

1. INTRODUCTION

This Non-Technical Summary (NTS) provides a synopsis of the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) prepared for the Melmoth Iron Ore Project (MIOP). This EIA and EMPr will be submitted to the KwaZulu-Natal Department of Mineral Resources and Energy (DMRE) to inform the Mining Right Application (MRA). This NTS has been made available in English and isiZulu and distributed to stakeholders as a basis for notification and comment.

Jindal Iron Ore (Pty) Ltd (Jindal), is owned by Jindal Steel and Power (Mauritius) Limited (74%) and a South African BBBEE partner, Mr. Thabang Khomo (26%). Jindal holds two Prospecting Rights (PR) within the Mthonjaneni Local Municipality (LM) in KZN. The North Block (PR 10644) is 8 467 ha and the South Block (PR 10652) is 11 703 ha in extent. Jindal had previously prospected in these PR areas, but suspended the project in 2016. The recent recovery of the iron ore price has encouraged Jindal to relook at the development of the Jindal MIOP and is currently undertaking a Bankable Feasibility Study (BFS).

The Jindal MIOP site is located 25 km southeast of Melmoth, within the Mthonjaneni Local Municipality (LM) in the Kwazulu-Natal (KZN) Province of South Africa. Jindal is proposing to develop an open pit iron ore mine and processing facility on the site to extract 32 million tonnes per annum (mtpa) of iron ore which would be processed on site to produce approximately 7 mtpa of iron ore concentrate. The Jindal MIOP is proposed to be developed in a phased approach and this Mining Right Application (MRA) only includes mining in the south-eastern section of the South Block (Figure 1). Through the MRA Jindal intends to consolidate their PRs for the North and South Blocks into a single Mining Right.

Jindal has appointed SLR Consulting (South Africa) (Pty) Ltd as the independent Environmental Assessment Practitioner to undertake the EIA process and the associated public participation process (PPP) to inform the MRA.

2. MRA AFFECTED PROPERTIES

The following properties form part of the MRA:

North Block

- Portion 3 and 4 of the Farm Reserve No. 11 15831
- Part of the Remaining Extent (RE) of the Farm Ntembeni 16921

South Block

- RE, Portions 1, 2, 3, and 4 of the Farm Black Eyes 13385
- RE, Portions 1, 2, and 3 of the Farm Goedgelooft 6106
- RE of the Farm Kromdraai 6110

- Portion 3, 4, 5, 6, 7, 8, 12, 13, 14, 15, and 16 of the Farm Wilderness 6107
- Part of the RE of the Farm Vergelegen 6104
- Goedertrow 89 No. 7806
- Portion of Rem of Reserve No. 11 No. 15831

3. HOW CAN YOU GET INVOLVED?

This EIA and Environmental Management Programme (EMPr) Report is currently out for a 30-day public review period from **14 July to 14 August 2023** in order to provide Interested & Affected Parties (I&APs) an opportunity to comment on any aspect of the project and the findings of the EIA and EMPr process. All comments received during the review process will be included in the EIA and Comments and Response Report for submission to the DMRE.

You can be involved by reviewing the NTS or Report:

The EIA and EMPr Report is available at the following locations:

- Attending a public meeting - 26 July 2023 at Mari's Cottage, 17 Flight Street, Melmoth, from 09:00 until 21:00. Formal presentations will be made at 11:00, 15:00 and 18:00.
- The full report at <https://slrpublicdocs.datafree.co/public-documents/JindalMIOP>, accessible from internet-capable mobile phones without data charges.
- The full report also available at: <https://slrconsulting.com/public-documents>.
- Hard copies are available at the following locations:

LOCATION	ADDRESS
Entembeni Traditional Court	Ndundulu
Obuka Traditional Court	Obuka
Yanguye Traditional Court	Yanguye
Melmoth Public Library	21 Reinhold Street, Melmoth
Eshowe Public Library	1 Hutchinson Street, Eshowe
King Dinuzulu Public Library	875 Inkosi Ndwandwe Street, Eshowe
Nkwaleni Store	Nkwaleni
Jindal Mining Office	15 Arbor Street, Melmoth

For more information please contact the following:

<https://survey123.arcgis.com/share/81b775dc20dd414aa777a349944409bb?portalUrl=https://geohub.zutari.com/portal>

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COMMENTS DUE BY 14 AUGUST 2023

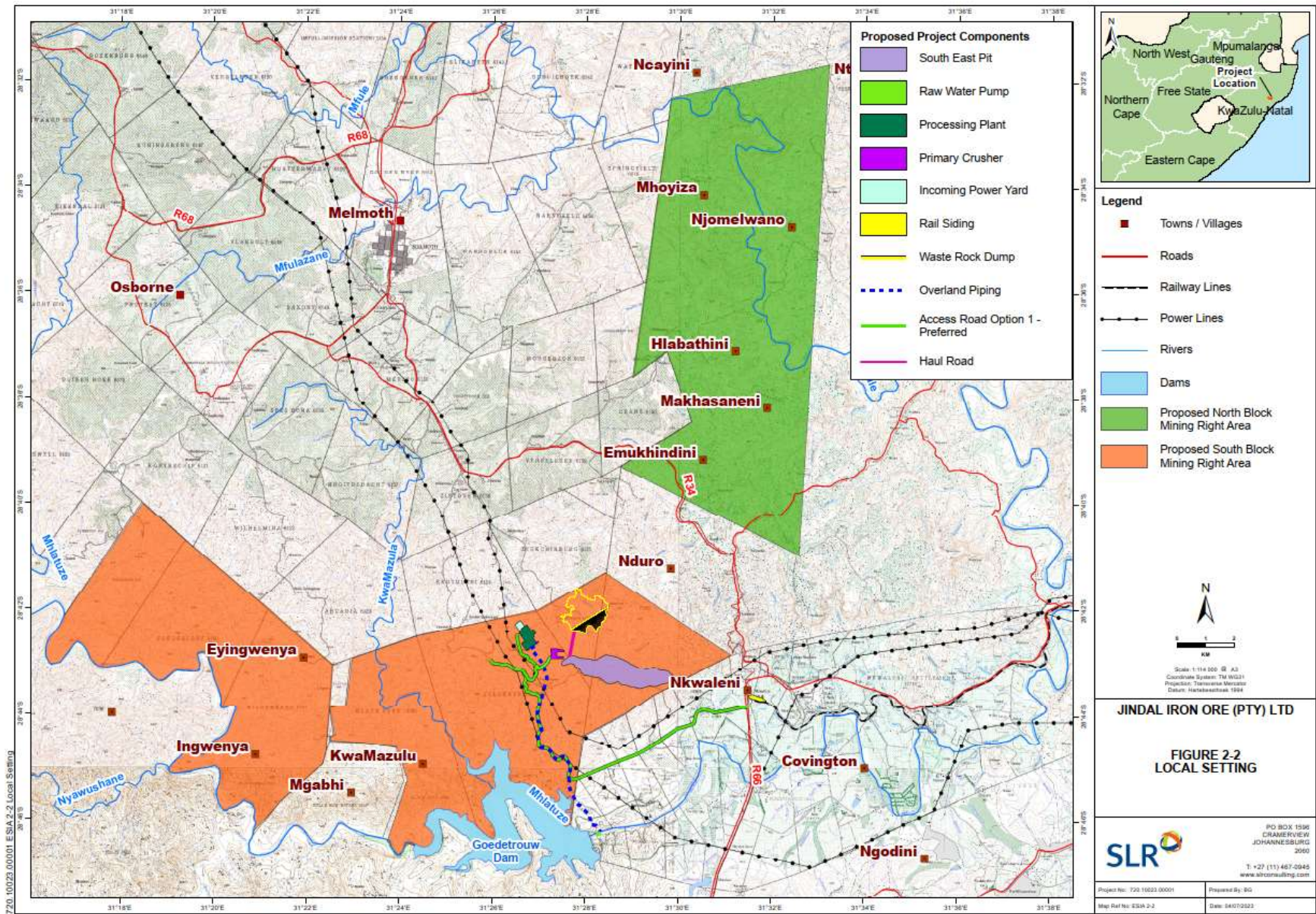


Figure 2: Proposed Jindal MIOP layout

4. PROJECT DESCRIPTION

Jindal is proposing the following for the Jindal MIOP:

- An open pit mining operation in the south east section of the South Block (named the South East Pit). The final dimensions of the South East Pit after 25 years would be approximately 4 000 m east-west, 1 000 m north-south and 550 m in depth.
- Mining of >800 million tonnes of ore over approximately 25 years generating approximately 32 million tonnes per annum (mtpa) of iron ore.
- A waste rock dump (WRD) for disposal of waste rock. The WRD is designed to have a maximum height of 251 m and a footprint area of approximately 204 Ha. The WRD provides a storage capacity of 194 million m³ over a deposition period of 25 years.
- A processing plant for milling and magnetic separation to produce approximately 7 mtpa of concentrate for export (there are limited local markets).
- Associated infrastructure to support the mine would include: a laboratory, rail loading facility, access and haul roads, electrical transmission line and sub-stations, water pipelines, stormwater management infrastructure, concentrate pipelines, offices, change house, workshops and perimeter fencing (amongst others).
- Make-up water requirements are calculated to be 1 500 m³/h, based on average annual plant operations. This equates to a consumption of 11.56 Gl/a. The Mhlathuze catchment is, however, currently overallocated and as such various options need to be assessed as part of the Water Use Licence Application (WULA).
- Upgrade of the railway line between Nkwalini Siding and Richards Bay Port for iron ore concentrate transport (part of a separate application).
- Slurry generated from the processing plant would be disposed of to a tailings storage facility (TSF) (also part of a separate application).

The proposed Jindal MIOP layout can be seen in Figure 1.

3. POLICY AND LEGISLATIVE CONTEXT

Prior to the commencement of the proposed Jindal MIOP, Environmental Authorisations are required from the following competent authorities:

- Mining Right Application from the DMRE in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).
- Environmental Authorisation from the DMRE in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.
- A Waste Management Licence (WML) from the DMRE in terms of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA).
- A Water Use Licence (WUL) from the Department of Water and Sanitation (DWS) in terms of the National Water Act, 1998 (No. 36 of 1998) (NWA).

A Scoping and EIA process, conducted in terms of the EIA Regulations, 2014, has been undertaken in order to inform the DMRE's decision making. The EIA and EMP Report assesses the potential issues relating to the proposed Jindal MIOP and identifies issues which are potentially significant as well as mitigation measures to minimise the impacts as far as possible.

4. NEED & DESIRABILITY OF THE PROJECT

The key components of the Need and Desirability Guideline are discussed in the following sections:

Ecological Sustainable Development and Use of Natural Resources

The proposed Jindal MIOP site is a 'greenfield' site (Figure 2) and outcomes from biodiversity studies have indicated that the project area identified for the placement of the Jindal MIOP is associated with some species of conservation concern (SCC). The expansion of the South East Pit and WRD would result in the loss of Moist Coast Hinterland Grassland (Endangered) and Dry Coast Hinterland Grassland (Vulnerable). However, given the nature of the grazing across the sub-region these grasslands have to some extent already be degraded/ transformed.



Figure 2. View of the South Block from the north

A Terrestrial Ecology study has been undertaken to understand the potential impact to the grasslands and ongoing engagement with local stakeholders and the development of a sustainable grassland management programme will be critical in ensuring that remaining intact primary grassland is not further degraded. It will also be important to combat alien plant invasions associated with the edge effects, created through both the mine development and overgrazing, with the implementation of a comprehensive alien plant control programme.

The mining operations would require water for the processing plant, dust control, for vehicle wash down, for the change house, and office use. A water supply analysis has been undertaken and the potential abstraction of water from the Mhlathuze catchment has been explored. The Mhlathuze catchment is currently overallocated and as such the DWS may only consider new allocations if the applicants contribute to interventions, which would generate additional water in the catchment. These options will require further assessment should the Mining Right be approved and will be subject to authorisation by the DWS through a WULA. Water requirements are likely to reduce

as the pit deepens due to the reuse of water that collects within the pit.

Promoting Justifiable Economic and Social Development

The Jindal MIOP will potentially be one of the largest direct foreign investment projects in South Africa in recent years. The mine would create direct job opportunities for approximately 800 people and indirect jobs for approximately 1 600 people during the operational phase. The South African Government, provincial and local municipalities would also gain an additional income stream from mining royalties, taxes, permits and fees.

The Mining Charter, 2018, was gazetted in September 2018 and is envisaged as a tool for driving transformation of the mining and minerals industry. At its core, the Mining Charter is premised on the conviction that the mineral wealth of the country belongs to all citizens and those that are located close to the mineral resources should derive socio-economic benefit from extraction and processing. Jindal, as with all other mining companies in South Africa, will be bound to compliance with this Mining Charter.

In addition, the South African National Development Plan aims to eliminate poverty and reduce inequality by 2030. The proposed Jindal MIOP can contribute towards the realisation of economic development and inclusive growth through revenue and tax generation and the creation of employment opportunities. Through the implementation of the Social and Labour Plan (SLP), the proposed project can positively contribute to projects identified through the Local Economic Development (LED) plan of the Mthonjaneni Local Municipality (LM), which in turn should deliver benefit to the communities directly affected by the establishment of the project.

Importantly, the proposed Jindal MIOP must take measures to limit any negative impacts on agriculture (Figure 3) and tourism development, as these are both considered vital sectors of the municipal economy.



Figure 1 Sugar Cane Production Under Pivot Irrigation in the Nkwalini Valley

5. PUBLIC PARTICIPATION UNDERTAKEN TO DATE

The following public participation has been undertaken so far:

- Pre-application meeting with the DMRE and approval of a Stakeholder Engagement Plan – 3 March 2021.
- Regular engagement with the Zulu-Entembeni Traditional Authority.
- Development and continuous update of an Interested and Affected Party (I&AP) database;
- Notification to I&APs, including landowners, government and traditional authorities – 17 June 2021;
- Distribution of a Background Information Document (BID), in English and isiZulu, since 17 June 2021;
- Publication of advertisements;
 - The Mercury, 15 June 2021, English;
 - Eyethu Baywatch - 16 June 2021, English;
 - Isolezwe - 18 June 2021, isiZulu; and
 - Zululand Observer - 21 June 2021, English;
- Erection of site notices at various locations in Melmoth, Eshowe and the South Block;
- Public Information Meetings in Melmoth (18 August 2021) and on MS Teams (6 July 2021);
- 24 stakeholder meetings with traditional leaders and their communities, farmers, local business and authorities (held between June and August 2021);
- Radio advertisements:
 - Icora 100.40 fm – 15 to 19 June 2021; and
 - Izwi Lomzansi 98.0 fm – 21 to 23 June 2021; and
- The Scoping Report went out for a 30 day public review period from 16 February to 18 March 2022; and
- The EIA and EMPr Report is now out for a 30 day public review period from 14 July to 14 August 2023.

6. ALTERNATIVES ANALYSIS

An assessment was undertaken to determine the viability of mining the North vs the South Block first. Due to difficulties with access to the North Block significantly more baseline work and detailed design has been done for the South Block. In addition, the South Block has better established access roads, has existing Eskom power lines adjacent to the preferred plant area and is the most accessible to the Nkwalini Rail Siding (proposed for concentrate transport to Richards Bay). The current plan is, therefore, to undertake Phase 1 of the Mine in the south-eastern section of the South Block. Other alternatives that have been considered include:

- Open pit (preferred alternative) vs underground;
- Different scales of mining: 20, 24, 28 or 32 mtpa (preferred);
- Site layout alternatives in terms of the WRD, access roads and processing plant (although options are limited due to the mountainous terrain); and
- The “no-go” alternative, taking into account the likely social and environmental consequences that may arise should the development not proceed.

Through this process the preferred alternative was assessed and is included in Figure 1.

7. WHAT ARE THE KEY ENVIRONMENTAL AND SOCIAL SENSITIVITIES?

The physical, biological and social status of the potentially affected environment has been investigated in order to assess impacts. The EIA Report presents the findings of the investigations undertaken. A summary of these findings is in the following sections and are depicted in Figure 8.

7.1 Physical Environment

The Mthonjaneni LM has a warm and humid subtropical climate, which is favourable for the extensive agricultural activity in the region. Mthonjaneni LM experiences average daily temperatures of between 16°C and 20°C, and average rainfall of between 2 000 mm and 2 400 mm per annum.

In terms of topography Melmoth is 800 m above sea level and is surrounded by low sandstone mountains and mudstone valleys. The regional geology of the area has given rise to a considerable diversity of relief, from gently rolling slopes to hilly and severely incised slopes found along valleys. Both the North and South Blocks consist of hilly terrain. The land capability classification for both the North and South Blocks indicates that the land is best suited to livestock grazing with only small areas having higher land capability that is suitable for rainfed crop production.



Figure 4. The Goedertrouw Dam

Groundwater data from the DWS National Groundwater Archive within 5 km of the Jindal MIOP showed that groundwater levels range between 2.1 to 56.4 metres below ground level (mbgl). Groundwater levels measured by Golder (2016) during a hydrocensus in the South Block area showed an average groundwater level of 45 mbgl. In the proximity of the TSF, which is in a low-lying area near to the Mhlatuze river, groundwater is typically very shallow (< 5mbgl). The regional groundwater movement was found to be from west to east but locally the movement could vary. According to Golder (2016), water quality results obtained at that time were all well below the Domestic Use Guidelines, rendering the groundwater a potable water source. In terms of groundwater quality for this EIA process no access was granted in the pit area and consequently no new water chemistry data is available for the pit area. Samples collected at the TSF boreholes drilled in 2022 (by SLR) showed several exceedances relative to the SANS 241:2015 drinking water quality guidelines. The

exceedances are typical of water quality in crop farming areas.

In terms of surface water the North Block falls between quaternary catchments (QC) W12B, W12C and W12D and is drained by the perennial Mfule River and its tributaries flowing in a southeast direction to join the Mhlatuze River.

The South Block spans over QC W12B and W12D and is drained by the perennial Mhlatuze, KwaMazula, Nyawushane and Mavungwini rivers. QC W12D is drained by the Mfule and Ntambanana rivers flowing in a south-east direction to join the Mhlatuze River. The Goedertrouw Dam is located on the Mhlatuze River (Figure). Surface water sampling was undertaken by SLR in May 2021 where six surface water quality monitoring stations located around the Project area were sampled. The water quality analysis results were compared against the DWS guidelines for irrigation, livestock watering and aquatic ecosystems including the SANS 241 guidelines for drinking water. The DWS guidelines are very stringent because they follow a conservative approach in terms of requirements for the most sensitive crops. The water quality results showed exceedances of aluminium, copper, mercury, pH and Total Cyanide concentrations at all six surface water monitoring points.

7.2 Biological Environment

Melmoth falls within the Maputoland-Pondoland floristic region and is an important centre of plant endemism. Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) are present within both the North and South Blocks of the study area.

Following the initial site inspection five distinct terrestrial vegetation communities were identified in the South Block, including:

- Community 1: Ngongoni Veld/Eastern Valley Bushveld Open Savannah;
- Community 2: Eastern Valley Bushveld Thicket/Ngongoni Veld Closed Woodland (Figure 5);
- Community 3: Degraded Ngongoni Veld/Eastern Valley Bushveld Open Savannah;
- Community 4: Degraded Eastern Valley Bushveld Thicket/Ngongoni Veld Closed Woodland; and
- Community 5: Secondary Open Savannah/Thicket/Closed Woodland.



Figure 5 Community 2 - Dense Closed Thicket (South-Central Block)

An additional five vegetation communities were identified for the North Block, including:

- Community 6: Ngongoni Veld/Northern Zululand Sourveld Open Savannah;
- Community 7: Scarp Forest /Northern Zululand Sourveld Thicket/Ngongoni Veld Closed Woodland;
- Community 8: Degraded Ngongoni Veld Closed Woodland/Northern Zululand Sourveld Thicket;
- Community 9: Degraded Ngongoni Veld/Northern Zululand Sourveld Open Savannah; and
- Community 10: Secondary Open Savannah/Thicket/Closed Woodland

Four of the ten vegetation communities mapped are considered to be in fair to natural condition and have a Very High Site Ecological Importance (SEI) rating (Communities 1, 2, 6 & 7). The remaining six vegetation communities on site range in SEI from Medium to Very Low. In addition to being in good to fair ecological condition the four largely intact vegetation communities are highly likely to support several floral SCC that are either red-listed, rare, or endemic. Following the initial site inspection, two SCC were confirmed to occur within open savannah/grassland vegetation on-site, namely Sensitive Species 191 (Vulnerable) and *Moraea graminicola* subsp. *graminicola* (Near Threatened, South African Endemic). In addition to the two threatened plant species occurring on site, which are protected under the National Environmental Management: Biodiversity Act (NEM:BA), there are a number of plant species that are protected under the Natal Conservation Ordinance and National Forest Act that will also require relevant plant permits from the appropriate competent authorities (i.e., Department of Forestry, Fisheries and the Environment (DFFE) and Ezemvelo KwaZulu-Natal Wildlife (EKZNW)).

Several faunal SCC have been flagged as potentially occurring within the study area and therefore further faunal surveys, by appropriately qualified specialists, will need to be undertaken to address any potential impacts associated with specific species.



Figure 6 Downstream photo of a reach of a Transitional River (South Block)

In the South Block, a total of 599 river/ stream units and 22 wetland units were identified and classified in the study area (Figure 6). In the North Block a total of 331 river/ stream units and 63 wetland units were identified and classified.

A high level river and aquatic health assessment for the North Block indicates that the sub-quaternary reach of the Mfule River that runs through the Block is largely in a natural condition with Ecological Importance and Sensitivity (EIS) rated as high. The current activities highlighted as potentially impacting the health of the system are rural settlements, invasive alien plant encroachment and abandoned agricultural lands.

The baseline wetland and aquatic study for the South Block (PR 10652) revealed that most watercourses in this area are rivers and streams. The rivers and streams ranged from a D (Poor Condition) to A (Natural Condition) ecological category. Most were Low to Moderate EIS, with the exception being the assessed reach of the Mhlatuze River, which was assessed as being of High EIS. A total of 23 wetland units were mapped within the South Block. This consisted of 11 unchanneled valley bottom wetlands and 12 seeps. These ranged from a D (Poor Condition) to C (Fair Condition) ecological category and from Low to Moderate EIS.

7.3 Socio-economic Environment

The area surrounding the proposed MIOP is classified as fully rural/ non-urban, with approximately 70 % of the land under tribal/ traditional authority administration. The only urban development within the study area is Melmoth (central west of the study area), which is approximately 15 km to the north west of the proposed Jindal MIOP.

Numerous communities inhabit the area proposed for the Jindal MIOP with most households comprising of formal brick dwellings, and traditional housing (Figure 7).

There are three Traditional Authority areas within the Mthonjaneni LM:

- Biyela KwaYanguye Traditional Authority is located to the north-east of the municipality.
- Zulu-Entembeni Traditional Authority is located to the south-east of the municipality.
- Biyela-Obuka Traditional Authority is located towards the East of the municipality.

Both the Mthonjaneni and uMlalazi LMs have economies that are currently strongly dependent on the agriculture, manufacturing, and mining sectors.

In these two municipalities the majority of job seekers have a matric with employment rates being higher in Mthonjaneni than uMlalazi. However, the average annual household is classified as a low income category, with an annual income of less than R40 000.

The agricultural production within the North and South Blocks is limited to subsistence farming with fields between 5 and 10 ha. Neither the North Block or the South Block falls within a High Potential Agricultural Area (HPAA) although higher potential agricultural areas surround the Jindal MIOP site. The most prominent production area located southeast of the south-eastern boundary of the South Block, is the Nkwalini valley. In this area, a variety of horticultural crops are produced under irrigation that include citrus, macadamias, bananas, and passion fruit. Other areas consist of irrigated sugar cane. Commercial forests and crops are also found to the north of the South Block.

Both municipalities show a slight potential decrease in population over the next 30 years which is likely due to people leaving the area in search of job opportunities in nearby urban areas, such as Empangeni and Richards Bay. There is evidence that the improving education levels has resulted in young professionals leaving the family home to find work elsewhere.

The bulk of the population, in both LMs, falls within the working age 15-64. However, this is still a low ratio and creates a significant dependency burden in the area. It is important in this scenario that job opportunities are available that will support households with a single breadwinner and many dependents. The average household is more than 4 people per house.

Within the two LMs, less than half of the households have access to municipal water. Access to basic levels of sanitation is also poor in both municipalities with almost half of the households not having access to flushing toilets. The high dependency on pit latrines is a concern as poor sanitation can be a vector for disease. Just over one third of households has access to refuse removal services supplied by the municipalities. Less than 20% of the population has access to electricity within their households. The remaining households rely on paraffin for cooking and lighting.



Figure 7 Traditional Households in the Area

Zulu people have occupied the Melmoth region for some 200 years and traditional culture is observed by many residents and community social structures remain strong. Homesteads (Figure 7) have remained within families for many generations and many residents have strong ties to the land with grave sites, artefacts and cultural heritage resources likely to be present. A full Heritage Study was

attempted however, due to community tension within the Project area, access to the area to conduct a site visit was not possible. During interviews held it was confirmed that grave burials were conducted under traditional rites and that graves are mostly located at family homesteads. Further surveys will be required to identify all potential cultural or heritage resources that fall within the proposed Jindal MIOP footprint area as part of any resettlement process.

5. SPECIALIST STUDIES

The following specialist studies were undertaken to inform the impact assessment:

- Groundwater Study;
- Surface Water Study;
- Terrestrial Biodiversity Study;
- Wetland & Aquatic Ecology Study;
- Air Quality Study;
- Noise Study;
- Soils, Land Capability & Land Use Study;
- Visual Study;
- Greenhouse Gas & Climate Change Study;
- Blasting & Vibration Study;
- Palaeontology Study;
- Community Health Study;
- Cultural Heritage Study;
- Traffic Study;
- Socio-economic Study; and
- Closure and Financial Liability.

The findings of these assessments are included in Table 1, Table 2 and Table 3.

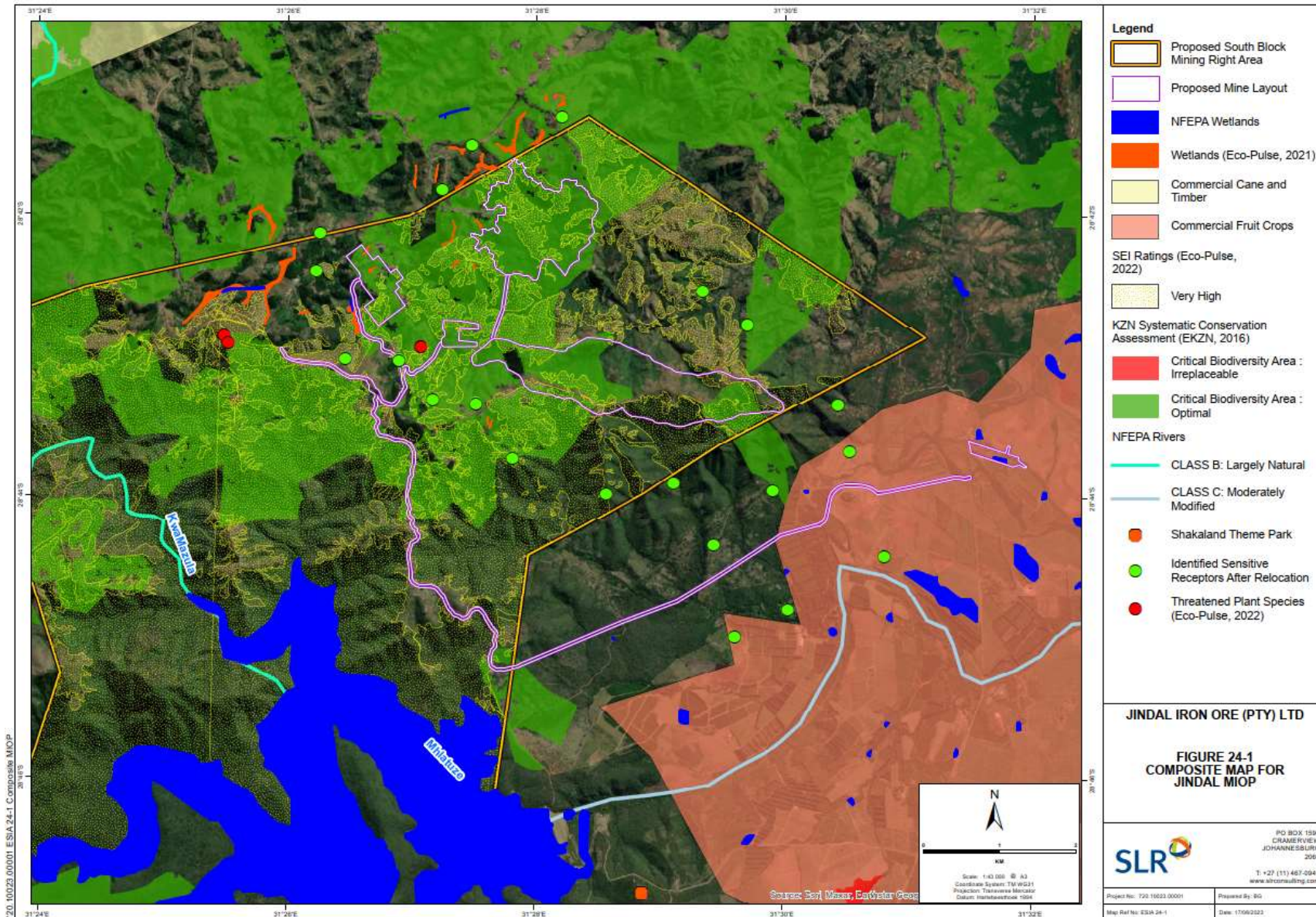


Figure 8 Sensitivity map for the Jindal MIOP

8. EIA FINDINGS AND RECOMMENDATIONS FOR THE JINDAL MIOP

An impact assessment was undertaken to determine the potential impacts associated with the proposed construction, operational and decommissioning phases of the Jindal MIOP.

The findings of this impact assessment, which includes the specialist findings, are summarised in Table 1, Table 2 and Table 3.

Construction Phase

During the construction phase there are a number of both biophysical and socio-economic impacts that could potentially occur once development of the project site is initiated. Most of the potential impacts can be reduced to between medium and insignificant, however, there are a number of impacts that even with mitigation implemented would still remain of a high significance. These high significance impacts are largely related to the impacts on sensitive biodiversity in the footprint and surrounding areas of the Jindal MIOP (Table 1). The most significant impacts are associated with the initial direct loss of habitat, loss of SCC and impacts on ecological processes. Based on best-practice guidelines, a biodiversity offset would therefore be required to compensate for these impacts should the application be approved. It is recommended that the residual impacts to both terrestrial and freshwater habitat be investigated and addressed as part of an overall biodiversity offset investigation. Protected plant permits would also need to be obtained from the relevant competent authorities. The impact on the visual environment is also very hard to mitigate with a project of this size and also remains of high significance.

An additional high impact is associated with the relocation of communities in order for the mine development to proceed. This would include the requirement for the relocation of graves which could significantly impact the families and descendants. The relocation of people, should the project proceed to this point, would be undertaken in accordance with best practice guidelines as part of the Resettlement Action Plan (RAP) (a separate process to the EIA and environmental authorisation application). The number of households which would require relocation is likely to be upwards of 350 pending the outcome of comprehensive community engagements regarding relocation. This process would result in distress amongst the affected communities and is of high significance. The RAP and the associated resettlement would have to be completed prior to any pre-construction work taking place. In addition, the social impacts associated with the Jindal MIOP need to be understood within the socio-political context of the receiving environment and the directly impacted communities. The risk of social and political interference in the construction and operation of the Jindal MIOP remains high within the Area of Influence (Aoi) given the social unrest and 'localised' political instability.

The nature and scale of the proposed development during the construction phase (5 years) is likely to positively impact South Africa's socio-economic environment through job creation in both supply and procurement (estimated to create 57 939 jobs, 26 437 of which are expected to be direct jobs). While a project of this nature is anticipated to create employment opportunities in the local area and surrounding communities, the supply chains of the service providers and the skill levels of the community members will determine the extent to which these opportunities are localised.

Table 1 Summary of Construction Phase Impacts Identified and their Pre and Post Mitigation Rating

Potential Impact	Unmitigated	Mitigated
Biophysical		
Impact on groundwater quantity	Very low -	Insignificant -
Impact on groundwater quality	Low -	Insignificant
Reduced surface water quality	Medium -	Low -
Alteration of natural drainage patterns and flow	Medium -	Low -
Impact of flooding (of infrastructure)	Medium -	Low -
Direct - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	Very high -	High -
Indirect - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	High -	Medium -
Direct - Impacts to species and threatened species conservation	High -	Medium -
Indirect - Impacts to species and threatened species conservation	Medium -	Medium -
Direct - Impacts to local and regional ecological processes	High -	High -

Potential Impact	Unmitigated	Mitigated
Indirect - Impacts to local and regional ecological processes	Medium -	Medium -
Physical loss or modification of freshwater habitat	Medium	Medium
Alteration of hydrological and geomorphological processes	Medium	Low -
Impacts to wetlands and aquatic ecosystems due to reduced water quality	Medium	Low -
Impacts to ecological connectivity and/or ecological disturbance impacts	Moderate-Low	Low -
Impact on ambient air quality	Medium	Low -
Impact on ambient noise levels	Low -	Very low -
Impact of change of land use from subsistence farming to mining	Medium -	Low -
Impact of loss and/or reduction of current land capability	High -	Low -
Impact of increased soil erosion	High -	Medium -
Impact of soil compaction	High -	Medium -
Impact of soil pollution	High -	Low -
Impact on landscape and visual aspects	High -	High -
Impact of the project on climate change	Low -	Low -
Socio-economic		
Loss of palaeontological resources	Insignificant	Insignificant
Impact of changing farming practices, market options and sources of nutrition	Very high -	Medium -
Exposure to vector-borne and zoonotic disease	Medium -	Low -
Changes in access to healthcare	Very high -	Very high +
Loss of cultural heritage resources	Very high -	Medium -
Relocation of graves	Very high -	High -
Impact on road users and traffic safety	Low -	Low -
Labour influx / in-migration of jobseekers	Low -	Very Low -
Resettlement and relocation	High -	Medium -
Community development and lifestyle	Medium -	Low -
Business and enterprise - impacts -on the agricultural sector	High -	Medium -
Business and enterprise - impacts on tourism	High -	Medium -
Impact on the local and regional economy	High +	High +

Operational Phase

During operations (Table 2) there are two potential impacts that have been the subject of a lot of stakeholders concerns; air quality (dust), and water supply. Air quality modelling indicates that levels of dust to surrounding farming areas are likely to be within manageable levels. It is going to be important, however, should the Jindal MIOP be approved that ongoing monitoring be undertaken to understand whether the model outcomes are correct as well as to ensure that additional mitigation measures are implemented should levels be higher than assessed.

In terms of water supply, the potential abstraction of water from the Mhlathuze catchment has been explored, however, the Mhlathuze catchment is currently overallocated and as such the DWS may only consider new allocations if the applicants contribute to interventions which would generate additional water in the catchment. These interventions will be assessed through a WULA.

Other potentially significant impacts post mitigation associated with the operational phase include reduced groundwater levels due to dewatering of the open pit, additional loss or modification of freshwater habitat as the open pit and the WRD footprints expand, and ongoing visual impacts. There is also the possibility of significant positive impacts in terms of job creation, economic stimulation, and potential positive impacts due to road improvements. One of the major positive impacts during the operational phase is the positive impact due to the use of iron, and subsequent steel, in the renewable energy sector. The global economy would not be able to move to a lower GHG emissions scenario without a substantial increase in renewable energy infrastructure development, which requires steel.

In term of positive impacts, the mine, when operating, will create direct job opportunities for approximately 800 people per year and indirect jobs for 1 600 people using a multiplier effect of 2 (ref. Chamber of Mines 2016).. This would include skilled, semi-skilled and unskilled jobs. It is predicted that the impact on the productivity of the commercial farms, as a result of the mine, should be low and hence there should be limited job losses resulting from this. Any potential job losses in the agricultural sector should be offset by employment opportunities presented by the mine.

Table 2 Summary of Operational Phase Impacts Identified and their Pre and Post Mitigation Rating

Potential Impact	Unmitigated	Mitigated
Biophysical		
Impact on groundwater quantity	Very high -	High -
Impact on groundwater quality	Insignificant	Insignificant
Reduced surface water quality	High -	Medium -
Alteration of natural drainage patterns and flow	Medium -	Low -
Impact of flooding	Medium -	Low -
Direct - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	High -	Medium
Indirect - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	High -	Medium -
Direct - Impacts to species and threatened species conservation	High -	Medium -
Indirect - Impacts to species and threatened species conservation	Medium -	Medium -
Direct - Impacts to local and regional ecological processes	Medium -	Medium -
Indirect - Impacts to local and regional ecological processes	Medium -	Medium -
Physical loss or modification of freshwater habitat	High	High
Alteration of hydrological and geomorphological processes	High	Medium
Impacts to wetlands and aquatic ecosystems due to reduced water quality	High	Medium
Impacts to ecological connectivity and/or ecological disturbance impacts	Medium -	Low -
Impact on ambient air quality - community health	High - to Medium	Medium - to Low -
Impact on ambient air quality - commercial crops	Low -	Very Low -
Impact on ambient air quality - blasting	Medium -	Low -
Impact on ambient noise levels	High -	Medium -
Impact of change of land use from subsistence farming to mining	High -	Low -
Impact of loss and/or reduction of current land capability	Medium -	Low -
Impact of increased soil erosion	Medium -	Very Low -
Impact of soil compaction	High -	Medium -
Impact of soil pollution	High -	Low -
Impact on landscape and visual aspects	Very high -	High -
Impact of the project on climate change	High +	High +

Potential Impact	Unmitigated	Mitigated
Impact of ground vibration, air blast and fly rock due to blasting activities	High -	Low -
Socio-economic		
Impact of changing farming practices, market options and sources of nutrition	Very high -	Medium -
Exposure to vector-borne and zoonotic disease	Medium -	Low -
Changes in access to healthcare	Very high -	Very high +
Loss of cultural heritage resources	Very high -	Medium -
Relocation of graves	Very high -	High -
Impact on road users and traffic safety	High to Medium -	Medium to High +
Labour influx / in-migration of jobseekers	Medium -	Low -
Community development and lifestyle	Medium +	High +
Business and enterprise - impacts on tourism	Medium -	Medium -
Impact on the local and regional economy	High +	High +

Decommissioning Phase

At decommissioning and closure (**Error! Reference source not found.**) of the Jindal MIOP the bulk of the impacts would cease, and the levels of impact would largely rate as low to insignificant (with a few of medium significance) provided that the infrastructure is decommissioned and rehabilitated according to the approved Closure Plan and associated Rehabilitation Plan. The visual impact related to the Jindal MIOP would remain in the landscape permanently but can be minimised to some extent with rehabilitation. An important impact at decommissioning would be the potential negative impact on the local area as a result of the loss of employment and the associated benefits linked to the spend of the Jindal MIOP in the local economy. However, if properly managed and planned for well in advance, through a well-structured and implemented mine Closure Plan, the negative impacts on the local communities and surrounding towns can be significantly reduced.

Table 3 Summary of Decommissioning and Closure Phase Impacts Identified and their Pre and Post Mitigation Rating

Potential Impact	Unmitigated	Mitigated
Biophysical		
Impact on groundwater quantity	Low -	Insignificant -
Impact on groundwater quality	Insignificant	Insignificant
Reduced surface water quality	Medium -	Low -
Alteration of natural drainage patterns and flow	Medium -	Low -
Impact of flooding	Medium -	Low -
Direct - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	Medium -	Low -
Indirect - Impacts to vegetation communities and implications for threatened ecosystems and biodiversity conservation	High -	Medium -
Direct - Impacts to species and threatened species conservation	Medium -	Low -
Indirect - Impacts to species and threatened species conservation	Medium -	Low -
Direct - Impacts to local and regional ecological processes	Medium -	Medium -
Indirect - Impacts to local and regional ecological processes	Medium -	Low -
Physical loss or modification of freshwater habitat	Medium -	Medium -

Potential Impact	Unmitigated	Mitigated
Alteration of hydrological and geomorphological processes	Medium -	Low -
Impacts to wetlands and aquatic ecosystems due to reduced water quality	Medium -	Low -
Impacts to ecological connectivity and/or ecological disturbance impacts	Moderate-Low -	Low -
Impact on ambient air quality	Medium -	Low -
Impact on ambient noise levels	Low -	Very low -
Impact of change of land use from subsistence farming to mining	High -	Low -
Impact of loss and/or reduction of current land capability	Medium -	Low -
Impact of increased soil erosion	High -	Medium -
Impact of soil compaction	High -	Medium -
Impact of soil pollution	High -	Low -
Impact on landscape and visual aspects	High -	Medium -
Impact of the project on climate change	Not assessed	
Socio-economic		
Impact of changing farming practices, market options and sources of nutrition	Very high -	Medium -
Impact on road users and traffic safety	Low -	Low -
Labour influx / in-migration of jobseekers	Low -	Very Low -
Community development and lifestyle	Medium -	Low -
Business and enterprise - impacts on tourism	High -	Medium -
Impact on the local and regional economy	Medium -	Low -

ENVIRONMENTAL MANAGEMENT PROGRAMME

Based on the outcome of the Impact Assessment and where applicable, the recommendations from specialists, the proposed management objectives and outcomes specific to the proposed Jindal MIOP are included into the EMPr. Specific environmental objectives and actions to control, remedy or prevent potential impacts are specified to either mitigate negative impacts or enhance positive impacts throughout the planning and design, construction, operational and decommissioning phases.

CONCLUSION AND RECOMMENDATIONS

The full Scoping and EIA process has been undertaken by the independent consultant, SLR Consulting (South Africa) (Pty) Ltd with input from the specialists as previously defined.

The findings indicate that while there are both negative impacts and benefits of the Jindal MIOP, careful consideration needs to be given to several key areas including management of impacts on biodiversity (and associated offset planning), impacts of air quality and water quality (particularly with reference to the nearby commercial farming areas), water quantity in terms of groundwater drawdown, water supply issues, the enhancement of local benefits, and proactive closure planning.

It follows therefore, that the findings of the impact assessment undertaken show that there is the potential for significant impacts throughout all phases of the project, however, with the effective implementation of the EMPr, careful planning and ongoing engagement with all stakeholders and potentially affected parties there is no biophysical, social, or economic reason why the project should not proceed.

