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ECONOMIC IMPACT AND ALTERNATIVE LAND-USE ASSESSMENT FOR THE PROPOSED UNDERGROUND MANGANESE MINE

prepared for SLR Consulting (Africa) (Pty) Ltd in support of the environmental impact assessment and the environmental management programme for the proposed mining development for

MN48 (PTY) LTD

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DECLARATION OF INDEPENDENCE

Mercury Financial Consultants (Pty) Ltd (Mercury) was established in 2013 and primarily undertakes economic impact assessments in support of environmental impact assessments. The company also provides business development and support services to SMMEs (Small, Medium and Micro-sized Enterprises). Mercury comprises of a small team of professionals which focusses on delivering strategic and sustainable solutions to its clients. Mercury in its dynamic approach to an ever changing business environment have established strategic partnerships with key environmental and social consultants.

Werner Neethling is a senior consultant at Mercury and is a qualified management accountant with over 17 years' experience. Werner Neethling, the primary author of this report, hereby declare that he is an independent economic assessment specialist. Werner Neethling CV is attached as Annexure A.

Mercury compiled this Economic Impact Assessment report based on independent research and analysis. I hereby confirm that I have no business, financial, personal or other interest in the activity proceeding other than remuneration for work performed as defined under "independent" in Chapter 1 of the Environmental Impact Assessment Regulations, 2014.

WERNER NEETHLING (ACMA) **DATE**

(Author)

ACRONYMS AND ABBREVIATIONS

Below a list of acronyms, abbreviations and definitions used in this report.

ACRONYMS / ABBREVIATIONS	DEFINITION
DMR	Department of Mineral Resources
EIA	Environmental impact assessment
EMP	Environmental management plan
GDP	Gross Domestic Product is defined by the Organisation for Economic Co-operation and Development (OECD) as an aggregate measure of production equal to the sum of the gross values added of all resident, institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs).
IDP	Integrated Development Plan
IRR	Internal Rate Of Return is the discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake the project.
JMLM	Joe Morolong Local Municipality
JTDM	John Taolo Gaetsewe District Municipality
LED	Local economic development
Mercury	Mercury Financial Consultants (Pty) Ltd
MPRDA	Mineral and Petroleum Resources Development Act, Act 28 of 2002
NPV	Net present value is difference between the present value of cash inflows and the present value of cash outflows. NPV is used in capital budgeting to analyse the profitability of an investment or project.
PV	Present value
SLP	Social and labour plan
SLR	SLR Consulting (Africa) (Pty) Ltd

MN48 (PTY) LTD - ECONOMIC IMPACT AND ALTERNATIVE LAND-USE ASSESSMENT FOR THE PROPOSED UNDERGROUND MANGANESE MINE

1 INTRODUCTION

Khwara Manganese (Pty) Ltd ("Khwara") and Lehating Mining (Pty) Ltd ("Lehating") entered into an amalgamation agreement on 2 December 2016. The agreement combines the two adjacent, contiguous mineral resources and surface rights comprising the Khwara and Lehating Manganese Mine into a single, high-grade manganese mining company known as Mn48 Pty Ltd ("Mn48"). SLR Consulting (South Africa) (Pty) Ltd (SLR), has been appointed by Mn 48 (Pty) Ltd ("Mn 48") to undertake the environmental authorisation process for a underground manganese mine on the western part (Portion 1) of the farm Lehating 741, portion 2 and the remaining extent of the farm Wessels 227 and portion 3 and 4 of the farm Dibiaghomo 226, north of Black Rock in the Northern Cape Province.

The town Kuruman is located approximately 67km to the southeast from the boundary of the proposed project area within the Kuruman Magisterial District within the John Taolo Gaetsewe District Municipality (JTDM) and Joe Morolong Local Municipality (JMLM).

SLR has appointed Mercury Financial Consultants (Pty) Ltd (Mercury) to undertake the Economic Impact and Alternative Land-use Assessment in support of the EIA process.

2 OBJECTIVE OF THIS STUDY

The objectives of this specialist investigation was to determine the following in support of undertaking the environmental authorisation project:

- undertake an analysis to identify economic conditions in order to profile baseline conditions;
- undertake a baseline assessment to quantify property value or infrastructure assets, to determine current commercial and economic contributions of potentially directly affected persons and to identify and quantify potential alternative land use activities;
- quantify the impact on economic conditions of directly affected persons by determining the potential impact, in financial terms, of the loss in property value or infrastructure assets and

determining the economic loss, in terms of net present value, of commercial, economic or as a result of the proposed mining activity;

- undertake a comparative assessment of the identified land use and development alternatives and their potential on the environment, social and cultural impacts in view of generally accepted sustainable development principles which considers the costs and benefits of social, environmental and economic factors; and
- provide input, together with SLR into management measures going forward.

2.1 PROPOSED APPROACH AND METHODOLOGY

The following approach and methodologies were applied in the process of identifying and evaluating potential economic impacts:

- preliminary analysis to identify and prioritise economic impact considerations and to identify the information requirements;
- profiling baseline conditions, which focused on the gathering of information about the economic environment and context of the proposed development;
- predicting impacts, quantifying impacts and model development: This step involved the analysis of the information which were collected from the scoping phase, baseline profiling and past experiences to predict possible economic impacts. Trade-offs between the adverse and beneficial impacts of a proposed development are part of this analysis were determined. Issues raised by interested and affected parties were taken into to consideration in the process of identifying and evaluating potential economic impacts;
- quantify potential outcomes in financial terms by using various assumptions and financial modelling techniques and incorporating economic risk factors;
- impact assessment. Methodology as prescribed by SLR and outlined in Section 7.1 was utilised; and
- defined mitigation plans and recommendations to ensure potential risks are adequately mitigated.

2.2 REQUIREMENTS FOR SPECIALIST REPORTS

This economic impact assessment report was compiled in compliance with the requirements specified in Appendix 6 of the Environmental Impact Assessment Regulations (R982 of 2014, as

amended in 2017) published in terms of the National Environmental Management Act, 107 of 1998 (NEMA) as outlined in Table 1 below.

TABLE 1: APPENDIX 6 REQUIREMENTS

REQUIREMENT 1.(1) A specialist report must contain:	**REFERENCE IN BASELINE REPORT, IF APPLICABLE**
(a) details of- (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Curriculum vitae included as Appendix A
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	A declaration of independence is included in the beginning of the report.
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section **Error! Reference source not found.**
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3,4 & 6
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Sections 6 & 7
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	No site visit was required
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
(f) details of an assessment of the specific identified sensitivities of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Not applicable
(g) an identification of any areas to be avoided, including buffers;	Not applicable
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Not applicable
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 8
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Sections 6, 7 & 10
(k) any mitigation measures for inclusion in the EMPr;	Section 9
(l) any conditions for inclusion in the environmental authorisation;	None identified
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	None identified
(n) a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; And (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 10
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 2.3
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 2.3
(q) any other information requested by the competent authority.	Section 2.3

2.3 ISSUES RAISED DURING PUBLIC CONSULTATION

SLR have been appointed to undertake the environmental authorisation process for the proposed project with the objective of making an EA amendment application, which process includes a public participation process. The consultation process has included various interested and affected parties. No economic issues were raised.

3 BACKGROUND INFORMATION

Lehating Mining (Pty) Ltd (Lehating) holds a Mining Right and approved Environmental Management Programme report (EMPr) for the development of a new underground manganese mining operation. The approved mine will be located on a portion of Portion 1 of the farm Lehating 741 as illustrated in Figure 1 below.

Immediately adjacent and to the south of Lehating, Khwara Manganese (Pty) Ltd (Khwara) holds an approved EMPr for underground mining of manganese on Portion 2 of the farm Wessels 227 and the Remaining Extent and Portions 3 and 4 of the farm Dibiaghomo 226. The Khwara underground resource will be accessed via/through the Lehating mine, using Mn48's approved surface infrastructure. In this regard, no surface infrastructure will be established as part of the Khwara Mine. Neither the Lehating nor Khwara Mines have been developed.

Khwara and Lehating have entered into an agreement which combines the two adjacent, mineral resources and surface rights comprising the Khwara and Lehating Mines into a single, high-grade manganese mining company known as Mn48 (Pty) Ltd (Mn48). Mn48 is now proposing to consolidate the Mn48 and Khwara mining right areas and associated EMPRs. In addition, Mn48 needs to amend its approved surface infrastructure layout to cater for changes to the layout following the outcome of the Bankable Feasibility Study.

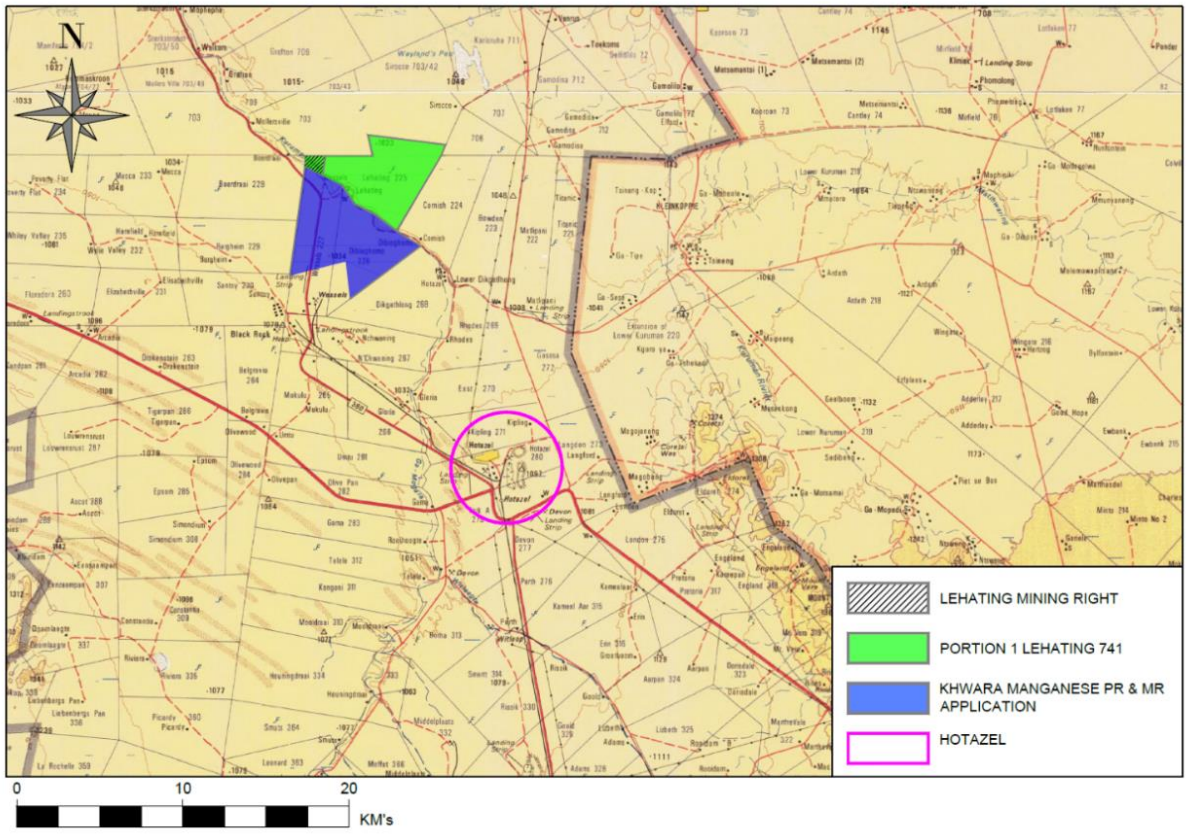

FIGURE 1: REGIONAL SETTING (WORLEYPARSONS RSA, 2019)

3.1 PROJECT OVERVIEW

Mn48 holds a mining right and approved EMPr for the development of a new underground manganese mining operation located on Portion 1 of the farm Lehating 741. While early works site clearing activities have taken place to date, surface infrastructure has not been established on this farm. The Khwara underground resource will be accessed via/through the Lehating mine, using Mn48's approved surface infrastructure. In this regard, no surface infrastructure will be established as part of the Khwara Mine. Consolidating the two mining right areas and corresponding EMPRs and the associated optimisation of approved surface infrastructure will allow for improved viability and operational efficiency.

Mn48 is now proposing to consolidate the Mn48 and Khwara mining right areas and associated EMPRs. In addition, the approved layout of surface infrastructure located on the farm Lehating 741 needs to be amended following the outcome of its Bankable Feasibility Study (BFS) which were undertaken by WorleyParsons RSA in 2019.

In summary, the changes to the approved operations and surface infrastructure include the following:

- Relocation of the primary crushing facilities from underground to surface;
- Extension of the footprint and capacity of the approved WRD;
- Addition of a second PCD, and relocation of the already approved PCD (note that the previously proposed emergency control dam will no longer be required);
- General re-configuration of approved surface infrastructure;
- Revision of the stormwater management plan to accommodate the changes to the surface infrastructure layout; and
- Establishment of proposed new support infrastructure such as a helicopter pad and weighbridge.

In addition to the above, the approved EMPr for Mn48 specified the need for a TSF. This will no longer be required. The project has made a fundamental change to the mineral processing methodology whereby a dry screening process will be used, instead of a wet screening process which would produce tailings.

3.2 PROJECT TIME FRAME

The Mn48 project has an operational life of 19 years which is preceded by four (4) years of construction and shaft sinking. The operational phase has a two-year ramp-up, operating at or close to steady state for 16 years when production will down during the last year. This equates to an estimated life of mine of 23 years. A blue-sky opportunity in adding the ore body to the northwest of the Lehating mining right boundary can potentially extend the mine life by more than five years, however this option is not included in this study.

3.3 PROJECT CAPITAL

The total project capital expenditure excluding sustaining capital is R2 846 million in 2019 real terms. At the time of undertaking the BFS, an exchange rate of R 14.20 to the US$ dollar was used. At the time of writing this report, the exchange rate was R16.73 to the US$ dollar. This will imply that capital expenditure will be higher as some equipment will be imported.

3.4 PROJECT REVENUE

The anticipated LOM revenue in real terms (2019) for the Mn48 project is estimated at R69 418 million (US$5 056million) for an operational life of 19 years.

3.5 PROJECT EMPLOYMENT OPPORTUNITIES

It is estimated that the operational phase of the project will create a total of 600 employment opportunities. No housing will be provided during the operational phase. Operational workers will be accommodated in nearby towns, such as Black Rock, Hotazel, Kathu and Kuruman.

3.6 DECOMMISSIONING AND CLOSURE

Decommissioning and closure activities associated with the proposed project will form part of the overall decommissioning and closure related activities. Decommissioning related activities specific to the proposed project however will include providing underground support. Closure specific activities may include the monitoring of groundwater to manage any latent dewatering risks.

4 CURRENT LAND USE

Information in this section was obtained from the Environmental Impact Assessment Report and Environmental Management Plan for the proposed Khwara Manganese Mine (SLR, November 2017) and Lehating Manganese Mine (SLR, February 2014).

4.1 PROJECT LOCATION

The proposed southernmost boundary of the project is located approximately 2 km north northeast of Black Rock in the Northern Cape Province. The town of Kuruman is located approximately 67 km to the south east from the boundary of the proposed project area within the Kuruman Magisterial District within the John Taolo Gaetsewe District Municipality (JTDM) and Joe Morolong Local Municipality (JMLM). The town Kathu located approximately 72 km to the south from the boundary of the proposed project area.

The proposed project is located within the Gamogara corridor, which is identified as a mining belt according to the Joe Morolong Spatial Development Framework (JMLM, September 2012). The Kuruman River is located along the northern portion of the proposed mining right area. The Kuruman

River is ephemeral in nature and as such will only flow during heavy rain events and can be associated with a perched water table. Due to the ephemeral nature of the Kuruman River, there is no third party reliance on surface water. Boreholes in the proposed project area are utilised for domestic purposes or livestock watering.

4.1.1 Land owners within the proposed project area

Landowners located within the proposed project area are outlined in Table 2 below.

TABLE 2: LANDOWNERS LOCATED WITHIN THE PROPOSED PROJECT AREA

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Lehating 741	Portion 1	Terra Nominees (Pty) Ltd
Wessels 227	Portion 2	Ntsimbintle Mining Pty Ltd
Dibiaghomo 226	Portion 3	Ntsimbintle Mining Pty Ltd
	Portion 4	Ntsimbintle Mining Pty Ltd
	Remaining extent	Magdalena Aletta van der Walt

4.1.2 Mining companies

Mining companies with existing and/or proposed operations surrounding the proposed Khawara project area include:

- South32 (Wessels Mine) – Located approximately 1 km south from the boundary of the proposed project area
- Assmang (Pty) Ltd (Nchwaning Mine) – Located approximately 3.4 km south from the boundary of the proposed project area
- Assmang (Pty) Ltd (Black Rock Mine) – Located approximately 3.29 km south west from the boundary of the proposed project area
- Assmang (Pty) Ltd (Gloria Mine) – Located approximately 6.2 km south east from the boundary of the proposed project area
- Kalagadi Manganese (Pty) Ltd (Kalagadi Mine) – Located approximately 10 km south east from the boundary of the proposed project area
- Kudumane Manganese (Pty) Ltd (Kudumane Mine) – Located approximately 14 km south east from the boundary of the proposed project area
- Sebilo Resources (Pty) Ltd (Sebilo Mine) – Located approximately 21.45 km south east from the boundary of the proposed project area
- United Manganese of Kalahari (Pty) Ltd (United Manganese of Kalahari Mine) – Located approximately 22 km south east from the boundary of the proposed project area

- Tshipi é Ntle Manganese (Pty) Ltd (Tshipi Borwa Mine) – Located approximately 30 km south southeast from the boundary of the proposed project area
- South 32 (Mamatwan Mine) - Located approximately 29 km south east from the boundary of the proposed project area

4.1.3 Livestock and game grazing

Livestock grazing currently takes place within the proposed project area. In this regard, Willem Strauss currently leases land on portion 2 of the farm Wessels 227 for ad-hoc grazing. Livestock grazing and game farming takes place surrounding the proposed project area. A farm employee resides in an old farm house on the farm employed by Willem Strauss. Farming activities are also taking place on Portion 0 of Lehating 741 and Portion 0 of Boerdraai 228 .

4.1.4 Communities/towns and isolated farmsteads

The nearest residential areas include the following:

- The Black Rock community located approximately 2.5 km south from the boundary of the proposed project area
- Isolated farmstead located approximately 2.6 km south east from the boundary of the proposed project site on the farm N'chwaneng 267
- Gloria Mine village located approximately 7 km south east from the boundary of the proposed project area
- Black Rock mine village located approximately 5.4 km south from the boundary of the proposed project area
- Isolated farmstead located approximately 9.4 km south west from the boundary of the proposed project site on the farm Olivewood 284
- Isolated farmstead located approximately 10 km south from the boundary of the proposed project area on the farm Umtu 281
- The Hotazel town situated approximately 12 km south east from the boundary of the proposed project area
- Isolated farmstead located approximately 12 km south west from the boundary of the proposed project site on the farm Olivepan 282
- The town Kuruman located approximately 67 km to the south east from the boundary of the proposed project area

- The town Kathu located approximately 72 km to the south from the boundary of the proposed project area

4.2 POTENTIAL ALTERNATIVE LAND USES

The dryland production potential of the deep Hutton and Clovelly form soils is low. The soils of the area are sandy and deep and therefore will drain rapidly. Due to this tendency, along with the lack of fertility, they have a low agricultural potential. Coupled with the hot, dry nature of the climatic regime, it can be seen that this area is not suited to dryland arable agriculture, and most of the farming enterprises in the vicinity are either game farms or cattle grazing activities.

The irrigation potential for the soil forms identified within the study area is moderate due to the very low clay content. The sandy nature of the soils would necessitate very careful scheduling because of the very low water holding capacity of the soils. The soils would require a substantial and reliable supply of water to ensure optimum soil moisture at all times.

Livestock grazing and game farming activities are already taking place in areas surrounding the proposed project area. The alternative land use is therefore farming enterprises relating cattle farms as the land is suited for grazing.

5 PROVINCIAL, REGIONAL AND LOCAL SOCIO-ECONOMIC PROFILE

Information in this section was sourced from the Environmental Impact Assessment Report and Environmental Management Plan for the proposed Khwara Manganese Mine (SLR, November 2017), which was sourced from the Khwara Social and Labour Plan (SLP), January 2017. The socio-economic information on this SLP was sourced from the Joe Morolong Local Municipality (JMLM) Integrated Development Plans, 2016 and the StatsSA community survey 2016.

The proposed project is located approximately 2 km north northeast of Black Rock in the Northern Cape Province. The town of Kuruman is located approximately 67 km to the south east from the boundary of the proposed project area within the Kuruman Magisterial District within the John Taolo Gaetsewe District Municipality (JTDM) and Joe Morolong Local Municipality (JMLM).

The John Taolo Gaetsewe District Municipality is a Category C municipality located in the north of the Northern Cape Province, bordering Botswana in the west. It comprises the three local municipalities

of Gamagara, Ga-Segonyana and Joe Morolong, and 186 towns and settlements, of which the majority (80%) are villages. The average population within the John Taolo Gaetsewe District Municipality (JTGDM) is approximately 242 300 people while the average population within the JMLM is approximately 84 200.

It has an established rail network from Sishen South and between Black Rock and Dibeng. It is characterised by a mixture of land uses, of which agriculture and mining are dominant. The district holds potential as a viable tourist destination and has numerous growth opportunities in the industrial sector. The economic nodes and employment opportunities are concentrated in towns such as Kuruman and Kathu. The main economic sectors are agriculture, mining and retail, with employment opportunities concentrated around Kuruman and the mines situated around Kathu, Hotazel and Black Rock. The annual average income per household equates to approximately R30 000.

The Joe Morolong Local Municipality (JMLM) is a Category B municipality. It is the largest municipality of the three that make up the district, accounting for three quarters of its geographical area. The area is mostly rural, with about 60% of it comprising virgin land surface. Although unemployment is high, the municipality has a great deal of potential for developers, especially those interested in ecotourism and conservation. Main economic sectors include agriculture, mining and community services.

The mining industry dominates the local economy in the John Taolo Gaetsewe District and Joe Morolong Local Municipalities. High levels of unemployment and low levels of education presents a significant challenge to the region and in particular the JMLM.

Over the past few years the towns of Kathu, Kuruman and Hotazel have observed significant growth as a direct result of the mining operations in the district. As the mines developed, a need to provide accommodation as well as services for employees grew. Hotazel is a municipal township with private development and is mainly owned by Hotazel Manganese Mining Company (Pty) Ltd. Black Rock is a mining town owned by Assmang. Kathu, Kuruman and Deben are also municipal towns meant to accommodate the expansion of the mining sector in the region.

According to the 2012-2017 JMLM integrated Development Plan, other challenges within the local municipality include the following:

- few employment opportunities;
- persistence of social ills such as poverty, crime and HIV/AIDS;
- lack of maintenance of infrastructure and service delivery;
- weak transport infrastructure and long commuting distances; and
- limited range of products and services being offered.

Dwellings

The most dominant type of dwelling utilised within both the JTGDM and the JMLM is a formally constructed house or brick structure. This consists of 86 % within the JTGDM and 82 % within the JMLM. Traditional dwellings (e.g. hut) are the second highest used dwelling type in the JMLM, while informal dwellings (e.g. Shacks) are the second highest used dwelling type in the JTGDM.

Basic services

Despite the relatively formalized housing infrastructure within both the JTGDM and the JMLM, basic services infrastructure appears to be far less formalized. Access to electricity within the JTGDM and the JMLM has increased slightly over the years, from 88 % in 2011 to 91 % 2016 in the JTGDM and from 83 % in 2011 to 90 % in 2016 in the JMLM.

The StatSA community survey of 2016 endeavoured to survey the perceptions people have of the quality of basic services delivered to them. In this regard, the rating of the main source of drinking water is rated low given the poor access to water. One of the key challenges for the JMLM and the JTGDM is to bring piped water to every individual house in the area. The JMLM water supply is mostly below average as water is not yet pumped to a high proportion of individual stands. In this regard, 39 % of the JTGDM and 8% of the JMLM water supply is above average. Other challenging areas' pertaining to basic services includes refuse removal, local police services and the quality of local clinics as per the perception of people. In this regard, the following was noted according to the StatSA community survey of 2016:

- Overall quality of refuse removal: 51 % of the JTGDM and the JMLM was below average
- Overall quality of local public clinics: 35 % of the JTGDM and 37 % of the JMLM was below average
- Overall quality of local public hospitals: 47 % of the JTGDM and the JMLM was below average
- Overall quality of the local police services: 33 % of the JTGDM and 40 % of the JMLM was below average.

Education

Overall statistics throughout the JTGDM and JMLM show poor educational profiles which results in a shortage of educated labour. Significant numbers of the population at these levels have received either no schooling (17.60 % of JTGDM and 22.05 % of JMLM) or only limited secondary education (15.10 % of JTGDM and 8.08 % of JMLM).

Some of these aspects may present the proposed project with opportunities to contribute towards socio-economic development in the region. These opportunities should typically be addressed in consultation with the relevant authorities as part of the mine's Social and Labour Plan (SLP) negotiations.

6 QUANTIFICATION OF ECONOMIC BASELINE

The potential economic impact of the following scenarios were therefore determined:

- pre-project land use activities, even though mining has already been approved, which comprises cattle grazing. This is also regarded as a feasible post closure or alternative land use activity; and
- Mn48 mining project as an amalgamation of the Lehating and Khwara mining operations. It should be noted that as no infrastructure will be located on the farms Wessels 227 and Dibiaghomo 226, activities associated with cattle grazing might be able to continue for the duration of mining.

6.1 POTENTIAL ECONOMIC IMPACT FROM CURRENT LAND USE ACTIVITIES

As indicated in Section 4, this area is not suited for dryland arable agriculture. The soils in the area have moderate potential for irrigation, due to the very low clay content and very low water holding capacity. Combined with the low rainfall potential of the region, the land capability of the project area is considered to be of low agricultural potential due. The optimum land-use option was identified to be farming enterprises relating to game farms or cattle ranches, as the land is suitable for grazing. The extent of the Mn48 project area is 6458ha and comprises the following farms:

- Lehating 741 is 2 443 ha (infrastructure and underground activities located on a portion of the farm)
- Wessels 227 is 2 053 ha (underground activities)
- Diaboghomo 223 is 1 068 ha (underground activities).

In determining the potential impact on current land use, it was assumed that current or potential activities in the farms Wessels and Diaboghomo will not be affected as those properties are associated with underground mining activities with no surface disturbance. It was furthermore assumed that the entire Lehating farm will be affected, even though the infrastructure will only be located on a portion of the farm. This is however a conservative approach which will result in an over estimation in favour of the current land use practices (cattle grazing)

6.1.1 Agricultural - land value

Although the presence of mineral resources and existing operating mines in the area has resulted in the escalation of land value in the region over the past few years, a conservative approach which ignored the opportunistic over-inflation of property value was taken. Land values for farm land is estimated at R 5 200 per hectare. This price was based on the highest price per hectare which was calculated from available farms in the market in the region and discussion with real estate agents in Kuruman. This price may vary depending on the available power, infrastructure and water on the farms in question. For the purpose of this report Mercury used the full extent of the surface areas over all three farms, which equates to 6458ha in order to determine a pre-project land value of R 33.9 million.

To illustrate the fluctuation in property values it is worthy to note that the entire farm Wessels 227 was purchased in 2010 from ESKOM for an amount of R 10.7 million by Hotazel Manganese Mine. In 2011, less than a year later, Ntsimbintle purchased it from Hotazel Manganese Mine for an amount of R 1.4 million.

6.1.2 Agricultural - employment

As the ratio of workers in practice are not directly related to the size of the agricultural area but rather to the amount of life stock or agricultural activity, one worker for every 100 cattle for was assigned. In addition, one worker was assigned for general farm duties on each of the three farms. This equates to an opportunity for eight (8) people to be employed as part of a cattle farming operation. This will equate to a present value, over the 23 year project life, of R 2.9 million based on a minimum wage of R 3357 per month assuming 180 hours of work per month (Department of Labour, 2020).

The employment value associated with the Lehating property will be R1.1 million over the 23 year period. This is the contribution which could potentially be lost if the project resumes, assuming no cattle grazing on the farm Lehating but continued grazing activities on the farms Wessels and Diaboghomo.

6.1.3 Agricultural - economic contribution

Long Term Grazing Capacity norms for South Africa published by the Department of Agriculture, Forestry and Fisheries in 2017 and based on a 1993 study, the grazing capacity for the Northern Cape ranges from between 7 and 140 ha/LSU (large stock unit) with an average of 33.3 ha/LSU. A value of 13 ha/LSU was assigned to the area in which the Mn48 project is located. A calfing ration of 83% was applied and it was assumed that all stock units will be sold at a price of R 6 500 per unit.

A property size of 6 458 ha with a feasible carrying capacity of 1 cattle per 13 hectare will yield 497 cattle within the area in question, equating to R 22.4 million (net present value) in revenue over the 23 year LOM. The revenue generation potential associated with the Lehating property for 188 cattle will equate to R 8.4 million over the 23 year period. This is the financial contribution which could potentially be lost if the project resumes, assuming no cattle grazing on the farm Lehating but continued grazing activities on the f farms Wessels and Diaboghomo.

6.2 POTENTIAL ECONOMIC IMPACT FROM PROPOSED MINING DEVELOPMENT

6.2.1 Land value

The capital investment required for the establishing of mining infrastructure was not taken into account to determine the land value post mine closure as the infrastructure is mining specific and it was assumed that it will be removed and the area completely rehabilitated during the decommission and closure phases of the mine in line with the EIA and EMP closure objectives.

Once the infrastructure has been removed and the area rehabilitated, the land will be restored back to grazing ability in line with the current land use. SLR calculated the LOM closure and rehabilitation of the Mn48 Project (current value (CV) as at June 2020) as R 32.8 million. This was done in accordance with the draft 2019 Financial Provision Regulations.

6.2.2 Direct employment

Neither the estimated construction labour cost nor the number of construction employment opportunities for the Mn48 project was disclosed. It was therefore not possible to quantify the direct impact the project construction phase will have on employment. It will however be a positive impact.

A provision of R 1 178 million life of mine cost was included in the operating cost for management and supervision. This equates to R 838 million in present value. An additional rate was included to make provision from contractor labour for the operation of the shaft and the processing facility. This rate, when applied to the life of mine production tonnage equates to escalated 2019 terms value of R1 828 million, which equates to a present value of R 854 million. The combined present value contribution toward employment will be R 1 692 million.

All the vertical shaft and processing operations and maintenance will be under the control of appointed contractors. The mining contractor will be the main contractor on the mine; hence a small owner's team will be required. Miscellaneous items such as medical facilities, stores management, etc. will be managed by the appointed mining contractor.

6.2.3 Economic Impact

The anticipated LOM revenue in real terms (2019) for the Mn48 project is estimated at R69 418million (US$5 056million). The economic contribution as a result of the proposed development will have a sustained positive impact on direct, indirect and induced effects on the local, regional and national economy for the duration of the project. It is furthermore envisaged that a significant financial contribution over the life of mine will be made towards the national economy.

Even when excluding the initial capital financial contribution, this project contributes significantly to the national and local economy in comparison to current as well as potential alternative land uses. The local and regional economy will benefit from the employment value created during the operational period.

Direct impacts

Direct effects are the results of the money initially spent in the study region by the business or organisation being studied. This includes money spent to pay for salaries, supplies, raw materials, and operating expenses.

Indirect effects

The direct effects from the initial and operational spending will create additional activity within the local and regional economy, as businesses benefiting directly from the proposed development will subsequently increase spending at other local businesses (indirect effect) as well as hiring additional staff members.

Induced Effects

Induced effects are the results of increased personal income a result of the proposed project, including indirect effects. Businesses experiencing increased revenue from the direct and indirect effects will subsequently increase payroll expenditures (by hiring more employees, increasing payroll hours, raising salaries, etc.). Households will in turn, increase spending at local businesses. The induced effect is therefore a measure of this increase in household-to-business activity.

6.2.4 Contribution towards socio-economic development

In addition to the direct and indirect economic impacts discussed above, the mine through its corporate social investments and social and labour plan, contributes towards the local economic development in the area. The operation of the proposed mine has following positive socio-economic benefits to its employees and surrounding communities:

- development of skills through its skills development plan;
- learnership programs to provide learners with an occupational qualification; and
- investment in infrastructure development through local economic development and integrated development programmes.

7 ECONOMIC IMPACT ASSESSMENT

7.1 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology was prescribed by SLR as tabulated in Table 3 below and complies with the method provided in the EIA guideline document. . Part A provides the approach for determining impact consequence (combining severity / nature, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D. The unmitigated scenario is considered for each impact.

TABLE 3: IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology was prescribed by SLR and is tabulated in Table 4 below. This assessment methodology enables the assessment of environmental issues including: cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

TABLE 4: CRITERIA FOR ASSESSING IMPACTS (PROVIDED BY SLR)

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

PART A: DEFINITION AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national

PART B: DETERMINING CONSEQUENCE					
			SEVERITY = L		
DURATION	Long term	**H**	**Medium**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Medium**
			SEVERITY = M		
DURATION	Long term	**H**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**
			SEVERITY = H		
DURATION	Long term	**H**	**High**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Medium**	**Medium**	**High**
			L	**M**	**H**

Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
SPATIAL SCALE		

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**H**	**Medium**	**Medium**	**High**
	Possible/ frequent	**M**	**Medium**	**Medium**	**High**
	Unlikely/ seldom	**L**	**Low**	**Low**	**Medium**
			L	**M**	**H**
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

***H = high, M= medium and L= low and + denotes a positive impact.**

7.2 ECONOMIC IMPACT ASSESSMENT

The assessment of the economic indicators, as outlined in Table 4 below, are discussed in more detail in Sections 6.1 and 6.2. Consideration were given to the potential economic impact of the following scenarios :

- pre-project land use activities, even though mining has already been approved, which comprises cattle grazing. This is also regarded as a feasible post closure or alternative land use activity; and
- Mn48 mining project as an amalgamation of the Lehating and Khwara mining operations. It should be noted that as no infrastructure will be located on the farms Wessels 227 and Dibiaghomo 226, activities associated with cattle grazing might be able to continue for the duration of mining.

TABLE 5: ECONOMIC IMPACT ASSESSMENT ANALYSIS

ASPECT	POTENTIAL IMPACT	PROJECT PHASE	BEFORE MITIGATION						AFTER MITIGATION					
			INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
Land value	The impact on land values could be affected both positively and negatively. Positive impacts are observed where the land value is expected to increase due to the presence of minerals. Negative impacts are observed when the value of land is compromised by unacceptable negative environmental and social impacts Mn48 will consolidate the Mn48 and Khwara mining right areas and associated EMPRs. All the infrastructure will be located on the farm Lehating 741, which will have a surface footprint of 9ha. The extent of the consolidated Mn48 project area is 6 458 ha. The agricultural land value of the consolidated area is estimated at R33.9million for all three farms. As a result of the existing mining activities in the area it is important to note that the land value of the farms within the immediate proximity of the proposed project site would most likely not be significantly impacted upon as a result of the proposed project. In the unmanaged scenario it is possible that land surrounding the project will experience some degree of negative social and environmental impact. With mitigation and management, it is however unlikely to cause a loss in related land values.	Construction, Operational Decommissioning and closure	**M**	**H**	**M**	**M**	**M**	**M**	**L**	**H**	**L**	**L**	**L**	**L**

ASPECT	POTENTIAL IMPACT	PROJECT PHASE	BEFORE MITIGATION						AFTER MITIGATION					
			INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
	As no infrastructure will be located on Wessels and Diaboghomo, it is expected that with the implementation of the relevant management and mitigation measures, grazing activities will be able to continue for the duration of the mining activities. No tailings storage facility will be located on any of the farms and post closure and rehabilitation it is expected that pre-project land use will be able to resume on all the farms with the implementation of relevant management and mitigation measures.													
Employment	The project will to create job opportunities in the local and regional area during the construction, operational en closure phase of the project. In its current state, the three farms does not create many employment opportunities. The proposed Mn48 project will create 600 job opportunities and associated secondary employment opportunities within the local and regional area for the duration of the operational phase. The present value contribution toward employment will be R1 692 million for the duration of the operational phase. In comparison, agricultural land use potential within the footprint of the three farms have the potential to employ in the order of eight (8) people. This will equate to a present	Construction, Operational Decommissioning and closure	**M+**	**M**	**M**	**M**	**M**	**M+**	**H+**	**H**	**H**	**H+**	**H**	**H+**

ASPECT	POTENTIAL IMPACT	PROJECT PHASE	BEFORE MITIGATION						AFTER MITIGATION					
			INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
	value of R2.9 million over the 23 life of mine. Agricultural practices on the farms Wessels and Dibiaghomo will be able to continue despite the underground mining activities as no surface disturbance will take place on these farms. Potential losses in employment linked to the agricultural activities on the Lehating farm, will equate to a potential loss of in employment value of R1.1 million for the 23 year period. This is the contribution which could potentially be lost if the project contnues, assuming no cattle grazing on the farm Lehating but continued grazing activities on the farms Wessels and Diaboghomo. From a local and regional perspective, the Mn48 project will contribute towards creating much needed employment opportunities, resulting in a positive impact, which could be further enhanced with mitigation measures. Recruitment efforts to focus on regional and local sources. Not proceeding with the project will result in the loss of 600 employment opportunities. It should however be noted that once mining activity stops and the area has been restored, employment opportunities													

ASPECT	POTENTIAL IMPACT	PROJECT PHASE	BEFORE MITIGATION						AFTER MITIGATION					
			INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
	will be limited to that associated with grazing based agricultural activities and some after care. It is therefore important that sustainable business opportunities and skills outside of the mining environment are identified and developed as part of the mitigation measures.													
Impact on economy	The project has the potential to sustain the cash injection to the local, regional and national economy it will receive from the duration of the Lehating mine. The 19 years of the operational life of the mine years will result in a R69 418million operational revenue. In comparison, the property size of 6458ha with a feasible carrying capacity of 1 cattle per 13 hectare will yield approximately 500 cattle within the area in question, equating to R22.4million (net present value) in revenue over the 23 year LOM of project life. Utilising the same assumption regarding the carrying capacity, Lehating could potentially yield a net present value revenue of R8.4 million over the 19 year LOM. Without mitigation, the local and regional economy may not fully benefit from the mine. With mitigation through local economic development and social and labour plans, it will be possible to enhance the contribution the mine will have on a local and regional economic scale. With mitigation some initiatives will be able to be sustained post closure.	Construction, Operational Decommissioning and closure	**M+**	**M**	**M**	**M**	**M**	**M+**	**H+**	**H**	**H**	**H+**	**H**	**H+**

ASPECT	POTENTIAL IMPACT	PROJECT PHASE	BEFORE MITIGATION						AFTER MITIGATION					
			INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
Socio-economic development	The proposed development is expected to create both positive and negative impacts. From a socio-economic perspective, the positive effects, in terms of export earnings, economic development, job creation, household income and government revenue that could be derived are deemed to outweigh the negative impacts that could ensue. The mine will be associated with a number of other negative effects that are more challenging to quantify and to offset. These are associated with the sense of place, loss of family ties, crime situation and pressure on socio-economic infrastructure. Post closure, agricultural activities will have a much smaller socio-economic footprint than mining.	Construction, Operational Decommissioning and closure	**M**	**H**	**H**	**H**	**M**	**M**	**H+**	**H**	**H**	**H+**	**H**	**H+**

8 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations apply to the economic impact assessment:

- the information supplied in relation to employment opportunities, labour value, income generation, life of mine, etc. by the client is an accurate reflection of the activities during operational and closure phases of the proposed project;
- a discount factor of 11% as advised by the client was used to calculate the net present value calculations;
- information which were used in some of the agricultural calculations were sourced from third parties. Errors with this information could possibly effect the results of the calculations and therefore the assessment. It should be noted that the best potential calf ratios and highest potential employment opportunities were assumed;
- land values are based on average land values in the region, however the true value of the land is determined by a range of factors and could therefore most likely be higher or lower than the value used in this report.

9 MITIGATION MEASURES

Mn48 will implement the commitments in the EMP to avoid/mitigate/manage all environmental, social and economic impacts and enhance potential positive impacts. More specifically, during all project phases, Mn48 will ensure the following mitigation measure are implemented to minimise potential negative economic impacts and to optimise positive economic impact that may result from the proposed project:

- where possible, hire local people from the closest communities;
- extend its formal bursary and skills development programmes to the closest communities to increase the number of local skilled people and thereby increase the potential local employee base;
- where possible, ensure it procures local goods and services from the closest communities;
- implement a procurement mentorship programme which provides support to local businesses from the enquiry to project delivery stages;
- include the incorporation of economic considerations into its closure planning from the outset;
- closure planning considerations cover the skilling of employees for the downscaling, early closure and long term closure scenarios; and

- identify and develop sustainable business opportunities and skills, independent from the project for members of the local communities to ensure continued economic prosperity beyond the life of project.

10 CONCLUSION

From an economic perspective, the project will contribute positively towards the local, regional and national economy through its capital investment, creation of employment opportunities and revenue generation potential. Implementing management and mitigation measures as outlined in the EMPr will ensure that the project is executed within the framework sustainable development, which will ensure that potential negative impacts are minimised and positive impacts enhanced.

Although the proposed project may have potential negative impacts on land value as well as agricultural employment and economic opportunities, these will be significantly outweighed by the positive contribution this project will have on the local, regional and national economy. It will also be possible to continue with agricultural activities, in particular grazing, on the majority of the land for the duration of the project. Not proceeding with the project will result in a lost opportunity to contribute towards addressing unemployment and socio-economic challenges within in the region. From an economic perspective, it is therefore recommended to proceed with the proposed project

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