences must include plans to support the progression of local managers and staff and to progressively replace expatriates (Article 41).

The Mining Code requires respect for human rights (Article 19). Under Article 120, the exploration, research or exploitation of mineral substances cannot be undertaken without the consent of affected communities. Landowners or occupiers have a right to fair compensation prior to land disturbance by mining (Article 123). Affected authorised miners are also entitled to compensation. The Code provides for authorisation of artisanal mining (Articles 71 to 83). Artisanal mining authorisations (valid for 2 years) will not be renewed where exploitation licences are awarded.

The Mining Code and regulations include provisions that regulate the environmental, health and safety aspects of mining activities but the environmental aspects are more specifically regulated by the Environmental Code and its implementing regulations.

Award of an exploitation permit is dependent upon environmental approval, specifically the favourable opinion of the Ministry for the Environment (Article 41). This Ministry's opinion is informed by the submission of an environmental and social impact assessment ("**ESIA**"), environmental and social management plans ("**ESMPs**"), including a rehabilitation and closure plan.

Exploitation licence holders are required to undertake bi-annual environmental management system audits (Article 139 of the 2015 Mining Code and Decree 2015-1200 on Conditions of Environmental Audits). The audit reports must be submitted to the minister in charge of the environment for approval. The technical services of the mining administration also have free access to the mining sites to carry out necessary checks and inspections. Failure to comply with the obligations set out in the Mining Code may give rise to penalties and/or result in withdrawal of the licence.

20.3.2 Mining Permits and Agreements

HGO holds an exploitation permit for the Houndé Mine granted by means of Decree 2015–090/PRES-TRANS/PM/MME/MEF/MERH. It was granted on 5 February 2015 and expires on 5 February 2035. This is complemented with an order (Arrêté Conjoint No 2018-003-MMC-MINEFID- Phase de Production HGO) fixing the date of first production of Houndé (6 November 2017) and marking the end of the construction period and start of production phase.

The Kari Pump Open Pit will fall under the exploitation permit for the Houndé Gold Mine. An extension application is being processed by the Burkina Faso Mining Administration and is scheduled for completion by July 2020.

BDGO also has an exploitation permit for the Dohoun and Bouéré satellite Open Pits by means of Decree 2017-027/ PRES/PM/MEMC/MINEFID/MEEVCC, which was granted on 23 January 2017 and expires on 23 January 2022.

The Houndé and the Bouéré-Dohoun "**Exploitation Permits**" have conditions attached. Both permits have conditions requiring quarterly reporting to government on production statistics, benefits to the communities, jobs, stakeholder feedback and conflict management, the implementation of the ESMP and progressive rehabilitation of the site.

Mining conventions are also in place for Houndé mining and the Bouéré-Dohoun satellite mining operations. These are agreements between government (represented by the Ministry of Mines and Energy) and the operating companies; HGO (Houndé Mining Convention, signed 20 November 2015) and BDGO (Bouéré-Dohoun Mining Convention, signed 22 February 2018). The terms in both mining conventions are similar (in wording and numbering). Obligations pertaining to environmental, social and governance include:

- Preferential use of national services and materials wherever possible (Article 6);
- Preferential employment of local people, respecting human rights and employment law and replacing expatriates with locals who have acquired the same experience (Article 7);
- From the date of first commercial production, contribution to the improvement of hospitals schools and other community infrastructure;
- Protection of the environment (Article 11);
- Maintenance of a bank account within Burkina Faso for a restoration fund for the mine site as defined by the mining regulations. the cost of which must cover the implementation of an environmental preservation and rehabilitation programme and is exempt from corporation tax (Article 11); and
- Payment of other taxes and fees (Article 18 and 19).

Exploration permits are held by either Avion Gold Burkina SARL and Burkina Faso Gold SARL for the Bagnima, Karba 2, Kari North, Kari South, Boni, Wakui 2, Kiéré 2, Touhahou and Pew concession. Applications have been made for permits for exploration on the Mou and Voho concessions.

20.3.3 Environmental and Social Legislation

The Mining Code makes provision for environmental and social management by mines as outlined in Section 20.3.1. It also requires observation of relevant environmental and social legislation. Relevant legislation is summarised in Table 20-1.

To develop a mine in Burkina Faso, environmental approval must be obtained under the Environmental Code (Decree 006-2013) and based on an ESIA process. The environmental approval is called "*Avis de Conformité et de Faisabilité Environmentale*". The ESIA process must include a public enquiry and the ESIA report must be accompanied by ESMPs, including a rehabilitation and closure plan.

The Ministry of Environment ensures implementation and monitoring of government policies regarding environment and sustainable development. This ministry was previously called the "**Ministry of Environment and Sustainable Development**" or "**MEDD**" and now called the "**Ministry of the Green Economy and Climate Change**" or "**MEEVCC**".

Administration of ESIA processes and enforcement of compliance with environmental approval conditions is undertaken by a branch of this ministry called the National Environmental Assessment Office ("**Bureau Nationale des Evaluations Environementales"** or "**BUNEE**"). The enforcement includes review of mine reports, which include compliance reports and audit reports, and inspections and audits of mines.

Table 20-1: Legislation relevant to environmental and social management

Legislation	Requirements
Constitution of Burkina Faso, 1991	This acknowledges (Article 29) the right of citizens to a healthy environment and states (Article 14) that natural resources "belong to the people" and "shall be used for the improvement of their living conditions." The Constitution establishes a right to petition for communities against any activity that could harm the environment or cultural heritage.

Legislation	Requirements
Framework Law on Sustainable Development, 2014 (Decree 2014-343)	This lays down the general rules for implementation of sustainable development in Burkina Faso. The right to sustainable development is guaranteed to all (under Article 6). In support of this, the private sector is required to respect the principles of social equity, environmental sustainability and economic efficiency. The private sector is required to provide decent jobs and access to work (under Article 14). It is also required to repair or mitigate socio-economic and environmental damage from activities that have a significant impact on the living environment, lifestyles, and health. Article 16 establishes a Fund for Future Generations, which is intended to finance sustainable development activities under the supervision of the Ministry for Sustainable Development. The Fund is financed through a proportion of revenues from the exploitation of non-renewable natural resources.
Code of the Environment, 2013 (Decree 006-2013)	The Code of the Environment lays down the basic rules governing sustainable management of natural resources, establishes a universal right to a healthy environment, and gives local communities and other stakeholders the right to participate in the management of their environment, to make use of natural resources, and to share in the benefits from their exploitation (Article 8). Article 87 requires authorities to take necessary measures to meet the basic needs of the population in relation to disease, hunger, unemployment, poverty, and social exclusion. Under Article 25, activities likely to have significant effects on the environment are subject to the prior approval of the Ministry of the Environment. This approval is based on a Strategic Environmental Assessment ("*SEA*"), an Environmental and Social Impact Assessment ("**ESIA**"), or an Environmental Impact Statement ("**EIS**"). Environmental assessments are to be conducted by authorised experts and based on terms of reference approved by the Ministry (Article 31). They are to be supplemented by a public inquiry, to take stakeholders views into account (Article 27). Reference is made to the publication of subsequent guidance on ESIA process (Article 34). Article 38 classifies facilities into three classes based on potential hazards and nuisance: Class 1 must be located away from residences; Class 2 can be in proximity subject to management measures; and Class 3 are only subject to general environmental protection requirements. All classified facilities must apply and pay for an environmental licence (Article 44) and are subject to regular environmental inspections (Article 39). Class 1 and 2 sites are subject annual inspections (Article 44) and must submit annual environmental reports (Article 41). Operating permits may be suspended or withdrawn by the administration, without the right to compensation (Article 79). Polluting activities, products and facilities are subject to taxation (Article 67), levied through annual fees defined in discharge and emission permits (Article 75). Any industrial or mining operation must avoid environmental damage (Article 37), and any equipment is to be constructed and operated in accordance with the Code (Article 65).
Decree on Environmental Assessment Procedures, 2015 (Decree 2015-1187)	This outlines the requirements and procedures for Environmental and Social Impact Assessments ("**ESIA**"). It includes the screening criteria to help categorise facilities or operations likely to have significant direct and indirect environmental impacts, and to determine the assessment required. Category A activities require a full ESIA. Category B activities require a less detailed Environmental and Social Impact Statement. Category C are only subject to general environmental and social requirements. The thresholds for each category are defined in Appendix 1. Mining sites operating over 100 tonnes per day typically fall into Category A. Under Article 8, the Decree defines the requirements for ESIAs, Environmental and Social Management Plans, and Rehabilitation and Closure Plans. Article 9 requires a full Resettlement Action Plan ("**RAP**") where over 200 people are displaced.
Act on Rural Land Tenure (Act 034-2009)	The Act establishes private and state-owned rural lands, i.e. lands located within the administrative boundaries of rural communities and destined for production and conservation activities. It also aims to clarify land security principles and sets conditions for expropriation. Village lands attached to urban communes are also subject to this Act (Article 2). It does not apply to lands destined for housing, commerce and related activities, as determined by the Urban Development Master Plan and land-use plans (Article 3).
The National Policy on Land Tenure Security (Decree 2007-610)	The policy aims to provide all rural stakeholders with equitable access to land, investment guarantee and effective management of land disputes, to reduce poverty, consolidate social peace and achieve sustainable development. The specific objectives are to ensure all rural stakeholders legitimate right of access to land, through sustainable rural development, improve settlement of litigations pertaining to land and natural resources and promote effective participation of grassroots stakeholders in the implementation and evaluation. The general principles are to increase investment in the rural sector, consider vulnerable groups and sustainability.
Decree on Discharge of Pollutants to Air, Water and Soil (Decree 2001-185)	The Decree establishes discharge standards for the release of pollutants to air, water and soil. These provisions regulate and punish any offender with a view to preserving the quality of the environment in Burkina Faso. The defined standards include emissions from fixed sources (Article 6), wastewater discharges (Article 10), pumped water standards (Article 9), and soil quality (Article 14). Article 12 identifies those substance which are prohibited for direct release (including organophosphates, cadmium, mercury, and cyanides), and Article 13 identifies those substances which require authorisation prior to release (including heavy metals and biocides).
Decree on Water Discharge Standards, 2015 (Decree 2015-1205)	The Decree aims to prevent or limit discharges of polluted or contaminated wastewater into receiving waters and to protect public health. It sets the standards and conditions for discharges, for a range of parameters defined in Annex 1. Article 15 prohibits the discharge of certain substances unless specifically authorised by competent authorities. Substances include organophosphates, carcinogens, mercury compounds, cadmium, hydrocarbons, cyanides and heavy metals.
Decree on Environmental Inspection, 2015 (Decree 2015- 1203)	Outlines the powers of inspectors of classified facilities and arrangement for environmental inspection in accordance with the 2013 Environmental Code. Inspectors are empowered to make unannounced visits and to check compliance with requirements laid down in environmental and social management plans, and in relation to waste management, emissions to air and wastewater discharges. Under Article 9, Class 1 and Class 2 facilities are subject of environmental inspections at least two times per year.
Code of Sanitation, 2005 (Decree N°2005-022)	Whilst largely related to public health and sanitation, Article 3 of the code states that any person who produces or holds waste under conditions likely to produce harmful effects on soil, flora or fauna, degrade the landscape, pollute the air or water, and cause noise and odour, is required to manage these effects by ensuring disposal according to provisions of the Code. Article 124 requires noise from motorised vehicles to conform with current regulations.
Code of Public Health, 1994 (Decree N°1994-023)	Defines in its fundamental principles, "the rights and duties inherent to the protection and promotion of the health of the population" as well as "promoting environmental health". Deals with other environmental aspects including air pollution, toxic waste, noise, etc.
The Forest Code of Burkina Faso, 2011 (Decree N°2011-003)	The Forest Code establishes the basic principles of sustainable management and valuation of forest resources, fish and wildlife. Under this law, any major work involving forest clearing is subject to prior authorization of the Ministry for the Environmental, based on an environmental impact assessment (Article 48).
Protection of Cultural Heritage (Decree N°2007-024)	The Decree describes the provisions to protect and preserve cultural heritage within Burkina Faso.

20.3.4 Environmental Approvals and Agreements

Primary Approvals

The environmental approval for Houndé was obtained in August 2014 by means of Decree 2014-150/MEDD/CAB. It was amended in December 2016 by Decree 2016-521/MEEVCC/CAB to change the location of the TSF. The approval is held by HGO, which is held 90% Houndé Holdings Limited ("**HHL**"). (formerly Avion Resources (Mali) Ltd.) and 10% by the State.

The Houndé environmental approval requires compliance with the environmental and social management plans and the following conditions:

- Preferential use local labour for unskilled jobs, on the basis of transparent criteria;
- Compliance with commitments made to local populations and authorities;
- Ongoing stakeholder engagement and establishment of a grievance mechanism for recording and responding to community complaints;
- Compensation to those affected by the project for the loss of trees, pastures and fields;
- Compliance with the customs of the people concerned in the management of graves and sacred sites;
- Equipment of workers with adequate personal protection equipment, training and awareness of HIV in particular;
- Submission of annual reports to the ministry in charge of the environment on compliance with the impact management plans;
- Environmental audits of the mines every three years with audit reports submitted to BUNEE;
- Establishment of an emergency plan, internal operations plan and waste management plan;
- Carry out an environmental evaluation of the resettlement site and proceed to compensate the affected persons before the start of mining.
- Ensure that there is a distance of 500m or more between houses and the edge of the TSF;
- Provide a closure plan for the rehabilitation of the TSF;
- Carry out drilling in the zone of the project to benefit the villages and people in the resettlement site to provide a potable water supply and arrange for an alternative water supply for the project affected people in case of water shortages or contamination caused by the project; and
- Monitoring of water, noise, vibration and dust impacts.

The environmental approval for Dohoun and Bouéré satellite mines was obtained in October 2016 by means of Arrêté 16-411-MEEVCC-CAB. It is held by BDGO, which is held 90% HHL. and 10% by the State.

The conditions of approval are similar to those described above for the Houndé Gold Mine, but do not include conditions pertaining to a TSF.

There are Memoranda of Understanding between BUNEE and the operating companies. This includes commitments to implement the environmental and social management measures in the ESMPs, RAPs, ESIA reports and feasibility reports and to monitor conformance with these. In addition, it includes an agreement that BUNEE audits the operations twice a year for the life of mine and produce reports on corrective actions required. The Companies are required to fund the audits with a payment of CFA5.0m per year.

The ESIA report for Kari Pump was completed by the Socrege environmental and social consultancy and was submitted for BUNEE for approval in 2019. The approval process is advanced and is expected to be completed shortly. The ESIA report includes an ESMP. A RAP has also been completed for the Kari Pump development and has been submitted to relevant regulatory authorities for approval.

Secondary Approvals

Key secondary approvals required and obtained for the operations are:

- Approval for construction of both the water harvest dam and the water storage dam was obtained in 2015 based on a Notice of Environment Impact. A full ESIA was not required for the development. The approval requires periodic consultation with government technical services to monitor hydraulic works, to consider increasing the storage capacity for other water users and to take measures into account for climate change to guarantee the sustainability of the dam;
- Approval for development on a transmission line (90 kV) in 2016;
- Handling of radioactive sources and equipment.

Resettlement Action Plans

Four Resettlement Action Plans ("**RAPs**") have been prepared; one for the main Houndé mining site (2013), two for the Bouéré and Dohoun Open Pits (2016) and one for the Kari Pump Open Pit. The RAPs were submitted for approval alongside the ESIA reports for the developments as outlined above.

20.4 Governance

Sustainability Reporting

Endeavour produces an annual sustainability report that summarises Environmental, Social and Governance ("**ESG**") performance, observing Global Reporting Initiative ("**GRI**") standards.

Management Systems

The Houndé mining complex has management systems to support its ESG performance. These include an environmental management system ("**EMS**") and a health and safety management system ("**HSMS**"). Both are being aligned with the ISO standards, respectively the ISO 14001:2015 and ISO 45001:2018 standards. Reviews of conformance with these standards show a need for more attention to be focused on:

- Definition of the scope and context of the systems;
- Worker participation in the systems;
- Tracking of conformance with all compliance obligations (in permits, approved plans and commitments made to stakeholders);
- Specific management measures for specific aspects and/or impacts;
- More frequent emergency drills;
- Regular internal and external audits; and
- Management reviews.

Environmental Monitoring

Monitoring of water dust, noise and waste management are undertaken routinely. For water quality, three different laboratories are used in rotation as part of the quality assurance/ quality control requirement.

Water monitoring results do not indicate that operations are impacting on water quality. Groundwater downstream of the TSF does contains naturally elevated turbidity and concentrations of iron and aluminium. Concentrations of arsenic, lead and manganese have been found to be elevated, compared to drinking water standards, in some samples but there is no evidence of an increasing trend. Cyanide concentrations are monitored and are below limit values.

Internal environmental reviews have identified a need to:

- Establish more settlement ponds downstream of infrastructure so that sediments are not released from the site;
- Improve liquid waste storage areas (impermeable floors in these areas);
- Increase oil-storage capacity and oil-separator capacity; and
- Signpost of topsoil storage areas.

Carbon Emissions

The Houndé mine greenhouse gas ("**GHG**") emissions (expressed as Gt CO_2e) in 2019 (Table 20-2) were estimated to comprise 70Gt of Scope 1 emissions and 35Gt of Scope 2 emissions Houndé Gold Mine is committed to related Endeavour commitments, including: working towards maximizing the efficiency of energy use, reducing overall emissions, decreasing emissions intensity and saving significant operating costs. In addition, Endeavour has committed to take part in the climate change global disclosure system run by the CDP (formerly Carbon Disclosure Project).

Table 20-2: Environmental Performance Statistics

Statistic	Units	Total	2017	2018	2019
Energy Generated (Fuel contribution)					
Diesel (total)	(GWh)	728.7	152.8	291.9	284.0
	(Ml)	7.1	-	6.6	0.5
Electricity					
Purchased	(GWh)	187.3	10.4	74.6	102.4
Generated	(GWh)	196.2	152.8	32.3	11.1
Consumption	(GWh)	383.6	163.2	106.9	113.5
Fuel Consumption					
Mining	(Ml)	56.0	13.4	19.7	22.9
Energy Generation	(Ml)	7.1	-	6.6	0.5
Other	(Ml)	2.7	-	1.3	1.3
Total	**(Ml)**	**65.7**	**13.4**	**27.6**	**24.8**
GHG					
Direct: Scope 1 (Fuel consumption emissions)	($GtCO_2e$)	192.2	37.7	84.5	70.0
Direct: Scope 2	($GtCO_2e$)	66.8	-	31.8	35.0
Procurement					
International	(US$m)	31.6	-	31.6	-
National	(US$m)	127.3	-	127.3	-
Local	(US$m)	3.7	-	3.7	-
	(US$m)	**162.6**	**-**	**162.6**	**-**
Water					
Abstraction	**(Ml)**	**2.3**	**-**	**-**	**2.3**
Surface Water	(Ml)	2.3	-	-	2.3
Groundwater	(Ml)	0.0	-	-	0.0
Third party Water	(Ml)	-	-	-	-
Discharge	**(Ml)**	-	**-**	**-**	**-**
Surface Water	(Ml)	-	-	-	-
Groundwater	(Ml)	-	-	-	-
Third Party Water (total)	(Ml)	-	-	-	-
Consumption	**(Ml)**	-	-	-	-
Air					
Particulate matter 2.5 (PM2.5): Annual average	($\mu g/m^3$)	24.7	-	19	30
Measured peak value	($\mu g/m^3$)	33.9	-	31	37
Particulate matter 10 (PM10) Annual average	($\mu g/m^3$)	81.7	-	57	106
Measured peak value	($\mu g/m^3$)	122.4	-	100	145
Waste					
Mining	(Mt)	88	16.9	35.7	35.2
Tailings	(Mt)	9	0.8	3.9	4.1
Hazardous Waste					
Reuse	(t)	15	-	1	14
Recycling	(t)	283	-	35	248
Recovery, including energy recovery	(t)	1	-	-	1
Incineration (mass burn)	(t)	382	-	89	293
On-site storage	(t)	144	-	46	98
Other	(t)	11	-	11	-
Total	**(t)**	**836**	**-**	**182**	**654**
Non-Hazardous Waste					
Reuse	(t)	647	-	-	647
Recycling	(t)	782	-	369	413
Landfill	(t)	537	-	153	384
Total	**(t)**	**1,319**	**-**	**522**	**797**

TSF Audits

The TSF has been audited on an annual basis since it was commissioned in September 2017. The most recent audit was undertaken in September 2019 by Knight Piesold Pty Ltd. The audit extended to a review of the water storage dam and the water harvest dam. It was established that the TSF and the two water dams are being operated in accordance with the design intent. It was noted that the TSF supernatant pond was very large after a wetter than normal wet season in 2019 and needed to be reduced as much as possible.

Cyanide Management

Endeavour has made a policy commitment to compliance with the International Cyanide Management Code but is not a signatory to the Code. HGO's compliance with the Code was audited by Afritech in 2019. The audit also noted that the cyanide levels at the point of discharge to the TSF exceeded the Code's limit (of 50mg/l WADCN) on the TSF. The company closely monitors the WAD CN levels at point of discharge from the plant and the decant return to the plant (located at the TSF). The average discharge in Q1 2020 was 120mg/l, though only 5ppm at the decant return, meaning that more than 95% of the WAD CN is destroyed as it enters the tailings facility and comes into contact with the supernatant pond and sunlight.

Stakeholder Engagement

Stakeholder engagement has been ongoing for several years. There was extensive consultation with interested parties during ESIA, RAP and environmental approval processes for Houndé, Bouéré and Dohoun and most recently, Kari Pump. Engagement records are stored in a database and date back to 2013/2014.

Community relations and grievances are reported monthly. The stakeholder engagement mapping and plans were updated in 2017. Community consultation committees have been established. There is a provincial-level monitoring and liaison committee comprising provincial and local authorities, religious leaders and community representatives. This has three sub-committees covering compensation and resettlement, local procurement and local recruitment. The committees include vulnerable groups.

A grievance mechanism is in place. Grievances recorded in the last two years generally pertain to land access, barriers to movement, damage to crops, local employment, local procurement, flooding of farmland and dust from trucks.

Health and Safety

Health and safety is managed with top-level management commitment per the ISO 45001:2018 management system framework. In 2019, Houndé Gold Mine (Table 20-3) recorded no Lost Time Injuries ("**LTIs**") which continues the same trend since commencement of operations in 2017. For the 12-month periods ending 2017, 2018 and 2019 no fatalities were reported and First Aid Injuries ("**FAI**") and Near Misses have continued their decline to reduce over the operating period.

Safety at Houndé Gold Mine is promoted through both training and participatory management. Workers are trained in risk analysis and provided with pocket notebooks for reporting risks. Corrective measures must be implemented before proceeding with work. Mining machinery operators are trained in simulators. Every million hours of work without an LTI is rewarded to encourage and further increase awareness. Houndé Gold Mine and subcontractors achieved approximately 17 million-man hours LTI free at the end of March 2020.

The number of annual malaria cases has averaged at 740 from 2017 through 2019 inclusive Reducing malaria in neighbouring communities is one of Endeavour's key health goals, with a target of 10% reduction in malarial incidence rates across the group year-on-year. In 2019there were 640 cases at the Houndé Gold Mine operations. The malaria prevention programs practiced at Houndé Gold Mine include fogging in camps, working areas and villages, reduction of stagnant water, distribution of impregnated mosquito nets, communication programs for malaria prevention (toolbox talk, video and awareness sessions).

The Houndé Gold Mine clinic is staffed with a paramedical team who can treat or refer and deal with emergency situations. Each employee is covered by a health insurance policy, which gives access to off-site medical facilities (clinic, hospital, pharmacy).

Table 20-3: Occupational Health and Safety Statistics

Statistic	Units	2017	2018	2019
Fatalities	(No)	-	-	-
Loss Time Injury ("**LTI**")	(No)	-	-	-
Medical Treatment Injury ("**MTI**")	(No)	2	6	4
First Aid Injury ("**FAI**")	(No)	75	7	6
Property Damage (PD)	(No)	111	114	112
Near Misses	(No)	4,885	1,495	59
Days since last LTI	(No)	-	976	1,340
LTIFR (12 months rolling)	(pmmh)	-	-	-
Environmental Incidents	(No)	19	21	9
Malaria Cases	(No)	710	869	640
Hours Worked	(mh)	5.77	4.39	16.83

Local Procurement and Employment

Local procurement and employment are prioritised by Endeavour which has a procurement policy that promotes giving of priority to local suppliers of goods and services, provided they are competitive (cost, delivery and quality). Relevant goods and services include cement, chemicals, construction, electrical, energy, engineering, equipment and parts, exploration drilling, explosives, fuel, mining contractors and transportation. A database has been established to monitor local procurement. Details on local suppliers are kept with information on ownership according to International Finance Corporation ("**IFC**") categories.

In 2018 and 2019, the percentage of Houndé Gold Mine's procurement budget spent on Burkinabé suppliers was 75% to 80%. his figure includes large international companies such as Total (France), Bia (Belgium) and medium-sized companies such as SFTP (Mali), who are fully compliant with local registration requirements, though also include Sonabel, the national electricity provider. The percentage spent with suppliers in the immediate vicinity of the mine was 2.2%. Effort is being made to build the capacity of local suppliers through awareness and training workshops and consultations.

To support local employment in the construction phase, Houndé Gold Mine established a database of over 3,000 local community members and considered all skills, not just literacy. Similarly, it established a local business database to support local procurement. These initiatives were complemented with training programmes ranging from work skills development, through training in small business development, to life skills training.

Endeavour is committed to recruiting over 90% of its workforce nationally. Expatriates have two-year contracts and are obliged to identify and train national employees who will ultimately replace them. At the end of Q1 2020, 96% of the Houndé Gold Mine workforce of 1,119 employees, were nationals. Expats numbered 48, down by 5 from 12 months prior. Senior management (general managers and heads of department) comprise 35% national employees, with an additional 4% from other parts of West Africa.

Endeavour is also working on youth development and employment within the company and broader community and empowering women to apply for job opportunities in fields not traditionally seen as female occupations. At the end of Q1 2020, 10.25% of the workforce were female, with two female members in the senior management team on site.

The right to freedom of association and collective bargaining is supported and regular meetings are held with unions and staff representatives. In 2019, site-specific collective agreements were reached and signed at Houndé.

Promotion of Community Development

Exploitation licence holders are required to contribute to a local development fund (Section 20.3.1). This fund is used to support the implementation of community-led projects identified in a local development plan devised by local government with community involvement.

In addition to making contributions to the local development as required by law, the operating companies also contribute to community development through voluntary actions and investments. A recent example is provision of a complete X-Ray unit to the Houndé medical centre (the district hospital). In 2019, an agreement was signed with a Canadian association called 48 North to build the capacity of local entrepreneurs to take advantage of the economic opportunities offered by the business.

In addition to making contributions to the local development as required by law, Endeavour launched ECODEV in 2018. This is a dedicated economic development fund that aims to support local economic growth by promoting establishment of businesses that can provide long-term employment and self-sustaining wealth creation within West Africa. Endeavour intends to work with partners to enhance the success of the initiative. In Burkina Faso the focus has been on developments in the cattle/beef sector to date.

Over 2012 to 2014, CFA40m was spent by Endeavour on local education, community health initiatives and initiatives aiming to promote local economic development.

Closure Review

A new Endeavour standard for closure has been drafted and closure plans and cost estimates will be updated to align with this new standard in 2020. Further discussion on this is presented in Section 20.6.

20.5 Key Issues

Resettlement

Resettlement was required at all four mine sites and RAPs were developed for this. Resettlement has been completed at Houndé and Bouéré and is still to be undertaken at Dohoun and Kari Pump. The livelihoods of affected parties were/ are based on agriculture and artisanal mining.

The resettlement measures in the RAPs include rebuilding of houses in new locations, compensation for land and livelihood/income lost. Most of the commitments in the Houndé and Bouéré RAPS have been met. Audits to evaluate the success of RAP implementation are commitments are still to be fulfilled.

The Houndé 2013 RAP refers to displacement of 243 households (541 structures), 1,845 people, 1,600ha of farmland, and 28,331 trees. The Dohoun and Bouéré 2016 RAPs estimated each mine would affect 221ha of village and agricultural land, with Dohoun affecting 244 households and Bouéré affecting 298 households. The RAPs also cover trees (almost 5,000 trees) and structures at artisanal workings.

The Kari Pump development will displace 162 households, made up of 694 individuals. Of these, 147 households will be physically displaced. The buildings affected are in farming villages and hamlets and on artisanal mining sites. Almost 60,000 fruit and multi-use trees will be affected. The number of households physically resettled to date are given in the table below.

Table 20-4: Required physical resettlement

Number of households	Houndé	Bouéré	Kari Pump	Dohoun
Resettled	197	31	0	0
To be resettled	0	147	147	77

Houndé mine resettlement planning and implementation was facilitated by a resettlement and compensation committee. The committee included representatives of provincial and local government, village chiefs, religious leaders, community elders and project-affected-persons including women and youth (60 committee members in total). Entitlement matrices, final compensation packages and assistance measures for vulnerable groups were agreed through the committee.

Construction of the Houndé resettlement houses commenced in August 2016 and was completed in February 2017. The construction was undertaken by local contractors. Compensation payments were completed in January 2017. Financial training was reportedly provided to affected parties through Ecobank. Women were given 10% of compensation payments into a bank account in their own right. A similar process was undertaken for Bouéré in early 2019 and is currently in progress for Kari Pump.

Similar committees were used for the preparation of the Bouéré, Dohoun and Kari Pump RAPs but with new community representatives. There is a livelihood restoration plan for Bouéré. This aims to restore and improve affected families' standard of living. It includes income-generation through improved crop farming and market gardening (with fertilization, new types of crops and improved seeds) and/or other activities such as beekeeping, raising chickens and goats. Audits will be undertaken to evaluate the success of the resettlement measures taken.

Artisanal Mining

There are numerous artisanal and small-scale mining sites on the exploration concessions and there is some encroachment on the exploitation licence areas. The Company security and community relations teams record and monitor these and assess risks to operations, health and safety and the environment using an inventory and risk analysis tool. The Company works closely with national and local authorities to manage identified risks.

Although the Mining Code provides for authorisation of artisanal miners outside of exploitation licence areas (Section 20.3.1), the artisanal and small-scale mining on Endeavour's exploration concessions is generally not authorised. Burkina Faso has recently established a National Agency for the Supervision of Artisanal and Semi-Mechanized Mining ("**ANEMAS**") for supervision of artisanal and small-scale miners. This agency facilitates engagement of artisanal and small-scale miners, support their authorisation and help address the environmental and social impacts of their operations.

Many of the artisanal miners live in the communities local to the Houndé, Bouéré, Dohoun and Kari Pump mine sites and are engaged through ongoing stakeholder engagement activities. They are also encouraged to participate in Endeavour's education and training activities to convert their skills to access different types of employment.

The operational site security teams are supported by private security contractors and national security forces (police, gendarme and military) under memorandums of understanding signed with the national authorities. Training on human rights policy and procedure is undertaken to ensure that conduct of security personnel towards third parties is appropriate.

Water Impacts

Formal geochemical studies have not been undertaken to ascertain the acid rock drainage and metal leaching ("**ARDML**") potential of the rock exposed by open pit mining and of placement on waste rock dumps and tailings storage facilities. The Houndé Gold Mine closure plan acknowledges test work is required to confirm closure scenarios for the pits and mine waste facilities, through there is no evidence of ARDML to date. Water impact management plans are lacking and is a point of focus for the Environmental team in 2020.

Biodiversity Impact Management Plan

Presently there are no biodiversity impact management plans. The ESIA reports for the mines state that several nationally protected species have been recorded in the area, but these reports do not delineate habitats or locate populations of conservation importance. These species include white gum tree (*Acacia Senegal*), the lucky bean tree (*Afzelia africana*), the silk cotton tree (*Bombax costatum*), oil palm (*Elaeis guineensis*), locust bean (*Parkia biglobosa*), iron tree (*Prosopis africana*), shea (*Vitellaria paradoxa*) and tamarind (*Tamarindus indica*).

20.6 Closure Plan and Costs

Endeavour Wide Review

A new Endeavour standard for closure has been drafted in Q1 2020 and this standard will apply to Endeavour managed operations and projects. The standard development process included review existing of closure plans and cost estimates against the existing Endeavour guidelines, legislation, stock exchange requirements and international standards (including the ICMM Integrated Mine Closure Good Practice Guide and relevant World Gold Council principles, IFC Performance Standards and EHS Guidelines, and International Cyanide Management Code requirements. Following on from the review, the next tasks are:

- Establishment of a centralised closure database, including information on unit rates and templates for closure plans and estimates; and
- Updating of closure plans and cost estimates.

The review revealed that the closure plans and cost estimates need refinement. The elements requiring attention include:

- Clearer reference to closure obligations, including commitments made by Endeavour and its operating subsidiaries and conditions in licences, approvals and agreements;
- Integration of closure planning and implementation into life of mine planning;
- Improvement of the vision for closure – including stakeholder engagement and definition of closure domains, post-closure land use, closure criteria;
- Vision and contingencies for temporary suspension of operations;
- Definition of closure risks and preparation of specific plans for management of these risks;
- More clarity on how impacts on biodiversity and ecosystems will be avoided;
- Specific plans for decommissioning cyanide facilities;
- Preparation for the social transition at closure to ensure a positive legacy; and
- Inclusion of water treatment costs in the cost estimates.

Closure Plans and Estimates

A closure plan for the Houndé Gold Mine was prepared in 2019, however it does not cover the Bouéré and Dohoun satellite mines. This closure plan has been reviewed as part of the Endeavour closure plan review and the findings of Endeavour operations review (summarised above) are considered to be equally applicable with respect to the level of closure planning and the accompanying cost estimate. It is anticipated that both elements will be updated during 2020 and aligned with the new closure standard and guidance that is presently being drafted.

A new 2020 closure cost estimate has been prepared for the Houndé Gold Mine site which reflects the anticipate closure estimate associated with depletion of the Mineral Reserves as reported in the current LoMp. The total Environmental Liability is inclusive of a 10% contingency estimated at US$12.8m (Table 20-5) and comprising: ongoing rehabilitation of US$3.5m incurred from 2020 through 2025; mine closure costs of US$7.1m incurred in 2029; and post closure monitoring costs of US$2.3m incurred from 2030 through 2034. This estimate does not however include mine closure costs related to the Bouéré, Dohoun and Kari Pump Open Pits. The earlier ESIA reports for Bouéré (2016), Dohoun (2016) and Kari Pump (2019) include cost estimates for rehabilitation and closure of these satellite mine sites of approximately US$0.9m, US$0.7m and US$0.6m respectively with a total of US$2.2m. These are indicative estimates based simply on a cost of US$0.05/t waste mined at each site (18.9Mt at Bouéré, 13.4Mt at Dohoun and 11.3Mt at Kari Pump). The current LoMp reflects a new total of 141.8Mt (Bouéré – 9.8Mt; Dohoun – 13.5Mt; Kari Pump – 118.5Mt) which on a similar basis would result in an additional closure cost of US$7.1m. Furthermore, it is important to note that none of the above estimates provide for water monitoring and water management costs post closure.

The 2019 Houndé closure plan assumes that when mining ceases, pumping is stopped, allowing the pits to gradually fill with water. Additional studies are required to determine the exact conditions of the recharge rate and water quality before future beneficial uses can be defined (such as fish farming). The closure of the pits involves construction of a trench and revegetated berm (2.5m high) and installation of a fence with signposts to stop the community entering the area.

The WRDs and RoM pad will be revegetated but trials are required to identify suitable substrate and vegetation. The TSF is considered non-acid generating non-metal leaching and as such, closure will involve allowing sufficient time for residual surface water to evaporate, also allowing any cyanide present to degrade on exposure to UV rays. A 30cm cover, comprising of waste rock material, will then be installed to limit wind and water erosion and serve as a basis for vegetation growth.

It is recognised that a more complex cover or cap may be required if geochemistry studies indicate that there is a potential for ARDML seepage from the TSF. The closure plan states the water reservoir and dam will remain in place to serve the community. It does not state who will be responsible for the future use and conversely or perhaps precautionary, the cost estimate includes provision for draining, shaping and revegetating the land associated with these facilities.

Table 20-5: Environmental Liabilities: ongoing, mine closure and post closure monitoring

Item	Expenditure (US$k)	Area (ha)	Unit Cost (US$k/ha)	Unit Cost (US$/m^2)
Open Pits	890	2,705	0	0.03
Waste Rock Dumps	4,376	400	11	1.10
RoM + Stockpile	90	17	5	0.53
TSF	3,359	-	-	-
Explosives Magazine	100	1	100	10.00
Process Plant	356	19	19	1.88
Maintenance	328	1	328	32.84
Hydrocarbon Storage Area	10	2	5	0.53
Road	329		-	-
Administration & Clinic	-	13	-	-
Camp	-	8	-	-
Inspection & Monitoring	2,056		-	-
Water Treatment (CN Conc.)	30			
Subtotal	**11,925**	**3,166**	**4**	**0.38**
Contingency	847			
Total	**12,772**	**3,166**	**4**	**0.40**

Table 20-6: Environmental Liabilities: ongoing, mine closure and post closure monitoring schedules (LoMp total, 2020 through to 2024)

Item	Units	Total	2020	2021	2022	2023	2024
Open Pits	(US$k)	890	-	-	-	168	161
Waste Rock Dumps	(US$k)	4,376	243	243	243	243	243
RoM + Stockpile	(US$k)	90	-	-	-	-	-

Item	Units	Total	2020	2021	2022	2023	2024
TSF	(US$k)	3,359	-	-	-	-	-
Explosives Magazine	(US$k)	100	-	-	-	-	-
Process Plant	(US$k)	356	-	-	-	-	-
Maintenance	(US$k)	328	-	-	-	-	-
Hydrocarbon Storage Area	(US$k)	10	-	-	-	-	-
Road	(US$k)	329	45	45	45	45	45
Administration & Clinic	(US$k)	-	-	-	-	-	-
Camp	(US$k)	-	-	-	-	-	-
Inspection & Monitoring	(US$k)	2,056	-	-	-	-	-
Water Treatment (CN Conc.)	(US$k)	30	-	-	-	-	-
Subtotal	**(US$k)**	**11,925**	**287**	**287**	**287**	**455**	**448**
Contingency	(US$k)	847	-	-	-	-	-
Total	**(US$k)**	**12,772**	**287**	**287**	**287**	**455**	**448**

20.7 Risks and Opportunities

The principal environmental and social risks relating to mining and processing related operations at Houndé Gold Mine are directly related to two key components:

- **Mine Closure Planning and Cost Estimation (process):** Recent Endeavour wide reviews of the closure planning and cost estimation have highlighted a number of specific recommendations required to ensure that future plans and estimates are more aligned with the following internationally accepted principles: Future mine closure planning and cost estimation processes will be enhanced through heightened adherence to the objectives noted in various key documents: specifically the International Council on Mining and Minerals ("**ICMM**") Planning for Integrated Mine Closure: Toolkit (2008);
- **Mine Closure Planning and Cost Estimation (base data):** The basis for closure planning requires further site-specific technical information to be gathered and processed, specifically with respect to geochemical analysis (static and kinetic) for Acid Rock Drainage and Metals Leaching of: mine waste (WRD and TSF); and anticipated pit lake chemistry on closure;
- **Mine Closure Planning and Cost Estimate (Scope):** Closure cost estimates will be updated for both immediate and longer term ("**LoMp**") mine closure requirements. With respect to the latter and specifically focusing on the landforms, the closure cost estimate will incorporate estimates for the final footprint of all open-pits, waste rock dumps, TSF facilities as reflected in the LoMp. Presently the estimate is primarily focused on HGO deposits and associated infrastructure in support of a balance sheet entry for Asset Retirement Obligations ("**ARO**") processes. Accordingly, and based on a preliminary estimate the additional incremental cost, not presently included in the current economic analysis may be of the order of US$7m to US$10m;
- **Social Licence to Operate:** the primary documentation governing the mining and processing operations comprise both Exploitation Permits and Mining Conventions which incorporate a number of commitments which are in effect conditions of approval. To date Houndé Gold Mine is focused on adherence to these commitments and appropriate management structures and resources are in place to maintain this. The key risk therefore relates to any changes in this approach which would impair the operations ability to manage and implement the obligations and commitments enshrined in the relevant permits; and
- **Economic Benefit Analyses:** To demonstrate compliance with and support of adherence to the legal commitments as defined in the Exploitation Permits and Mining Conventions to undertake further economic analyses of economic model focusing on the economic benefits contributions to the licence holders and the Government of Burkina Faso.

20.8 Interpretation, Conclusions and Recommendations

The assessment of the environmental and social aspects at the Houndé Gold Mine confirms management focus and adherence to the obligations and commitments enshrined in the Exploitation Permits and Mining Conventions. There are elements of environmental management are planned for 2020, specifically with respect to mine closure planning and related estimation of environmental liabilities. Recent Endeavour wide assessments of the mine closure planning process has however identified a number of weaknesses and proposed a remedial action programme to address these.

In conclusion, management focus on the legal commitments and adherence thereto is appropriate and whilst the environmental issues at Houndé Gold Mine are well understood, further work is required to address certain aspects pertaining to biophysical environmental issues. Accordingly, the following items are noted as the key recommendations to be addressed in the forthcoming work programmes for 2020 and 2021.

- Fully align with the international standards and benchmarks;
- Separately define environmental closure costs as at the date of declaration of the Mineral Reserves and assuming full depletion of the Mineral Reserves, specifically for the latter to ensure that the scope of the remediation plan extends for all landform extents assumed at the date of depletion;
- Complete additional site specific testwork, specifically focusing on geochemical analysis (static and kinetic testing) to define the extent to which Acid Rock Drainage and Metal Leaching management measures are required as part of the mine closure plan; and
- Quantify and analyse the economic benefit to both the licence holders and the Government of Burkina Faso.

21 CAPITAL AND OPERATING EXPENDITURE

21.1 Introduction

The following section includes discussion and comment on the capital and operating expenditure assumptions relating to Houndé Gold Mine. Specifically, details are included on the basis of estimation, key input assumptions and other supporting data for the primary reporting areas of: mining, processing, G&A and refining for operating expenditures; and mining, processing, TSF, infrastructure and Mine closure reporting areas for capital expenditure as well as aggregations for growth, sustaining and non-sustaining capital expenditures.

21.2 Capital Expenditure

The capital expenditure for Houndé Gold Mine comprises zero growth capital, US$201.1m sustaining capital and US$24.9m non-sustaining capital. The majority of this is allocated to mining related equipment (US$131.1m), TSF raises (US$23.8m) and process plant related sustaining capital (US$41.4m) and items included in the approved 2020 budget (US$29.7m). Additional expenditures over and above this relate include Mine Closure costs of US$12.8m.

Table 21-1 include the LoMp totals and the annual schedules of expenditures from 2020 through 2024 inclusive for capital expenditure and other (Mine Closure) expenditures associated with depletion of the Mineral Reserves as included in the current LoMp.

The capital expenditure items have been compiled incorporating inputs from both mine based discipline representatives and external consultants as appropriate. The capital estimates are base dated 1 January 2020 and stated in US$ with exchange rate assumptions incorporating an assumption of A$1.50 and XOF595 to one US$.

Table 21-1: Capital Expenditure and other expenditure details: LoMp total and 2020 through 2024 inclusive

Capital Item	Total LoMp	2020 (US$k)	2021 (US$k)	2022 (US$k)	2023 (US$k)	2024 (US$k)
Summary						
Growth	-	-	-	-	-	-
Sustaining	201,149	13,408	26,026	27,714	24,862	25,765
Non-Sustaining	24,882	16,282	8,600	-	-	-
Capitalised Waste Development	102,740	28,441	26,481	1,614	21,129	19,291
Capitalised Waste Development (Non-Sustaining)	4,666	4,666	-	-	-	-
Exploration	-	-	-	-	-	-
Subtotal	**333,437**	**62,796**	**61,107**	**29,327**	**45,991**	**45,056**
Mine Closure	12,772	-	-	-	287	287
Total	**346,209**	**62,796**	**61,107**	**29,327**	**46,278**	**45,343**

Mobile Mining Fleet

The Mobile Mining Fleet equipment asset management strategy employed at Houndé Gold Mine is focused on optimise and minimise the lowest practical Total Cost of Ownership ("**TCO**").

Detailed mining plans and schedules dictate the type and period for the equipment to be purchased and operated. Mine and process plant design considers mining input and equipment constraining items such as haul road widths, haul road inclines, mining and waste dump area dimensions, crusher hopper dimensions and required primary crusher feed size as examples.

All major Heavy Mining Equipment ("**HME**") in operation at Houndé Gold Mine are presently sourced from Komatsu. Where specific Komatsu HME models and ancillary systems are referenced, any alternative OEM HME brand, model or type must provide a system of the same type and quality or be superior to that supplied by Komatsu.

A final step is then to weigh up the merits of performing all of this work with a fully owned equipment fleet, versus options to wet hire some fleet on dayworks rates (based on engine hours) or to fully contract elements such as drill and blast, grade control drilling, surface haulage or activities such as TSF construction that are more periodic in nature. Key items addressed for the asset management strategy at Houndé Gold Mine comprise:

- **Major Components and Undercarriage Costs:** A reliability monitoring Planned Component Replacement ("**PCR**") programme utilising the Original Equipment Manufacturers ("**OEM**") recommended hours as a baseline is in place at Houndé Gold Mine. Component hours are extended where data is recorded and analysed to ensure economic life and as a general rule asset are not run to failure. From this programme a database of planned works is developed and updated every three months in line with the site budget and forecasting timelines;
- **Asset Replacement:** The asset replacement strategy is based on the economic life hours of the current equipment and follows the strategy of reliability against cost monitoring. The current cost profile is based on operating life hours divided by monthly average hours per asset which is used to generate the asset replacement timeframe. Since commencement of owner operations in 2017 there have been no asset replacements to date;
- **Disposal/Scrap:** During the operational life of mobile equipment, detailed analysis of both financial and technical performance of the plant and equipment is undertaken which is then used as the basis for decisions relating to retention, replacement or disposal. These decisions are informed by the maintenance costs on an existing item of plant and equipment against the opportunity for increased reliability and productivity against a high initial cost and a reduced maintenance cost for new plant and equipment.
- **Purchase/Acquisition:** Life Cycle Planning ("**LCP**") is a key component of the asset management plan and a comprehensive approach to LCP forecasts the expenditure required to support the performance of the mobile equipment assets over its life. This incorporates all capital, maintenance and operational expenditure along with the value of the asset throughout its life and an estimation of remaining life at any given point. Delivery and commissioning involves pre-delivery testing, commissioning and handover of the plant and equipment by the OEM and/or their local representative. This includes training, provision of tools and specialist equipment, all manuals and as built documentation.

Tailings Storage Facilities

The capital requirements for the TSF at Houndé Gold Mine are based on the tailings storage facility lift programme (physicals) as established by Knight Piésold (Pty) Ltd in support of the LoMp deposition programme as reported herein; and application of the capital unit rates by the Group's Project Services Group ("**PSG**"). Figure 21-1 and Figure 21-2 provides the overall engineering layout and a cross section of the embankment construction respectively. The TSF lifts are constructed using mine waste in defined stages and the basis of design and construction methodology comprises:

- Mine waste for construction of "**Zone C**";
- The downstream structural fill zone of the TSF embankment (Zone C) has been and will continue to be constructed by the mining operation, by direct paddock dumping mine waste hauled directly from the open pit by mining fleet. This waste material is levelled using bulldozers, graders or similar and compacted via systematically distributed trafficking with loaded haul trucks (Komatsu 785);
- The TSF embankments are separated into segments for the purpose of providing Zone C volumes for scheduling purposes, which is aligned to the respective mine plan;
- The TSF Staged lift Zone C embankment profile consists of a suitable running surface, as necessary for the mine to maintain current safe operating standards, typically 26m inclusive of 1m windrow on either side of the running surface for safety;
- The upstream face of the embankment is filled with a low permeable saprolite material layer,

otherwise known as “**Zone A**”. This layer is shaped, and proof rolled and covered with High Density Polyethylene (“**HDPE**”) liner which is fully welded and non-destructive tested (“**NDT**”) to ensure quality assurance in line with design considerations;

- Tailings disposal systems are installed on top of the final HDPE lined TSF and tailings discharged / handled as described in Section 18 of this Technical Report; and
- Wearing course around the perimeter of the TSF which is installed for maintenance access.

The capital estimates are based on a high-level final design for the TSF to support the estimation of physical offtakes for construction of extensions to Zone A and Zone C for each lift. Based on the actual costs incurred to date, the associated capital estimate assumes a unit rate of US$4.00/$m^3$ for a total additional lift volume of 25.2Mm^3.

Process Plant Sustaining Capital

The Houndé Process Plant is well established and only requires additional ongoing expenditures to ensure asset integrity and ongoing operations. To this end the following key activities are catered for in the current sustaining capital expenditure estimate which address repair works, remediation and minor plant optimisation programmes:

- process plant earthworks for drainage, storm event rectification etc.;
- concrete addition/replacement following wear or incident damage. Footpath, work area addition or new concrete drainage installation;
- structural steel replacement or corrosion protection;
- carbon steel replacement or corrosion protection;
- poly pipe, or fitting replacement;
- cable tray / sun cover replacement or corrosion protection;
- field electrical equipment or cable replacement / repair following sun damage;
- infrastructure building repair / replacement; and
- infrastructure location optimization relating to operational efficiency etc.

The sustaining capital expenditure provision is largely based on historical performance and PSG experience and is projected at a rate of US$1.45/$t_{milled}$ comprising provisions for: crushing; grinding; Carbon In Leach Plant (including thickening/trash screen); gold room and electrowinning; water, plant services, plant mobile equipment, infrastructure, general, labour, contract labour; and contingencies.

Figure 21-1: Houndé Gold Mine Tailings Storage Facility: Stage 4/5 lift plan (source: Endeavour)

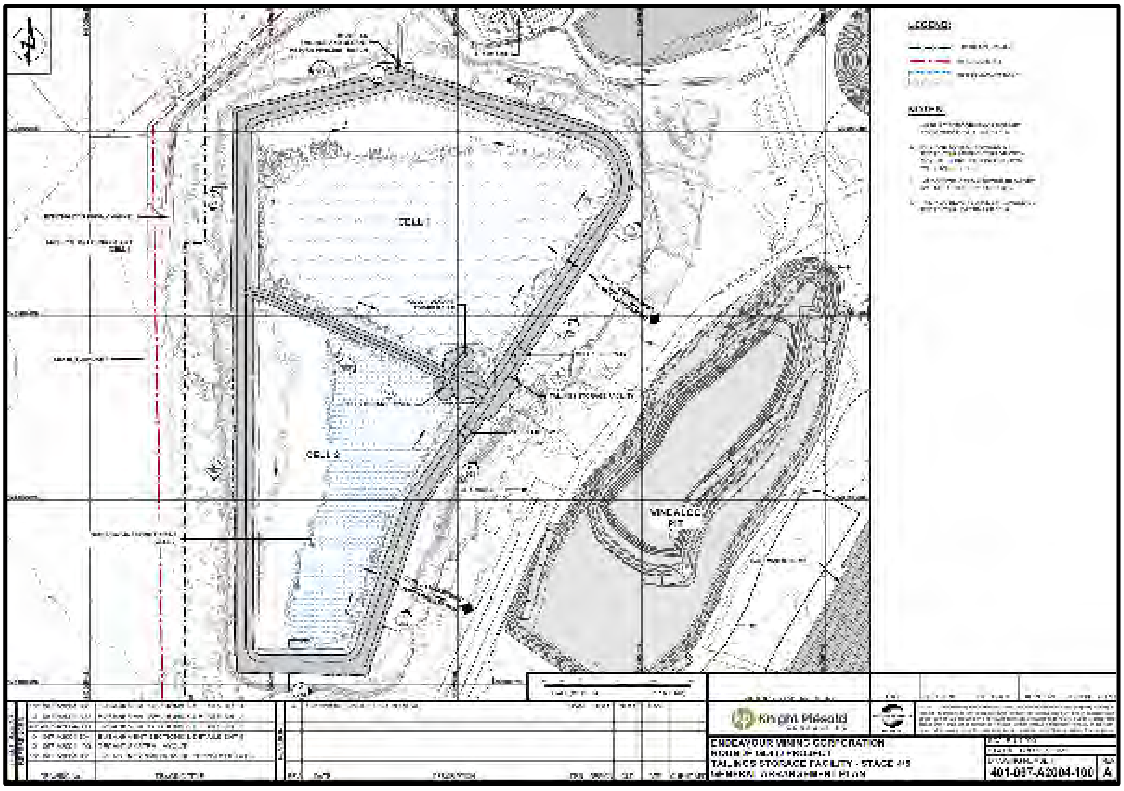
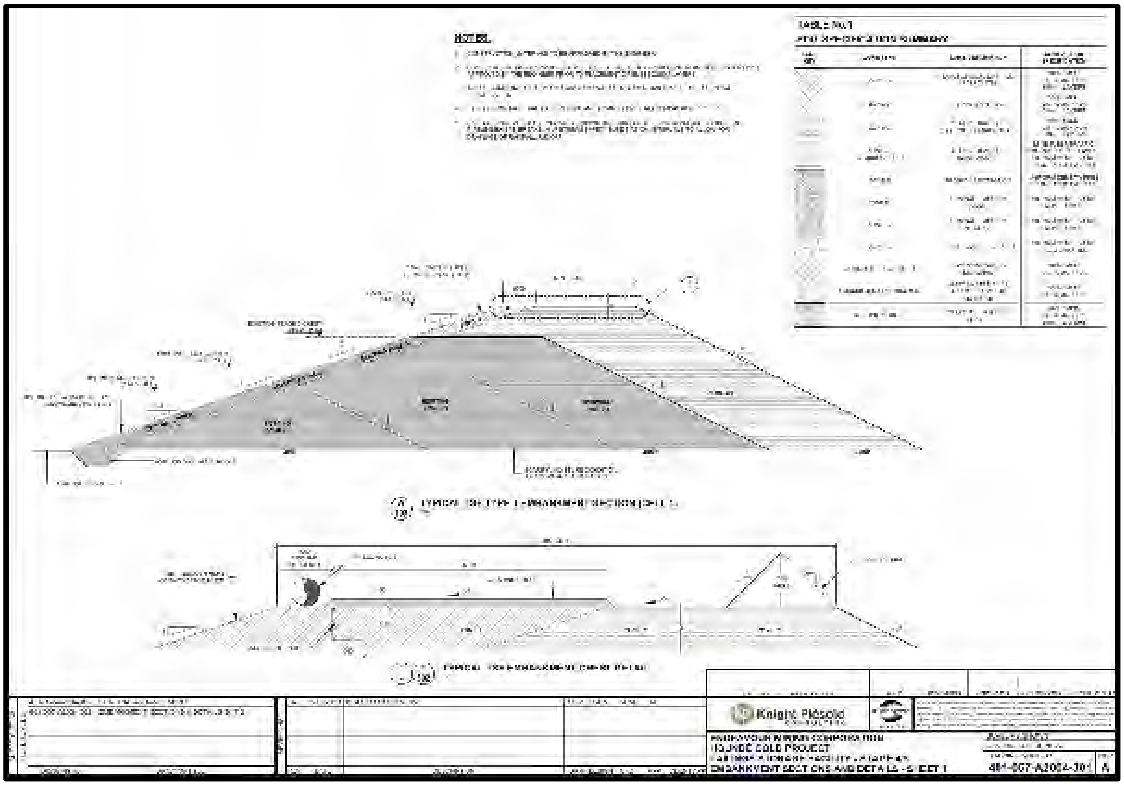


Figure 21-2: Houndé Gold Mine Tailings Storage Facility: Stage 4/5 lift typical embankment elevation (source: Endeavour)



Kari Pump Infrastructure

The Kari Pump deposit is located approximately 7km west of the Houndé Process Plant and is planned to commence during Q4 2020. The associated capital programme is underway and planned for completion in Q3 2020 the related expenditures are included in the 2020 Budget estimates. The key items relating to the capital programme are noted below:

- **Buildings and Infrastructure:** The site will be treated in a similar way to the Bouéré deposit, with minimal infrastructure given that these facilities will also likely service future mining operations at Kari West and Kari Centre once the appropriate technical studies have been completed on these. The associated capital expenditure programme has been allocated in the 2020 budget to complete land access compensation, resettlement, infrastructure and commence mining in 2020. Aside from the Komatsu PC3000 excavator which was sitting idle at Karma and additional track dozers which are being mobilized from Ity Gold Mine, there is not further equipment requirements planned at this stage. Due to the overlap in timing of mining at the Bouéré Open Pit for 6-months, there will be a slight increase in supervisory skills for the period.

  The site will be fenced to prevent animal access and deter access by unauthorised persons. Road access into the fenced area will be through a manned checkpoint. Site security is based on concentric lines of fencing/control. Security fencing will surround the general site infrastructure.

  Power for dewatering and for infrastructure will be via generator in the short term to defer capital for an 11kV line, which will cost approximately US$1.0m including terminations and step-down transformer. The decision on whether to run a high voltage line will only be made in 2021 for inclusion in the 2022 budget, with the inclusion of Kari Centre and West and extension of mine life following completion of the necessary additional technical studies and to support declaration of Mineral Reserves.

  Site buildings will be ‘fit for purpose’ industrial type structures. The workshop and warehouse will be constructed of a concrete slab on ground with structural steel frame and metal cladding and offices and amenity buildings will be prefabricated structures.

  The following facilities will be located in a fenced area adjacent to the current Houndé process Plant:

  - gatehouse with turnstile and entry boom gate control,
  - clinic and emergency response building,
  - chop shop and meals area for mid-shift break,
  - 2-bay workshop using sea containers and domed roof,
  - fuel and lubricant storage and dispensing facility (by the fuel supplier),
  - mine Go-Bay to park up the mining fleet,
  - area for contractors to establish their facilities for blast hole drilling, GC drilling, blasting and surface haulage.

  Internal communications and IT services shall be via a site wide fibre optic network. One of the local mobile phone providers will be contracted to install facilities on site and provide a link into the local, national and international telecommunication network. A radio network will be established with dedicated operational, security and emergency channels. A local ground station will be installed to provide global satellite voice and data connection.

- **Capital Expenditure Estimation:** The total capital estimate for the Kari Pump open pit establishment comprises a total of US$9.7m for the primary infrastructure which includes allowances for land compensation and resettlement (US$6.4m), infrastructure and fencing (US$2.1m); pit and waste dump clearing and grubbing (US$0.2m), dewatering boreholes (US$0.6m); infill drilling for advanced grade control and sterilisation (US$0.3m). Additional expenditures over and above this comprise US$6.6m for capitalised waste stripping and US$1.3m for refurbishment of the PC3000 excavator sourced from the Karma Gold Mine. These estimates are in part based on historical experience in establishing mining operations at the Bouéré Open Pit at Houndé Gold Mine and certain open pit operations at Endeavour's Karma Gold Mine.

Additional Expenditures

The additional expenditures reported Mine Closure the basis for which are included in Section 20.6

21.3 Operating Expenditure

The operating expenditures (Table 21-2) for Houndé Gold Mine as incorporated into the current LoMp are based on input data gathered as part of the annual budgeting process and the development of cost models relating to the primary cost centres of mining, processing and G&A. In summary the key assumptions are as follows:

- Exchange Rate assumptions comprising: US$1.11 to one Euro ("**€**"); US$1.25 to one Great British Pounds ("**GBP**"); Canadian Dollar ("**C$**") of 1.30 to one US$; *'Coopération financière en Afrique centrale'* ("**CFA**") issued by '*Banque des États de l'Afrique Centrale*' ("**BEAC**") hereinafter CFA BEAC ("**XOF**") of 600 to one US$; and Australian Dollar ("**A$**") of 1.50 to one US$;
- Electricity supply prices assuming USc26.8/kWh for grid supply and own diesel generation accordingly with grid supply assumed to be contributing 90% of power consumption for 2020 onwards;
- Unit prices supplied on a Carriage Insurance and Freight ("**CIF**"), Delivered at Place ("**DAP**") and Delivered Duty Place ("**DDP**") basis for steel balls (US$1,300/t), caustic soda (US$1,035/t), hydrogen peroxide (60% - US$1,963/t), cyanide (US2,553/t), hydrochloric acid (32% - US$616/t), copper sulphate (US$2,550/t);
- Diesel unit prices of US$1.12/l quoted on a DDP basis;
- Royalty and other revenue related determinations comprising:
  - Government royalty based on banded rates: ≤US$1,000/oz of 3.00%; >US$1,000/oz and ≤US$1,300/oz of 4.00%; and >US$1,300/oz of 5.00%,
  - Social Development Fund of 1.00% of payable metal,
  - Sandstorm Gold Ltd ("**Sandstorm**") royalty of 2.00% of payable metal; and
- Gold refining services costs based on a unit rate of payable gold set at US$3.35/oz and assuming a payability of 99.95%

Table 21-2: Operating Expenditure: LoMp total

Item	Units	Total
Physical		
Stripping Ratio	(t_{waste}:t_{ore})	8.78
Mined	(kt)	309,845
Waste	(kt)	278,172
Ore	(kt)	31,673
Milled	(kt)	32,623
Produced	(kozAu)	1,960
Sold	(kozAu)	1,959
Diesel	(Ml)	188.5
Mining	(Ml)	174.0
Energy Generation	(Ml)	3.9
Other	(Ml)	10.6
Electricity	(GWh)	149.8
Grid	(GWh)	135.1
Generated	(GWh)	14.7
Revenue		
Gold	(US$k)	2,546,641
Expenditures		
Mining	(US$k)	611,682
Processing	(US$k)	485,750
G&A	(US$k)	193,520

Item	Units	Total
Site	(US$k)	141,898
Allocation	(US$k)	51,622
Refining	(US$k)	6,566
Royalty	(US$k)	178,265
Capitalised	(US$k)	(107,407)
Total	**(US$k)**	**1,368,376**
Unit Rates		
Mining	(US$/$t_{mined}$)	1.97
Operating	(US$/$t_{mined}$)	1.63
Capitalised	(US$/$t_{mined}$)	0.35
Processing	(US$/$t_{milled}$)	14.89
G&A	(US$/$t_{milled}$)	5.93
Refining	(US$/oz)	3.35
Royalty	(%)	7.00

21.4 Risks and Opportunities

The principal risks regarding capital expenditure, other expenditures and operating expenditures at Houndé Gold Mine are:

- The risk that following development of more detailed and integrated activity and element cost models for LoMp schedules results in increased expenditures over and above that reported herein;
- The risk of variation in the cost of the supply of services for various contractors arising from increased consumable rates, exchange rate fluctuations and inflation;
- The risk of increased expenditures relating to demobilisation related expenditures which are at present not accounted for in the current LoMp cost modelling process, but only likely to be incurred on cessation of mining and processing operations in 2028;
- The risk that the current contribution of power supply from the grid (90%) could revert to historical levels (70%) thereby necessitating an increase in the more expensive supply from the diesel-powered generators; and
- The risk that the cost of security as presently provided may be increased in response to any worsening of security related concerns and activities in Burkina Faso.

The principal opportunities regarding capital expenditure, other expenditures and operating expenditures at Houndé Gold Mine are directly related to continued management focus on cost improvement initiatives and efficiencies as envisaged in Endeavour's longer-term strategic planning process, specifically in respect of: procurement initiatives; equipment maintenance programmes; and introduction of solar power technology where considered cost effective.

21.5 Interpretation, Conclusions and Recommendations

The estimation of operating expenditures for the Houndé Gold Mine is presently reliant on details generated by the annual budgeting process as well as a degree of LoMp cost modelling. With respect to the latter, the cost models as developed require further refinement to enable a more integrated and interdependent approach to life-of-mine cost modelling with specific focus on mining, power (demand, supply and consumption), and consumption of reagents and variation in respect of plant feed (material type etc). Another key area is also with respect to the development of LoM manpower and labour.

Accordingly, whilst the resulting cost models are largely aligned with historical performance as reported in 2019, further work is required to refine the cost modelling process which is planned for completion during 2020 as part of the pre 2021 budgeting process.

On this basis the principal recommendations are as follows:

- To develop a more detailed and integrated LoMp cost model for the key reporting areas of mining , processing and G&A;
- To incorporate both activity and element-based costing assumptions as the current approach for cost projections beyond the budget period is largely focused on activity costing

with limited details on the element components of the reporting areas;

- To develop a LoM manpower schedule in order to determine the impact on production build-ups and tails with respect to the reporting areas;
- To advance the strategic initiatives currently under consideration with a view to incorporating the results into the 2021 budgeting process; and
- To establish the potential impact of contractor demobilisation and any additional site costs to be incurred during the closure and post closure monitoring phase.

22 ECONOMIC ANALYSIS

In accordance with the exemptions afforded to producing issuers as stipulated in Form-101F1,“***the information required under Item 22 for technical reports on properties currently in production***” is excluded as Endeavour believes that Technical Report does not include “**a material expansion of current production**”.

23 ADJACENT PROPERTIES

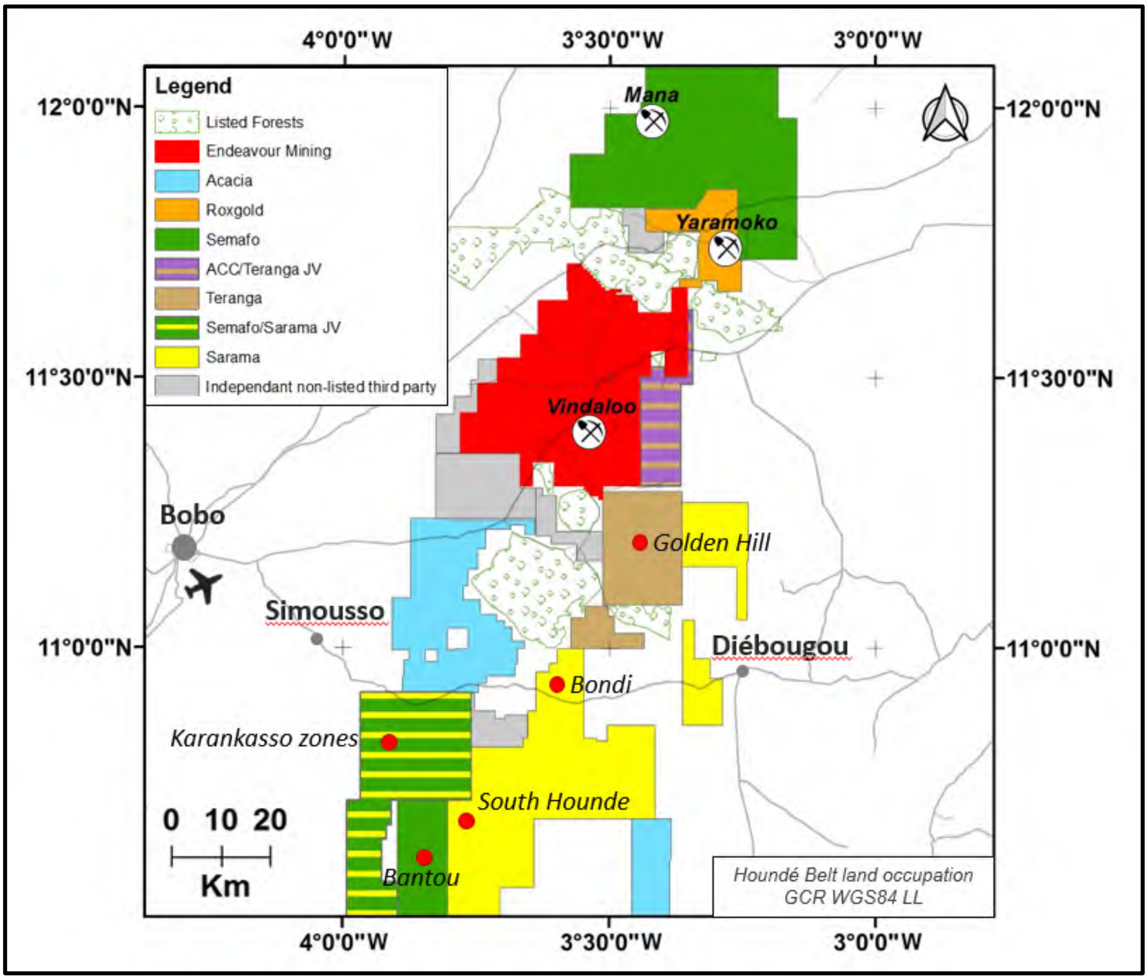
23.1 Introduction

Mineral properties adjacent to the Houndé Gold Mine include two operating mines, Roxgold Inc.'s Yaramoko Mine Complex and SEMAFO Inc.'s Mana Gold Mine and five advanced exploration projects namely: Bantou; Karankasso; Houndé South; Three Bee; and Golden Hill.

The adjacent properties of interest are described briefly in the following sections. Figure 23-1 illustrates their relative locations.

The Adjacent Properties included herein are for context purposes only and may not be indicative of the Houndé property that is the subject of this Technical Report. The Qualified Person has been unable to verify the information as sourced from documents in the public domain and referenced below.

Figure 23-1: Location Map – Adjacent Properties (source: Endeavour)



23.2 Surrounding Properties

Yaramoko Mine (Roxgold Inc)

The Yaramoko property lies approximately 40km northeast of Vindaloo, along the eastern edge of the Houndé volcanic belt. The mineralisation is hosted by structurally controlled high-grade quartz veins in the granite and volcanic rocks. Roxgold Inc. is listed on the Toronto Stock Exchange (with ticker "**ROXG**"). The Yaramoko Mine Complex consist of two high-grade underground mines, 55 Zone and Bagassi South.

The Yaramoko December 2018 Mineral Resource and Reserve Statement (reported in accordance with CIM Standards) includes Proven and Probable Mineral Reserves of 2.48Mt at an average grade of 8.23g/tAu for 0.66MozAu of gold in two in-situ deposits and stockpiles (Table 23-1). It also includes Measured and Indicated Mineral Resources of 2.12Mt at a grade of 12.11g/t Au containing 0.83MozAu; and Inferred Mineral Resources of 0.48Mt at 12.47g/t Au containing 191kozAu (Table 23-2).

Table 23-1: Roxgold's Yaramoko Gold Mine Mineral Reserve Statement, as of December 31, 2018 (Source: www.roxgold.com)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven			
55 Zone	386	9.43	117
Bagassi South	49	7.62	12
Stockpiles	123	4.55	18
Subtotal	**558**	**8.19**	**147**
Probable			
55 Zone	1,314	7.84	331
Bagassi South	612	9.10	179
Subtotal	**1,926**	**8.24**	**510**
Mineral Reserves			
55 Zone	1,700	8.20	448
Bagassi South	661	8.99	191
Stockpiles	123	4.55	18
Total	**2,484**	**8.23**	**657**

The accompanying notes for the Mineral Reserves as reported in Table 23-1 are:

- Mineral Reserves are reported with an effective date of December 31, 2018. Mineral Reserve estimates reflect the Company's reasonable expectation that all necessary permits be maintained. Mining dilution and mining recovery vary by deposit and have been applied in estimating the Mineral Reserves;
- The Mineral Reserves have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014);
- Mineral Reserves are the economic portion of the Measured and Indicated Mineral Resources. Mineral Reserve estimates including mining dilution at grades assumed to be 1.2g/tAu and 1.0g/tAu for 55 Zone and Bagassi South respectively. Mining dilution and recovery factors vary with specific reserve sources and are influenced by several factors including deposit type, deposit shape and mining methods;
- The 2018 Mineral Reserves were prepared under the supervision of Benny Zhang, Principal Mining Engineer at SRK Consulting (Canada) Inc., Peng (PEO # 100115459). Mr. Benny Zhang is a Qualified Person as defined by NI 43- 01 and independent of the Company;
- The Mineral Reserve Statement effective on December 31, 2018 is reported at a cut-off grade of 3.7g/t gold for the Zone 55 deposit assuming a gold price of US$1,300/oz, mining cost of US$98.19/t, G&A cost of US$19.31/t, processing cost of US$23.75 per tonne, and process recovery of 98.3%; and a cut-off grade of 3.1g/tAu for the Bagassi South deposit assuming a gold price of US$1,300/oz, mining cost of US$76.10/t, G&A cost of US$19.31/t, processing cost of US$23.75/t, and process recovery of 98.3%. Mineral Reserve estimates include mining dilution and mining recovery; and
- For further information, please refer to the technical report dated December 20, 2017 and entitled *"Technical Report for the Yaramoko Gold Mine, Burkina Faso"* available the on Roxgold's website and on SEDAR at www.sedar.com.

Table 23-2: Roxgold's Yaramoko Gold Mine Mineral Resource Statement, as of December 31, 2018 (Source: www.roxgold.com)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured			
55 Zone	382	14.09	173
Bagassi South	37	13.45	16
Stockpiles	123	4.55	18
Subtotal	**542**	**11.88**	**207**
Indicated			
55 Zone	1,135	10.96	400
Bagassi South	445	15.31	219
Subtotal	**1,580**	**12.19**	**619**
Measured + Indicated			
55 Zone	1,517	11.75	573
Bagassi South	482	15.16	235
Stockpiles	123	4.55	18
Total	**2,122**	**12.11**	**826**
Inferred			
55 Zone	384	12.80	158
Bagassi South	93	11.10	33
Total	**477**	**12.47**	**191**

The accompanying notes for the Mineral Resources as reported in Table 23-2 are:

- Mineral Resources are reported with an effective date of March 9, 2019 and March 25, 2019, for the 55 Zone and Bagassi South respectively (collectively "**Yaramoko**"). The Yaramoko Mineral Resources reflect that they have been depleted for mining and mine development up to December 31, 2018. Depletion also includes artisanal workings close to the surface;
- The Yaramoko Mineral Resources are reported at gold grade cut-off of 3.5g/tAu, assuming: a gold price of US$1,450,oz, mining cost of US$85.00/t, general and administration cost of US$22.00/t, processing cost of US$31.00/t, process recovery of 98.5%;
- The Mineral Resources have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014), and procedures for classifying the reported Mineral Resources were undertaken within the context of the Canadian Securities Administrators NI 43-101;
- All Mineral Resources reported are reported inlcusive of those Mineral Resources modified to estimate Mineral Reserves;
- The Yaramoko Mineral Resource Statement was prepared under the supervision of Dr Belinda van Lente, Principal Resource Geologist at CSA Global (UK) Ltd. Dr van Lente is a Qualified Person as defined in NI 43-101 and independent of the Company;
- Mineral Resources that are not Mineral Reserves do not necessarily demonstrate economic viability; and
- For further information, please refer to the technical report dated December 20, 2017 and entitled *"Technical Report for the Yaramoko Gold Mine, Burkina Faso"* available on Roxgold's website and on SEDAR at www.sedar.com.

According to Roxgold published production figures, Yaramoko underground mine produced 0.5Moz Au from mid-2016 to end-2019.

Mana Mine, SEMAFO Inc

Mana Mine is located approximately 60km north of Houndé Gold Mine within the Houndé greenstone belt. It is composed of multiple deposits and has produced some 2MozAu since its first gold pour in 2008. In 2019, Mana gold production totalled 136kozAu. SEMAFO Inc. is listed on the TSX and NASDAQ OMX Stockholm Exchange.

Six deposits have Mineral Reserves, namely Wona-Kona, Nyafe, Fofina, Siou Open Pit, Siou Underground and Yama. Nine deposits have Mineral Resources, namely Wona-Kona, Nyafe, Fofina, Yaho, Filon 67, Fobiri, Siou Open Pit, Siou Underground and Yama.

The Mana December 2019 Mineral Reserve and Resource Statement reported in accordance with CIM Standards includes Proven and Probable Mineral Reserves of 15.0Mt at an average grade of 2.91g/tAu for 1.4Moz of gold (Table 23-3). It also includes Measured and Indicated Mineral Resources of 43.6Mt at a grade of 1.92g/tAu containing 2.7MozAu; and Inferred Mineral Resources of 8.9Mt at 2.66g/tAu containing 0.77Moz Au (Table 23-4).

Table 23-3: SEMAFO's Mana Mine Mineral Reserve Statement, as of December 31, 2019 (Source: SEMAFO 2019 AIF)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Proven			
Wona-Kona	734	2.36	56
Nyafe	265	5.82	50
Fofina	24	5.18	4
Siou OP	567	3.35	61
Sios UG	1,607	3.78	195
RoM Pad	63	3.90	8
Subtotal	**3,260**	**3.56**	**374**
Probable			
Wona-Kona	9,554	2.31	709
Nyafe	6	3.63	1
Fofina	3	3.11	0
Siou OP	168	1.80	10
Sios UG	1,401	6.15	277
Yama	651	1.75	37
Subtotal	**11,783**	**2.73**	**1,034**
Mineral Reserves			
Wona-Kona	10,288	2.31	765
Nyafe	271	5.77	50
Fofina	27	4.95	4
Siou OP	735	2.99	71
Sios UG	3,008	4.88	472
Yama	651	1.75	37
RoM Pad	63	3.90	8
Total	**15,043**	**2.91**	**1,407**

The accompanying notes for the Mineral Reserves as reported in Table 23-3 are:

- Mineral Reserves are reported with an effective date of December 31, 2019.
- The Mineral Reserves have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014);
- SEMAFO Inc. holds indirectly 90 % of SEMAFO Burkina Faso S.A., with the Government of Burkina Faso holding the remaining 10% interest;
- Mineral Reserves were estimated using a gold price of US$1,200/oz; and
- The Mineral Reserve estimates were prepared and approved by François Thibert, M.Sc.Geo, Manager, SEMAFO Estimate Group Resources and Reserves West Africa.

Table 23-4: SEMAFO's Mana Mine Mineral Resource Statement, as of December 31, 2019 (Source: SEMAFO 2019 AIF)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Measured			
Wona-Kona	1,290	2.09	87
Nyafe	286	3.95	36
Fofina	292	4.26	40
Yaho	5,738	0.91	169
Filon 67	26	2.75	2
Fobiri	496	1.70	27
Siou OP	88	0.64	2
Siou UG	639	2.74	56
Subtotal	**8,855**	**1.47**	**419**
Indicated			
Wona-Kona	21,618	2.55	1,776
Nyafe	223	5.96	43
Fofina	253	4.44	36
Yaho	11,636	0.88	331
Filon 67	9	3.46	1
Fobiri	114	1.53	6
Siou OP	75	0.62	2
Siou UG	781	3.29	83
Yama	99	1.54	5
Subtotal	**34,808**	**2.04**	**2,281**
Measured + Indicated			
Wona-Kona	22,908	2.53	1,862
Nyafe	509	4.83	79
Fofina	545	4.34	76
Yaho	17,374	0.89	499

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Filon 67	35	2.93	3
Fobiri	610	1.67	33
Siou OP	163	0.63	3
Siou UG	1,420	3.04	139
Yama	99	1.54	5
Total	**43,663**	**1.92**	**2,700**
Inferred			
Wona-Kona	3,377	3.00	325
Nyafe	151	5.85	28
Fofina	67	4.22	9
Yaho	223	0.78	6
Filon 67	6	5.70	1
Fobiri	578	1.39	26
Siou OP	2,628	1.62	137
Siou UG	1,857	3.87	231
Yama	58	1.34	3
Total	**8,945**	**2.66**	**766**

The accompanying notes for the Mineral Resources as reported in Table 23-4 are:

- SEMAFO Inc. holds indirectly 90 % of SEMAFO Burkina Faso S.A., with the Government of Burkina Faso holding the remaining 10% interest;
- Mineral Resources are reported with an effective date of December 31, 2019;
- The Mineral Resources have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014), and procedures for classifying the reported Mineral Resources were undertaken within the context of the Canadian Securities Administrators NI 43-101;
- The Mineral Resource estimates were prepared and approved by François Thibert, M.Sc.Geo, Manager, SEMAFO Estimate Group Resources and Reserves West Africa;
- Mineral Resources were estimated using a gold price of US$1,200/oz;
- Mineral Resources that are not Mineral Reserves do not necessarily demonstrate economic viability;
- The Inferred Mineral Resource in this estimate has a lower level of confidence that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. The quantity and grade of reported inferred mineral resources are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources, and it is uncertain if further exploration will result in upgrading them to these categories; and
- All Mineral Resources reported are reported exclusive of those Mineral Resources modified to estimate Mineral Reserves.

Bantou and Karankasso Advanced Exploration Projects, SEMAFO SARL

The Bantou and Karankasso properties are located approximately 45km southwest of Houndé, and comprises the Karankasso Zones (namely Kien, Kueredougou West and Dioso) and the Bantou Zones (namely Bantou, Proximal and Tankoro). The properties cover a land package of some 1,250km^2.

The properties were acquired by SEMAFO during the acquisition of Savary Gold Corp. in early 2019.

Exploration on the Karankasso project is currently active and a press release dated 24 February 2020 mentioned significant intercepts on the new Tiebi zone with 21m at 14.63g/tAu from 63m (KARC19-0127). Note, the Karankasso project interests are split through a SEMAFO / Sarama Resources joint venture, 80% and 20% respectively.

Mineralisation within Karankasso is mainly hosted in sheared contacts between metasediments and intermediate volcaniclastic formations, while Bantou mineralisation is associated with chert levels in intermediates volcanics along a dioritic intrusion.

A Mineral Resource Statement for Bantou, as published by SEMAFO as of December 31, 2019 and reported in accordance with CIM Standards, includes an Inferred Mineral Resource of 51.1Mt at 1.37g/tAu for a total contained metal of 2.2MozAu (Table 23-5).

Table 23-5: SEMAFO's Bantou Mineral Resource Statement, as of December 31, 2019 (Source: Bantou Project NI 43-101 Technical Report – Mineral Resource Estimate, Prepared by DRA/Met-Chem, April 2020 on behalf of SEMAFO)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Inferred			
Bantou	2,206	6.12	434
Bantou Nord	36,110	0.95	1,101
Diosso	2,770	1.97	175
Karangosso	2,590	1.78	148
Kien	3,020	1.56	151
Kueredougou West	1,320	1.77	75
Serakoro	3,040	1.64	160
Total	**51,056**	**1.37**	**2,244**

The accompanying notes for the Mineral Resources as reported in Table 23-5 are:

- Mineral Resources are reported with an effective date of 31 December, 2019;
- The Mineral Resources are reported assuming: a gold price of US$1,450/oz, mining cost of US$85.00/t, general and administration cost of US$22.00/t, processing cost of US$31.00/t, process recovery of 98.5%;
- The Mineral Resources have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014), and procedures for classifying the reported Mineral Resources were undertaken within the context of the Canadian Securities Administrators NI 43-101;
- The Bantou Property Mineral Resources Estimate was prepared by François Thibert M.Sc. geo., Directeur, Groupe Estimation Ressources et Réserves, Afrique de l'Ouest and SEMAFO's QP;
- The Kueredougou Main deposit was excluded from the Mineral Resources Estimate because of extensive artisanal mining currently on-going;
- Mineral Resources that are not Mineral Reserves do not necessarily demonstrate economic viability;
- The Inferred Mineral Resource in this estimate has a lower level of confidence that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. The quantity and grade of reported inferred mineral resources are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources, and it is uncertain if further exploration will result in upgrading them to these categories; and
- For further information, please refer to the technical report dated December 20, 2017 and entitled *"Bantou Project NI 43-101 Technical Report – Mineral Resource Estimate, Prepared by DRA/Met-Chem, April 2020"* available on SEDAR at www.sedar.com.

Houndé South and ThreeBee Advanced Exploration Projects, Sarama Resources Ltd.

The Houndé South and ThreeBee advanced exploration projects are owned by Canadian-listed Sarama Resources Ltd. Houndé South is located 55km south of the Houndé Gold Mine, while Threebee is located between 10km and 35km southeast of the Houndé Gold Mine.

Houndé South is composed of the Tankoro, Werinkera, Ouangoro, Danymi, Gbingué, Bini and Tyikoro properties. The Tankoro property reports a Mineral Resource Statement, dated 31 March 2016 with an Inferred Mineral Resource of 43.0Mt at 1.52g/tAu, for 2.1MozAu in the MM, MC, Obi, Kenobi and Phantom deposits (Table 23-6). Mineralisation at MM is reported to be hosted by two parallel trends, and associated with veins and disseminated sulphides, within porphyry intrusives or siltstone formations.

Table 23-6: Sarama Resources' Houndé South Inferred Mineral Resource Statement as of 31 March 2016 (Source: NI 43-101 Independent Technical Report South Houndé Project Update 31 March 2016, prepared by Cube Consulting)

Category/Deposit	Reporting Cut-off Grade (g/tAu)	Density (t/m^3)	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Inferred					
0-200m					
Oxide	0.3	1.6	13.5	1.15	498
Transition	0.8	2.0	2.5	1.41	113
Fresh	0.8	2.7	25.0	1.54	1,237
Sub-total		**2.2**	**41.0**	**1.40**	**1,848**
>200m					
Fresh	2.2	2.7	2.0	3.89	250
Total		**2.5**	**43.0**	**1.52**	**2,098**

The accompanying notes for the Mineral Resources as reported in Table 23-6 are:

- Mineral Resources are reported with an effective date of 31 December, 2019;
- The Mineral Resources are reported with cut-off grades derived assuming a gold price of US$1,500/oz and metallurgical recoveries supported by testwork and based on oxide material being processed by heap leach flowsheet and fresh and transition material being processed by a flotation+BIOX® +CIL flowsheet;
- Depth below surface classification used as a guide to assess the modelled mineralisation; for likelihood of reasonable prospects of eventual economic extraction and is not supported by a preliminary economic assessment or a feasibility study. The classification does not imply that Mineral Resources demonstrate economic viability;
- Mineral Resources reported above and below 140mRL, corresponding to a depth of approximately 200m below surface;
- Weathering classification is based on visual assessment of drill core and cuttings by geologists and does not represent a definitive geometallurgical classification;
- Mineral Resources situated 0m to 200m deep are reported above 0.3g/tAu, 0.8g/tAu and 0.8g/tAu for oxide, transition and fresh material types respectively. Mineral Resources situated >200m deep are reported above 2.2g/tAu;
- The Mineral Resources have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014), and procedures for classifying the reported Mineral Resources were undertaken within the context of the Canadian Securities Administrators NI 43-101;
- Mineral Resources that are not Mineral Reserves do not necessarily demonstrate economic viability;
- The Inferred Mineral Resource in this estimate has a lower level of confidence that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. The quantity and grade of reported inferred mineral resources are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources, and it is uncertain if further exploration will result in upgrading them to these categories; and
- For further information, please refer to the technical report dated December 20, 2017 and entitled *"NI 43-101 Independent Technical Report South Houndé Project Update 31 March 2016, prepared by Cube Consulting"* available on SEDAR at www.sedar.com.

The ThreeBee Project includes the Djarkadougou, Bamako, Botoro and Bouni properties and the Bondi deposit. The Djarkadougou permit hosts the Bondi deposit and was previously owned by Orezone Gold Corporation.

Golden Hill Advanced Exploration Project, Teranga Gold Inc.

Golden Hill is owned by Canadian listed Teranga Gold Inc ("**Teranga**"). The Golden Hill deposits are spread over a 10km trend over five main areas, namely Ma, Jachammer Hill, Peksou/C Zone, Nahiri, and the A and B zones.

A NI 43-101 Technical Report, dated November 30, 2018 reports Indicated Mineral Resources of 6.4Mt at 2.02g/tAu for 0.4MozAu and an Inferred Mineral Resource of 12.0Mt at 1.68 g/ Au for 0.6MozAu (Table 23-7).

Table 23-7: Teranga's Golden Hill Open-Pit Mineral Resource Statement, as of November 30, 2018 (Source: www.terangagold.com/reservesandresources)

Category/Deposit	Tonnage (kt)	Grade (g/tAu)	Content (kozAu)
Indicated			
Ma	5,789	2.03	378
JackhammerHill	610	1.89	37
Subtotal	**6,399**	**2.02**	**415**
Measured + Indicated			
Ma	5,789	2.03	378
JackhammerHill	610	1.89	37
Total	**6,399**	**2.02**	**415**
Inferred			
Ma	4,082	1.71	225
JackhammerHill	692	1.48	33
Peksou/C-Zone	3,839	2.13	263
Nahiri	1,659	0.84	45
A and B Zones	1,675	1.45	78
Total	**11,947**	**1.68**	**644**

The accompanying notes for the Mineral Resources as reported in Table 23-7are:

- Mineral Resources are reported with an effective date of 30 November 2018;
- The Mineral Resources are reported with cut-off grades derived assuming a gold price of US$1,450/oz and constrained within preliminary pit shells;
- Mineral Resources are reported at cut-off grades ranging from 0.35g/tAu to 0.36g/tAu in oxide, 0.39g/tAu to 0.41g/tAu in transition, and 0.44g/t Au to 0.46g/tAu in primary rock;
- High grade assays were capped at grades ranging from 15g/tAu to 25g/tAu;
- A minimum thickness of two metres was applied;
- Depth below surface classification used as a guide to assess the modelled mineralisation; for likelihood of reasonable prospects of eventual economic extraction and is not supported by a preliminary economic assessment or a feasibility study. The classification does not imply that Mineral Resources demonstrate economic viability;
- The Mineral Resources have been classified under the guidelines of the CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council (2014), and procedures for classifying the reported Mineral Resources were undertaken within the context of the Canadian Securities Administrators NI 43-101;
- Mineral Resources that are not Mineral Reserves do not necessarily demonstrate economic viability;
- The Inferred Mineral Resource in this estimate has a lower level of confidence that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. The quantity and grade of reported inferred mineral resources are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or

measured mineral resources, and it is uncertain if further exploration will result in upgrading them to these categories; and

- For further information, please refer to the technical report dated December 20, 2017 and entitled *"NI 43-101 Technical Report [additional reference required]"* available on SEDAR at www.sedar.com.

Mineralisation is reported to be associated with shear-zones in contact areas between granitic to granodioritic intrusives and mafic volcanics with sericite, iron carbonates and sulphide alteration. Teranga is also active with regional exploration, within the Gogoba West prospect located in the middle of the Ma – B Zone trend. Teranga also has an interest in the Dossi project area, through its joint venture with ACC Resources Limited.

Dossi Advanced Exploration Project (ACC Resources Ltd / Teranga Gold Inc)

Established in 2007, ACC Resources Ltd ("**ACC**"), is private company controlled by ACC International Holdings. The Dossi project is located approximately 18km east of Vindaloo and is subject to a joint venture with Terraga Gold.

23.3 Risks and Opportunities

To date, no significant risks and opportunities have been identified in respect of the adjacent properties discussed above.

23.4 Interpretation, Conclusions and Recommendations

The Mineral Resources and Mineral Reserves as reported in this Technical Report are based on significant site-specific information including mining experience gained since commencement of operations in 2017. Accordingly, there are no substantive interpretation, conclusions or recommendations relevant to the Houndé Gold Mine which can be drawn from the Adjacent Properties as reported herein.

24 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanatory comments are deemed necessary to ensure that all chapters of this Technical Report are understandable with no misleading statements or information.

25 INTERPRETATION AND CONCLUSIONS

25.1 Introduction

The following section includes a summary of the principal interpretation and conclusions relating to the Houndé Gold Mine.

25.2 Geological Setting and Mineralisation

The geological setting and mineralisation for the deposits investigated to date at Houndé Gold Mine are well informed by and geological data gathered through extensive exploration programmes conducted to date. As such, the focus of current activities are directly related to the broader exploration programmes currently conducted by Endeavour, pending advancement to sufficient level to transfer to the operating entities managed by Houndé Holdings Limited, Houndé Gold Operations SA and Bouéré Dohoun Gold Operation SA.

Further work is planned to refine the geological models and upgrade the lower levels of resource categories through infill drilling and where appropriate extensional drilling to the currently defined wireframes. This is specifically so in those deposits for which grade-based domains predominate as noted for Kari Centre and Kari West.

25.3 Mineral Resources

The Mineral Resources as reported herein are considered to reflect an unbiased and reasonable estimate given the geological data gathered to date and that are also reported in accordance with the guidelines and terminology provided in the CIM Standards. This aside there are a number of areas of potential improvement which if completed would increase the confidence and transparency relating to the current declarations.

The current Mineral Resource estimate is undertaken by both the internal resource modelling team and external consultants appointed for certain deposits. The grade-control models are presently the responsibility of the mine-based teams and as such future resource models would be further enhanced through greater integration of the knowledge capital established by the various consultants. Furthermore, certain of the Mineral Resource estimates are informed by dated and historical estimates which would benefit from updates to incorporate additional geological information, analysis and understanding developed in the interim period, specifically as the mining operations extend into their fourth year of operations. The key areas of focus include:

- Updating of the resource models with all geological information and analysis completed since the last historical re-estimation;
- Grade control models and reconciliation studies; and
- Basis for reporting potentially economically extractable resources and open-pit optimisation studies.

25.4 Mineral Reserves

The Mineral Reserves as reported herein are demonstrably economic and are supported by the appropriate level of technical studies to support their declaration in accordance with guidelines and terminology provided in the CIM Standards. This aside there are certain areas of the supporting technical work which can be considered as associated with previous technical updates (2015), specifically with respect to the pit optimisation analyses for all open pits other than the Kari Pump open pit.

Furthermore, opportunities exits to optimise the design and reporting process, specifically with respect to completion of additional sensitivity analyses as part of the optimisation process and as appropriate with respect to the current cut-off grade strategy employed for the Sub-Ore. In addition, certain assumptions, notably the increased IRA assumptions at the Houndé group of pits are not yet supported by site specific data and further work is required to support this changed design assumption.

25.5 Mining Methods

The mining method and operating assumptions as incorporated into the mining LoMp at Houndé Gold Mine are well established following commission and commencement of operations in 2017. The current LoMp is focused on the Houndé open pits and the Kari Pump open pit, with these providing the majority of ore production sourced from the Mineral Reserves reported at 31 December 2019. The mobile mining equipment fleet is relatively new and operational performance to date is broadly aligned with expectations. This aside the projections for 2020 and 2021 note a significant increase in total material mined reaching a peak of 55.6Mt in 2022 which is supported by establishment of mining operations at the Kari Pump open pit. The current LoMp is also dependent on production from a number of satellites open pits which have short operating lives and contribute significantly less than the three main mining operations at Vindaloo Main Pit, Vindaloo Central Pit and Kari Pump.

The current scheduling process supporting the 2019 Mineral Reserves, with the exception of Kari Pump, relies on partial modification of historical pit designs, the majority of which were based on pit optimisation studies completed in 2015. Accordingly, whilst the mining inventories and production schedules are derived from the current block model, no updated optimisation studies have been completed using the 2019 block models and the updated parameters as incorporated into the LoMp process utilised to support the Mineral Reserves as reported herein. This aside, it is worth noting the gold price assumptions as incorporated for 2015 is similar (US$1,300/oz) to that assumed for the 2019 Mineral Reserves US$1,300/oz.

Furthermore as the open pit mining operations mature, increase in operating depth and extend to the as yet unmined deposits the focus on geotechnical and hydrogeological aspects will naturally increase and in certain areas additional technical studies are planned to advance these beyond that originally considered in the 2013 FS and to calibrate these with operational experience to date.

25.6 Mineral Processing, Metallurgical Testing and Recovery Methods

In summary the metallurgical assumptions as incorporated into the metallurgical LoMp for Houndé Gold Mine are well established following commissioning and commencement of operations in 2017. The original technical studies have also been supplemented by additional testwork for the additional deposits now incorporated into the Ore Reserve statements reported in the 31 December 2019 declarations. Operational performance to date has, specifically with respect to overall plant throughput, exceeded the original nominal design capacity of 3.0Mtpa and the plant is currently operating in excess of 4.0Mtpa with increased availability and utilisation to achieve hourly throughput exceeding 500t. This performance is however supported by higher than planned proportion of feed sourced from oxide material which physical properties facilitates higher throughput due to reduced milling requirements.

In addition to the above, Houndé Gold Mine is also investigating and in certain aspects implementing a number of strategic initiatives focused on various operational improvements, the benefits of which are not factored into the current LoMp metallurgical plan.

Notwithstanding the above, the following areas are noted as the key areas of focus:

- Current process throughput exceeds the original nominal design capacity by some 30% and is currently exceeding 4.0Mtpa. The ability to sustain this at increased fresh ore tonnage contributions (>80% at 4.0Mtpa) remains untested and as such further technical work and or a degree of mine planning and scheduling may be required to maintain production throughput at this rate;

- The current LoMp incorporates ore sources which to date have not been historically processed and are entirely reliant on bench scale testwork results; and in addition, lower grade stockpile material which are processed at grades <1.2g/tAu;
- The original leach kinetics of various ore source blends were based testwork and assuming a nameplate capacity of 3.0Mtpa. Accordingly, further work may be required to test the impact of leach kinetics of sulphide ore on required residence time and recoveries at the increased throughput of 4.0Mtpa assuming no further change to process plant configuration and operating practices;
- Reporting of past performance is generally focused on monthly reporting at a relatively high level which is then used to inform the metallurgical LoMp assumptions. Accordingly, there remains an opportunity to collate and analyse historical physical (ore feed, gravity recovery, CIL feed etc), consumable stores, power consumption and operating expenditures to establish predictive performance relationships to finesse the projections as reported herein;
- Operating expenditure assumptions which assume unit process rates per weathering ore type which remain static between individual deposits. These are largely based on original estimates as reflected in prior technical studies tempered by recent operational experience. Further work however is required to refine the estimates with specific focus on assessment of physical consumable stores, power consumption and other detailed activity and element costing within the various sections of the process plant;
- The current pre-leach thickeners are not operational. Assessing the benefits of changing their current status to improve water management through retaining water circulation in the plant, possibly reduce cyanide consumption and reduce operating costs through increasing the solids content of tailings arisings (reduced pump back of water) should be considered.

25.7 Infrastructure

In summary the infrastructure aspects at the Houndé Gold Mine are well established following commissioning and commencement of operations in 2017. The asset integrity programmes including ongoing maintenance and replacement is well established and supports all aspects of key operational activities resulting in relatively high availability and utilisation for remote mining and processing operations.

Notwithstanding the above the following areas are noted:

- **Electrical Power Supply:** Recent improvements in the reliability of electrical power supply from the national grid network has facilitated a reduced demand from the Power Plant and should this continue there remains a further opportunity to reduce reliance on electrical power generated from the LFO Power Plant.
- **TSF Management:**
  - Increased Mineral Reserves, a 33% increase in mill capacity and the lower density noted for drained tailings conditions has resulted in reduced capacity and the requirement for additional tailings lifts for the current LoMp, and
  - Excess water storage requires further management controls to ensure that this does not exceed design and operational criteria;
- **External Threats** from security related issues and COVOID-19 require continued management focus to mitigate the risks posed to ensure security and safety as well

sustainable production due to supply chain disruptions and personnel movement.

25.8 Environmental Studies, Permitting and Social or Community Impact

The assessment of the environmental and social aspects at the Houndé Gold Mine confirms management focus and adherence to the obligations and commitments enshrined in the Exploitation Permits and Mining Conventions. There are elements of environmental management which have not necessarily substantively advanced following completion of the Feasibility Studies, specifically with respect to mine closure planning and related estimation of environmental liabilities. Recent Endeavour wide assessments of the mine closure planning process has however identified a number of weaknesses and proposed a remedial action programme to address these.

In conclusion, management focus on the legal commitments and adherence thereto is appropriate and whilst the environmental issues at Houndé Gold Mine is well understood, further work is required to address certain aspects pertaining to biophysical environmental issues.

25.9 Capital and Operating Expenditure

The estimation of operating expenditures for the Houndé Gold Mine is reliant on details generated by the annual budgeting process as well as a degree of LoMp cost modelling. With respect to the latter, the cost models as developed require further refinement to enable a more integrated and interdependent approach to life-of-mine cost modelling with specific focus on mining, power (demand, supply and consumption), and consumption of consumable reagents and variation in respect of plant feed (material type etc). Another key area is also with respect to the development of LoM manpower and labour.

Accordingly, it may be concluded that whilst the resulting cost models are largely aligned with past performance as reported in 2019, further work is required to refine the cost modelling process which is planned for completion during 2020 as part of the pre 2021 budgeting process.

25.10 Economic Viability Analysis of the Mineral Reserves

The economic viability analysis of the Mineral Reserves as reported herein is limited to that associated with depletion of the Mineral Reserves reported as at 31 December 2019 with depletion commencing 1 January 2020. In analysing the economic viability of the Mineral Reserves, the following conclusions are drawn:

- Total gold production and gold sales of 1,960koz and 1,959koz respectively;
- Total sales revenue of US$2,546.6m derived assuming a constant real (1 January 2020) money terms gold price of US$1,300/oz;
- Total operating expenditure (post capitalisation) of US$1,368.4m (real money terms 1 January 2020);
- Total capital expenditure of US$346.2m comprising sustaining capital, capitalised operating expenditures, and mine closure (real money terms 1 January 2020). In addition to this the lease repayments and other outflows amount to US$47.1m which are assumed to be expended from 2020 through 2023 inclusive;
- LoM weighted average unit mining, processing and G&A related operating expenditures (pre capitalisation) of US$1.97/tmined, US$14.89/t_{milled} and US$5.93/$t_{milled}$ respectively; and
- LoM weighted average unit cash costs and AISC of US$734/oz and US$844/oz reported on a sales basis.

Accordingly, the primary conclusions drawn are as follows:

- The Mineral Reserves are demonstrably economic and indicate a significant headroom with AISC of US$844/oz relative to the assumed long-term gold price of US$1,300/oz;
- Strong positive post-tax pre-finance cashflows from 2020 through 2028 prior to implementation of the assumed mine closure programme; and
- Sensitivity analysis which indicates +ve economic viability for all scenarios.

26 RECOMMENDATIONS

26.1 Introduction

The following section provides a summary of the recommendations incorporated into the various discipline sections of this Technical Report as appropriate.

26.2 Geological Setting and Mineralisation

The geological setting and mineralisation for the deposits investigated to date at Houndé Gold Mine are well informed by and geological data gathered through extensive exploration programmes conducted to date. As such, the focus of current activities are directly related to the broader exploration programmes currently conducted by Endeavour, pending advancement to sufficient level to transfer to the operating entities managed by Houndé Holdings Limited, Houndé Gold Operations SA and Bouéré Dohoun Gold Operation SA.

Further work is planned to refine the geological models and upgrade the lower levels of resource categories through infill drilling and where appropriate extensional drilling to the currently defined wireframes. This is specifically so in those deposits for which grade-based domains predominate as noted for Kari Centre and Kari West.

Accordingly, the principal recommendations are to continue with the proposed drilling programmes and address the key areas identified with respect to Section 14.15 of this Technical Report.

26.3 Exploration

The exploration activities completed to date have been undertaken in accordance with Endeavour's standards and practices and in compliance with the commitments made in respect of the governing regulatory permits. It is recommended that the wider exploration programme and in addition the ongoing infill drilling relating to the deposits for which Mineral Resources are reported is completed and incorporated into the next resource model updates as appropriate.

26.4 Mineral Processing and Metallurgical Testing

The key recommendations relating to Mineral Processing and Metallurgical Testing and practices at the Houndé Gold Mine are:

- For the next phase of evaluation at Kari Pump it is recommended to perform comminution and leach test work on composites of material with different weathering characteristics to represent the possible feed blends to the plant over the life of mine based on an optimised mine schedule;
- Variability samples should be selected for both comminution and leach test work once the mining schedule and pit design is developed. An investigation if improvements in leach extraction from bedrock material can be realised on recovery at finer grinds than the 75µm tested should be carried out; and
- If zones of potential ore with high arsenic grades are identified, some mineralogical analysis is recommended to better understand the relative occurrence of mineral species and the association of gold within these various minerals.

26.5 Mineral Resources

The principal recommendations pertaining to the reporting of Mineral Resources at Houndé Gold Mine are:

- As appropriate to update the resource models with all additional drilling, grade control and other geological understanding gathered since the last historical complete re-estimation;
- To align the optimisation input parameters with that derived as inputs to the current Mineral

Reserve process and as necessary ensure that the sensitivity analysis is completed to enable enhanced transparency with respect to sensitivity analysis;

- To implement the recommendations relating to grade control modelling and reconciliation studies with a view to informing the resource models as deemed appropriate;
- To undertake further analysis of the underground potential at certain of the deposits to determine the extent to which any Mineral Resources located below the current final pit designs can be mined by underground methods;
- Following completion of additional drilling at certain of the deposits to establish the extent to which the current grade-based domains can be supplements with lithological and/or structural domains thereby enhancing the confidence and understanding of the mineralisation and grade distribution; and
- To complete the planned exploration programmes currently underway at certain of the exploration targets by the Company and following successful outcomes delineation of Mineral Resources which can then be transferred to the operating entities managed by Houndé Gold Mine.

26.6 Mineral Reserves

The key recommendations relating to Mineral Reserves at the Houndé Gold Mine are:

- Ensuring that the necessary regulatory approvals are obtained in respect of the Kari Pump Open Pit planned operations specifically as mining operations are scheduled to commence in H2 2020;
- Completion of updated pit optimisation analysis incorporating the latest available geological models and operating/design assumptions as reported in this Technical Report;
- Updating all engineered pit designs following completion of the updated pit optimisation including revisiting of the staged push backs and ultimate shell selections; and
- Completion of additional geotechnical investigations at the Houndé group of open pits specifically targeting the currently assumed steeper inter ramp slope angles.

26.7 Mining Methods

The key recommendations relating to mining methods and practices at the Houndé Gold Mine are:

- Development of a detailed mobile mining equipment and mine cost model which is integrated with the output of the mine production schedules;
- To reassess the current mining and processing constraints as incorporated into the mine scheduling, specifically with respect to those factors which impact sink rates for the smaller open pits and as the larger pits approach the final pit limits, process plant capacity for given weathered ore type contributions (notably fresh ore);
- To update the mining production schedules following completion of updated optimisation analysis;
- To consider the possibility for introduction of ADTs for some of the smaller open pits which may intron enable reduced stripping ratios due to narrower ramp access and steeper gradients; and
- To reassess the current stockpiling strategy, specifically with regards expanding the current approach of focusing on grade bins to also include weathering ore types for each of the mined deposits.

26.8 Recovery Methods

The key recommendations relating to Recovery at the Houndé Gold Mine are:

- To undertake further technical work to assess the appropriate limit to fresh ore contribution measured as a percentage of total plant feed at the increased plant throughput of 4.0Mtpa;
- To undertake further technical work to refine metallurgical recovery assumptions, specifically:
  - to confirm the leach kinetics (recovery and residence time) of sulphide ore at the increased throughput of 4.0Mtpa),
  - to reassess metallurgical recoveries of lower grade bin ores, specifically <1.2g/tAu;
- To further analyse historical performance statistics to support establishment of performance relationships for production assumptions (gravity recovery, CIL feed recovery and tails grades, residence time and total recovery), consumable stores consumption rates, power consumption, water usage, and operating expenditure assessments; and
- To assess the potential benefits of various strategic initiatives underway and the extent to which this can be included as direct measurable improvements to the LoMp metallurgical assumptions.

26.9 Infrastructure

The key recommendations relating to Infrastructure at the Houndé Gold Mine are:

- Further work to integrate the tailings lift construction with the mining plan in order to develop an almost continuous construction programme for the bulk waste, essentially treating this as a waste dump and therefore reducing construction costs; and
- Continued management focus in monitoring and managing potential external threats from the ongoing security related issues in Burkina Faso and operational disruption related to the current global COVOID-19 pandemic.

26.10 Market Studies and Contracts

The key recommendations relating to Market Studies and Contracts at the Houndé Gold Mine are:

- The determination of silver in the underlying block models; and
- An assessment of the potential demobilisation costs/liabilities to be incurred on cessation of services.

26.11 Environmental Studies, Permitting and Social or Community Impact

The key recommendations relating to Environmental Studies, permitting and Social or Community Impact which are planned to be addressed in the forthcoming work programmes for 2020 and 2021 are:

- Fully align with the international standards and benchmarks;
- Separately define environmental closure costs as at the date of declaration of the Mineral Reserves and assuming full depletion of the Mineral Reserves, specifically for the latter to ensure that the scope of the remediation plan extends for all landform extents assumed at the date of depletion;
- Complete additional site specific testwork, specifically focusing on geochemical analysis (static and kinetic testing) to define the extent to which Acid Rock Drainage and Metal Leaching management measures are required as part of the mine closure plan; and
- Quantify and analyse the economic benefit to both the licence holders and the Government

of Burkina Faso.

26.12 Capital and Operating Expenditure

The key recommendations relating to Capital and Operating Expenditure at the Houndé Gold Mine are:

On this basis the principal recommendations are as follows:

- To develop a more detailed and integrated LoMp cost model for the key reporting areas of mining , processing and G&A;
- To incorporate both activity and element-based costing assumptions as the current approach for cost projections beyond the budget period is largely focused on activity costing with limited details on the element components of the reporting areas;
- To develop a LoM manpower schedule in order to determine the impact on production build-ups and tails with respect to the reporting areas;
- To advance the strategic initiatives currently under consideration with a view to incorporating the results into the 2021 budgeting process; and
- To establish the potential impact of contractor demobilisation and any additional site costs to be incurred during the closure and post closure monitoring phase.

26.13 Economic Viability Analysis of Mineral Reserves

The key recommendations relating to the Economic Viability Analysis of the Mineral Reserves for Houndé Gold Mine as reported herein are:

- Completion of economic benefit analysis to include quantification of the economic benefit attributable to Endeavour and the Government of Burkina Faso;
- Inclusion in the economic analysis of the physical opening balance of Work in Progress, specifically for Gold in Circuit and Finished Goods;
- Inclusion of the impact of silver credits, following re-assessment of the geological and mining models;
- Updating of the economic analysis following refinement of the LoMp cost models for mining, operating and site G&A expenditures;
- The impact of potential carbon tax charges as currently considered in other countries;
- Refinement and inclusion of retrenchment related expenditures in the economic analysis;
- Quantification of the contractor demobilisation costs and as appropriate incorporation into the economic analysis; and
- Reassessment of mine closure costs for both immediate closure and upon depletion of the Mineral Reserves following completion of additional technical work to assess geochemistry, waste encapsulation, post closure water treatment, overall “walk away” objectives and to further the supporting engineering designs related to the mine closure plan.

26.14 Strategic Initiatives

Houndé Gold Mine is presently advancing a number of technical studies to implement a number of strategic initiatives which include:

- Vendor Managed Inventory/Consignment system applied to >70% of value of inventory to enabled improved working capital management;
- Mill Expert Control system presently installed with commissioning underway;
- Exploration drilling programme targeting:

- mineralised extensions to the Kari deposits (Centre and West) with an aim to add to the Mineral Resource base and input to the 2020 LoMp process and updated Mineral Reserves,
- depth extensions at Vindaloo to determine potential for underground mining,
- greenfields drilling on the broader Houndé lease areas;

- Increase motor/gearbox size for the vibrating feeder system coming from the surge bin to match the increased throughput at the crusher and increase throughput to the SAG Mill, which is planned for implementation in late 2020;
- Installation of automatic feed and tailings samplers in 2021;
- Installation of Historian software for Supervisory Control and Data Acquisition ("**SCADA**") system in 2021 which will facilitate storage and retrieval of time-series database for analogue data, digital readings, process data, quality information, aggregate data and alarm information;
- Optimisation of the Pebble Crusher through modification of the SAG Mill discharge trommel grate size in order to maximise pebble crusher throughput. This also requires review of pebble crusher feed bin arrangement in order to choke feed, which is anticipated in 2021;
- Investigation of the benefits of the RECYN Project being undertaken at Ity Gold Mine for potential application at the Houndé Process Plant with potential savings in cyanide consumption. RECYN is a specialist technology, which facilitates recovery of cyanide and dissolved metals from precious metal plant process streams;
- Drill and blast optimisation and consideration for use of electronic detonators;
- Development of a 'basic' truck dispatch system integrating ability to utilise real time data monitoring available on trucks and excavators; and
- Installation of solar/battery solution to improve power supply reliability and reduce power supply costs.

Accordingly, it is recommended that the above strategic initiative programme is completed and the outcomes incorporated into the next LoMp cycle as appropriate.

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DATE AND SIGNATURE PAGE

The effective date of this report entitled "*Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso*" is 31 December 2019 (the "**Technical Report**"). The Technical Report has been prepared for Endeavour Mining Corporation (the "**Issuer**") by Salih Ramazan FAusIMM, Gérard de Hert, EurGeol, Kevin Harris, CPG and Mark Zammit, BSc (Hons), GradCertGeostat, MAIG, each of whom are qualified persons as defined by NI43-101.

Signed the 15th day of June 2020.

"Signed and Sealed"
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Glossary

Glossary – Mineral Resources and Mineral Reserves

Mineral Resources	A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.
Measured Mineral Resource	A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.
Indicated Mineral Resource	An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.
Inferred Mineral Resource	An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration
Modifying Factors	Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal,

environmental, social and governmental factors.

Mineral Reserve	A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported. The public disclosure of a Mineral Reserve must be demonstrated by a Pre-Feasibility Study or Feasibility Study.
Proven Mineral Reserve	A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.
Probable Mineral Reserve	A Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve

Glossary – Development Stages

Producing Property	Mineral assets for which current Mineral Reserves are declared and mining and processing operations have been commissioned and are in production.
Development Property	Mineral assets for which Mineral Reserves have been declared and are essentially supported by a minimum of a pre-feasibility study which on a multi-disciplinary basis demonstrates that the consideration is technically feasible and economically viable.
Pre-Development Property	Mineral assets for which Mineral Resources have been defined but where a decision to proceed with development has not been made.
Advanced Exploration Property	Mineral assets for which only Mineral Resources have been declared.
Exploration Property	Mineral assets for which no Mineral Resources have been declared.

Glossary – Technical Studies

Feasibility Study	A Feasibility Study is a comprehensive technical and economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable Modifying Factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate at the time of reporting that extraction is reasonably justified (economically mineable). The results of the study may reasonably serve as

	the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The confidence level of the study will be higher than that of a Pre-Feasibility Study.
Preliminary Feasibility Study	
	A Preliminary Feasibility Study (Pre-Feasibility Study) is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of any other relevant factors which are sufficient for a Competent Person, acting reasonably, to determine if all or part of the Mineral Resources may be converted to an Ore Reserve at the time of reporting. A Pre-Feasibility Study is at a lower confidence level than a Feasibility Study.
Scoping Study	A Scoping Study is an order of magnitude technical and economic study of the potential viability of Mineral Resources. It includes appropriate assessments of realistically assumed Modifying Factors together with any other relevant operational factors that are necessary to demonstrate at the time of reporting that progress to a Pre-Feasibility Study can be reasonably justified.

Abbreviations

2D	Two-Dimensional
3D	Three-Dimensional
AARL	Anglo American Research Laboratories
AAS	Atomic absorption spectroscopy
AC	Aircore
ACA	Australian Communications Authority
ACC	ACC Resources Ltd
AD	Articulated dump truck
AEL	African Explosive Limited
AFD	French Development Agency
AIF	Annual Information Forms
AISC	All in sustaining cost
ANCOLD 2012	Guidelines on Tailings Dams: Planning, Design, Construction, Operation and Closure
ANEMAS	National Agency for the Supervision of Artisanal and Semi-Mechanized Mining
ANFO	Ammonium nitrate/fuel oil
ARC	Air core reverse circulation
ARDML	Acid rock drainage and metal leaching
Arethuse	Arethuse Geology Sarl
ARO	Asset-retirement-obligation
Avocet	Avocet Mining
Barrick	Barrick Gold Corporation
BCM	Bank cubic meter
BDGO	Bouéré Dohoun Gold Operations SA
BD Gold	BD Gold Operation SA
BEAC	Banque des États de l'Afrique Centrale
BFA	Batter face angle
BMT	Blast movement simulation technology

BUMIGEB	Bureau de Mines et de la Géologie du Burkina Faso
BUNEE	Bureau Nationale des Evaluations Environnementales
BRGM	Bureau de Recherches Géologiques et Minières
CCTV	Closed-circuit television
CDP	Congrès pour la démocratie et le progrès
CFA	Central African Franc
CIF	Carriage Insurance and Freight
CIL	Carbon In Leach
CIM	Canadian Institute of Mining
CIMVAL	Canadian Institute of Mining, Metallurgy and Petroleum on Valuation of Mineral Properties
CIT	Corporate income tax
CMF	Consensus market forecasts
COG	Cut-off grade
CNWAD	Cyanide Weak Acid Dissociable
CPI	Consumer price inflation
CPINF	Constant consumer price inflation
CRM	Certified reference material
CRV	Certified Reference Value
Cube	Cube Consulting Pty Ltd
D1, D2, D3	Deformational events
DAP	Delivered at Place
DBMS	Database Management System
DD	Diamond Drilling
DDH	Diamond Drill hole
DDP	Delivered Duty Place
DOR	Declared ore mined
DTH	Down-the-hole
DTM	Digital Terrain map
ECOWAS	Economic Community of West African States
EGL	Effective grinding length
EMS	Environmental management system
EPCM	Engineering, Procurement, Construction Management
EoR	Engineer of Record
ESG	Environmental, Social and Governance
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan
FAI	First Aid Injuries
FEL	Front End Loader
FG	Finished goods
FS	Feasibility Study
FTE	Forages Technic-Eau Burkina SARL
G&A	General and Administrative
GC	Grade Control
GHG	Greenhouse gas
GIC	Gold in circuit
GIIP	Good International Industry Practice
GIS	Geographic information system
Goldbelt	Goldbelt Resources West Africa SARL
GPS	Global positioning system

H	Horizontal
HDPE	High-density polyethylene
HFO	Heavy fuel oil
HGO	Houndé Gold Operation SA
HGO	High grade ore
HHL	Houndé Holdings Ltd
HME	Heavy Mining Equipment
HPP	Houndé Processing Plant
HQ	PQ core diameter 63.5mm
HSMS	Health and safety management system
HWD	Houndé west domain
ICAEW	Institute of Chartered Accountants for England and Wales
ICMM	International Council on Mining and Metals
ICOLD	International Committee on Large Dams
ICP	Inductively coupled plasma
IFC	International Finance Corporation
ILR	Intensive leach reactor
ID	Identification
IDW	Inverse Distance Weighting
IP	Induced Polarization
IRA	Inter ramp angles
ISCOG	In-situ cut-off grade
ISO	International Organization for Standardization
KP	Knight Piesold
LCP	Life Cycle Planning
LFO	Light fuel oil
LGO	Low grade ore
LIBOR	London Interbank Overnight Rate
LIMS	Laboratory Information Management System
LoMp	Life of Mine Plan
LOS	latch-off-stop
LRS	Liquid Resistor Starters
LSGO	Low Sulphur Gas Oil
LTIs	Lost Time Injuries
LTP	Long Term Price
Ma	Million years
MCC	Motor control centers
MEDD	Ministry of Environment and Sustainable Development
MEEVCC	Ministry of the Green Economy and Climate Change
MGO	Medium grade ore
MRE	Mineral Resource estimate
MSA	Mine services area
N1	Route National 1
NATO	North Atlantic Treaty Organization
NDT	Non-destructive tested
NI 43-101	National Instrument 43-101
NN	Nearest Neighbor
NPV	Net present value
NQ	NQ core diameter 47.6mm
NSR	Net Smelter Return
NW	Northwest
OCOG	Operational or run of mine cut-off grade
OEM	Original Equipment Manufacturers’
OK	Ordinary kriging

OMC	Orway Mineral Consultants
OSCE	Organization for Security and Co-operation in Europe
OSH	Occupational safety and health
P	Passing
P&E	P&E Consultants
PCR	Planned Component Replacement
PCS	Process control system
PEA	Preliminary Economic Assessment
PGA	Peak ground acceleration
PLC	Programmable logic controller
PMF	Probable Maximum Flood
POBA	Peter O'Bryan and Associates
PQ	PQ core diameter 85mm
PSG	Project Services Group
PVC	Polyvinyl Chloride
QA	Quality assurance
QA-QC	Quality assurance–quality control
QC	Quality Control
OIT	Operator interface terminals
QKNA	Quantitative Kriging Neighbourhood Analysis
QP	Qualified Person
RAB	Percussion Rotary Air Blast
RAP	Relocation Action Plan
RC	Reverse Circulation
RC-DD	Reverse circulation percussion with diamond core tail
RED	Residual, Erosional, Depositional
Resolute	Resolute West Africa
RL	Reduced Level
RoM	Run of Mine
RTS	Robotic total station
S0, S1, S2	Structural fabric(s)
SABC	SAG/Ball and Scats Crushing / Semi-Autogenous Ball Mill Crusher
SAG	Semi-autogenous grinding
Sagax	Sagax Afrique SA
Sap	Saprolite
SASE	Strong albite – silica alteration zone
SCADA	Supervisory control and data acquisition
SD	Standard Deviation
SEAL	Strong sericite alteration zone
SED	Slip Energy Recovery
SEMAFO	SEMAFO Sarl
SG	Specific Gravity
SGS	SGS Bureau de Liaison
SMBS	Sodium metabisulphite
SMC	SAG Mill Comminution
SMU	Selective mining unit
SO	Sub Ore
SONABEL	Société Nationale d'électricité du Burkina Faso
TCO	Total Cost of Ownership
TEC	Total Employees Costed
Teranga	Teranga Gold Inc
TSF	Tailings Storage facility
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US$	United States Dollar
US$m	Million United States Dollar
UV	Ultra Violet
V	Vertical

VAT	Value Added Tax
VOIP	Voice Over Internet Protocol
WACC	Weight adjusted cost of capital
WAD	Weak acid dissociable cyanide
WAEMU	West African Economic and Monetary Union
Wega	Wega Mining
WIP	Work in progress
WRD	Waste rock dump
WRIM	Wound Rotor Induction Motors
WSD	Water Storage Dam
XOF	West African franc

Units

°	Degree
%	Percent
w/w	weight for weight
A	Amp
A$	Australian Dollar
C	Celsius
CFA	Coopération financière en Afrique Centrale' or Central African Franc
cm	Centimeter
C$	Canadian Dollar
d	Day
€	Euro
g/t	Grams per tonne
GW	Giga Watt
Gt	Giga tonnes
h	Hour
ha	Hectare
hp	Horse Power
Hz	Hertz
ID^2	Inverse distance squared
kg	Kilogram
km	Kilometer
km^2	Kilometer Square
koz	Thousand troy ounces
kt	Thousand tonnes
kV	Kilo Volt
kVA	Kilo Volt Amps
kW	Kilo Watt
kWh	Kilo Watt hour
L	Liter
m	Meter
µm	micron
m^2	Square Meter
m^3	Cubic Meter
ML	Mega Liter
min	Minutes
mm	Millimeter
ML	Mega Liter
MPa	Mega Pascal
Mt	Million tonnes
Mtpa	Million tonnes per annum
MVA	Megavolt Amperes
MW	Mega Watts
oz	Troy ounce

Pa	Pascal
pa	Per annum
ppb	Parts per billion
ppm	Parts per million
Q	Quarter year
t/m^3	Tonnes per meter cubed
tpy	Tonnes per Year
t	Metric tonne
tph	Tonnes per hour
US$	United States Dollar
US$m	Million United States Dollar
V	Volt
XOF	CFA BEAC or West African franc

Chemical Formula

Al	Aluminum
Ag	Silver
Au	Gold
Ba	Barium
Be	Beryllium
Bi	Bismuth
Ca	Calcium
Cd	Cadmium
Co	Cobalt
CO_2	Carbon Dioxide
Cr	Chromium
Cu	Copper
Fe	Iron
Hg	Mercury
K	Potassium
La	Lanthanum,
Li	Lithium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
Na	Sodium
NaCN	Sodium Cyanide
NaOH	Sodium hydroxide
Nb	Niobium
Ni	Nickel
P	Phosphorus
Pb	Lead
S	Sulfur
Sb	Antimony
Sc	Scandium
SiO_2	Silica Dioxide
SO_2	Sulfur Dioxide
Sn	Tin
Sr	Strontium
Te	Tellurium
Ti	Titanium
V	Vanadium
W	Tungsten
Y	Yttrium
Z	Zinc
Zr	Zirconium

I **Salih Ramazan**, Fellow of the Australian Institute of Mining and Metallurgy, as an author of this report entitled *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"* dated effective date 31 December 2019 (the "**Technical Report**") prepared for Endeavour Mining Corporation (the "**Issuer**") do hereby certify that:

1. I am the Vice President – Mine Planning of the Endeavour Mining Corporation located at 5 Young Street, London, England, United Kingdom.
2. This certificate applies to the Technical Report entitled "*Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso*", dated effective date 31 December 2019 (the "Technical Report").
3. I graduated with a Bachelor in Mining Engineering from the Middle East Technical University, Ankara, Turkey in 1992; Master of Science (Mining Engineering) from the Colorado School of Mines, Golden, United States of America., in 1996; a Master of Engineering (Geostatistics) from Ecole Nationale Supérieure Des Mines de Paris, French Republic; a Doctor of Philosophy (Mining Engineering) from the Colorado School of Mines, Golden, Unites States of America, in 2001; a Master in Finance from Curtin University, Perth, Commonwealth of Australia.
4. I am a Fellow of the Australian Institute of Mining and Metallurgy (FAusIMM – 222870).
5. I have practiced my profession continuously since 2001 and have 19 years' experience in the mining industry and have significant experience in respect of mine design, planning and scheduling and metalliferous mining including gold deposits.
6. I am directly responsible for the generation of the Mineral Reserves for Houndé Gold Mine which is the subject matter of this Technical Report.
7. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.
8. I have visited Houndé Gold Mine on numerous occasions with my most recent visit occurring on 3-5 February 2020.
9. I was directly responsible for Sections 15 and 16 and I am responsible for the preparation or supervising the preparation of Items (Sections) 1, 2, 3, 13, 17, 18, 19, 20, 21, 22, 24, 25, 26 and 27 in the technical report.
10. I am not independent of the Issuer in accordance with the application of Section 1.5 of National Instrument 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and the items for which I am responsible in this report entitled, *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"*, with an effective date of 31 December 2019, has been prepared in compliance with same.
12. At the effective date of the technical report, to the best of my knowledge, information and belief, the items of the Technical Report that I was responsible for contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated at 5 Young Street, London, England, United Kingdom, this 15th of June 2020.

"Signed and Sealed"

Salih Ramazan

Salih Ramazan, FAusIMM.

Vice President – Mine Planning,

Endeavour Mining Corporation.

I **Gérard de Hert**, Fellow of the Australian Institute of Mining and Metallurgy, as an author of this report entitled *“Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso”* dated effective date 31 December 2019 (the “**Technical Report**”) prepared for Endeavour Mining Corporation (the “**Issuer**”) do hereby certify that:

1. I am the Senior Vice President – Exploration of the Endeavour Mining Corporation located at 5 Young Street, London, England, United Kingdom of Great Britain and Northern Ireland.
2. This certificate applies to the Technical Report entitled “*Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso*”, dated effective date 31 December 2019 (the “Technical Report”).
3. I graduated with a Bachelor of Science in Geology (1995) and a Master of Science in Mineralogy & Geology (1996) from the Catholic University of Louvain, Belgium, and a Master of Science in Mineral Exploration from the University of Leicester in 2001.
4. I am a European Geologist (EurGeol – 1046) with the European Federation of Geologists.
5. Chartered Professional Geologist (CPG-11639) with the American Institute of Professional Geologists and a Professional Member of the Society of Mining Engineers.
6. I have practiced my profession continuously since 1995 and have 25 years’ experience in the mining industry and have significant experience in exploration an geological aspects in respect of gold deposits.
7. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.
8. I have visited Houndé Gold Mine on numerous occasions with my most recent visit occurring on 21-23 January 2020.
9. I was directly responsible for Sections: 4, 5, 6, 7, 8, 9 and 23 as reported in the Technical Report with effective date of 31 December 2019.
10. I am not independent of the Issuer in accordance with the application of Section 1.5 of National Instrument 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and the items for which I am responsible in this report entitled, *“Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso”*, with an effective date of 31 December 2019, has been prepared in compliance with same.
12. At the effective date of the technical report, to the best of my knowledge, information and belief, the items of the Technical Report that I was responsible for contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated at 5 Young Street, London, England, United Kingdom, this 15th of June 2020.

“**Signed and Sealed**”

Gérard de Hert

Gérard de Hert, EurGeol.

Senior Vice President – Exploration,

Endeavour Mining Corporation.

I **Kevin Harris**, Fellow of the Australian Institute of Mining and Metallurgy, as an author of this report entitled *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"* dated effective date 31 December 2019 (the "**Technical Report**") prepared for Endeavour Mining Corporation (the "**Issuer**") do hereby certify that:

1. I am the Vice President – Resources of the Endeavour Mining Corporation located at 5 Young Street, London, England, United Kingdom of Great Britain and Northern Ireland.
2. This certificate applies to the Technical Report entitled "*Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso*", dated effective date 31 December 2019 (the "Technical Report").
3. I graduated with a Bachelor of Science in Geological Engineering (1980) and a Master of Science in Geology (1991) at the South Dakota School of Mines and Technology, Rapid City, South Dakota, United States of America.
4. I am a Chartered Professional Geologist (CPG-11639) with the American Institute of Professional Geologists and a Professional Member of the Society of Mining Engineers.
5. I have practiced my profession continuously since 1991 and have 29 years' experience in the mining industry. I have worked extensively in exploration, resource definition, mine geology, mine engineering and operations. I have been involved in West Africa exploration and resource definition since 2010.
6. I am directly responsible for the generation of the Mineral Resources for Houndé Gold Mine which is the subject matter of this Technical Report specifically for following deposits, Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit.
7. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.
8. I have visited Houndé Gold Mine on numerous occasions with my most recent visit occurring on 20-24 February 2020.
9. I was directly responsible for Sections: 10, 11, 12 and for Section 14 in respect of the declaration of Mineral Resources for the Bouéré Deposit, the Dohoun Deposit, the Kari Pump Deposit, the Kari Centre Deposit and the Kari West Deposit with effective date of 31 December 2019.
10. I am not independent of the Issuer in accordance with the application of Section 1.5 of National Instrument 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and the items for which I am responsible in this report entitled, *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"*, with an effective date of 31 December 2019, has been prepared in compliance with same.
12. At the effective date of the technical report, to the best of my knowledge, information and belief, the items of the Technical Report that I was responsible for contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated at 5 Young Street, London, England, United Kingdom, this 15th of June 2020.

"**Signed and Sealed**"

Kevin Harris

Kevin Harris, CPG.

Vice President – Resources,

Endeavour Mining Corporation.

I **Mark Zammit**, Member of the Australian Institute of Geoscientists ("**MAIG**"), as an author of this report entitled *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"* dated effective date 31 December 2019 (the "**Technical Report**") prepared for Endeavour Mining Corporation (the "**Issuer**") do hereby certify that:

1. am an employee (Principal Consultant Geologist) of Cube Consulting Pty Ltd, located at 1111 Hay Street, West Perth 6005, Western Australia, Commonwealth of Australia.
2. This certificate applies to the Technical Report entitled "*Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso*", dated effective date 31 December 2019 (the "**Technical Report**").
3. I hold a Bachelor of Science degree with Honours (Geology major) from the University of Western Australia (1992), a Post Graduate Diploma in Business (Management Studies) from Edith Cowan University (2005) and a Graduate Certificate in Geostatistics from Edith Cowan University (2008).
4. I am a Member (3843) of the Australian Institute of Geoscientists ("**MAIG**").
5. I have practiced my profession continuously since 1992 and have 28 years' experience in the mining industry. During that time, I have worked in open pit and underground mining operations and geological consulting. I have experience in multiple commodities including precious and base metals.
6. I am directly responsible for the generation of the Mineral Resources for the Vindaloo -Madras deposits of Houndé Gold Mine.
7. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.
8. I have visited Houndé Gold Mine on numerous occasions with my most recent visit occurring on 23 to 31 January 2019.
9. I was directly responsible for Sections 12 and 14 specifically for the Vindaloo Madras deposits in the Technical Report.
10. I am independent of the Issuer in accordance with the application of Section 1.5 of National Instrument 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and the items for which I am responsible in this report entitled, *"Technical Report On The Houndé Gold Mine, Republic Of Burkina Faso"*, with an effective date of 31 December 2019, has been prepared in compliance with same.
12. At the effective date of the technical report, to the best of my knowledge, information and belief, the items of the Technical Report that I was responsible for contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated at L4/1111 Hay St, West Perth, Western Australia, 6005, Commonwealth of Australia, this 15th of June 2020.

"**Signed and Sealed**"

Mark Zammit

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Mark Zammit,

Principal Geologist, Cube Consulting (Pty) Ltd.,

BSc (Hons), GradCertGeostat, MAIG.