DRAFT

JACOBS

Environmental Impact Statement

Executive Summary

Contents

Executive Summary

I. Project Factsheet

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<tr><td>Total Project Area</td><td>532 ha</td></tr>
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<tr><td>Project Proponent</td><td>Silangan Mindanao Mining Co., Inc.</td></tr>
<tr><td>Proponent Representative</td><td>Eulalio B. Austin, Jr.President and Chief Executive Officer</td></tr>
<tr><td>Proponent Address</td><td>Main Office: 2nd Floor Launchpad Building, Sheridan corner Reliance Streets, Mandaluyong City
Mine Office: SMMCI Mine Office, Brgy. Timamana, Tubod, Surigao del Norte</td></tr>
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	• Mine access Roads • Administration Complex • Mine Office • Communication Infrastructure • Sewage Treatment Plant • Security Headquarters • Core Farm • Assay Laboratory • Accommodations	• Recreational Facilities • Water Refilling Station • Water Treatment Plant for Processing • Water Treatment Plant for TSF Discharge • Fuel Storage Facilities • Generator sets and Switchyards • Materials Recovery Facility • Ecological Composting Facility • Onsite Sanitary Landfill
	Sub-Total for Mill, Crushing Facilities and Support Facilities	
	Total Disturbance Area for Underground Mine	532 Has

II. Background Information

The Silangan Copper-Gold Mine Project has previously been awarded ECCs in 2013 and 2016 for the block cave plan and open pit plan respectively. The Declaration of Mine Project Feasibility (DMPF) was also awarded for the project. Since the issuance of project approvals in 2016 a number of regulations where issued that impacted the development of the Project. In particular, DAO 2017-10 entitled “Banning the Open Pit Method of Mining for Copper, Gold, Silver and Complex Ores in the Country” compelled SMMCI to revisit the mine method for the project and consider the viability of sub-level caving in order for the project to proceed. Since change in mine method is considered a major amendment, SMMCI is submitting this EIS to support the application of an amended ECC for sublevel caving. Ang Silangan Copper-Gold Mine Project kaniadto gihatagan sa ECCs sa 2013 ug 2016 alang sa block cave plan ug open pit nga plano matag usa. Ang Deklarasyon sa Mine Project Feasibility (DMPF) gihatagan usab sa maong proyekto. Sukad nga ang pag-aprobar sa proyekto atong tuig 2016 adunay ubay-ubay nga mga regulasyon kung diin gi-isyu nga nakaapekto sa pagpalambo sa Proyekto. Sa partikular, ang DAO 2017-10 nga nag-ulohang "Banning the Open Pit Method of Mining alang sa Copper, Gold, Silver and Complex Ores in the Country" gipugos ang SMMCI sa pagbalik sa pamaagi sa minahan alang sa proyekto ug paghunahuna sa viability sa sub-level caving alang sa proyekto nga magpadayon. Tungod kay ang pagbag-o sa akong pamaagi giisip nga usa ka dakong pag-amyenda, ang SMMCI nagsumiter niini nga EIS aron pagsuporta sa paggamit sa usa ka giusab nga ECC alang sa sublevel caving.

III. Process Documentation

Jacobs followed the EIA process flow as stipulated in DAO 2003-30, DMC 2014-005, and DAO 2017-05 incorporating the additional steps to enhance public participation for the environmental impact assessment process. The accomplished steps are tabulated below; Gisunos ni Jacobs ang proseso sa EIA nga gilatid sa DAO 2003-30, DMC 2014-005, ug DAO 2017-05 nga naglakip sa dugang nga mga lakang aron mapalambo ang partisipasyon sa publiko alang s environmental impact assessment process. Ang nahuman na mga lakas gibutnag sa ubos:

Activities	Dates
IEC Campaign and Perception Survey	December 13, 2018 to January 25, 2019
Public Scoping	February 26 to 28, 2019
Technical Scoping	March 11, 2019
Baseline Studies	January 7 to March 22, 2019

Public Hearing	April 29, 2019

Results of baseline studies from surveys conducted from 2013 to 2016 were reviewed. Additional baseline studies were conducted from January 8 to March 5 of 2019. Protocols for sampling for soil, water, and air were taken from relevant DENR guidelines and results of the analyses were also compared to the applicable standards. Transects observations and quadrats were employed for terrestrial biota with the observed species compared against the International Union for Conservation of Nature (IUCN) red list of threatened species to determine if there are vulnerable species within the project site. As for the People module, an updated household and perception survey was conducted among the host and neighboring barangays to determine any changes from the demographic, socio-economic and health data documented in the previous studies. The perception survey was meant to determine the acceptability of the project among the stakeholders. Ang resulta sa hingpit na pagtuon gikan sa mga surbey nga gipahigayon gikan sa tugi 2013 ngadto sa tuig 2016. Dugang nga mga hingpit na pagtuon gipahigayon gikan sa Enero 8 ngadto sa Marso 5 sa tuig 2019. Ang mga protocol sa sampling alang sa yuta, tubig, ug hangin gikuha gikan sa mga may kalabutan nga mga sumbanan sa DENR ug ang resulta sa pag-analisar gitandi usab sa mga angay nga mga sumbanan. Ang mga obserbasyon sa mga transect ug quadrats gigamit alang sa terrestrial biota sa mga naobserbahan nga mga klase nga gitandi batok sa red list sa International Union alang sa Conservation of Nature (IUCN) sa mga nameligro nga mga espisye aron mahibal-an kung adunay mga bulnerable nga matang sa sulod sa site. Mahitungod sa People module, gipahigayon ang usa ka updated household ug perception survey sa mga host ug silingan nga mga barangay aron mahibal-an ang bisan unsang mga kausaban gikan sa demographic, socio-economic ug health data nga natala sa miaging mga pagtuon. Ang survey nga panglantaw gituyo aron mahibal-an ang pagdawat sa proyekto sa mga stakeholders.

The draft document was submitted to DENR-EMB last March 21 for procedural screening. The scheduled public hearing is on April 29, 2019 to be conducted in the Gymnasium of the Municipality of Tubod at 9:00 a.m. The EIA team consists of the following specialists and consultants: Ang draft nga dokumento gisumite ngadto sa DENR-EMB niadtong Marso 21 alang sa screening sa pamaagi. Ang gitakda nga public hearing sa Abril 29, 2019 nga ipahigayon sa Gymnasium sa lungsod sa Tubod sa alas 9:00 sa buntag. Ang team sa EIA naglangkob sa mosunod nga mga espesyalista ug mga konsultant:

Name	Role
Katherine Gavile	Project Manager
Malvin Manueli	Senior Geologist, Pedology and Geohazard Specialist
Rodel Alberto	Land Use Specialist and Forester
Pastor Malabrigo	Senior Forester
Anna Pauline De Guia	Senior Wildlife Specialist
Karel Padayao	Senior Environmental Scientist
Edimar Ederio	Environmental Scientist
John Paul Pareja	Water Quality Specialist
Joyce Almadrones	Water Quality Specialist
Veronica Atienza	Aquatic Ecologist
Joan Julia	Senior Air Quality Specialist
Anthony Magsombol	Air Quality Specialist
Susan Cruz	Sociologist
Fernando Karlo Gavile Jr.	Anthropologist
Engr. Vengel Romero	Proponent
Engr. Amando Reyes IV	Proponent
Engr. Dulce Romero	Proponent

IV. Project Alternatives

Project alternatives were considered in terms of siting, technology selection/operation processes, and design. The results of the alternatives investigation are presented below: Ang mga alternatibo sa proyekto giisip nga termino sa sitwasyon, teknolohiya pagpili / operasyon nga proseso, ug disenyo. Ang mga resulta sa mga alternatibo nga imbestigasyon gipakita sa ubos:

Aspect	Alternatives
Siting	Mining development is constrained by the fixed location of the orebody, site topography, available technology, cost, limited waste storage alternatives, and availability of usable areas. Due to constraints in the location of the mine area, project alternatives and options for the locations of the mine components and waste storage facilities are also limited. In general, the location of the project site was delineated through an integrated assessment of the constraints in the mine area, method and cost as well as potential environmental and social conditions and impacts in the placement of the mine components. Ang pagpalambo sa pagmina gipugngan pinaagi sa natino nga lugar sa orebody, topography sa site, teknolohiya nga magamit, gasto, limitado nga mga alternatibo sa paghipos sa basura, ug ang adunay igong lugar nga magamit. Tungod sa mga kakulangan sa nahimutangan sa minahan, alternatibong proyekto ug mga kabtangan ug sangkap sa mina ug mga pasilidad limitado usab. Sa kinatibuk-an, ang nahimutangan sa proyekto gilatid pinaagi sa usa ka hiniusa nga pagsusi sa mga limitasyon sa minahan, pamaagi ug gasto ingon man sa potensyal nga epekto sa kinaiyahan ug sa komunidad ug mga epekto sa pagbutang sa mga pasilidad sa minahan
Technology selection/operation processes	Technologies were considered for the viability of block-cave, open pit and sub-level caving. Technologies are available for three options but the final consideration for the method that will be applied concern geotechnical, environmental, and regulatory aspects. Sublevel caving was chosen as it eliminated the issues with safety previously encountered during the block-cave decline development. In terms of environmental impact, the sub-level cave method significantly reduced the surface disturbance area thereby eliminating or reducing the impacts previously associated with the open pit method. Finally, the regulatory restriction on the development of open pit mining compelled SMMCI to adopt the sub-level caving mining method. Ang mga teknolohiya gikonsiderar alang sa viability sa block-cave, open pit ug sub-level caving. Ang mga teknolohiya available alang sa tulo ka mga pamaagi apan ang katapusang konsiderasyon alang sa pamaagi nga gamiton kabahin sa mga aspeto sa geotechnical, environmental, ug regulatory. Ang sublevel caving gipili kay kini nagawagtang sa mga isyu nga kaniadto nasugatan sa panahon sa pag-uswag pa sa block-caving. Sa natad sa epekto sa kinaiyaham, ang pamaagi sa sub-level caving may dakong pagkunhod sa lugar mga madisturbo sa ibabaw sa yuta pinaagi sa pagwagtang o pagpakunhod sa mga epekto nga sama sa nahiaguman kaniadto sa kanhi open pit pa nga pamaagi. Sa katapusan, ang regulatory restriction sa pagpalambo sa open pit mining nagpugos sa SMMCI sa pagadopt sa sub-level caving mining method.
Design	The design of the major mine facilities such as the sub-level cave, mill, and TSF were based on available technology, cost, environmental viability and suitability for the site. Preference was given to design that is also implemented by other mines in the Philippines with a similar mine plan and with best performance. The TSF

Aspect	Alternatives
	design was based on the requirements of ANCOLD. Ang disenyo sa mga dagko nga mga pasilidad sa mina sama sa sub-level cave, Mill, ug TSF gibase sa anaa nga teknolohiya, gasto, kahimtang sa kinaiyahan ug kaangay alang sa lokasyon. Gihatagan ang preference sa disenyo nga gipatuman usab sa ubang mga minahan sa Pilipinas nga adunay susama nga plano ug labing maayo nga performance. Ang disenyo sa TSF gibase sa mga gikinahanglan sa ANCOLD.
No project	The 'no project' option must be weighed against the economic benefit that the project would bring to the host barangays and to the national and regional economies. As previously discussed, economic benefits that would be derived from the project are: Ang opsyon nga 'walay proyekto' kinahanglan nga timbangon batok sa kaayohan sa ekonomiya nga dad-on sa proyekto ngadto sa mga barangay nga host ug ngadto sa nasyonal ug rehiyonal nga ekonomiya. Sama sa nahisgutan na kaniadto, ang mga benepisyo sa ekonomiya nga makuha gikan sa proyekto mao ang: • Potential to create up to 2,500 jobs during the construction phase; • • Potensyal sa pagmugna og kutob sa 2,500 nga mga trabaho sa panahon sa pagtukod nga bahin; • Royalties and taxes paid locally and shared by provincial, municipal and barangay communities; and • Mga royalty ug mga buhis nga gibayad sa lokal ug gipakigbahin sa mga komunidad sa probinsiya, munisipalidad ug barangay; ug • Social development programs that will benefit the host communities. • Social development nga mga programa nga makabenepisyo sa mga sakop na komunidad. If the project does not proceed, the above benefits and the corresponding multiplier effects and general improvement in the conditions of the host communities will not be realized. These being said, this standard of living will remain if the project is not implemented. The project is expected to provide direct and indirect livelihood opportunities for stakeholders within the host barangay. Kung ang proyekto dili magpadayon, ang mga benepisyo ug ang katugbang nga mga epekto ug pangkinatibuk-an nga pag-uswag sa mga kondisyon sa mga komunidad sa host dili matuman. Giingon kini, nga sukdanan sa panginabuhi magpabilin kon ang proyekto dili mapatuman. Ang proyekto gilauman nga mohatag og direkta ug dili direkta nga mga oportunidad sa panginabuhian alang sa mga stakeholders sulod sa host barangay.

V. Summary of Baseline Characterization

The total 532 hectares of mine footprint is classified as alienable and disposable land. Based on field observation and mapping data, majority of the actual land use within the project site is utilized for agriculture particularly coconut plantations and minimal rice paddies. The project site also captures only three types of environmentally critical areas

(ECA) as defined by DAO 2003-30 namely areas with critical slopes, recharge areas of aquifers, and geohazard-prone areas. ECAs that were previously identified during the open pit mine design are no longer included during the sublevel caving design since the mine footprint was significantly reduced, eliminating the impact. Ang kinatibuk-an nga 532 ka ektarya sa footprint gi-classified ingon nga alienable ug disposable nga yuta. Base sa pag-obserbar ug datos sa pag-mapa, ang kadaghanan sa aktwal nga paggamit sa yuta sulod sa proyekto nga site gigamit alang sa agrikultura ilabina ang mga kalubi-an ug diyutay nga humay. Ang proyekto nakakuha lamang ug tulo ka matang sa mga kritikal nga mga lugar (ECA) sama sa DAO 2003-30 mga lugar nga adunay kritikal nga mga bakilid, recharge areas sa aquifers, ug geohazard-prone areas. Ang mga ECA nga giila kaniadto sa open pit mine design wala na mahilakip sa disenyo sa sublevel caving sukad nga gipagamyan ang desinyo sa minahan, kun diin kini nagapakunhod sa epekto.

The project site is located in a geologically active area which is also the reason why the project site and its vicinity have mineral resources. The trenches and faults affecting the Project site are as follows: the Philippine Trench in the Philippine Sea to the east, the Philippine Fault (Surigao Segment) and Cabadbaran Fault along the Malimono Range to the west, the Suriga Valley Fault along the foot of Diwata Range, and the Philipine Fault (Lianga Segment) to the south. PHIVOLCS considers as active the Philippine Trench and the Philippine Fault. The Philippine Trench and the Surigao Segment of the Philippine Fault are the sources of most earthquakes that have happened in the area. The project site is susceptible to geohazards such as ground shaking brought about by seismic activities, slope failure for areas located in critical slopes, and flooding near major river systems and low-lying areas towards the coast and Lake Mainit. Soil investigations conducted within the 6-year period exhibit sufficient organic matter and metals content but slight deficiency in other nutrients. Because of this, there is a limitation as to the kind of crops that can viably grow. The soil characteristics are typical of soil types derived from volcanic rocks. Ang proyekto nahimutang sa usa ka dapit nga aktibo sa geolohiya nga mao usab ang rason ngano nga ang lokasyon ug ang palibot niini adunay mga kahinguhaan sa mineral. Ang mga trenches ug mga fault nga nakaapekto sa proyekto mao ang mosunod: Philippine Trench in the Philippine Sea to the east, the Philippine Fault (Surigao Segment) and Cabadbaran Fault along the Malimono Range to the west, the Surigao Valley Fault along the foot of Diwata Range, and the Philipine Fault (Lianga Segment) to the south. Giisip sa PHIVOLCS nga aktibo ang Philippine Trench ug Philippine Fault. Ang Philippine Trench ug ang Surigao Segment sa Philippine Fault mao ang mga tinubdan sa kadaghanan sa mga linog nga nahitabo sa maong lugar. Ang proyekto dali kun duol nga mahitabo sa mga geohazard sama sa pag-uyog sa yuta nga gipahinabo sa mga kalihokan sa seismic, kapakyasan sa slope sa mga lugar nga nahimutang sa kritikal nga mga bakilid, ug pagbaha duol sa mga dagkong suba nga mga sistema ug ubos nga mga lugar paingon sa baybayon ug Lake Mainit. Ang mga imbestigasyon sa yuta nga gipahigayon sulod sa 6 ka tuig nga panahon nga exhibit igo nga organikong butang ug metal nga mga sulod apan gamay nga kakulangan sa ubang mga sustansya. Tungod niini, adunay limitasyon sa matang sa mga tanom nga mahimong motubo. Ang mga klasi sa yuta kasagaran sa mga matang sa yuta nga nakuha gikan sa mga bato sa bolkan.

In terms of terrestrial vegetation and wildlife, there are no protected vegetation communities within the project site based on PD 705, RA 7586 and the CLUPs of the host municipalities. Remaining patches of forests near the project site are forests of limestones located in Barangays Marga and Motorpool in the Municipality of Tubod but these are already heavily disturbed by logging and wildlife poaching. Heavily disturbed forest over limestone were observed in Brgys. Marga and Motor Pool, Municipality of Tubod. The original vegetation community (lowland evergreen forest) within this region has almost been completely wiped out by commercial logging and land conversion to agriculture and agroforestry. The most dominant trees within the project site are coconuts trees and falcata. Sa natad sa terrestrial nga mga tanum ug mga ihalas nga mga mananap, wala'y protektado nga mga komunidad sa tanum nga Makita diha sulod sa proyekto nga base sa PD 705, RA 7586 ug CLUPs sa mga apektado na munisipyo. Ang mga nahibilin nga mga lasang duol sa lugar sa proyekto mao ang mga kalasangan sa limestones nga nahimutang sa Barangay Marga ug sa Motorpool sa lungsod sa Tubod apan kini naapektuhan pag-ayo sa pagpamutol ug kahoy ug pag pangdakop sa ihalas nga mga mananap. Ang hilabihan nga pagkatugaw sa kalasangan nakita didto sa Brgys. Marga ug Motor Pool, lungsod sa Tubod. Ang orihinal nga mga komunidad sa tanum (lowland evergreen forest) sa sulod niini nga rehiyon hapit na nahanaw pinaagi sa komersyal nga logging ug conversion sa yuta ngadto sa agrikultura ug agroforestry. Ang labing nag-una nga mga kahoy sa sulod sa proyekto mao ang mga kahoy nga lubi ug falcata.

The water resources within the project site and vicinity consists of fresh surface water and groundwater or spring sources. The project site straddles three river catchments namely, Hinagasa-an in the north, Magpayang in the south, Bad-as-Amoslog in the east and partly Mayag in the west. Run-off from the Hinagasa-an catchment flows to Sison; run-off from Magpayang flows through Tubod and Placer then down to Mainit, the rest of the run-off from the site will flow to the west. The project site and surrounding areas consist of local and less productive aquifers of relatively low yield that often cannot sustain the needs of the communities being serviced. Based on hydrologic studies, the only domestic well that will be impacted by the project is located in Barangay Timamana. Nevertheless, three Community Water Projects (CWPs) located in Timamana and Anislagan are already constructed and are ready to be energized to provide alternative water sources to the impacted host communities in the event these barangays will have reduction

in existing water sources. Ang mga kahinguhaan sa tubig sulod sa site ug palibot sa proyekto naglakip sa presko nga tubig sa ibabaw ug sa mga tinubdan sa tubig o sa tuburan. Ang proyekto nag-agi sa tulo ka mga sapa sa suba nga mao, Hinagasa-an sa amihanan, Magpayang sa habagatan, Bad-as-Amoslog sa sidlakan ug usa ka bahin sa Mayag sa kasadpan. Gikan sa Hinagasa-usa ka sapa nga moagos ngadto kang Sison; Ang dagasa gikan sa Magpayang moagi sa Tubod ug Placer dayon paingon sa Mainit, ang nahibilin sa dagasa gikan sa site moagos padulong sa kasadpan. Ang proyekto ug ang naglibot nga mga dapit naglangkob sa mga lokal ug dili kaayo mabungahon nga mga aquifers nga adunay gamay nga ani nga sa kasagaran dili makasustento sa mga panginahanglan sa mga komunidad nga giserbisyuhan. Base sa pagtuon sa hydrologic, ang bugtong puloy-anan nga naapektohan sa proyekto nahimutang sa Barangay Timamana. Bisan pa niana, tulo ka Community Water Projects (CWPs) nga nahimutang sa Timamana ug Anislagan ang natukod na ug andam nga mahimong kusog aron paghatag og alternatibong mga tinubdan sa tubig ngadto sa naapektuhan nga mga komunidad sa host kung kini nga mga barangay adunay pagkunhod sa kasamtangan nga mga tinubdan sa tubig. The characteristics of stream waters are influenced by their location, land use, and geology. Rivers located in the Hinagasa-an catchment generally comply with Class B standards for fresh surface water (DAO 2016-008) except for biological oxygen demand and fecal coliform which exceed the standard. This can be attributed to the impact of domestic and animal wastes and run-off from agricultural lands. On the other hand, rivers within the Magpayang catchment (which includes the mine areas) are generally within the prescribed range of Class B standards except for arsenic and fecal coliform which exceed the standard. Fecal coliform contamination can be attributed to improper disposal of domestic wastes while the arsenic is attributable to the mineralized geology of the area. The Bad-as Amoslog catchment is the most impacted of the river systems registering above-standard levels of heavy metals, oil and grease, bacteriological input and chloride levels. Various tributaries drain into this catchment from land uses that include agriculture, industrial (mining), transport, and construction. Consequently, findings on aquatic ecology is directly related to the stream water quality. Heavily impacted streams are distinguished by the dominance of pollution-resistant phytoplankters while streams of good quality have more diverse assemblage of freshwater biota. Only three genera of fish were documented in the different sampling stations. These include *Anguilla marmorata*, *Rhinogobius* sp. and *Gobius* sp.. Generally, these fishes were caught in Hinigasa-an River and its tributaries. Ang mga kinaiya sa mga tubig sa suba naimpluwensyahan sa ilang nahimutangan, paggamit sa yuta, ug geolohiya. Ang mga sapa nga nahimutang sa Hinagasa-usa ka catchment kasagaran mosunod sa mga pamantayan sa Class B alang sa presko nga tubig sa kadagatan (DAO 2016-008) gawas sa biological oxygen nga panginahanglan ug fecal coliform nga lapas sa standard. Mahimo kini tungod sa epekto sa mga basura sa binuhing mga hayop nga mupadulong sa yuta sa agrikultura. Sa laing bahin, ang mga suba sa sulod sa Magpayang catchment (nga naglakip sa minahan nga mga lugar) kasagaran sulod sa gilatid nga klase sa mga klase sa Class B gawas sa arsenic ug fecal coliform nga lapas sa standard. Ang fecal coliform kontaminasyon mahimong hinungdan sa dili husto nga paglabay sa mga basura sa balay samtang ang arsenic tungod kini sa mineralized geology sa lugar. Ang Bad-as nga Amoslog catchment mao ang labing naapektuhan sa mga sistema sa suba nga nagparehistro sa mga standard nga lebel sa mga bug-at nga metal, lana ug grasa, mga lebel sa bacteriological ug chloride. Nagkalainlaing mga tributary sa kini nga katubigan gikan sa mga gamit sa yuta nga naglakip sa agrikultura, industriya (pagmina), transportasyon, ug pagtukod. Tungod niini, ang mga nahibal-an sa aquatic ecology direktang may kalabutan sa kalidad sa tubig sa sapa. Ang mabug-at nga naapektohan nga mga sapa nailhan sa dominasyon sa mga phytoplankter nga dili makalusot sa polusyon samtang ang mga maayong kalidad adunay daghan nga nagkalainlain nga mga mananap sa freshwater. Adunay tulo lamang ka matang sa isda ang natala sa nagkalainlaing mga estasyon sa sampling. Kini naglakip sa Anguilla *marmorata, Rhinogobius* sp. ug *Gobius* sp. Kasagaran, kini nga mga isda nakuha sa Hinigasa-an River ug mga sapa niini

Jacobs also measured ambient air quality and noise. Average backgound levels of particulate pollutants TSP and PM_{10} range from 6 µg/Ncm to 125 µg/Ncm. These are within the applicable National Ambient Air Quality Guideline Values (NAAQGV). Low background concentrations of SO_2 and NO_2 across the stations were detected during the 1-hr and 24-hr averaging periods which are also within the range of the NAAQGV. Emissions observed come mostly from motor vehicles and the practice of waste open burning. All monitoring stations classified as Class AA exceeded the DENR/NPCC Standards for the 1-hour monitoring and this is due to noise coming from the school and motor vehicles. Nighttime noise levels are attributable to motor vehicles. Gisukod usab ni Jacobs ang kalidad sa hangin ug kasaba. Ang kasarangan nga lebel sa mga particulate nga TSP ug PM10 gikan sa 6 µg/Ncm ngadto sa 125 µg/Ncm. Anaa kini sa sulod sa mga naa sa National Ambient Air Quality Guideline Values (NAAQGV). Ang ubos nga konsentrasyon sa SO_2 ug NO_2 sa mga estasyon nakita sa 1-hr ug 24-oras nga mga average nga panahon nga anaa usab sa sulod sa NAAQGV. Ang mga pag-obserba nga naobserbahan kasagaran gikan sa mga sakyanan sa motor ug ang pagbansaybansay sa mga basura Ang tanan nga monitoring station nga gi-classify nga Class AA milapas sa DENR / NPCC Standards alang sa 1 ka oras nga pag-monitor ug kini tungod sa kasaba nga gikan sa eskwelahan ug motor nga mga sakyanan. Ang mga oras sa kasaba sa kagabhion ang hinungdan sa mga sakyanan sa sakyanan.

The MPSA and total project footprint has no overlap with approved Certificate of Ancestral Domain Titles (CADT), Ancestral Domain Claims (CADC), or Ancestral Land Titles (CALT). The host barangays are rural, mostly leading to, or themselves in, the mountains and in the interior of the host municipalities. While most houses and farm lands tend to be owner occupied, the houses are mostly made of a mix of strong and light materials and the farm lands tend to

be small (< 3 hectares). This is a reflection also of the the average household income for all host barangays is of PHP5,803/mo which is significantly below the poverty threshold of PhP 9,063.75 a month. About forthy seven percent (47%) of respondents are strongly in favor of the Project. There is a considerable body of those who mildly support, are neutral or mildly oppose with the vast majority of these respondents expressing neutrality. About eighteen percent (18%) of respondents are strongly not in favor of the project. The main driver for the strong support is the need for employment and livelihood which stakeholders perceive can be realized through the project. The summary of impacts is tabulated below according to the previous and present mine methods for the Project. Residual impacts after the application of mitigation presented in the Environmental Management Plan (EMP) are included below: Ang MPSA ug ang kinatibuk-ang proyekto sa footprint wala mag-overlap sa naaprobahan nga Certificate of Ancestral Domain Titles (CADT), Ancestral Domain Claims (CADC), o Ancestral Land Titles (CALT). Ang mga host sa barangay mao ang mga rural, kasagaran padulong sa, o sa ilang mga kaugalingon sa, sa mga kabukiran ug sa sulod sa mga host lungsod. Samtang ang kadaghanan sa mga balay ug mga yuta sa umahan nga gi-okupar sa tag-iya, ang mga balay kasagaran gama sa usa ka hugpong sa lig-on ug gaan nga mga materyales ug ang mga yuta sa umahan lagmit nga gamay (<3 ektarya). Kini usab usa ka pagpamalandong sa kasagaran nga kinitaan sa panimalay alang sa tanan nga mga barangay nga anaa sa PHP5,803 / mo nga ubos sa poverty threshold sa PhP 9,063.75 sa usa ka bulan. Mahibaluan nga ang pito ka porsyento (47%) sang mga ginaproponido pabor sa Tampakan. Adunay usa ka igo nga pundok niadtong malumo nga nagpaluyo, neyutral o gamay nga nagsupak sa kadaghanan sa mga gisaligan nga nagpahayag og neyutralidad. Mga 18 porsiyento (18%) sa mga gisaligan dili kusgan nga mipabor sa proyekto. Ang nag-unang drayber alang sa lig-on nga suporta mao ang panginahanglan alang sa pagpanarbaho ug panginabuhian diin ang mga nahibal-an sa mga hingtungdan mahimo matuman pinaagi sa proyekto. Ang summary sa mga epekto gibutang sa ubos sumala sa kaniadto ug karon nga mga paagi sa mina alang sa Tampakan. Ang nahabilin nga mga epekto human sa paggamit sa mitigation nga gipresentar sa Environmental Management Plan (EMP) gilakip sa ubos:

Environmental Aspects	Potential Impacts associated with Block Cave Mining	Potential Impacts associated with Open Pit Mining	Potential Impacts associated with Sub-level Caving	Residual Effects after applying Mitigation Measures	Risks and uncertainties relating to the findings and implications for decision-making
Geohazards	• Construction of the TSF may cause a reduction of the frequency of flooding in downstream areas • Breach in TSF may cause flash flooding, high-density flows and spillage of mine tails in downstream areas • Subsidence and slope failure (landslides) may take place during construction and operation • Tension cracks may propagate beyond the estimated limits of the subsidence pit and cause slope failure on adjacent mine facilities or proximal settlements. • Mud rush, or sudden inflow of fine sediments from underground drawpoints, may occur during the mine's construction and operations phase. Mud rush will destroy underground infrastructure.	Except for the impacts identified for the underground mine component, the same set of impacts identified for the underground mine also applies for the Open Pit. In contrast however, the limits of the Open Pit can be accurately planned and defined before Project commissioning thus enabling the proponent to adequately implement engineering control measures specific for the geohazards identified and within the limits of the Open Pit.	The same set of impacts are also identified for the sub-level caving method but due to the reduction of mine footprint, the magnitude and extent of these impacts will be contained within the disturbance areas	Potential for slope failures and TSF issues will be significantly reduced or eliminated with engineering measures. While the extent of the subsidence zone is modeled or computed, provision for buffer and engineering measures that are part of the subsidence zone management will be able to prevent impacts related to slope failure and subsidence	Risks are associated with uncertainties in geotechnical properties of soils and rocks that may be encountered during construction. These can be minimized with the continuation of geotechnical investigations and minimized by phasing the construction schedule
Terrestrial Vegetation and Wildlife	• Construction of the mine components will require stripping of vegetation. • Removal of vegetation may disturb habitat and food source of wildlife and people. • Site clearing for Project development will result in the reduction of wildlife population and may decrease the number of species growing within the footprint.	The impacts identified for terrestrial vegetation for an underground mine project are also applicable for a surface mine project.	The impacts identified for the open pit method also applies for the sub-level caving method but the impact areas are already reduced and with the accomplishment of the tree inventory, the vegetation cover that will be likely removed is also identified. With the reduction in	With the reduction in footprint and the implementation of mitigation measures, the status of terrestrial flora and fauna within the vicinity of the Project will be improved since there will be active rehabilitation and protection. In fact, even before the project commences,	None

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			project footprint, more land can be allocated for revegetation and buffer.	about 287,000 trees have already been planted and survived improving vegetation cover within the vicinity of the project.	
Hydrology	• The underground mine may potentially impact the spring and groundwater systems within the Project and its vicinity resulting to groundwater drawdown, reduction of flow, or disappearance of groundwater and spring sources within the host barangays. • The development of the TSF and the subsidence pit over time may result in changes to surface hydrology leading to reduction of stream volumetric flows along drainage channels located downstream of these facilities. • Reduction of vegetation cover would result in an increase in surface runoff	Impacts to surface water, groundwater and spring sources may also be potentially impacted over time as the Open Pit is developed similar to what may occur if the mine progresses with the block cave method. In contrast with the underground mining method, surface drainage, diversion and sedimentation controls, and water quality management strategies can be planned before the pit is developed.	Catchments that are previously encroached by the project during the open pit plan will no longer be impacted due to the reduction of project footprint. Potential impacts to groundwater resource are identified however. To address these impacts, Community Water Projects (CWPs) have already been established.	With mitigation, the potential water resource and supply issues are resolved and potential impacts are minimized.	The risks are associated with potential impacts to hydrology that may be observed once the project construction and sublevel caving development. These risks can impact decision making for the development of the CWPs and the mine development to minimize affecting groundwater sources.
Water Quality	• Effluents and process waters enriched in metals and other pollutants may be released from the TSF and mill and be discharged into receiving water bodies • Hydrocarbon leaks and spills from vehicles, fuel tanks and used oil storage may contaminate ground and stream water • Non-mine wastewater from	The potential impacts to water quality for both surface and groundwater resources for the underground method are applicable for the Open Pit as well. The same mineral processing method proposed for the underground mine will also be used for the Open Pit with the modification that the grinding circuits will now be	Surface water bodies that were previously identified to be impacted will no longer be encroached thereby eliminating or reducing the extent and magnitude of potential water contamination.	Minimize or eliminate impacts	Risks are associated with the release of deleterious substances from the process or the TSF which were not previously identified in the mine planning and design. The risks will be eliminated by continued technical studies and pilot

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	support facilities particularly the administration and accommodations complex and the various warehouses may contaminate surface water bodies.	placed on the surface. Contingent to the Open Pit mining method, surface infrastructure footprint is also expected to be larger than the surface footprint of an underground mine.			testing which will be conducted before the mine operates.
Climate, Air Quality and Noise	• Removal of vegetation would decrease carbon sequestration potential within the Project area • Significant alterations to the topography and hydrology by the Project may affect microclimate conditions • Blasting, vehicular movement and equipment operations will increase ambient noise levels • Land clearing, blasting and vehicular movement will increase the amount of fugitive dust and particulates in the air • Metal-rich particulate matter liberated from mineralized materials as a result of mining activities will increase the ambient concentrations of elements suspended in the air. • Vehicle and equipment operation (e.g. diesel generators) will emit additional NO_x, SO_x, heavy metals and other greenhouse gases (GHGs) from the combustion of fuels.	The impacts identified for the underground mine will also be recognized for the Open Pit operations. However, the magnitude of impact, particularly for decreased carbon sequestration potential and air quality and noise, would be directly related to the Project footprint and the increase of surface infrastructure particularly with the addition of the Open Pit and WRD and the corresponding change in footprint for the TSF and the associated mine facilities.	With the shift to sublevel caving, most aspects of the operations will shift to the underground reducing the need to clear large areas of vegetation to construct the surface facilities. With the reduction in disturbance areas, more areas within the MPSA can be allocated for revegetation, wildlife protection, and GHG offsetting. Dust generation will also be limited to the subsidence zone, the haul roads, and the TSF and mill (during construction)	None	None
Socio-Economics, Public Health and	• Inhabitants and properties within the project site may be displaced	The potential impacts recognized for this module for	Stakeholders and infrastructure that were identified to be	Minimize or eliminate impacts in relation to in-migration, waste	Risks are associated with negative perception and

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Safety	which may lead to adverse impacts with regards to the cohesion of their community, the quality of life, fears, apprehensions and perceptions of the receiving community and local government units where they will be transferred, and competition for basic utilities, public services, and other limited resources. • Payment of government dues in the local level would bring additional operational funds for local government units (LGUs) • Hiring of a significant amount of locals will bring a steady source of income and contribute to poverty reduction in the impact barangays. • Mining operations will open a market for support services such as security, housekeeping, catering, etc. that can foster local entrepreneurship and contribute to poverty alleviation. • Business opportunities created by the presence of the Project may encourage in-migration to the host barangays / municipalities, causing both positive (hiring) and negative (competition for work, resources, service, etc.) socio-economic effects in these areas • In-migration can lead to higher risk of spread of communicable diseases and resource competition • Higher income generation due to	the underground mine are also applicable for the Open Pit project. Mining-related guarantee funds and programs, such as the Contingent Liability and Rehabilitation Fund (CLRF) and the Social Development and Management Program (SDMP), are prescribed in the Philippine Mining Act of 1995 (Republic Act 7942) and its implementing rules and regulations DENR Administrative Order (DAO) 96-40. The potential impacts on displacement may also apply for the Open Pit mine method but the magnitude of impact will be highly dependent on the project footprint and the areas the facilities will encroach. It can be surmised that the potential impact of displacement or resettlement is more significant for the Open Pit mine method since surface facilities not present for the underground mine (e.g., WRD) may encroach existing settlements for the Open Pit mine method.	displaced during the open pit plan will no longer be disturbed as there is no need to construct the WRD. With the reduction in project footprint, previous farmlands that will be encroached by the surface facilities will no longer be disturbed. In order to maximize benefits from employment, the BESO is instituted that allows the barangay to screen and endorse candidates to SMMCI making the opportunity for direct employment equitable among the host barangays. With the previous baseline studies conducted, there was sufficient information available to craft a comprehensive SDMP.	management, and resource competition. At the same time, benefits from the mine will be enhanced with appropriate measures	conflicts with stakeholders (grievance) which may occur if commitments or measures included in the EIS and SDMP are not fulfilled. Other risks are associated with security. These risks could entail provision for additional resources and manpower to handle community-related issues and security, enhanced coordination with stakeholders and government agencies, and additional measures to manage issues and concerns not previously identified in the EIA.

Environmental Aspects	Potential Impacts associated with Block Cave Mining	Potential Impacts associated with Open Pit Mining	Potential Impacts associated with Sub-level Caving	Residual Effects after applying Mitigation Measures	Risks and uncertainties relating to the findings and implications for decision-making
	direct and indirect contribution from the Project can boost local purchasing power, as well as increase the incidence of theft, drugs, alcohol, gambling and prostitution. • Mine activities will lead to an increase in vehicular traffic leading to the Project site, providing better transportation, as well as increasing accident and health risks to the communities. • Mining operations and in-migration would increase production of human and non-human wastes.				