Summary of Work Undertaken on the Gcwihaba Resources (PTY) Ltd. Metals Licenses PL 020-026/2018

Xaudum Iron Formation (XIF) Project: Summary Update for MDCB

1. Introduction

The Xaudum Iron Formation Iron Project is a magnetite project at an early stage of exploration and evaluation currently being assessed for viability by Gcwihaba Resources (Ltd) Pty. (Gcwihaba) a Botswana subsidiary of Tsodilo Resources Limited (Tsodilo). This report describes the current levels of exploration, evaluation, drilling, and project advancement.

Currently Gcwihaba has engaged engineering firms to quote on the development of a Preliminary Economic Assessment ("PEA") of its Xaudum Iron Project in Northwest Botswana. The company sees this as an important and logical next step in creating a road map for development of this important resource.

1.1. Project Summary

- ✓ Project Prospecting Licenses are held by Tsodilo Resources Botswana subsidiary Gcwihaba Resources (Pty) Ltd.
- ✓ The project is located in the North-West District of Botswana near the town of Shakawe and close to the Mohembo border crossing to Namibia. The project is ~50km from the town of Divundu in Namibia, through which the Trans Caprivi Railway (TCR) line linking Zambia and Namibia, is planned to pass which will provide access to Walvis Bay etc. It is also located within ~70 km of the proposed Angolan, Mucusso line to the Namibe Port.
- ✓ An Inferred resource of 441 Mt of magnetite at 29.4% Fe has been defined in Block 1, see Table 1, which is part of a magnetite BIF deposit and the area called Block 1 on RMR
- ✓ 2.
- ✓ Also shown on Figure 2 is the Block 2 area that is the next area planned within the XIF mineralization that will be defined as a resource by further resource drilling.

- ✓ Block 1 is only a fraction of the potential resource: An Exploration Target mineral inventory has the true size of the Xaudum Iron Formation at around 5 to 7 billion tonnes at 15-40% Fe for the whole magnetite deposit. Importantly this mineral inventory could easily be turned into a far larger resource in excess of 2 billion tonnes if required simply by further resource drilling.
- ✓ Excellent metallurgical results confirm that a premium product of around 67% Fe is easily obtained from all magnetite resource materials. Further to this minor extra grinding and basic magnetic separation allows a super high end product of over 70% Fe to also be generated which means that the XIF can access the rare and very high end niche chemical markets for magnetite, which mean that small scale start up mining could be a reality for the XIF.

1.1. Location

The Xaudum Iron Project is located in the Northwest of Botswana in the Ngamiland region, close to the town of Shakawe, see Figure 1.

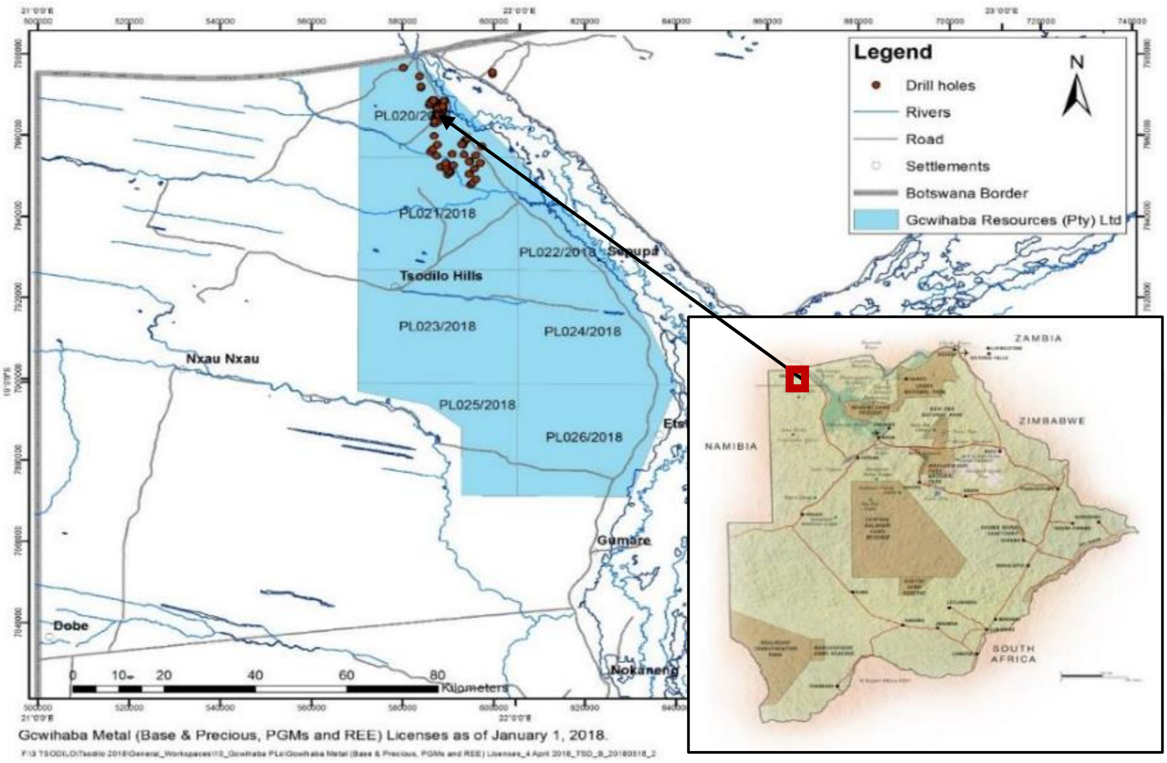


Figure 1. Xaudum Iron Project location in relation to current prospecting licenses (PL's) and relative to greater Botswana and the Namibian boarder.

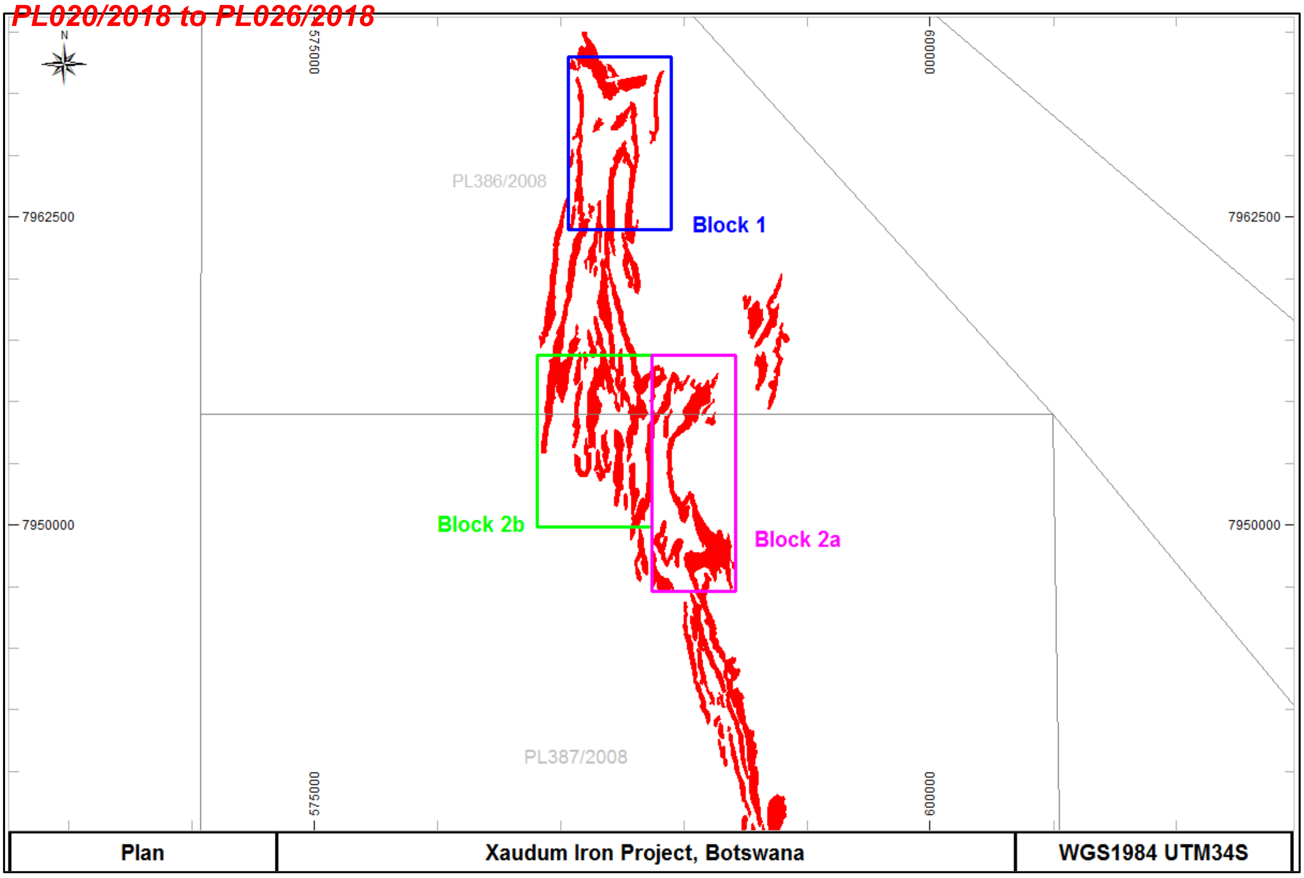


Figure 2. Showing the outline of the Xaudum Iron Formation mineralization body defined from ground magnetic geophysics. Shown also for reference are the Block 1 areas that has defined resources and the Block 2 area that will be the next area to be drilled for resource definition.

Table 1. Mineral Resource Statement for the Xaudum Iron Project Block 1.

Geodomain Zone	Resource Category	Tonnes (Mt)	Fe %	SiO_2 %	Al_2O_3 %	P %
MBA	Inferred	236	35.6	34	4	0.3
DIM	Inferred	148	20.9	51	9.1	0.2
MBW	Inferred	21	34.3	35.4	4.4	0.2
DMW	Inferred	29	20.5	49.5	8.2	0.2
MGS	Inferred	7	22.1	50.8	8.9	0.2
TOTAL	**Inferred**	**441**	**29.4**	**41**	**6.1**	**0.3**

Quote from Baker, 2014 on this resource statement

"Note:
(1) Geodomains MBA = Magnetite Banded (BIF), DIM = Magnetic Diamictite, MBW = Weathered Banded Magnetite (oxidized MBA), DMW = Weathered Magnetic Diamictite (oxidised DIM), and MGS = Magnetic Garnet Schist.
(2) The Mineral Resource is not a Mineral Reserve and has no demonstrated economic viability.
(3) The effective date of the Mineral Resource is August 29, 2014.
(4) The Mineral Resource estimate for Xaudum was constrained within lithological and grade based solids and within a Lerchs-Grossman optimized pit shell defined by the following assumptions; metal price of USD 1.5 / dmtu; slope angles of 26°, 45° and 50° in the sand, calcrete / oxide and fresh material; a mining recovery of 95.0%; a mining dilution of 5.0%; a base case mining cost of USD 2.20 / t ore and an incremental mine operating costs of USD 0.05 / t / 10 m; process operating costs of USD 5.00 / t ore; iron processing recoveries of 78.1% (MBA); 54.0% (DIM); 46.3% (MBW); 53.6% (DMW); 23.7% (MGS); G&A costs of USD 5.00 / t / ore; transport costs of USD 5 / t concentrate.
(5) The Mineral Resource is reported using a 12% Fe cut-off grade.

(6) Mineral Resources at Xaudum have been classified according to the "CIM Standards on Mineral Resources and Reserves: Definitions and Guidelines (May 2014)" by Howard Baker (FAusIMM (CP), an independent Qualified Person as defined in NI 43-101.

(7) The quantity and grade of reported Inferred Mineral Resource is uncertain in nature and there has been insufficient exploration to report this as an Indicated or Measured Mineral Resource; and it is uncertain if further exploration will result in upgrading it, or a portion of it, to an Indicated or Measured Mineral Resource category."

Please see section "Assumed Mining Dilution Factors and Pit Optimization conducted by SRK" below and the associated reduction in the metallurgical recovery by 5% in the economic modelling to account for the mining dilution factor of 5% to 10%.

This Inferred Mineral Resource shown in Table 1 for the XIF was prepared under the independent direction of Mr. Howard Baker (of SRK Consulting (UK) Ltd) the Qualified Person (QP) as such term is defined by National Instrument 43-101 and the companion policy 43-101 CP. The definitions of Inferred Resources in this Mineral Resource statement conform to the definitions and guidelines of the CIM Definition Standards for Mineral Resource and Mineral Reserves, May 2014. For more details please see Baker, 2014 (which is the Xaudum Iron Project NI 43-101 MRE report, that can be downloaded from System for Electronic Document Analysis and Retrieval (SEDAR) (a filing system developed for the Canadian Securities Administrators) website www.sedar.com). Figure 3 shows the pit shells for the main modelled Xaudum Iron geodomains for the resource shown in Table 1.

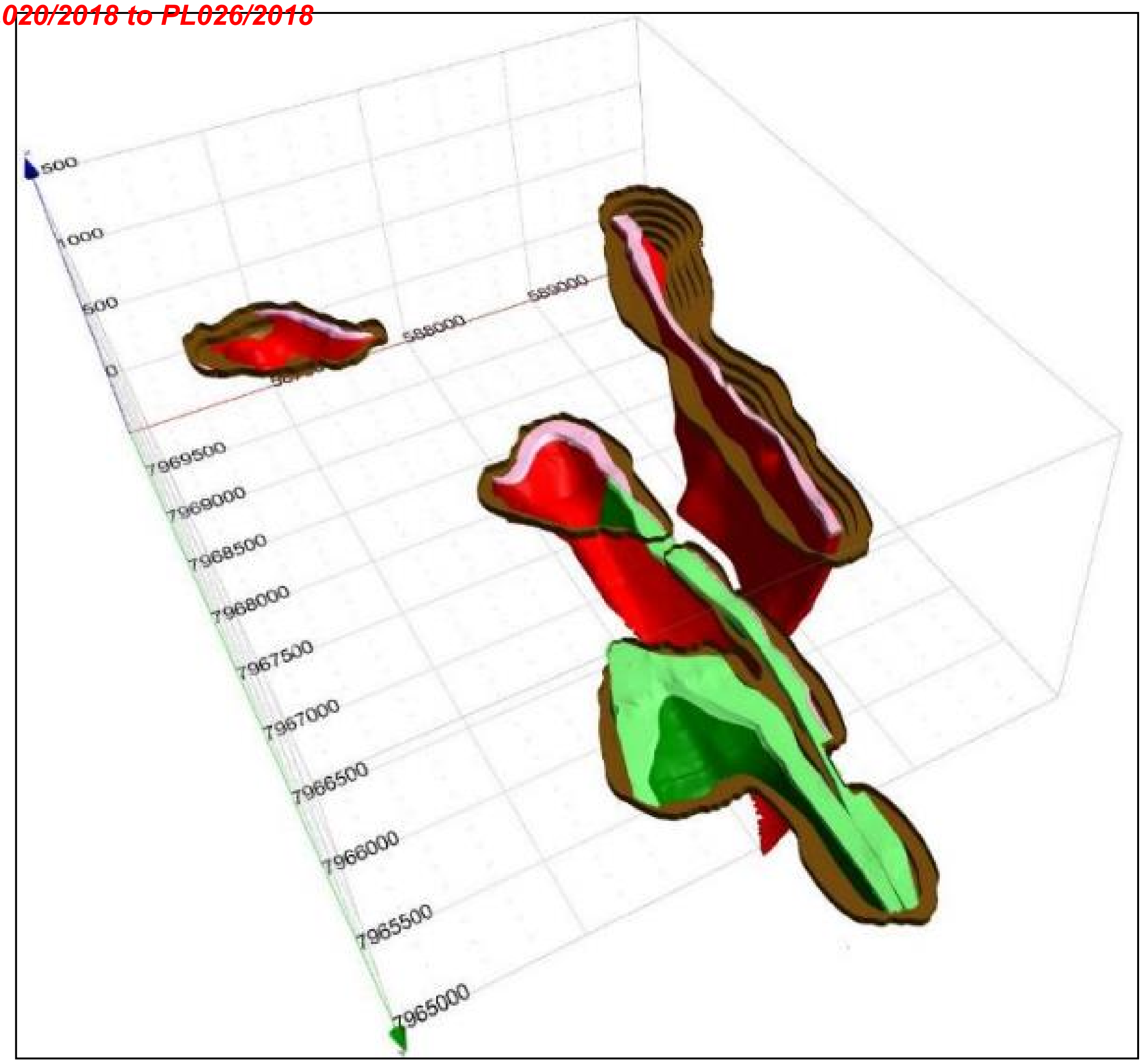


Figure 3. Diagram showing the main modelled XIF geodomains MBA (red), MBW (pink), DIM (green), and DMW (light green), and their respective grade within optimized pit shells.

2. Ownership

The project is contained 7 licenses are part of an initial grant issued by the Department of Mines on behalf of the Ministry of Mineral Resources Green Technology and Energy (MMGE), Government of the Republic of Botswana, and are valid for three years from 1st October 2018 to 30th September 2021.

3. Project Overview

The XIF Project is a potential Tier 1 iron ore project as it will be large, long life, and low cost, the project is located close to Shakawe. The Ngamiland District in northwest Botswana (Figure 1), is one of the poorest and least developed regions of Botswana. Botswana currently has no other iron resources or reserves outside of this XIF Project resource despite significant but unsuccessful exploration efforts by other companies such as Rio Tinto and BCL. Botswana has significant coal reserves which can be a major advantage for the XIF Project, allowing for coal reserves to be used in the beneficiation processes to generate iron products, such as pig iron and iron pellets, but also to produce steel.

The Project would represent the first iron deposit to be considered for development in Botswana. Gcwihaba has identified the project as having the potential to positively impact the future economy of Botswana as the country looks to diversify its economy. Where the XIF Project can help Botswana to reach its goal of moving away from a dependence on diamond revenues. Given that the Xaudum Iron Project could generate a positive NPV in the order 4 to 10 billion USD (Table 2), undertaking a PEA into the project economic variability and study options for development is a vital next step.

The PEA will evaluate a number of possible options for development of the project using current and well-known technologies and systems in terms of mining, beneficiation, transport and infrastructure.

3.1. Exploration conducted by Gcwihaba - Work on the XIF Project to Date

Gcwihaba has compiled a data set of 556 drill holes (~83,500 m) that has been used to develop the geological model of the XIF. In addition, over 30,000 assay results were used in the Company's initial assessments and culminated in an initial resource of 441 Mt at 29.4% Fe reported by SRK in a NI 43-101 Mineral Resource Estimation (MRE) technical report, see Baker, 2014. In which it was reported that this resource is upgradable to around 146.2 Mt of 67.2% Fe concentrate based on metallurgical results. This resource represents only a small portion of the mineralisation within the entire XIF, and this resource represents only 8 km of the entire 37 km strike length of the iron target. A conservative exploration target for the entire XIF mineralisation was calculated to be 5 to 7 billion potential tonnes of iron mineralisation at grades ranging between 15-40% Fe, see Baker, 2014, and Martinez et al., 2015. This includes both MBA units (~25-40% Fe) and DIM units (~15-25% Fe) that make up the main proportion on the XIF over its strike length. The exploration target was calculated by extrapolating results from drill hole data to the entire XIF area as defined by detailed airborne magnetics surveys complemented by some 20,000-line kilometres of ground magnetics surveys and supported a magnetic inversion modelling exercise, Martinez et al. 2015.

The Block 1 drill hole geological model used in the MRE covers approximately only one fifth to one sixth of the total XIF ground magnetic anomaly. This exploration target demonstrates the significant potential of the project area for further development in terms of exploration and resource definition drilling should a positive outcome be shown during this proposed PEA study.

Tsodilo initiated drilling on the next exploration area, referred to as Block 2, but delayed the completion thereof due to iron-ore market conditions and to await the outcome of this PEA. However, if there is a positive outcome from the PEA, this resource definition of Block 2 will be focused based on the best places to drill based on the outcome of the PEA (the potential is that Block 2 plus Block 1 will result in a total resource well over 1 Billion tonnes of iron).

3.2. Gcwihaba Work on the Xaudum Iron Project to Date

Gcwihaba has a data set of 556 drill holes, sampling the geology in the region of the Xaudum Iron Project. Table 2 shows a breakdown of the work and data taken to date by Gcwihaba and its JV partners in this area to date.

Table 2. Table summarizing the amount of work Gcwihaba has completed, and data collected for the Xaudum Iron Project area.

Work Performed	Data Collected	Number
Exploration Drilling	Number of Holes Drilled	556
	Meters Drilled (m)	83,546.95
	Geochemical Analysis Performed (Assays)	59,921
	Geological Logging	12,898
	Geotechnical and Structural Logged intervals	28,878
Xaudum Iron Evaluation	Number of Iron Holes Drilled	156
	Meters Drilled (m)	30,935
	Meters of Iron Mineralization intersected	9,022
	Geochemical Analysis Performed (Assays)	9,221
Geophysics	Reflex Gyro Down-hole surveys	116
	Ground Magnetic Survey line km (20 and 50 m spacing)	22,749
	Airborne Magnetic Survey Flown line km (200m line spacing)	16,933
	Airborne Gravity Survey Flown line km (200m line spacing)	10,392
	Magnetic Susceptibility Measurements	132,566
Exploration and Evaluation	Density Measurements	8,680
	Hydro Geochemical Analysis, water analysis taken	283
	Mineralogy Reports	88
	Geochronology Dates taken (Samples)	16
	Passive seismic data points	116
	Local and regional interpretations and cross-sectional analysis	Various
	3D modelling of regional scale and local scale	Various
	GoCad Xaudum Iron 3D model, for specific iron resource definition	Verified by SRK
Metallurgical Analysis	Davis Tube Recovery (DTR), bulk composites	19
Resource Reporting	NI 43-101 Mineral Resource Estimate Technical Report	SRK

4. SRK Pit Optimization (SRK)

Figure 1 shows the project area and the licenses that Gcwihaba holds which and are in good standing, have an initial grant term of 3 years effective October 1, 2018 and a further two 2-year renewals.

The economic fundamentals of the resource on the face of it are excellent, as shown by the resource defined by the independent consulting company SRK Consulting (UK) Limited ("SRK") when they modelled the resource using international standard pit optimization techniques, see Baker, 2014.

For reference the SRK values are shown in table 3 below.

Table 3. SRK (Baker, 2014) Pit Optimization Parameters, see chapter 13.17.

Pit Optimization Parameters	Variables Used by SRK	Values Input
Geotechnical Parameters	GZONE 1 = Kalahari sand SAK	26°
	GZONE 2 = Calcrete CAC	45°
	GZONE 3 = Oxidised material MBW and DMW	45°
	GZONE 4 = Fresh material MBA and DIM	50°
Mining Parameters	Base Mining Cost (at reference RL):	USD 2.20/ t ore
	Incremental mining cost per bench (below reference elevation 1010 m)	USD 0.05/t/10 m
	Mining Recovery	95%
	Mining Dilution	5%
Processing Parameters	Concentrate Grade	67%
DTR Mass Recoveries	MBA / MBW / DIM / DMW / MGS	45.5% / 25.4% / 17.9% / 21.6% / 10.7%
Transport Costs	Slurry Pipe Line	$5 / tonne concentrate
General Administration Costs	Estimated at	$5 / tonne concentrate
Economic Parameters	Fe Price	USD 1.5 / dmtu
	Royalty	3%

4.1. Broad Desktop Study for Block 1

Tsodilo has defined a Resource Development Plan for Block 1, below is a similar broad desktop study level look at the economics of Block 1 in and its plausible NPV's.

Tsodilo Assumed Inputs for the spreadsheet for the Block 1 desktop study are shown in table 4. The data for this desktop study can be found in "Block 1 XIF Economic Analysis Version 1.xls". Table 5 shows the NPV calculations showing that both scenarios are profitable.

Table 4. Tsodilo broad desktop study into Block 1, inputs and parameters. Where the "All" option in this case is a 441mt mine that uses all of the inferred resource. Whereas the MBW+MBA option in this case is just looking at the MBW and MBA at over 30% Fe at an assumed 236 Mt of MBA and 21 Mt of MBW, at 45.5% mass recovery and 25.4% mass recovery respectively.

Desktop Study Spreadsheet Input	Option	Values Input	Reasoning
Deposit Size	All	441 Mt	All is the entire 441 Mt of ore, and MBW+MBA is just the high-grade ore at over 30% Fe and high mass recoveries
	MBW+MBA	5 billion tonnes	
DTR Mass Recovery Grade	All	33.2%	Respective weighted averages from the DTR mass recoveries
	MBW+MBA	43.9%	
Assumed Conc. Grade	All	67.2% Fe	This is the Block 1 average.
	MBW+MBA	67.8 % Fe	This is the weighted average head grade
Concentrate Tonnes	All	146.4 million tonnes	Conc. tonnes at the respective recoveries
	MBW+MBA	125.7 million tonnes	
Life of Mine	All	58 years	Life of mine is large for a deposit of this potential size
	MBW+MBA	44 years	
Iron Ore Price	All + (MBW+MBA)	$80.00/tonne	Price of Iron Ore 62% Fe fines in February 2020
$ per dry metric tonne unit (dtmu)	All + (MBW+MBA)	$1.29/dmtu	dtmu of 62% Fe fines in February 2020, this is lower than the 1.5/dtmu used in the SRK

Upgrade premium above base iron ore price based on 67.2% Fe	All + (MBW+MBA)	$6.71/tonne	Upgrade on top of the $80.00/tonne price of 62% Fe iron ore based on 67.2% Fe
Total Upgraded Price of the Conc.	All + (MBW+MBA)	$86.71/tonne	Total upgraded price assumed for the conc. ore
All in CAPEX for this full size mine	All	$576.3 Million	As per the Resource Development Plan
	MBW+MBA	$576.3 Million	
Borrowing Rate / Inflation Rate	All + (MBW+MBA)	8% / 6.5%	The borrowing rate has been assumed at 8% and the inflation rate at 6.5, these are based on some discussions with James Polan the Vice-President of the Office of Development Credit at the U.S. International Development Finance Corporation (DFC)
Long Term Loan Length	All + (MBW+MBA)	20 years	Assumed CAPEX load term length
Annual Load Interest	All + (MBW+MBA)	$29.9 million per year	Annual Loan interest for the CAPEX over 20 years
Mining Costs	All + (MBW+MBA)	$9.00/tonne conc.	All in assumed mining costs, includes machinery usage costs, consumables, manpower, and power costs etc. all in
Plant Processing Conc. Beneficiation	All + (MBW+MBA)	$15.00/tonne conc.	All in assumed processing costs, includes, consumables, manpower, water costs and power costs etc. all in.
Transport Costs	All + (MBW+MBA)	$10/tonne conc.	$5/tonne Slurry Pipe line + 5$/tonne rail transport, for a slurry Pipe line and Rail to Walvis Bay
Other Costs	All + (MBW+MBA)	$10/tonne conc.	Other costs such as wages, H+S, Admin, etc.
All In Total Operational	**All + (MBW+MBA)**	**$49.00/tonne conc.**	**Mining costs + Processing Costs + Transport Costs + Other Costs**
Net Revenue per tonne	All + (MBW+MBA)	$37.71/tonne conc.	Total Upgraded Price of the Conc. minus the Total Operational Costs
	All	7,2 million tonnes per	

ROM production ore	MBW+MBA	5.5 million tonnes per	Run of Mine Production, factored with an extra 5% reduction to account for the 5%
Tonnes of Conc. per Year	All	2.4 million tonnes per	Tonnes of conc. produced each year, kept constant at 2.4 Mtpa
	MBW+MBA	2.4 million tonnes per	
Botswana Mining Tax	All + (MBW+MBA)	25%	Botswana mining tax
Years to Start of Mine	All + (MBW+MBA)	2 years	A mine of this could take up to 10 years for the mine to be developed, but this could be reduced significantly.
Remaining Development Costs Estimate	All + (MBW+MBA)	$12 million	The possible costs associated with resource studies costs to get to BFS level at this size of mine

Table 5. NPV calculations using inputs and other assumed inputs as shown in table 4 to calculate some first pass NPV results. The excel calculation can be seen in the file supplied called "All XIF_Big Future Mine 2-5 billion tonnes_Version1".

All Inferred Resources

Revenue Inputs for Small Part of Deposit (e.g., Blocks 1 & 2)			Economic Calculations		
Deposit size (Billion Tonnes)	Tonnes	**441,000,000**	In Situ Value (Million dollars)	USD	$1,269,533,729,032
DTR Recovery %	% recovery	33.2	Gross income per year before CAPEX costs		$90,432,618
DTR Recovery Grade	% Fe	67.2	Gross income per year (sales - costs) during CAPEX loan term	USD	$60,550,449
Concentrate Tonnes	tonnes	146,412,000	Botswana Mining Tax	%	25%
Life of Mine	years	58	Annual Profits (after tax) during CAPEX loan term	USD	$45,412,836.75
Iron Ore Price/ton	China, 62% Fe fines	$80.00	Annual Profits after CAPEX loan paid	USD	$90,432,618
US$ Per Dry metric Tonne Unit (US$/dmtu)	China, 62% Fe fines	1.29	Annual Profits (after tax) after CAPEX loan paid	USD	$67,824,463.26
Upgrade premium per ton for DTR Recovery Grade (67.2% Fe)	67.2	$6.71	Tax Revenue to Government per year during CAPEX loan term	USD	$15,137,612.25
Upgraded Price per ton for 67.2% fines	$US	$86.71	Tax Revenue to Government per year after CAPEX loan paid	USD	$22,608,154.42
CAPEX (e.g., mine construction)	USD	$576,295,000.000			
Borrowing Rate	%	8.0%	Total Profit during CAPEX loan term	USD	$908,256,735
Loan Term	years	20.0	Total Profit after CAPEX loan paid off	USD	$3,436,439,472.08
Annual Loan Expense (interest)	USD	$29,882,169	Life of Mine Profit	USD	$4,344,696,207.12
Mining costs	$/tonne concentrate	$9.00	Life of Mine Tax Revenue to Government	USD	$1,161,862,113.03
Processing costs	$/tonne concentrate	$15.00	Net Present Value	USD	$917,224,477
Transport Costs	$/tonne concentrate	$10.00			
Other costs such as wages, admin, etc.	$/tonne concentrate	$15.00			
Total operational costs	$/tonne concentrate	$49.00			
Net Revenue per ton	USD	$37.71			
Inflation Rate	%	6.5%			
ROM production	Tonnes per year	7,223,275.86			
Tonnes of Concentrate to be Shipped (67.2% Fe)	Tonnes per year	2,398,127.59			
Botswana Mining Tax	%	25%			
Years to Start of Mine	years	2			
Remaining Development Costs (e.g., drilling and BFS)	$USD	$12,000,000			

MBW and MBA Inferred Resources Only

Revenue Inputs for Small Part of Deposit (e.g., Blocks 1 & 2)			Economic Calculations		
Deposit size (Billion Tonnes)	Tonnes	**257,000,000**	In Situ Value (Million dollars)	USD	$977,339,458,065
DTR Recovery %	% recovery	43.9	Gross income per year before CAPEX costs		$91,770,185
DTR Recovery Grade	% Fe	67.8	Gross income per year (sales - costs) during CAPEX loan term	USD	$61,888,017
Concentrate Tonnes	Million tonnes	112,714,000	Botswana Mining Tax	%	25%
Life of Mine	years	44	Annual Profits (after tax) during CAPEX loan term	USD	$46,416,012.44
Iron Ore Price/ton	China, 62% Fe fines	$80.00	Annual Profits after CAPEX loan paid	USD	$91,770,185
US$ Per Dry metric Tonne Unit (US$/dmtu)	China, 62% Fe fines	1.29	Annual Profits (after tax) after CAPEX loan paid	USD	$68,827,638.95
Upgrade premium per ton for DTR Recovery Grade (67.2% Fe)	67.2	$6.71	Tax Revenue to Government per year during CAPEX loan term	USD	$15,472,004
Upgraded Price per ton for 67.2% fines	$US	$86.71	Tax Revenue to Government per year after CAPEX loan paid	USD	$22,942,546
CAPEX (e.g., mine construction)	USD	$576,295,000.000			
Borrowing Rate	%	8.0%	Total Profit during CAPEX loan term	USD	$928,320,249
Loan Term	years	20.0	Total Profit after CAPEX loan paid off	USD	$3,436,439,472.08
Annual Loan Expense (interest)	USD	$29,882,169	Life of Mine Profit	USD	$3,130,804,695.04
Mining costs	$/tonne concentrate	$9.00	Life of Mine Tax Revenue to Government	USD	$860,061,194.48
Processing costs	$/tonne concentrate	$15.00	Net Present Value	USD	$863,988,150
Transport Costs	$/tonne concentrate	$10.00			
Other costs such as wages, admin, etc.	$/tonne concentrate	$15.00			
Total operational costs	$/tonne concentrate	$49.00			
Net Revenue per ton	USD	$37.71			
Inflation Rate	%	6.5%			
ROM production	Tonnes per year	5,548,863.64			
Tonnes of Concentrate to be Shipped (67.2% Fe)	Tonnes per year	2,433,597.73			
Botswana Mining Tax	%	25%			
Years to Start of Mine	years	2			
Remaining Development Costs (e.g., drilling and BFS)	$USD	$12,000,000			

4.2. Broad Desktop Study Analysis at 2 Billion and 5 Billion Tonne Future resource

As independent qualified experts SRK applied reasonable assumed processing and mining cost parameters, pit slope angles, and processing recoveries during the pit optimization of the XIF 441 Mt of resource, although this is a good first pass independent economic modelling excise it does not look at NPV calculations and does not make any assessment beyond possible future extraction assumptions, AS SUCH it cannot be considered a full economic assessment, and as such a PEA is required.

Tsodilo acknowledges that whilst the XIF has amazing potential there are many unknown factors to take into account when assessing the viability of a very large scale possible future resource, as in undefined resources. . So Tsodilo has instead attempted to say the following:

Given the potential of the XIF what is the potential economics of a large scale mine, where on the face of it this is somewhat within the realm of understanding but outside of a Block 1 PEA. But could be further refined in an unpublished options study outside of a PEA.

This lead to the following desktop study. Whereby Tsodilo assumed inputs for the spreadsheet for the desktop study shown in table 6.

Table 6. Tsodilo broad desktop study inputs and parameters. Where Option 1 is 2 billion tonnes total future resource and option is a 5 billion tonne potential future resource.

Desktop Study Spreadsheet Input	Option	Values Input	Reasoning
Deposit Size	Option 1	2 billion tonnes	That whilst these are above the inferred resource of 441 MT and outside of a PEA scope, it is within the scope of the exploration target and recommendations from a PEA, and as such used for future vision purposes in this broad-brush desktop analysis.
	Option 2	5 billion tonnes	
DTR Mass Recovery Grade	Option 1 + 2	Input for this study as 25%	Block 1 is 33.1% so to add a level of conservatism to the NPV results of the
Assumed Conc. Grade	Option 1 + 2	67.2% Fe	This is the Block 1 average.
	Option 1	0.5 billion tonnes	Conc.tonnes at 25% mass recovery

Concentrate Tonnes	Option 2	1.25 billion tonnes	
Life of Mine	Option 1	50 years	Life of mine is large for a deposit of this potential size
	Option 2	75 years	
Iron Ore Price	Option 1 +	$80.00/tonne	Price of Iron Ore 62% Fe fines in February
$ per dry metric tonne unit (dtmu)	Option 1 + 2	$1.29/dmtu	dtmu of 62% Fe fines in February 2020, this is lower than the 1.5/dtmu used in the SRK work
Upgrade premium above base iron ore price based on 67.2% Fe	Option 1 + 2	$6.71/tonne	Upgrade on top of the $80.00/tonne price of 62% Fe iron ore based on 67.2% Fe
Total Upgraded Price of the Conc.	Option 1 + 2	$86.71/tonne	Total upgraded price assumed for the conc. ore
All in CAPEX for this full size mine	Option 1	$5 billion	All in assumed CAPEX for a very large scale mine of these sizes.
	Option 2	$7 billion	
Borrowing Rate / Inflation Rate	Option 1 + 2	8% / 6.5%	The borrowing rate has been assumed at 8% and the inflation rate at 6.5, these are based on some discussions with James Polan the Vice-President of the Office of Development Credit at the U.S. International Development Finance Corporation (DFC)
Long Term Loan Length	Option 1 + 2	20 years	Assumed CAPEX load term length
Annual Load Interest	Option 1 + 2	$259 million per year	Annual Loan interest for the CAPEX over 20 years
Mining Costs	Option 1 + 2	$9.00/tonne conc.	All in assumed mining costs, includes machinery usage costs, consumables, manpower and power costs etc. all in
Plant Processing Conc. Beneficiation Costs	Option 1 + 2	$15.00/tonne conc.	All in assumed processing costs, includes, consumables, manpower, water costs and power costs etc. all in.
Transport Costs	Option 1 + 2	$10/tonne conc.	$5/tonne Slurry Pipe line + 5$/tonne rail transport, for a slurry Pipe line and Rail to Walvis Bay
Other Costs	Option 1 +	$10/tonne	Other costs such as wages, H+S, Admin, etc.

All In Total Operational Costs	**Option 1 + 2**	**$49.00/tonne conc.**	**Mining costs + Processing Costs + Transport Costs + Other Costs**
Net Revenue per tonne	Option 1 + 2	$37.71/tonne conc.	Total Upgraded Price of the Conc. minus the Total Operational Costs
ROM production ore	Option 1	38 million tonnes per	Run of Mine Production, factored with an extra 5% reduction to account for the 5% mining dilution to a 10% mining dilution
	Option 2	63 million tonnes per	
Tonnes of Conc. per Year	Option 1	12.5 million tonnes per	Tonnes of conc. produced each year.
	Option 2	12.5 million tonnes per	
Botswana Mining Tax	Option 1 + 2	25%	Botswana mining tax
Years to Start of Mine	Option 1 + 2	10 years	A mine of this could take up to 10 years for the mine to be developed, but this could be reduced significantly.
Remaining Development Costs Estimate	Option 1 + 2	$150 million	The possible costs associated with resource studies costs to get to BFS level at this size of mine

Table 6 shows the output results of the XIF desktop study of a largescale mine possibility. The general NPV calculations indicate what is possible for the XIF in terms of possible viability that could be achieved upon further investment and resource development. The calculation file is shown in "All XIF_Big Future Mine 2-5 billion tonnes_Version1".

4.2.1. Engineering at a Broad Level Technologies

The Transport looked at is Slurry Pipe line, SRK have suggested that this is around 5 $/t, although Tsodilo have gone with 10 $/t to account for any ancillary transport such as rail lines etc.

The plant will be a Low Intensity Magnetic Separation (LIMS) technology.

4.3. Exploration Target Material outside of Block 1 and the PEA Study

Tsodilo understands the following when compiling this below desktop study and the upcoming PEA study:

- It is recognized that whilst a PEA study by definition is allowed to only look at inferred resources defined in its detail techno-economic analysis that is published.

- Tsodilo also understand that that the PEA will not able to publish economic analysis of deposit tonnages assumed to be within the Exploration Target ("anomaly").
- However, Tsodilo will request that the engineering firms that undertake the PEA study, undertake a Scoping Desktop Study of all available option, even those outside the publishable limits of a PEA, such as looking at a larger deposit. This desktop study scoping level techno-economic analysis with very broad-brush assumptions deduced from the Block 1 mineralization assuming larger tonnages for either the recommendations section only, or purely internal use and as such not published or made available to those in the public domain.
- The major issue with these types of highly scoping level analysis is that there are far too many unknowns to be published, many on grade, however given the confidence and knowledge that Tsodilo has, and the nature of the ore body and our in depth understanding of how the geophysics can relate to some degree to a prediction of the ore body we feel this is an approach that will help lead to recommendations of validity.
- This is warranted as Tsodilo is very confident that given more drilling that it will simply be able to turn the extra tonnages it believes are available outside of Block 1 into a defined resource to international standards by simply undertaking more drilling.
- The PEA can make recommendations in terms of the resource development program. Making comments on what size resource would need to be defined to make larger scale mining option economic. As such this is why Tsodilo has looked at these future larger size scenarios for the XIF at this stage, whilst fully understanding that these have caveats and a degree of risk, at these stages of exploration these forward thinking can be helpful however and are undertaken by companies such as Rio Tinto when reconciling which deposits to priorities or which areas of a deposit should be focused on next for delineation of further resources form the Exploration Target "anomalies". In fact, the author was involved in very similar practices for Rio Tinto on a number of projects which focused areas of further resource delineations.
- Tsodilo maiden MRE resource statement is limited at 441 million tonnes for a very large scale operation, so in this section Tsodilo has assumed a larger deposit size based on the understanding of the deposit, the interpretation of the geophysics, and application of it known conservative exploration target of 5 to 7 billion tonnes at 15 to 40% Fe. Tsodilo has as such looked at deposit sizes of 2 billion tonnes and 5 billion tones for this study.

4.4. Broad Desktop Study Conclusions

Table 5 and Table 7 show that a positive NPV's can be attained for the XIF at various scales. The Block 1 NPV is between US$850 million and US$900 Million.

These calculations cannot be considered as anything other than indicative of possible future mining.

These NPV's are in line with another African Project where a pre-feasibility study into options for development of the project on a similar sized project in Tete Mozambique by Baobab Resources showed an NPV of $467 million USD for a 3 MTPA concentrate option, and $1,361 Million USD for a 1 MTPA Pig Iron production option. As you can see from the results shown in Table 5 and 7 the Xaudum Iron Project could be similar.

Not covered are smaller scale options, which on the face of it are equally attractive, but are out of the scope of this report, but very much the focus of the companies suggested PEA options study, which will be conducted to define all broad techno-economic analysis, make recommendations for upsizing the resource and the direction that the project should move in to realize its potential, by creating a road make for development and upscaling.

These Tsodilo "All in Total Operational Costs" are at ~49 USD per tonne of ore, and as such places the XIF iron project towards the lower end of the cost curve for global iron projects and means that the potential for a positive NPV is enhanced, see Figure 11. This lower position on the cost curve also means that fluctuations in the price of Fe ore should have less impact of the profitability of the project as margins should still be good even at suppressed iron ore prices.

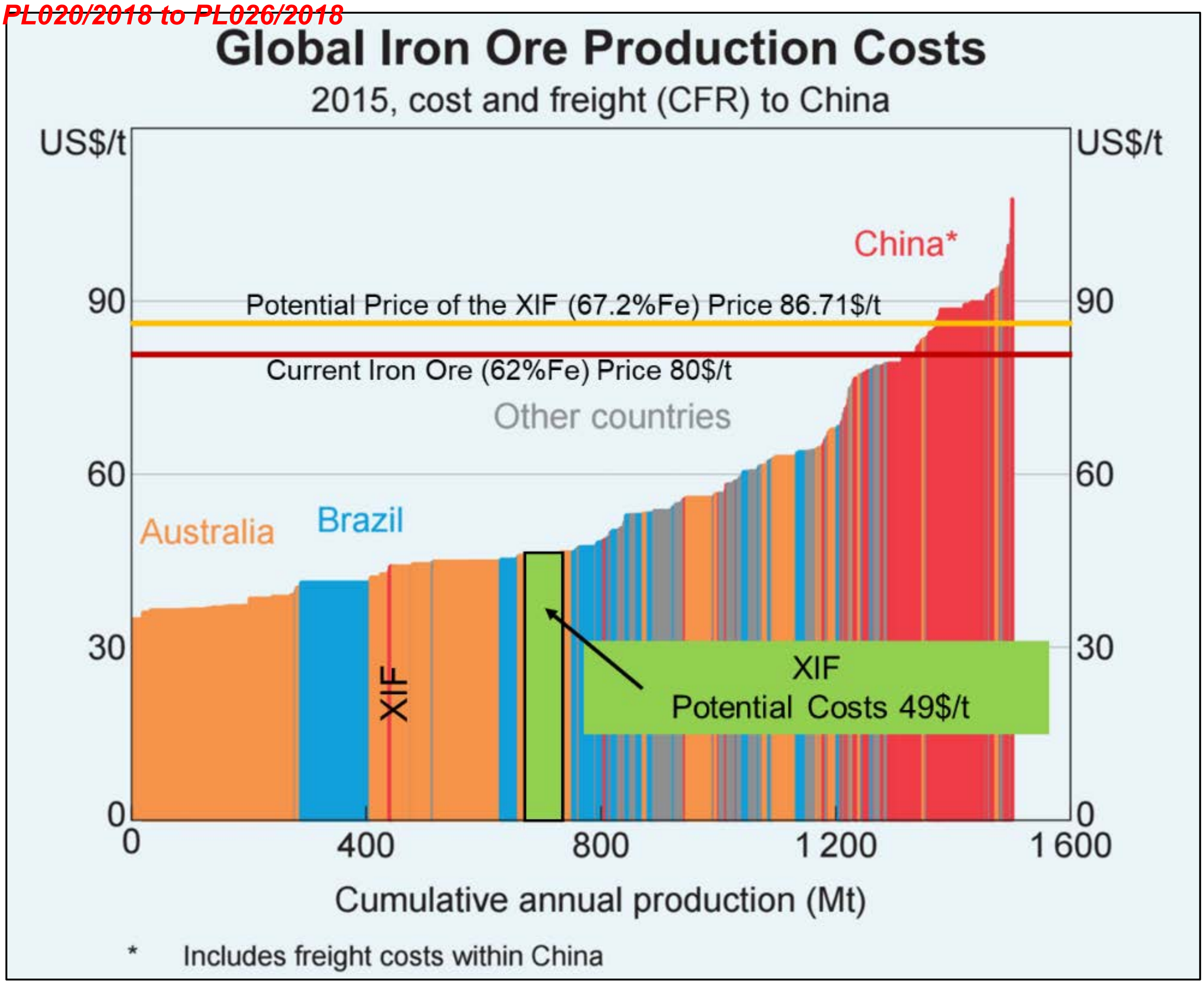


Figure 4. Showing the position of the XIF project using the SRK cost forecast of 44 USD per tonne used in their resource pit optimization analysis for the production of the Xaudum Iron Formations resource, see Baker, 2014.

4.5. Price Sensitivity analysis (market price range analysis)

To compliment this desktop study the same model has been run at prices ranges from $30 per tonne to $140 per tonne price for variations to the global 62% Fe iron ore fines, to show the variation in the NPV at differing prices, see Figure 12a for the large scale mine and Figure 12b for the Block 1 mine.

As you can see the price has to drop to around $50 per tonne for 62% Fe iron ore fines before the study sees a negative NPV's for Block 1. The future of the iron ore price is hard to predict however the pre Brumadinho dam disaster price for iron ore was still well above $60 dollars per tonne (see Figure 13) suggesting that the project should be buoyant about its chance of long term success, given that the market has since not dropped to those lows. This in combination with the product being of a premium iron ore variety allows the project for more chance buoyancy and buffer over a lower grade ore body.

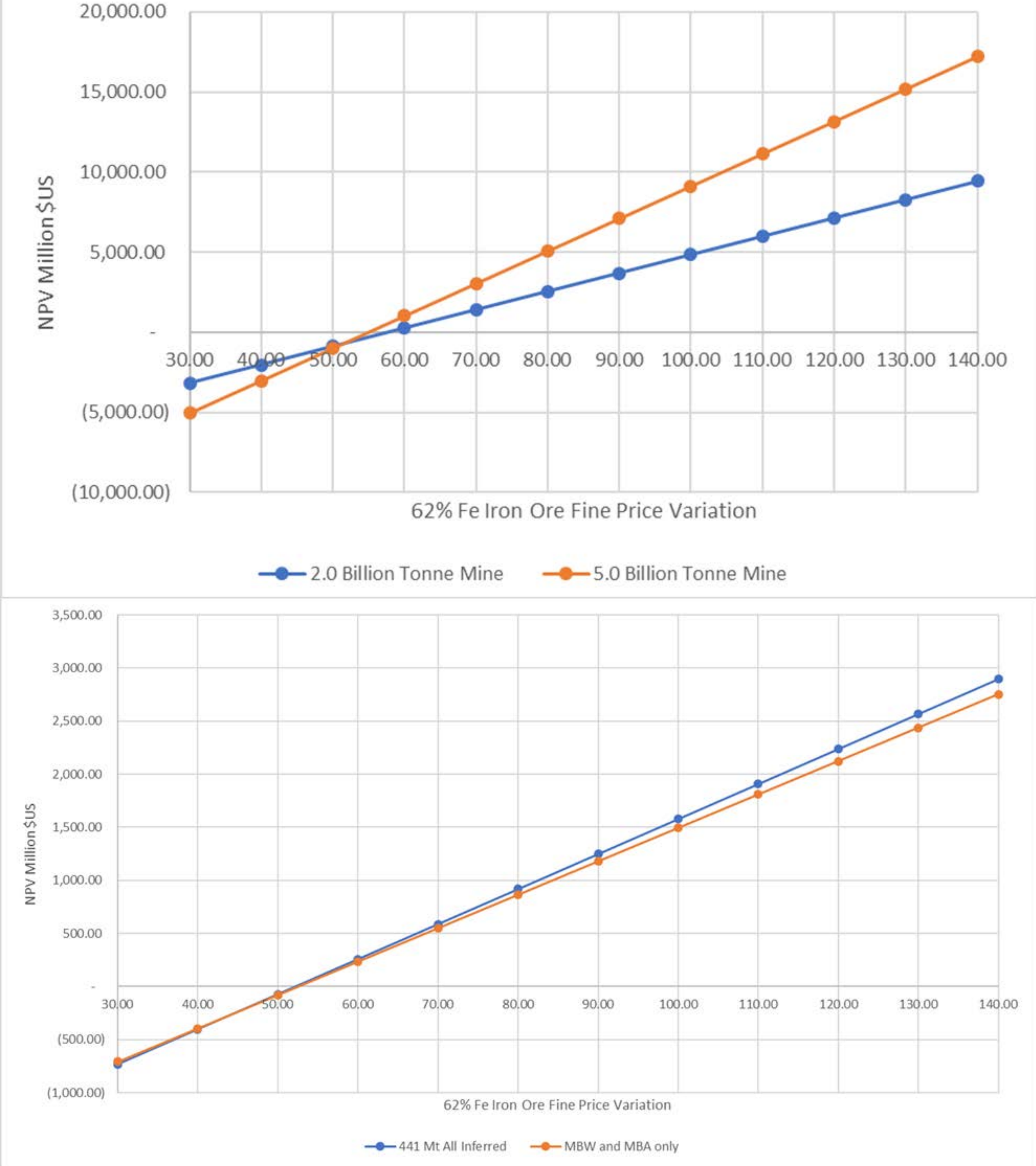


Figure 5. Price sensitivity analysis for the desktop study showing the price of 62% Fe iron ore fines varying from $30 to $140 dollars per tonne for both deposit sizes considered.

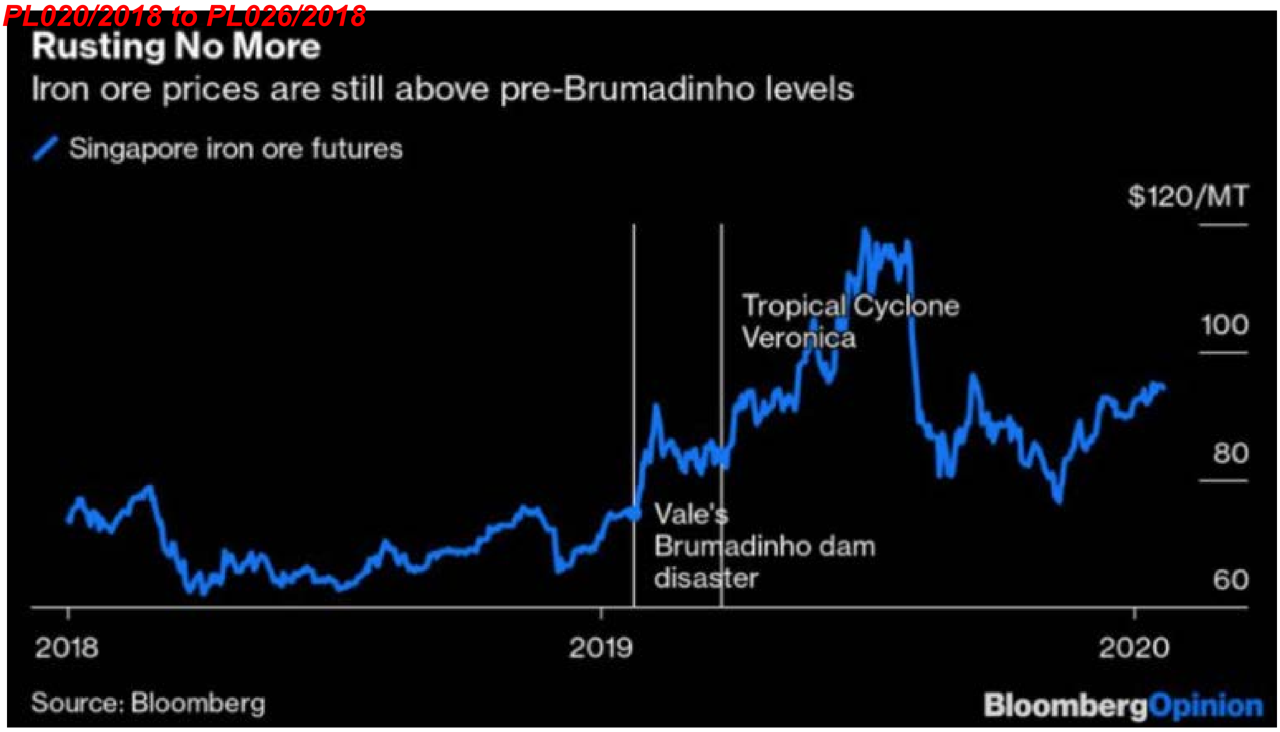


Figure 6. Price between 2018 and 2020 for the global 62% Fe iron ore fines. Highlighting the price before the Brumadinho dam disaster and the prices after and current trajectories.

Table 7. NPV calculations using inputs as shown in table 6 to calculate some first pass NPV results. The excel calculation can be seen in the file supplied called "All XIF_Big Future Mine 2-5 billion tonnes_Version1".

Revenue Inputs for Small Part of Deposit (e.g., Blocks 1 & 2)			SRK NI43-101	Economic Calculations		
Deposit size (Billion Tonnes)	billion tonnes	**2.0**		In Situ Value (billion dollars)	US	$57
DTR Recovery %	% recovery	33.0%	33.1	Gross income per year before CAPEX costs		$472,879,355
DTR Recovery Grade	% Fe	67.2%		Gross income per year (sales - costs) during CAPEX loan	US	$213,618,311
Concentrate Tonnes	billion tonnes	0.66		Botswana Mining Tax	%	25%
Life of Mine	years	50		Annual Profits (after tax) during CAPEX loan term	US	$160,213,733.04
Iron Ore Price/ton	China, 62% Fe fines	$80.00		Annual Profits after CAPEX loan paid	US	$472,879,355
US$ Per Dry metric Tonne Unit (US$/dmtu)	China, 62% Fe fines	1.29		Annual Profits (after tax) after CAPEX loan paid	US	$354,659,516.13
Upgrade premium per ton DTR Recovery Grade (67.2%	67.2	$6.71		Tax Revenue to Government per year during CAPEX loan	US	$53,404,578
Upgraded Price per ton for 67.2% fines	$US	$86.71		Tax Revenue to Government per year after CAPEX loan	US	$118,219,839
CAPEX (e.g., mine construction)	billion USD	$5.0				
Borrowing Rate	%	8.0%		Total Profit during CAPEX loan term	US	$3,204,274,661
Loan Term	years	20.0		Total Profit after CAPEX loan paid off	US	$14,186,380,645.1
Annual Loan Expense (interest)	USD	$259,261,04		Life of Mine Profit	US	$17,390,655,306.0
Mining costs	$/tonne concentrate	$9.00	$9	Life of Mine Tax Revenue to Government	US	$4,614,686,714.91
processing costs	$/tonne concentrate	$15.00	$15	Net Present Value	US	$2,547,076,534
Transport Costs	$/tonne concentrate	$10.00	$5			
Other costs such as wages, admin, etc.	$/tonne concentrate	$15.00	$15			
Total operational costs	$/tonne concentrate	$49.00	$44			
Net Revenue per ton	USD	$37.71				
Inflation Rate	%	6.5%				
ROM production	million tonnes per	38.0	5% reduction on			
Tonnes of Concentrate to be Shipped (67.2% Fe)	million tonnes per	12.5				
Botswana Mining Tax	%	25%				
Years to Start of Mine	years	10				
Remaining Development Costs (e.g., drilling and BFS)	$USD	$150,000,00				

Revenue Inputs for Entire Exploration Target			43-101
Deposit size (Billion Tonnes)	billion tonnes	**5.0**	
DTR Recovery %	% recovery	33.0%	33.1
DTR Recovery Grade	% Fe	67.2%	
Concentrate Tonnes	billion tonnes	1.65	
Life of Mine	years	75	
Iron Ore Price/tonne	China, 62% Fe fines	$80.00	
US$ Per Dry metric Tonne Unit (US$/dmtu)	China, 62% Fe fines	1.29	
Upgrade premium per ton DTR Recovery Grade (67.2% Fe)	67.2	$6.71	
Upgraded Price per ton for 67.2% fines	$US	$86.71	
CAPEX (e.g., mine construction)	billion USD	$7.0	
Borrowing Rate	%	8.0%	
Loan Term	years	20.0	
Annual Loan Expense (interest)	USD	$362,965,46	
Mining costs	$/tonne concentrate	$9.00	$9
processing costs	$/tonne concentrate	$15.00	$15
Transport Costs	$/tonne concentrate	$10.00	$5
Other costs such as wages, admin, etc.	$/tonne concentrate	$15.00	$15
Total operational costs	$/tonne concentrate	$49.00	$44
Net Revenue per tonne	USD	$37.71	
Inflation Rate	%	6.5%	
ROM production	million tonnes per	63.3	5% reduction on
Tonnes of Concentrate to be Shipped (67.2% Fe)	million tonnes per	20.9	
Botswana Mining Tax	%	25%	
Years to Start of Mine	years	10	
Remaining Development Costs (e.g., drilling and BFS)	$USD	$150,000,00	

Economic Calculations		
In Situ Value (billion dollars)	US	$143
Gross income per year before CAPEX costs		$788,132,258
Gross income per year (sales - costs) during CAPEX loan	US	$425,166,796
Botswana Mining Tax	%	25%
Annual Profits (after tax) during CAPEX loan term	US	$318,875,097.23
Annual Profits after CAPEX loan is paid	US	$788,132,258
Annual Profits (after tax) after CAPEX loan is paid	US	$591,099,193.55
Tax Revenue to Government per year during CAPEX loan term	US D	$106,291,699
Tax Revenue to Government per year after CAPEX loan	US	$197,033,065
Total Profit during CAPEX loan term	US	$6,377,501,945
Total Profit after CAPEX loan paid off	US	$43,347,274,193.55
Life of Mine Profit	US	$49,724,776,138.09
Life of Mine Tax Revenue to Government	US	$12,962,652,530
Net Present Value	US	$5,074,376,931

The suggested PEA will be the first level "early stages" scoping study to look at options for processing and engineering strategies to show what could be the most economic methods of processing and developing the resource including; equipment and technology requirements; transport and infrastructure requirements; associated costs such as capital costs, and operational costs, life-cycle costs; and thus anticipated revenues.

In sub-Saharan Africa the iron ore industry is limited to a few main suppliers of steel, and is dominated by the Republic of South Africa. Most sub-Saharan Africa countries import most if not all of their steel and iron, and as such the possibilities of selling iron and steel both domestically and to other Southern African countries is very good. The increasing trend in Sub-Saharan Africa is for urbanization which creates significant and increasing demand for steel. The Southern African Development Community (SADC) with its free trade area agreement in place means that the basic trade agreement framework for sales is already in place. Before the mine closure BCL were in talks with Tsodilo on undertaking a joint venture to develop the Xaudum iron resource as they saw the huge potential of the project and that it fit with their Polaris development project and their plans to significantly increase steel production from the Pula Steel electric arc furnace that they were part owners at that time.

Globally the iron ore and steel markets have been going from strength to strength and have regained a lot of ground on the 2015 market lows, see the Plats iron ore price index and the Metal Bulletin iron ore price index.

The XIF is capable of producing a premium concentrate ore and pellet feed material of 66-68% Fe. The XIF product is very similar to the iron ore concentrate fines and DRI pellet feed produced from global premium iron ore producers in the U.S., Canada, Brazil, and Sweden etc. Similarly, the XIF product will carry a high-grade premium value compared to standard global iron ore products.

There has been a major drive on more environmentally cleaner steel production globally, and most recently in China. Where the Chinese government has placed far tighter restrictions and legislative controls on Chinese steel mills than the industry has seen before. In particular they have imposed controls on emissions in an effort to curb the countries growing "city smog" and airborne pollution crisis. Further to this the Chinese government has also cracked down on substandard steel rebar production primarily from "illegal" induction furnaces in the country, whilst this has had a slight negative effect on supply demand, the consequences are however positive for suppliers of higher quality ore as these operations tended to purchase the lowest "cheapest" quality iron ore and coal. As a result of this action the demand for cleaner higher-grade iron ores have increased dramatically. Cleaner iron ores with a higher Fe content of 65% Fe and above increase high quality steel output and produce substantially lower waste and emissions as higher grade ore uses substantially less coking coal per unit of steel than the lower grade ores that have been the previous main stay for Chinese steel production. This has led to a major increase in the demand for higher grade ores, and thus the premiums that these higher-grade iron ores and direct reduction pellets receive has increased considerably relative to the 62% Fe benchmark. This is excellent news for projects like the Xaudum Iron project that produce premium high end "green" concentrate products like the XIF at 67% Fe and which can easily produce a high quality direct reduction pellet product makes the project highly desirable as currently these products command a significantly higher premium compared to standard lower grade producers in Australia, India and South Africa etc. Additionally, an electric arc furnace could also be added to the project and steel produced and sold, where steel fetches significantly high prices again.

5. Delineation of XIF Resource Outside of Block 1

Tsodilo Resources Limited (Tsodilo) is very excited about delineating a larger Xaudum Iron Formation (XIF) resource outside of block 1, this is why it used a larger deposit size for its exploratory desktop study in the section above. Tsodilo has already shown the potential for a far larger resource outside of Block 1 by defining a conservative exploration target of 5 to 7 billion tonnes of mineralization between 15 to 40% Fe. Using inversion modelling of the ground magnetic data with reference and conversion to realistic volumes and tonnages based on the resource drilled regions (Martinez et al. 2015). However, there is no currently no direction for the development of the project and as such drilling and defining resource outside block 1 without a clear and defined vision of the direction and development plan the project will have, would be drilling for the sake of drilling at this stage. To this end however Tsodilo has defined the next stage of the development of the project is to better design a direction for the project and alongside this define a resource a development plan via detailed options study PEA. As already outlined our general direction for the project and how best to increase the resource outside of Block 1 and upgrade the resource above Inferred level within Block 1 are dependent of the road map for the development of the project that is to be delineated in the upcoming engineering options PEA study.

Whereby the terms of reference for the PEA is to undertake a study into best options for development of the project at various scales and end products and beneficiation and sales streams. The potential options and directions for the development of the project are so varied and the implications of each different for the resource upscaling implications in terms of location and budget, that delineation of a resource outside of Block 1 without fully defining a road map for the development of the project may potentially be futile and costly exercise.

5.1. Block 2 Resource Drill Plans

The above does not precluded a significant upscaling of the XIF resource to well over 2 billion tonnes if this is warranted based on the results of the PEA, far from it, there is such significant potential tonnage upsizing to be had within the XIF that Tsodilo has already made drill plans for an area referred to as Block 2. In fact, Tsodilo has already drilled 11 core drill holes totaling 1,288.50 meters of drilling within this Block 2 area already, totaling 1,003.80 meters of Fe mineralization, see the drill plan in Figure 14 highlighting the 11 already drilled holes.

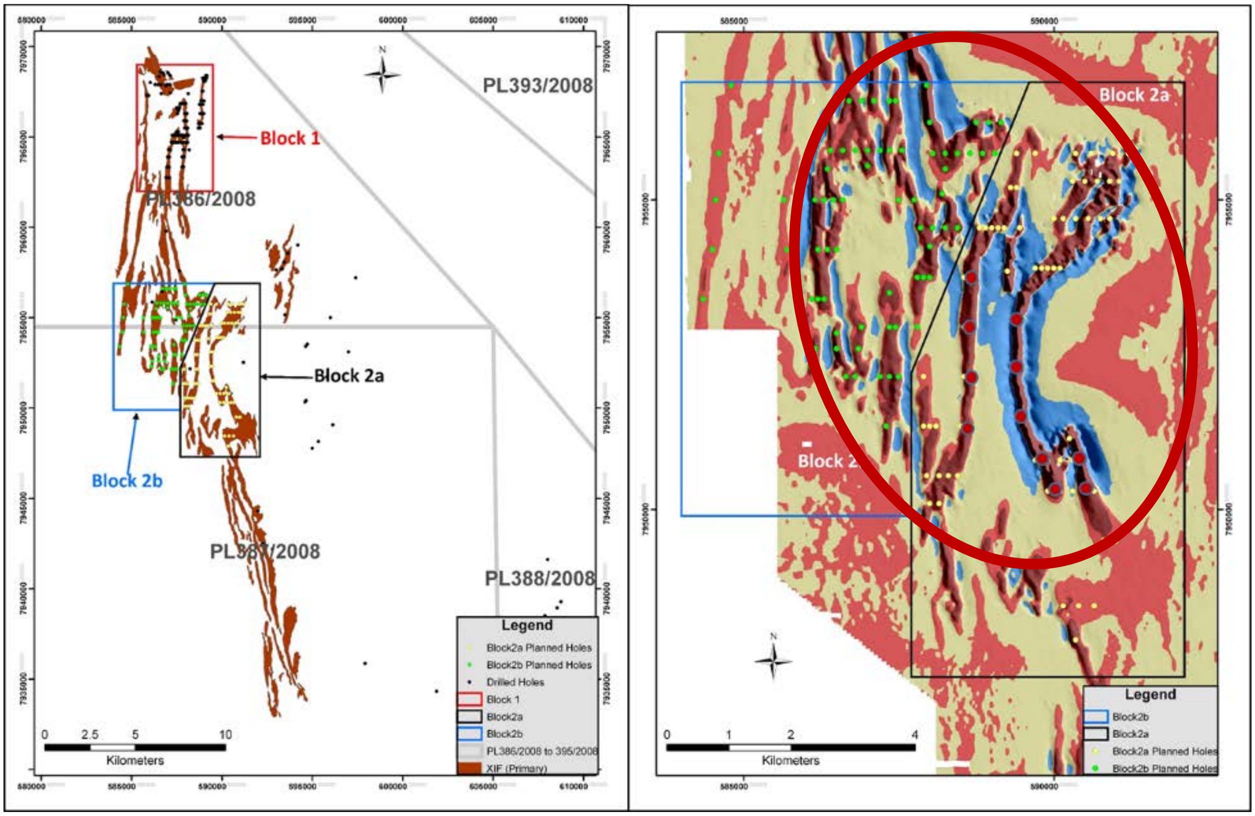


Figure 7. Shows the Block 2 drill plan divided into Block 2a and Block 2b. The map on the left is sows the all of the XIF and the map on the right shows a close up of the XIF on the ground magnetic background. Also shown on the map on the right is the 11 holes that have been drilled into Block 2a (red and blue circles). The larger red oval delineates in a broad manner the area within Block 2 that has been deduced from ground magnetic analysis to likely contain a substantial proportion of high grade +30% Fe material.

This Block 2 drill plan shown in Figure 14 was planned in these locations, and this general Block 2 area prioritized over other areas of the XIF for two very good reasons:

1. That there was an apparent widening of the XIF mineralization in this area, due to apparent units repeating due to folding and faulting, which made this area a good choice for upscaling the resource based on the width of the mineralization being good for mining.
2. That when the magnitude or intensity of the ground magnetic survey signal of the entire XIF area was compared to that within the Block 1 area. There were many areas of apparent very high magnetic intensity signal in Block 2, see the areas inside the red oval in Figure 14. These somewhat mirrored the higher magnetic intensity signal of the higher magnetite content material and as such higher grade +30% Fe material area's within Block 1. Suggesting that this pseudo magnetite/grade mapping whilst fairly imprecise, can be used to some degree as a tool for targeting areas to priorities for further exploration.

Suggesting that is significant potential for further delineation of high-grade material at +30% Fe in the Block 2 area (within both Block 2a and 2b).

Logging and of these 11 holes already drilled into Block 2a contain significant intersections of higher grade +30% Fe material. Suggesting that this analysis and assumption was very much correct in that large amounts of high grade XIF at +30% Fe can be expected within Block 2.

It is likely that this Block 2 area could add 1.5 to 2.0 billion tonnes of Fe mineralization resource on top the current resource defined in Block 1 if drilled to enough detail, of which well over 50% of this mineralization could be high grade 30+ Fe material based on the geophysical assessment mentioned above.

This Block 2 drill plan was started when the price of iron ore was high, however the drill plan was postponed during a major down turn in the price of iron ore at the end of 2014 into 2015, although the price of iron ore has rebounded significantly in more recent time. The company at this time reconciled that the best plan of action was to focus on other exploration projects (also due to budget constraints), whilst it looked into conducting a PEA into the options for development of the XIF project. It is assumed that if there is a positive outcome to the PEA and one of the recommendations is that it would be worth looking into defining more resource, then the Block 2 drill plan can be reinitiated.

Potential to upgrade Block 1 to an Indicated Resource and Comments on Tonnages inside Block 1 at +30% Fe cut-off **Upgrading Block 1 to an Indicated Resource**

Baker, 2014 during his review for the XIF Block 1 NI 43-101 MRE report suggested that indicated resources within Block 1 could be proven in a number of ways:

1. Reduction to < 200m spacing would be enough to classify Block 1 as an Indicated resource. Baker, 2014: "*SRK believes that infill drilling to <200 m drilling gates, along with re-assaying of the historic ICP assayed samples is required in order to delineate Indicated or Measured resources*."
2. Given the drill hole spacing in the northern end of the MBA 3 (See Figure 15) at 150 x 50 m was seen as dense enough currently for defining an indicated resource. However, the

assay method applied in these holes was ICP and as such the quality of the grade results were insufficient to classify it as inferred, see the ICP vs XRF section in Baker, 2014. Baker, 2014 Went on to suggest that re-assaying of one entire hole from each drill section (3 sections: L9600_10, 1821B85, L9600_11W) that were assayed with ICP with the more standard/appropriate XRF analysis type, alongside the inclusion of the later adopted blind QAQC sampling, would be enough to classify this section as Indicated without further drilling in this area.

Baker, 2014: "*The drill spacing in the northern end of the MBA 3 unit is likely dense enough (150 x 50 m) to delineate Indicated Resources in this area, however, all drilling here was conducted prior to the insertion of blind QAQC sampling and the majority of the samples was assayed using ICP methods, which are considered less appropriate than XRF methods. SRK recommends re-assaying one hole (entire hole) on each section (3 sections: L9600_10, 1821B85, L9600_11W) using XRF in order to verify the ICP results and provide greater confidence in the data.*"

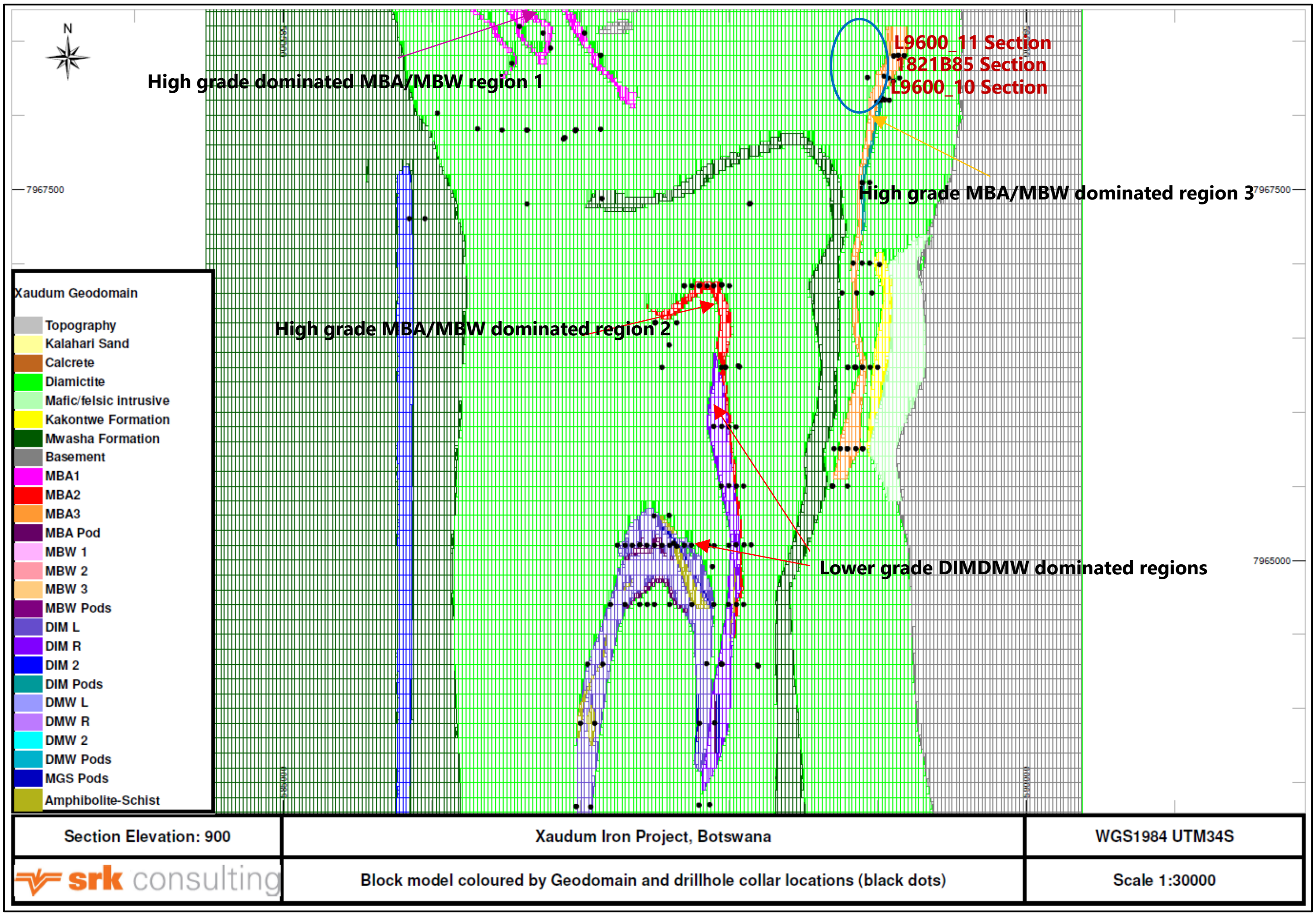


Figure 8. Highlighting the area (smaller blue oval and drill section labels) within Block 2 that Baker, 2014 suggested could be re-classified as Indicated without the need for extra drilling if one hole from each section was re-assayed using XRF analysis adding blind QA/QC samples. Taken from Baker, 2014, showing the drill collars and the 900 m RL block model colored by geodomain.

5.2. Tonnages inside Block 1 at +30% Fe cut-off and Related Recovery Opportunities and Focus for Further Exploration

The tonnage inside Block 1 at different cut-offs has been defined by Baker, 2014 during their analysis of the resource. Whilst all material above a cut-off grade was considered viable as a future minable asset. Baker, 2014: "*The Mineral Resource Statement generated by SRK has been restricted to all classified material falling within the optimized pit shell representing a metal price of USD 1.5 / dmtu for magnetite concentrate and above a cut-off grade of 12% Fe. This represents the material which SRK considers has reasonable prospect for eventual economic extraction potential.*"

This is reasonable when considered in light of other similar magnetite projects that mine a cut-offs of this order when the magnetic separation gives iron grades of well over 65% as is the case with the XIF, such as the Hawsons Magnetite Project that has a cut-off at 9.5% Fe for an overall resource of 755 Million tonnes at a total Fe of 14.7% and a magnetic recovery of ~15%. Further to this the Nevada Iron ore project has a cut-off grade of 10.2 to 10.4% also (Sylvester, et al. 2013), which is again lower than the 12% cut-off grade used by SRK fir the XIF.

It however must be considered that the Tsodilo geologist's geodmained the lower grade DIM and DMW and MGS at Fe above 15% Fe and created solid boundary modelled geodomains in the geological model used by SRK. As such the explaining the somewhat flat lining of tonnage below 15% Fe in the grade tonnage curves for the XIF project, see Figure 16. Making the effective cut – off actually ~15% Fe.

Baker, 2014: "*The grade – tonnage curve for all Inferred material within the resource pit shell and above 12% Fe is shown in Figure 13 20. The curve shows the relationship between the modelled tonnage and grade at increasing Fe cut-offs.*" "*The grade – tonnage curve shows a steadily decreasing tonnage with an associated steadily increasing Fe grade from above a 15% Fe cut off. Steps in the grade profile are observed representing the different geodomains and associated Fe grade populations within the model.*"

Whereby MBA and its weathered equivalent MBW represent the main ore high grade ore geodomains averaging 35.6% Fe (236 Mt) and 34.3% Fe (21 Mt) respectively, will be the main ore taken during future mining. Whereas the lower grade DIM, DMW, and MGS geodomains at 20.9% Fe (148 Mt), 20.5% Fe (29 Mt), and 22.1% Fe (7 Mt) respectively, represent low grade ore that will represent possible future "blend-able" ore based on the future mine plans.

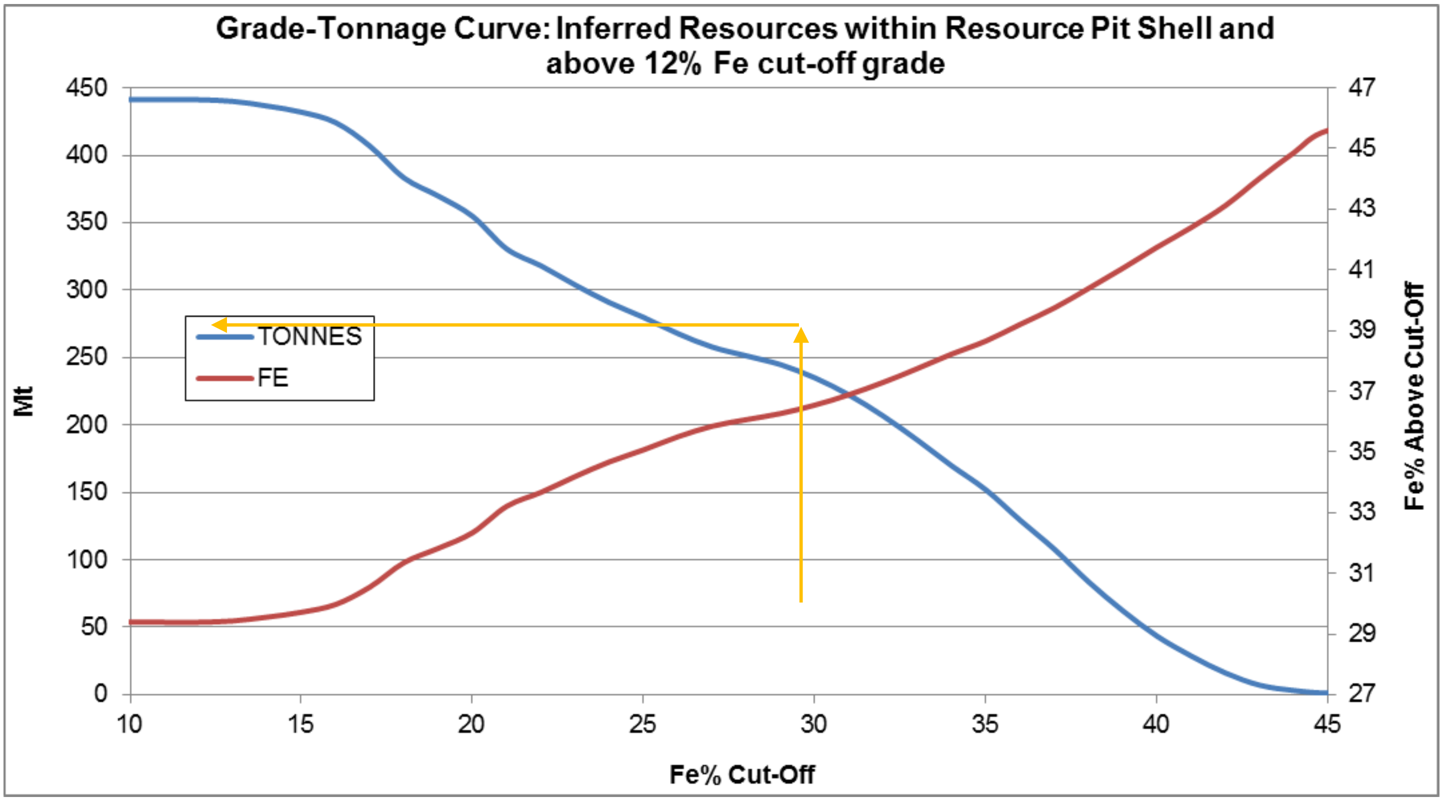


Figure 9. Shows the Grade Tonnage Curve for all Inferred material within (above) the Block 1 pit shell and above 12% Fe cut-off grade. Also show is the projected tonnage above a 30% Fe grade within Block 1 pit shells. After Baker, 2014.

There are also grade tonnage curves of this type published for all ore geodomains (MBA, MBW, DIM, DMW, and MGS) on page 94 to 96 of Baker, 2019 (the SRK NI 43-101 MRE report).

The grade tonnage curves for the Block 1 resource (Figure 16) show that there is around 240 million tonnes of material inside the Block 1 pit shells above 30% Fe. This corresponds very closely with the 257 tonnes of MBA and MBW of inferred resource within Block 1 where 236 Mt of MBA + 21 Mt of MBW = 256 Mt. Suggesting again that these geodomains are predominantly composed of material above 30% Fe.

Alongside this these two higher grade geodomains MBA and MBW naturally have higher Metallurgical recoveries during Davis Tube Recovery (DTR) magnetic separation. Where MBA and MBW have an average of

It has recognized by Tsodilo and Baker, 2014 that MBA and MBW geodomain materials grading +30% Fe represents a far more attractive material for mining than the lower grade DIM, DMW, and MGS geodomain materials. As such will be the focus for future explorations. As discussed above that the relative intensity of the ground magnetics survey signal has been used usefully to somewhat pseudo-map areas of relative higher magnetite content and as such likely higher grade, allowing for this to be used to priorities areas for future “high-grade” exploration drilling.

Baker, 2014: "*As a result of the pit optimization, it is clear that the DIM, DMW and MGS units are marginally economic using the optimization parameters noted above. This is a result of a combination of the low Fe grades and the low Fe recoveries from the DTR analysis. It is therefore recommended that future exploration attempts to focus on the MBA material. If the MBA Mineral Resource can be increased, this may improve the economic viability of the lower grade DIM, DMW and MGS mineralization.*" "*In view of this, SRK recommends that a study is undertaken to attempt to differentiate between the geophysical signatures of the MBA and the other material types. If the different material types prove to have differed geophysical signatures, it would be possible to focus the drilling more effectively*."

6. **Geology of the XIF: Regional Geology**

The geology of the region comprises a thick late Neoproterozoic sequence of sediments of the Katanga Supergroup (ca. 750 - 560 Ma), consisting of metamorphosed (up to amphibolite grade, with local kyanite) and deformed diamictites, sandstones, silts and substantial carbonates, each interbedded with intermittent banded ironstone formation (“BIF”). These metasediments overlie with profound unconformity, a complex granitoid Archaean-Proterozoic basement. Khoza, et al., (2013) defined this metasedimentary sequence as a passive margin sequence which was deposited on a rift margin and over-thrusted onto the craton during the amalgamation of Gondwana around 495 Ma. The sediments were severely deformed and tectonically displaced in the Southern African (Damaran-Lufilian-Zmabezi) orogeny between 750 Ma and 540 Ma. This is demonstrated by intense local cleavages, and shear zones separating suspected granite gneiss slices, as well as large scale overturning observed within the core sequences. The Project is within a geological region that forms a Neoproterozoic suture zone between the Kalahari and Central African Shields; the regional and general geological setting is shown in Figure 18.

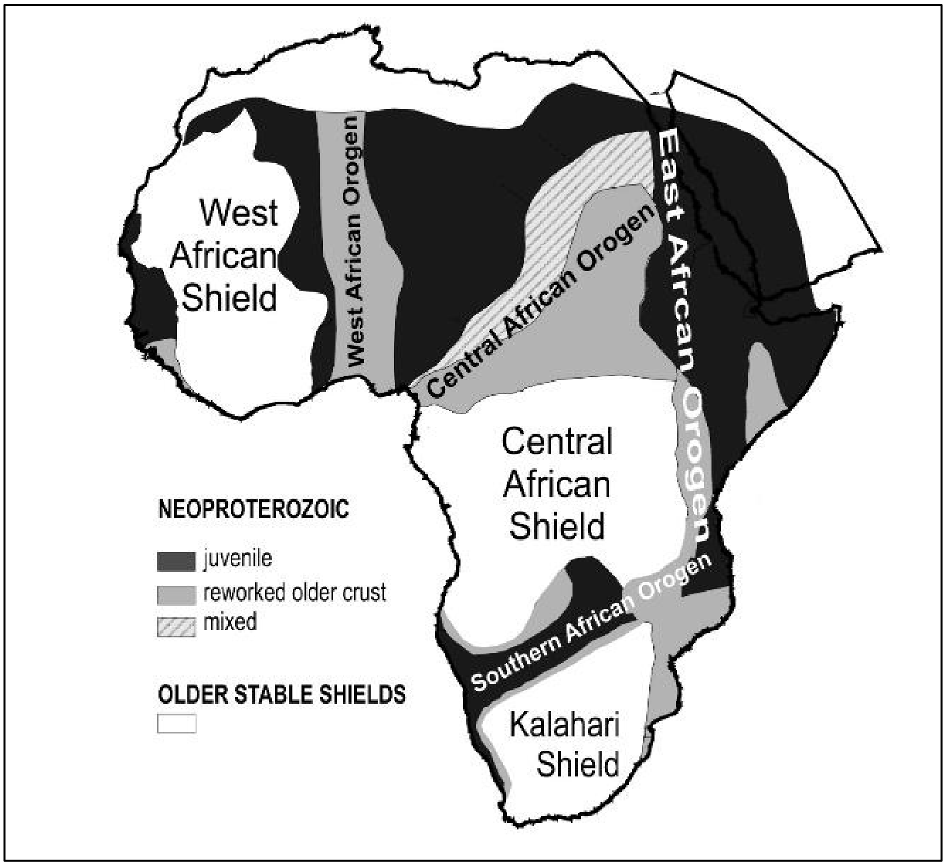


Figure 10. Major African tectonic terranes (Source: De Wit, 2009).

The basement rocks of the area recognized to date are Neoarchaean to Palaeoproterozoic age (ca. 2.6 and 2.0 Ga, respectively). Some samples drilled by the company recorded zircons with Archean age range of 2.8 Ga to 2.6Ga. Detrital zircons in the Neoproterozoic succession indicate also that older and younger granitic basement (ca 2.7 and 1.0 Ga) also contributed as a source terrain for the sediments.

The entire Tsodilo sequence is intruded by a complex set of gabbro-mafic sills and dykes, which display in places distinct hydrothermal alteration along the contacts of the sediments, displaying 'skarn-like' metasomatic reactions (coarse garnet, quartz-epidote-rutile-magnetite-sulphides). These intrusions are early Cambrian in age (ca. 540 Ma).

This general geochronology and lithostratigraphic sequence resembles closest those from the Lufilian Arc in Zambia, especially the Kalumbila sequence as reported by Steven and Armstrong (2003).

The Project area sits in between two well-established mining districts in Zambia-DRC and Namibia; these districts are related to the Lufilian Arc and the Damaran Belt, respectively. De Wit (2009) suggests a north-easterly continuation of the ophiolites of the Matchless Amphibolite Belt ("MAB") within the Damaran Belt extends into the Project area through trans-current shearing. The ophiolites may represent the source of metals associated with metalliferous deposits in the area. Figure 19 shows the interpretation by De Wit (2009), with the MAB extension ("MABE") in Botswana shown between Namibia and Angola-Zambia. Figure 20 shows a similar interpretation linking the XIF and Central African Copper belt, after Hitzman, et al 2013.

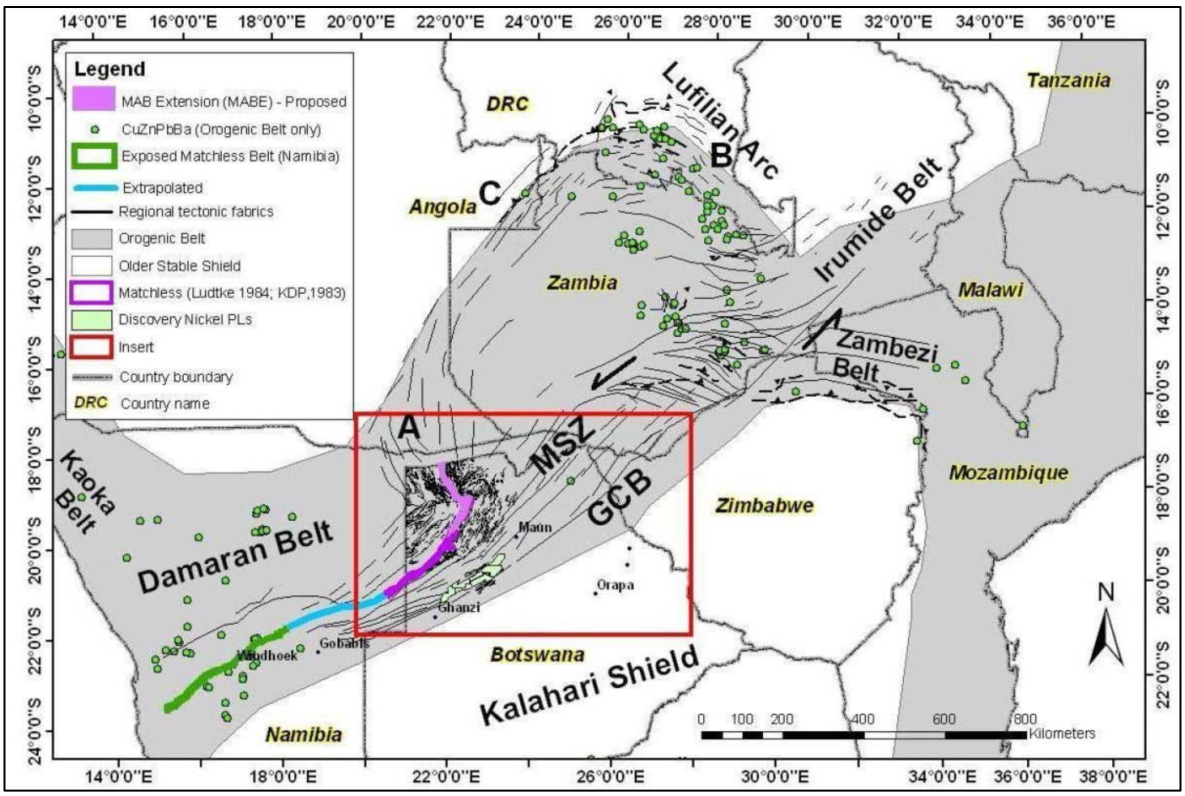


Figure 11. Southern African Orogeny tectonic map. (Source: De Wit, 2009).

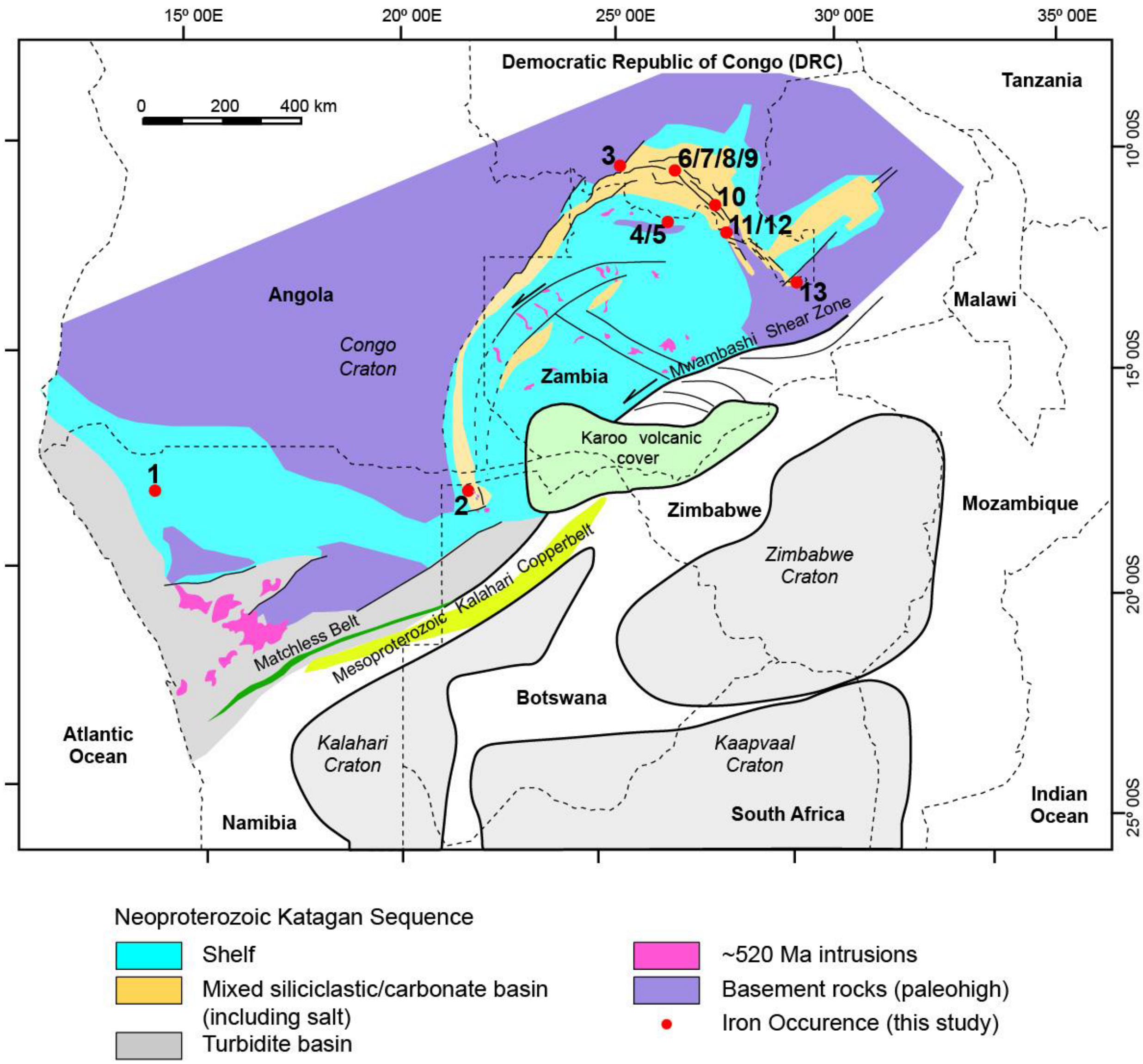


Figure 12. Generalized geologic map of the Katangan and Damaran areas of southern Africa showing the location of same age iron formations to the XIF in the local region. Map after Hurth, 20187, modified from Hitzman et al., (2012). Iron occurrences: 1= Kaoko belt, 2= Xaudum, 3= Kamoa, 4=Kansanshi, 5=Chafaguma Hill, 6= Kabolela, 7=Mukondo, 8= Bangwe, 9= Mulenga, 10= Kipushi East, 11=Konkola, 12= Kasumbalesa, 13= Fishtie.

6.1. Local Geology and Deposit Stratigraphy

Lithologies intersected in drill holes at Xaudum can broadly be correlated with those in the Zambian-Congolese Copperbelt (Figure 20 and Figure 23, after Hitzman, 2013). They include Pre-Katangan Supergroup basement meta-granite and metamorphosed sedimentary rocks that appear to correlate with Roan Group Mwashya Subgroup and Nguba Group rocks (Figure 22)

(Hurth 2017). The XIF is contained within the Grand Conglomerate unit of the Nguba Group. Figure 21, 22, and 23 illustrate the general stratigraphy of the Tsodilo license areas.

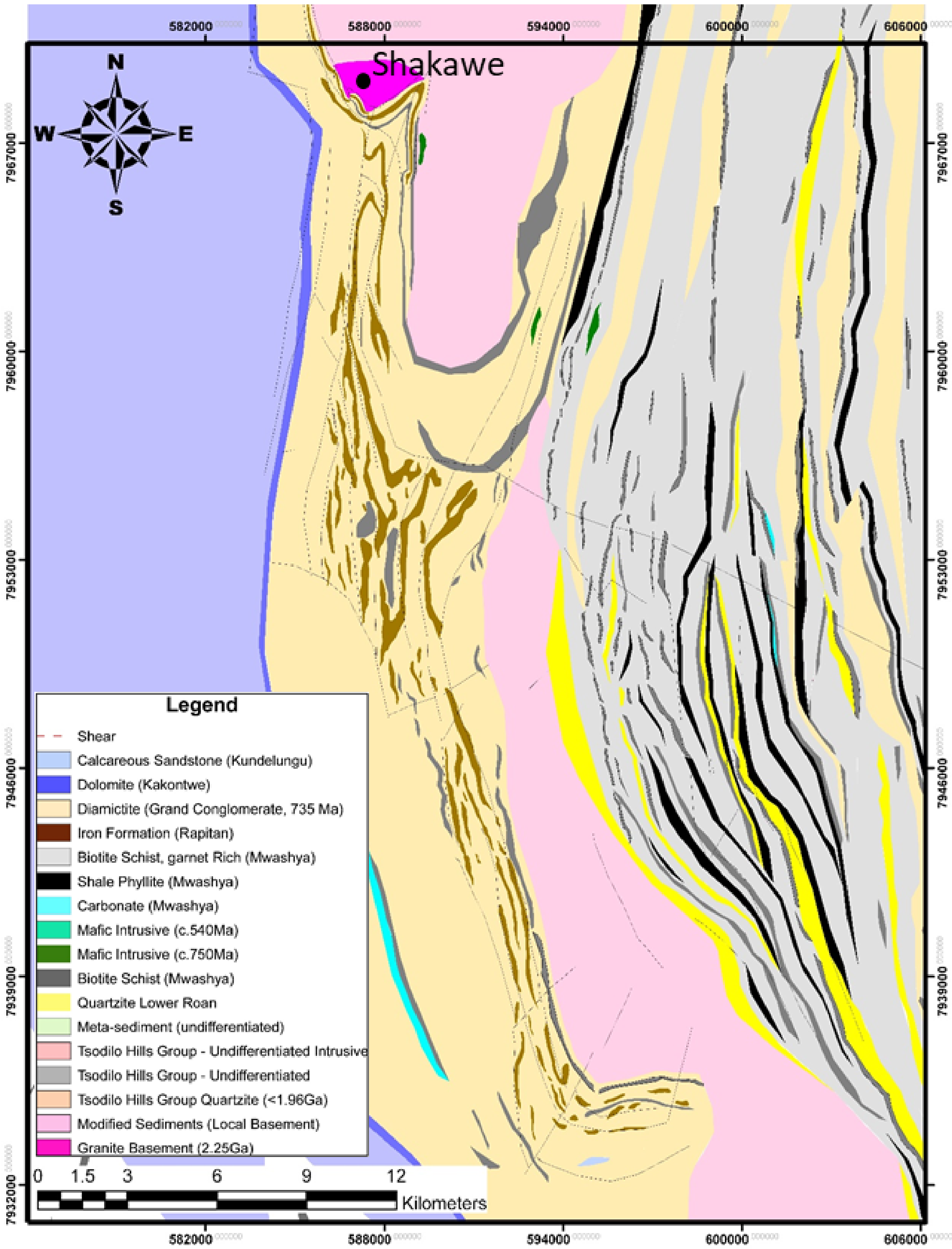


Figure 13. Local geology map showing main stratigraphic units and faults

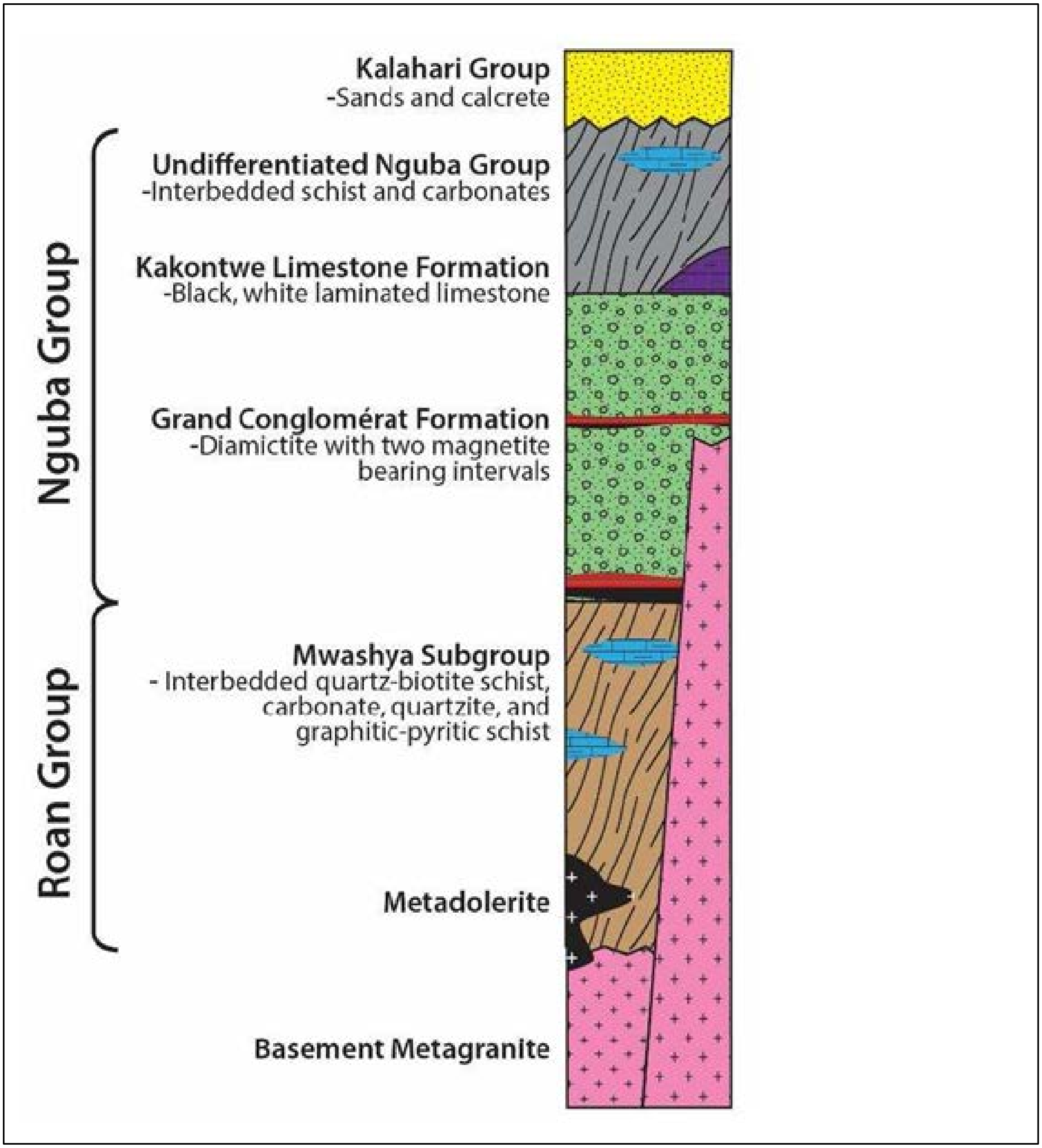


Figure 14. Stratigraphy of the Xaudum area based on drill hole data. Strata above the Nguba Group Grand Conglomérat Formation were grouped into undifferentiated Nguba Group. It is possible that Roan Group metasedimentary rocks older than the Mwashya Subgroup are present at Xaudum below the level of current drilling (Hurth, 2017)

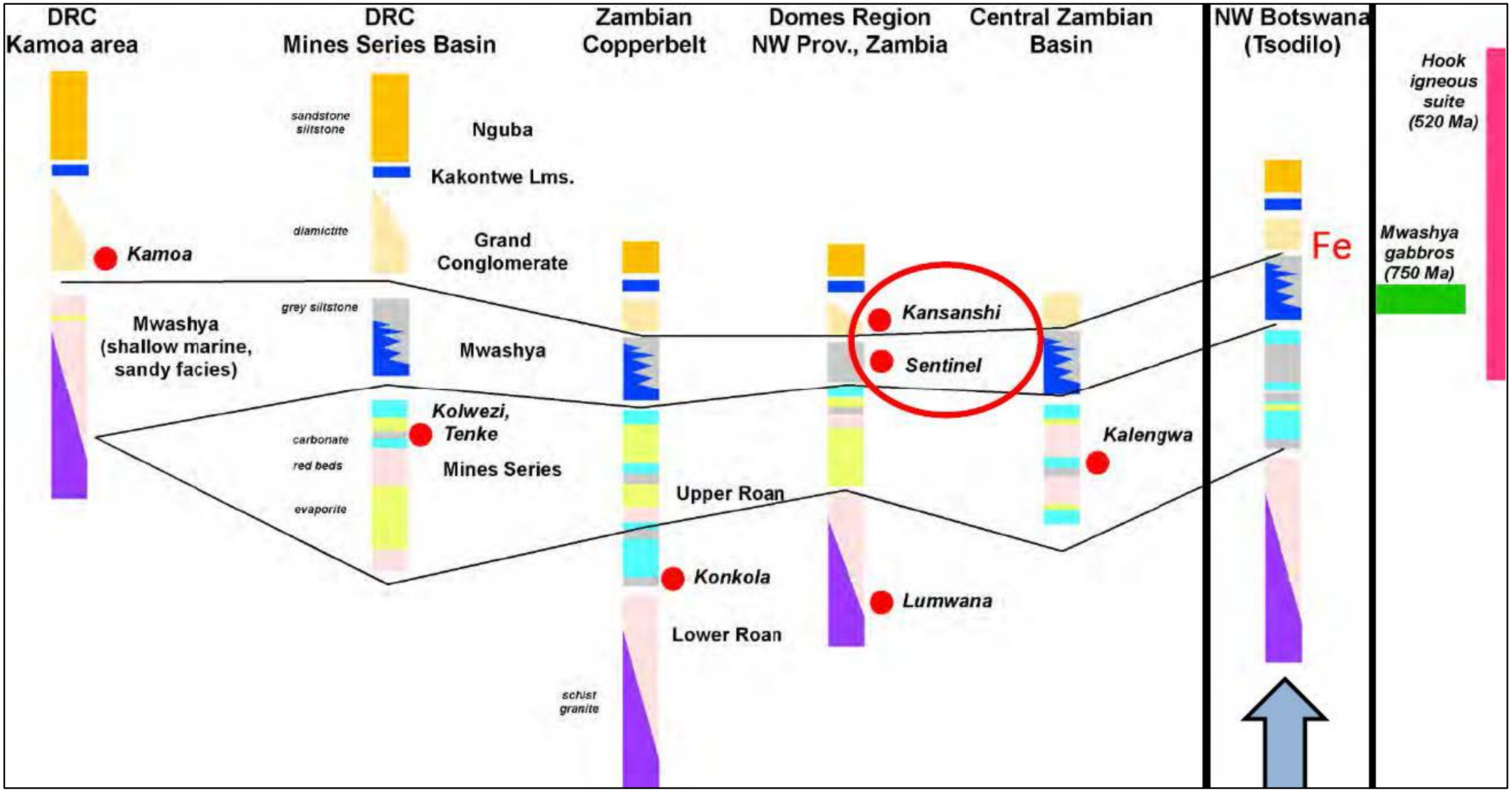


Figure 15. Stratigraphic horizon comparison between DRC-Zambian Copperbelts and Xaudum (Tsodilo) (Source: Hitzman, 2012)

6.2. Mineralization

The XIF mineralization occur within 'Grand Conglomerate' equivalent diamictite horizon, which is referred to as a diamictite schist (Geodomain DIA). These diamictites, are a glacial origin marker horizon within the Neoproterozoic rocks.

Drilling to date has confirmed that the XIF is comprised of two major and one minor mineralized fresh material types (Geodomains), along with two weathered material types:

Magnetite banded (banded iron formation ("BIF") material (Figure 24). This material is coded as MBA (for magnetite banded) when fresh. MBA is generally well banded with dark (magnetite rich) bands and light (quartz and silicate rich) bands. It is suggested that the MBA Geodomain generally formed from a cherty-shaley BIF which was subsequently regionally metamorphosed and recrystallized to amphibolite facies.

Figure 16. Banded magnetite - Geodomain

b. **Weathered magnetite banded material**, coded MBW, represents near surface partially weathered MBA material (Figure 25). Clay development is limited and the material is not observed to be "sticky" with clays.

Figure 17. Weathered Banded magnetite

c. **Magnetite diamictite schist**, (Figure 26, coded DIM (for diamictite magnetic). DIM has a very similar appearance to the un-mineralized diamictite (coded DIA), however, the DIA is non-magnetic. DIM is generally a well-foliated schist with a high percentage of magnetite. There is no obvious segregation of magnetite as seen in MBA, so whilst it does not have a classic BIF form, it is still an iron formation material. The genetic origin is suggested as a ferruginous, silty to sandy shale or semi-pelitic sediment with varying contents of Ca and Mg, which has been metamorphosed to amphibolite facies. The leucocratic felsic clasts are believed to represent pebbles, indicating a glacial origin and so have been termed diamictites.

Figure 18. Magnetite diamictite schist (DIM)

d. Weathered magnetite schist, coded DMW, represents near surface partially weathered DIM material. The magnetite is variably oxidized to hematite (martite) and goethite but not fully decomposed. As with MBW, clay development is limited.

e. Minor unit – magnetite garnet schist, coded MGS. Magnetite and Garnet are the dominant minerals, however, abundance is quite variable. MGS can have a sub-banded to sub-foliated nature, and can appear similar to MBA when magnetite is dominant. The genetic origin is suggested as an iron-rich calcareous (±Mg) shaly semi-pelagic sediment, which has been metamorphosed to amphibolite facies. (Figure 27)

Figure 19. Magnetite garnet schist (MGS)

6.3. Structural Geology

Several geological and structural logging and interpretation programs have been completed on the Project to date. Three of the most recent reports are discussed below.

A report on the structural geology of the Xaudum Project was undertaken by Colorado School of Mines (Nelson, 2012). The results of the study are described below.

Structural logging of cores was undertaken in the northern portion of the license area. This consisted of observation and description of various core-scale structures as well as construction of dip logs in vertical drillholes. This analysis indicates that the structure of the prospect area is very complex and likely developed by both early extensional tectonism during basin formation, as well as during subsequent poly-phase syn-metamorphic deformation likely formed during crustal shortening tectonism. During the crustal shortening tectonism, two principal deformation events (D1 and D2) are recorded in the structures, and likely formed during a progressive deformation event rather than during two deformation events separated by a large time interval.

Based on 2011 logging (Hitzman, 2011) and the structural logging of 2012 (Nelson, 2012), a series of maps were produced to show the distribution of three structural features in core: high versus low dip domains, folded domains, and stratigraphically overturned domains. These maps show that high-dip domains, folded domains, and overturned sections all are concentrated along the eastern magnetic anomaly just west of the proposed palaeo-normal fault. This is consistent with strong deformation having developed in the hanging wall of this normal fault when it was inverted (reactivated) as a reverse fault. In this model, the footwall acted as a buttress against which strong folding occurred and resulting in a steeply dipping iron formation section (Figure 28).

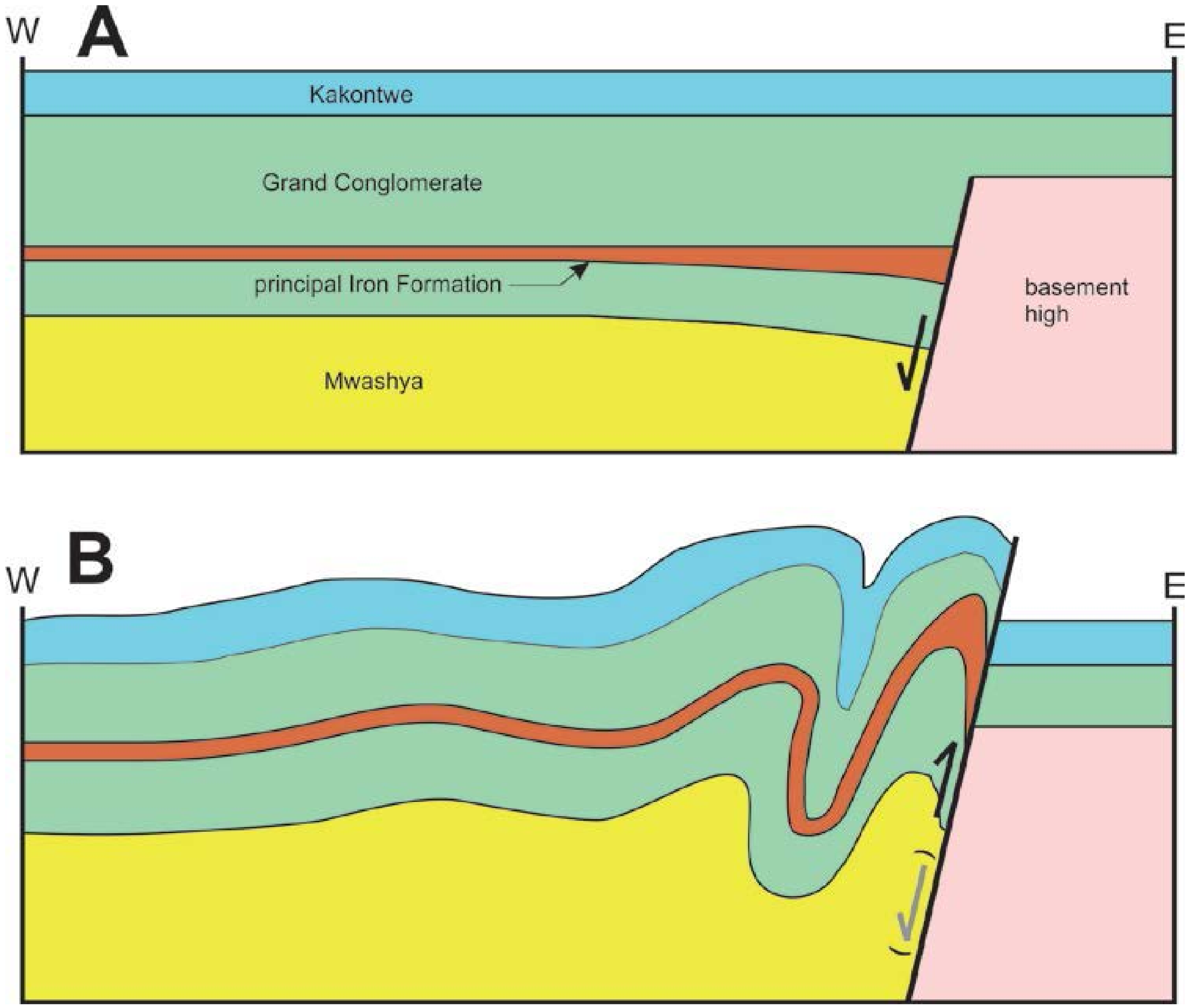


Figure 20. Schematic cross-section of northern XIF geological structure (Nelson, 2012).

This interpretation by Neloson is affirmed by more recent work and interpretatins by Hurther, 2017 where by he analysed the same rock units and data and came up with the same general conclusions, see Figure 29 below. Where by suggesting that syn-sedimentary normal faulting resulted in thickness changes within the Katangan Supergroup sequence and stratigraphic pinch outs over basement highs. This then transitioned into a burial and compressional regime whereby this compression resulted in reactivation of the faults to form reverse structures with local zones of intense folding adjacent to the original basement highs.

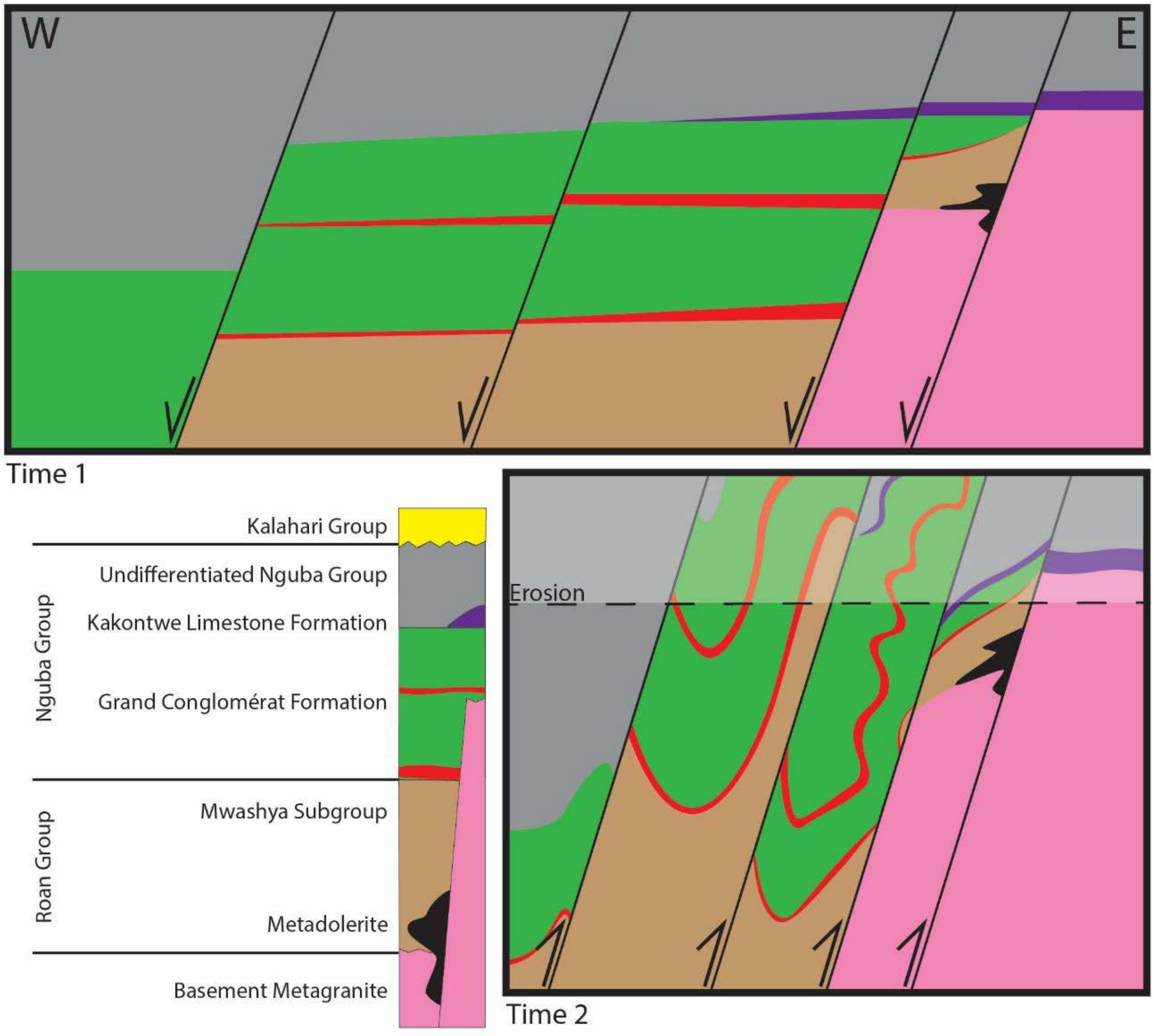


Figure 21. Schematic cross sections illustrating a structural model for the Xaudum area. During Time 1 synsedimentary normal faulting resulted in thickness changes within the Katangan Supergroup sequence and stratigraphic pinch outs over basement highs. During Time 2 regional compression resulted in reactivation of the faults to form reverse structures with local zones of intense folding adjacent to the original basement highs.

Hurth, 2017 went on to draw further conclusions and made a simplified schematic map of the Block 1 area showing the relationships between the lithology and the structural conditioning of this area and how that defines the Block 1 ore body development and across dip and down dip geometries, see figure 30.

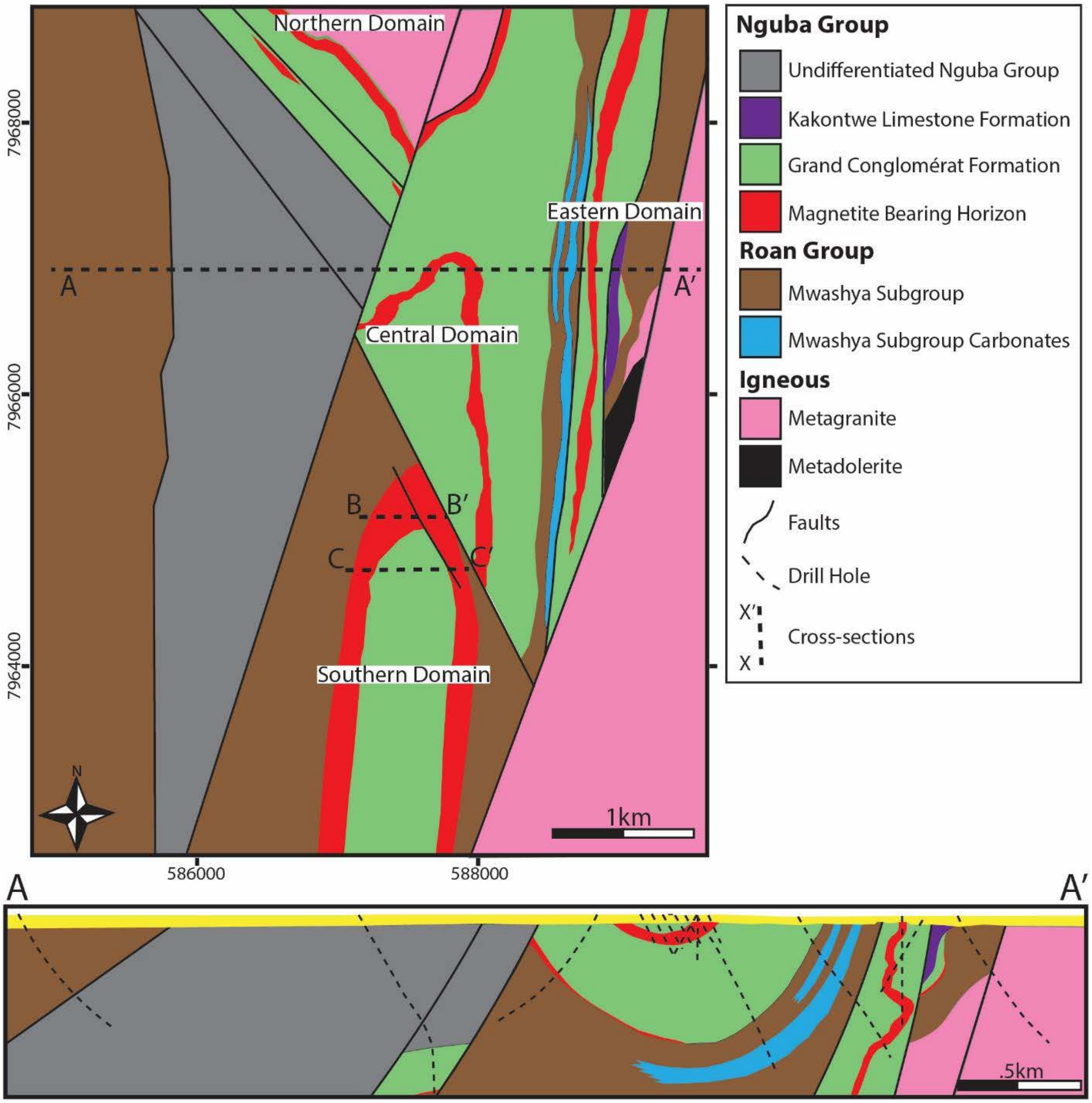


Figure 22. Simplified bedrock geologic map of the Xaudum area (which corresponds with the Block 1 area) derived from drill, EM, and ground magnetic data. Cross-section A-A′ illustrates the structure and stratigraphy of the Block 1 prospect area.

262 structural data points from oriented drill core from fence lines; L9600-11, 1821B85, L9600-10, L9600-13 and 1821B90E were collected and analyzed, a short interpretation is given below:

The banded iron formation showed all characteristics of tight to isoclinal folding with parasitic S- and Z-folds formed on the fold limbs and M-folds in the hinge zones. Monoclinal open folds are also present.

b) There is a moderately well-developed axial planar cleavage cutting through the hinge zone of the tight folds containing consistent ~5mm long laths of inter-grown amphibole crosscutting the general foliation.

c) Fold hinge zones are much more prevalent in the banded iron formations than the more massive diamictite. Figure 31 below shows the effect of horizontal compression on layers of different thicknesses. A thick layer (a) will tend to thicken marginally and to buckle to a low amplitude. A thinner layer (b) will tend to thicken less but have a higher amplitude of deformation. The thin layer (c) will buckle in to tight high amplitude folds to take up the strain.

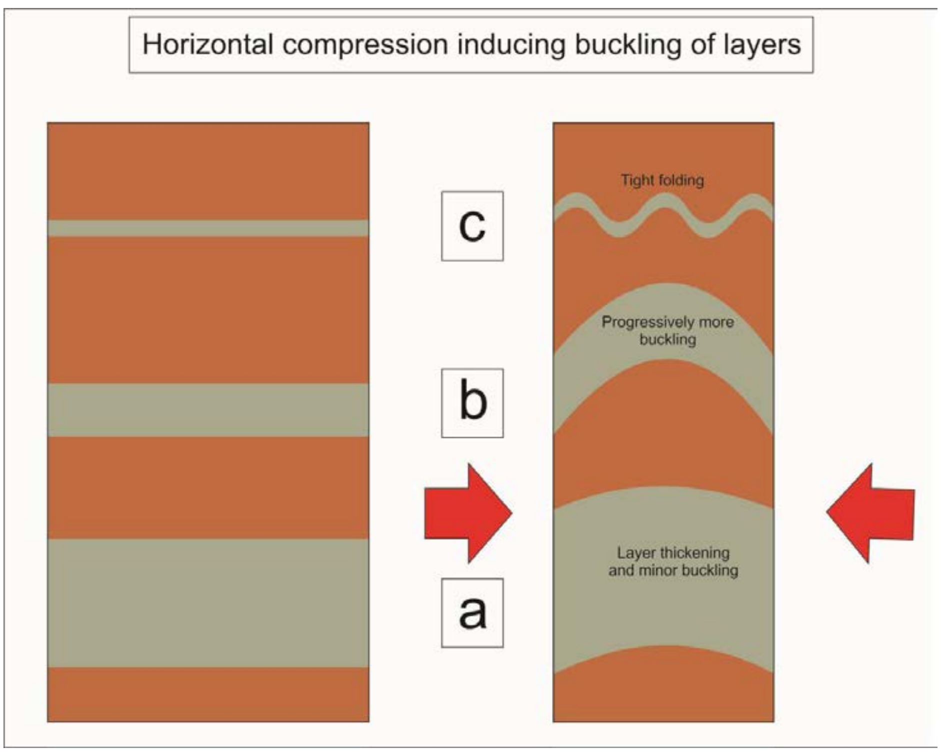


Figure 23. Possible scenario of the deformation present in the Xaudum Iron formation (Andersen, 2013)

The diamictite represents the thicker layering and the banded iron formations the thinner layering. The regional structure of the area comprises a set of rather tightly overturned anticlines and synclines verging to the east, see Figure 32, which is similar further emphasis the Block 1 structures.

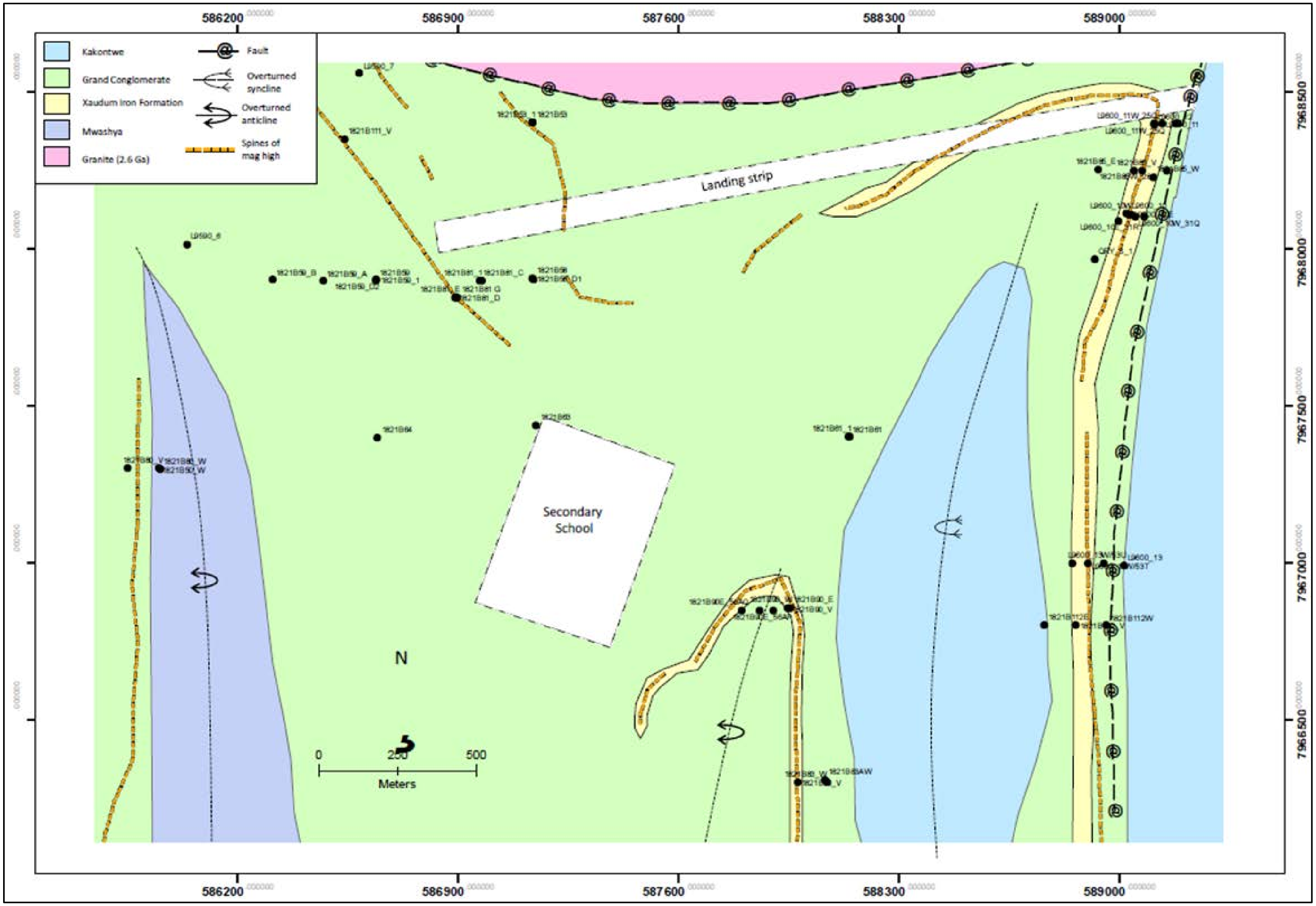


Figure 24. Regional Structural map within Block 1 of project area (Andersen, 2013).

6.4. Weathering

Shallow chemical weathering affects the lithologies directly under the Kalahari Sand cover. The weathering is non-pervasive and results in a rusty coating of the XIF, rather than material decomposition. The weathering alters magnetite into hematite and other iron oxides locally, potentially affecting the geometallurgy and processing of the material when mined. However, the average vertical depth of weathering varies between 0 and 60 m in the Block 1 area, and averages approximately 17 m; it is not considered a material volume of material when compared to the fresh material.

6.5. Deposit Type

The XIF has been identified as a Rapitan style BIF of Neoproterozoic age. Neoproterozoic BIF formations have been proposed to have formed during or in the immediate aftermath of the so called Neoproterozoic "Snowball Earth" state at that time (considered to be around 0.5-0.8 Ga in age). Other examples of Neoproterozoic BIF include the Rapitan Group in northwest Canada; the Yudnamutara Subgroup, Braemar Iron Formation, Australia; the Chuos Formation, Namibia; and the Jacadigo Group, Brazil, Urucum district.

6.6. Discussion

Xaudum is one of several iron oxide-rich deposits of Sturtian age, termed 'Rapitan-type' deposits, that marks the return of widespread iron deposition after a one-billion-year hiatus (Klein and Buekes, 1993; Cox et al., 2013). Rapitan-type deposits typically display an association glaciogenic strata and contain ferruginous siltstones or in the case of the XIF ferruginous diamictite. They commonly show abrupt thickness changes and are located in extensional basins. The Xaudum iron prospect shares all of these characteristics.

Some Rapitan-type deposits appear to have formed through exhalative processes in which iron-rich hydrothermal fluids migrated along faults and either debouched into basins or infiltrated permeable sediments resulting in the precipitation of iron bearing mineral, Hurth, 2017.

Most Rapitan-type deposits appear to have formed from a sedimentary origin, whereby the sedimentary units can have strike lengths of 10's of km like the XIF, Hurth, 2017. Further evidence for a sedimentary origin of these deposits includes the presence of 'iron formation' clasts in the diamictites that host the deposits.

The synchronous and short-lived reappearance widespread of banded iron deposits in the Sturtian a period of extreme perturbations of the Earth surface environment, strongly suggests that the chemical conditions of Neoproterozoic oceans were a critical factor in the formation of Rapitan-type iron deposits. Local or global ice cover during the Sturtian is likely to have led to stagnant, anoxic conditions in Neoproterozoic oceans that facilitated the accumulation of dissolved Fe2+, see the depositional model in figure 33, proposed by Hurth, 2017.

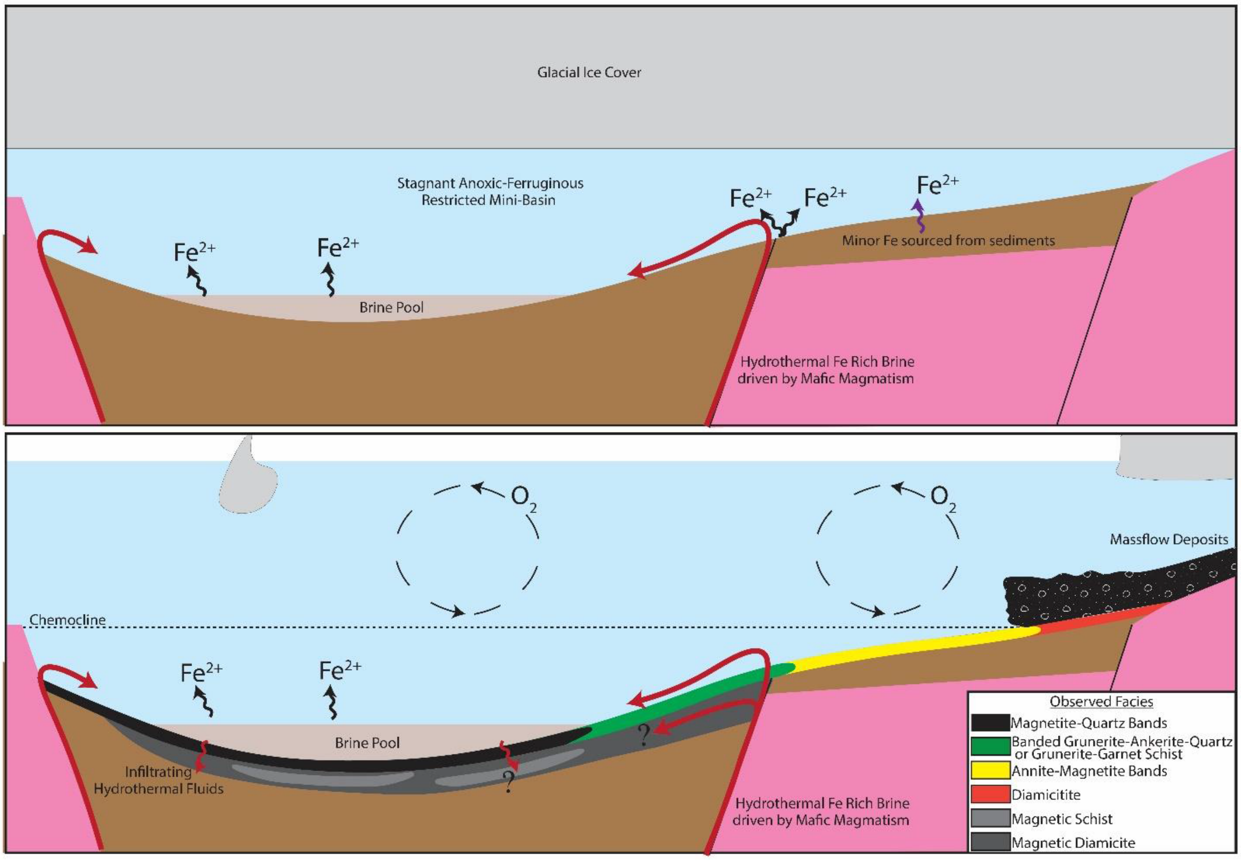


Figure 25. A simplified depositional model to explain the lateral facies distribution of the Xaudum iron deposit during periods of glacial ice cover (top) and interglacial transgression (bottom) based on the distribution of rock types and magnetite mineralized units, assay data and geochemistry of magnetite mineralized units at Xaudum. During periods of glacial ice cover the restricted sub-basin became anoxic resulting in the concentration of dissolved Fe2+ in seawater derived primarily from hydrothermal brines. During interglacial periods surface waters were oxygenated resulting in the development of an iron chemocline. Banded magnetite rocks could have been deposited during periods of reduced sedimentation (receding ice margins) with deposition of more argillaceous facies closer to the basin margin. After Hurth, 2017.

6.7. Conclusions

The iron occurrence at Xaudum forms a 37 km NNE-trending magnetic anomaly in northwestern Botswana. Iron-rich rocks form two stratiform horizons hosted within diamictites of the Neoproterozoic Nguba Group Grand Conglomerate Formation that were deposited above and adjacent to paleo-highs along a basin margin.

The iron-rich rocks and surrounding sediments were complexly deformed during a later tectonic event. These now metamorphosed iron-rich rocks include magnetic diamictite (DIM), and banded magnetite units (MBA), where the DIM units contain disseminated magnetite. The banded magnetite consisted of a pre-metamorphic mineral assemblage of iron oxide-cryptocrystalline quartz-ankerite-dolomite with minimal argillaceous material, Hurth, 2017.

7. XIF Metallurgical Studies

Preliminary magnetic concentrate sizing test work using Davis Tube Recovery (DTR) method was conducted at the ALS Minerals Division, Iron Ore Technical Centre. This test work was overseen by the competent person Mr. Wayne Abbott the Operations Manager (Analytical) for the ALS Minerals Division of the Iron Ore Technical Center (Wangara, Perth, Western Australia).

This DTR test work was conducted on 15 composite samples (12 in November 2013, and 3 in June 2014) comprising the full mineralized geodomain suite. The results from all of these mineralized samples was very encouraging and showed that the XIF had significant potential. As a blank for comparison purposes two non-mineralized DIA samples were also sent, as expected these gave negligible recovery results. The test work has been conducted on the following samples:

- Non-mineralised diamictite schist (geodomain DIA) – 1 sample;
- Low grade magnetic diamictite schist (DIM) – 5 samples;
- Weathered magnetic diamictite schist (DMW) – 1 sample;
- Low grade magnetite garnet schist (MGS) – 2 samples.
- High grade banded magnetite (MBA) – 5 samples; and
- Weathered banded magnetite (MBW) – 1 sample.

The locations of the drillholes used for creating the composite samples for DTR test work is shown in Figure 43 show that they were taken over a good level of geographic dispersion in Block 1.

These composites were comprised of 8 to 10 meters of drill core from 11 different drill holes (see data tables in "17. Metallurgy Davis Tube Recovery Data for the Xaudum Iron Formation Evaluation Program" folder)

- 2 x 10m DIM samples from drill hole L9600_10W31Q (56.5 to 66.5m) and (77.5 to 87.5m);
- 1 x 13.3m DIM sample from drill hole 1821B83E67AM (65.9 to 79.2m);
- 1 x 10m DIM sample from drill hole 1821B121E91AV 104.0 to 114.0m);
- 1 x 8m DMW sample from drill hole 1821B85V (27.5 to 35.5m);
- 1 x 10m MBW sample from drill hole 1821B115W67T (20.9 to 30.9m);
- 1 x 10.4m and 1 x 9.95m MBA samples from drill hole 1821B115E67U (102.4 to 112.35m) and (186.6 to 179.0m);
- 1 x 10m MBA sample from drill hole L9600_13W53S (221.5 to 231.5m);
- 1 x 10m MBA sample from drill hole L9600_13W53T (103.0 to 113.0m);
- 1 x 10m MBA sample from drill hole 1821B115V67U (200.2 to 210.2m);
- 1 x 10m MGS sample from drill hole 1821B122W99AN (98.0 to 108.0m); and
- 1 x 10m MGS sample from drill hole 1821B121E91AT (118.0 to 128.0m).

The samples were composited from coarse reject material not used for XFR resource grade assaying. Each composite was ground to 5 different sizing fractions and the P80s (P80 is the grind size at which 80% of the material passes the screen) were calculated for each size fraction.

The head (DTR input), concentrate (DTR output), and tails (material left over after concentration) fractions were chemically assayed using XRF. In addition, %Magnetics were calculated using Magnasat technology (similar to a Satmagan system), which uses a magnetic susceptibility measurement calibrated to a sample with known magnetic content. The resultant %Magnetics represents all magnetic and para-magnetic material in the sample, which, for the case of Xaudum, is almost entirely magnetite. Figure 44 shows the % head feed vs. the % mass recovery and % magnetics vs. the Fe Recovery, showing that there is a good correlation between recovery and the amount of magnetite in the rock.

Quote from Baker, 2014:

"The results show that the general trend of the data is to produce good quality concentrate grades at all grind sizes between 50 to 100 microns for all units."

"The highest recoveries match with the high-grade MBA geodomain, as expected. There is a linear relationship between MBA and DIM, with the lower grade DIM showing a lower %mass recovery (and %Fe recovery). The MGS and MBW geodomains show a different trend, indicating the presence of non-magnetic minerals with an associated low mass recovery and Fe recovery. Again, this is expected due to the high %Fe total content of almandine garnet in the MGS, and goethite and limonite in the MBW. The high percentage of garnets creates an issue for the DTR test work due to inclusions of magnetite within the garnet."

'The resulting concentrate specifications indicate a high-grade Fe% and low impurity levels coupled with moderate grinding. The concentrate %Fe Total grade ranges from 65 – 70%, apart from one MGS sample which produces a lower grade concentrate with 61% Fe Total. Other major elemental oxides not reported here such as S, MgO, CaO, K2O, Na2O, TiO2 and MnO are also significantly reduced to low levels during the concentration process."

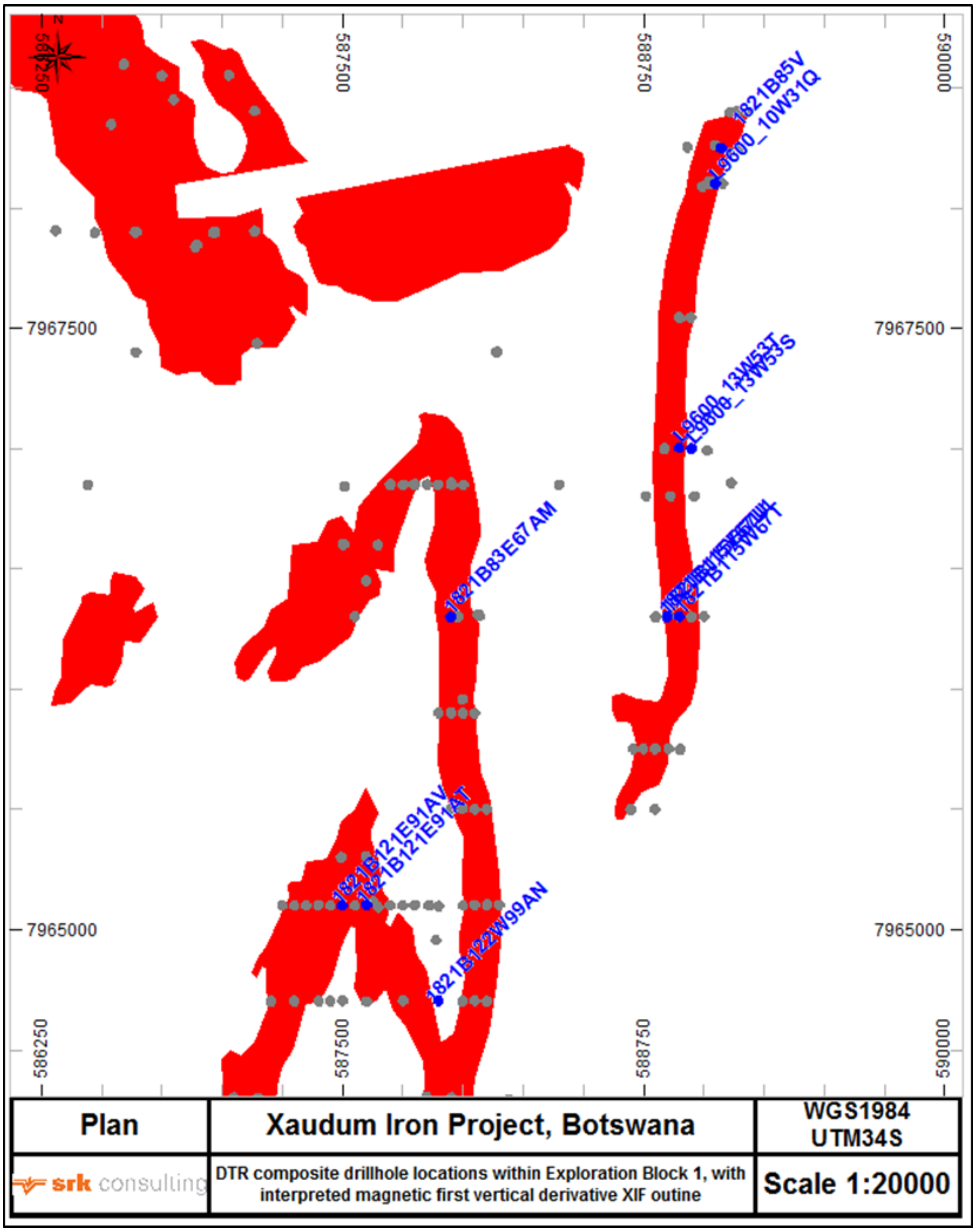
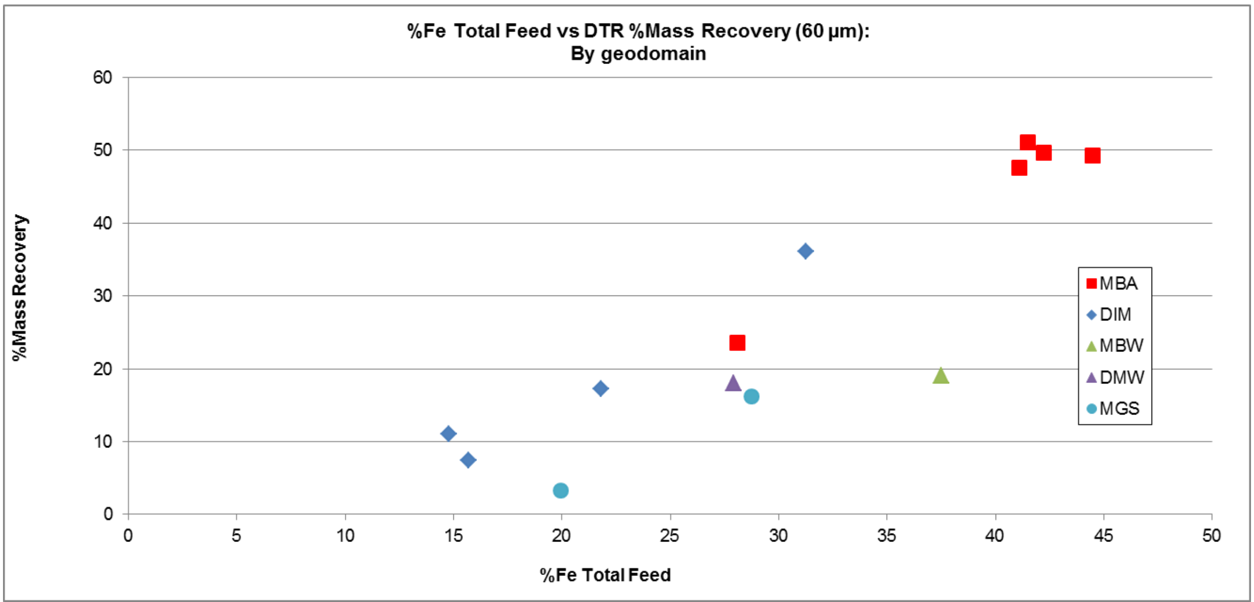


Figure 26. Map showing the locations of DTR drillhole composite samples in Block 1 Project area. After Baker, 2014.

Table 8. DTR results by averaged by geodomain.

Geo-domain	Feed (Head)		Grind	Magnetic Concentrate					
	Fe	Magnetics*	P_{80}	Mass Rec.	Fe Rec.	Fe	SiO_2	Al_2O_3	P
	(%)	(%)	(microns)	(%)	(%)	(%)	(%)	(%)	(%)
DIM	20.49	9.25	50	16.7	50.8	68.6	2.5	0.4	0.04
			60	17.1	51.8	67.9	3.3	0.5	0.05
			70	17.5	53.0	67.1	4.1	0.5	0.05
			80	17.9	54.0	66.4	4.9	0.6	0.06
			90	18.4	54.9	65.5	5.8	0.7	0.07
			100	19.2	56.1	64.5	7.1	0.8	0.09
MBA	39.39	51.47	50	43.3	75.5	69.6	2.3	0.4	0.05
			60	44.1	76.4	69.0	2.8	0.4	0.06
			70	44.8	77.3	68.5	3.3	0.4	0.07
			80	45.5	78.1	67.9	3.8	0.5	0.08
			90	45.8	78.2	67.1	4.5	0.5	0.09
			100	46.1	76.6	65.9	5.7	0.6	0.08
MGS	24.35	11.17	50	9.2	21.8	66.2	5.4	1.5	0.09
			60	9.7	23.0	65.2	6.5	1.7	0.11
			70	10.2	23.1	64.2	7.8	1.9	0.14
			80	10.7	23.7	63.2	9.0	2.1	0.16
			90	11.2	24.0	62.1	10.3	2.3	0.17
			100	11.6	25.1	60.9	11.7	2.6	0.17
MBW	37.50	5.20	50	15.5	28.5	69.0	2.4	0.0	0.03
			60	19.0	34.5	68.6	2.8	0.0	0.04
			70	22.3	40.7	67.2	3.4	0.0	0.04
			80	25.4	46.3	66.8	3.6	0.0	0.05
			90	27.4	49.5	66.4	4.0	0.0	0.05
			100	27.5	49.0	65.9	4.5	0.0	0.05
DMW	27.90	8.50	50	17.6	43.6	69.0	1.5	0.2	0.01
			60	18.0	47.0	68.7	1.8	0.2	0.02
			70	20.3	50.5	68.4	2.2	0.2	0.02
			80	21.6	53.6	68.0	2.5	0.2	0.02
			90	22.8	56.5	67.7	2.8	0.2	0.02
			100	23.7	58.8	67.2	3.3	0.2	0.02



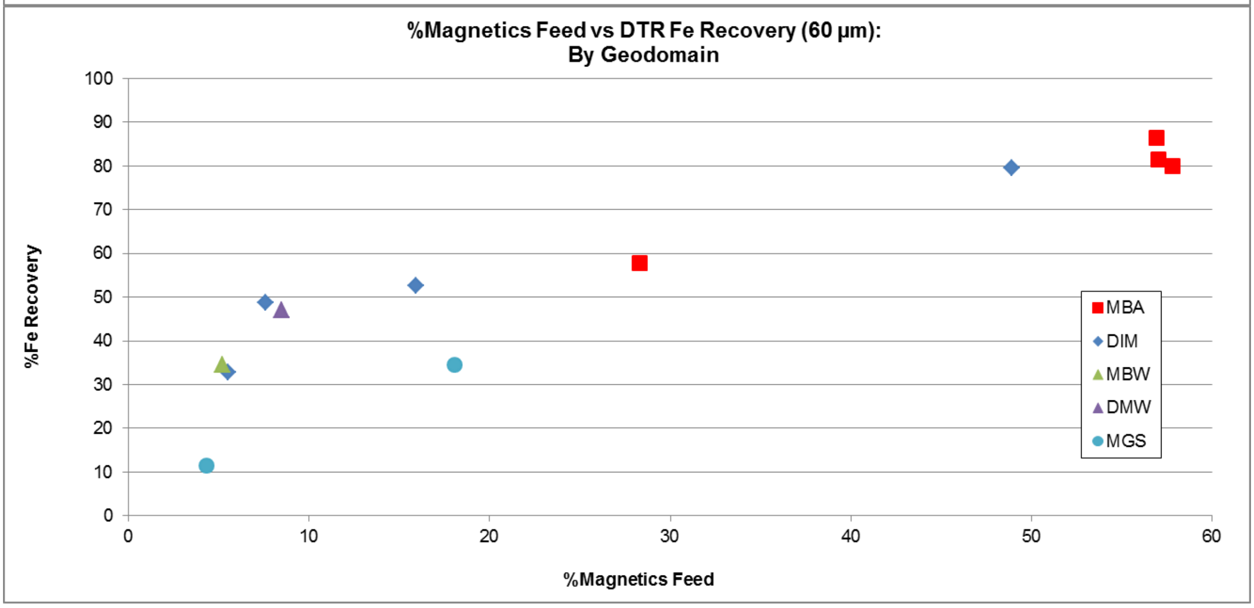


Figure 27. % Upper: Fe Head Feed (Total Feed) vs. the DTR % Mass Recovery, by Geodomain. Lower: % magnetics vs. % Fe Recovery, by geodomain. After Baker, 2014.

Quotes from Baker, 2014 on the DTR test work and future recommendations: *"The DTR test work results are positive and prove that reasonable iron recoveries can be achieved from low, medium and high-grade samples with mainly premium quality products produced. Further test work is recommended which is aimed at better understanding of the variability of response with depth and across the entire Project area."*

"It is also recommended that Satmagan or equivalent magnetic Fe readings (such as Magnasat) are tested and implemented on all future samples in order to assign a %magnetics to each assay

interval. This will assist with the geodomaining and provide useful information determining Fe contained within silicates (e.g. garnet) compared to magnetite."

As such the project will look to purchase a Satmagan machine for routine % magnetic test work, as well as plan more detailed DTR and other metallurgical test works such as looking into Low Intensity Magnatic Separations (LIMS) to see if the recoveries can be improved especially in the more oxidized weathered domains such as MBW and DMW.

7.1. Mining Comparison to Nevada Iron or Project

The Nevada Iron ore mining methods, XIF Project will likely be similar

The mining method is a conventional open pit, drill and blast operation. The mining units are:

- 12 x 166 tonne haul trucks;
- 3 x 11.5–13.0 m^3 bucket capacity front end loaders;
- 1 x grader;
- 1 x 800 to 900 horsepower large dozer;
- 1 x wheeled dozer;
- 1 x water truck; and
- 5 x 9-inch drill and blast drill rigs.

Scheduling priorities that could be similar to XIF priorities:

- Maximise grade early in the production (Aim for MBW and MBA closes to surface at start);
- Mining around 10-11 Mtpa of ore at ~19% Fe head grade (this is lower than he likely XIF head grade but is low end comparison);
- This equates to a steady concentrate production of around 2.4 Mtpa (wet tonnes) at around 67% Fe at a recovery of around 22% by mass;
- Minimize the build-up of ore stockpiles to reduce working capital requirements; and
- Maintain an ore mining rate of around 16 Mtpa inclusive of waster over the first 5 years, with total material movement reducing to around 10-11 Mtpa for the remainder of the mine life.
- As such utilize of three (3) loading implements for the first 5 years, then reducing this number to two (2) for the remaining mine life.

Processing Plant Recovery Methods

Process Description at the Nevada Iron ore project, XIF Project will likely be similar

The Navada Iron ore plant follow a pre-concentration of a fine crushed product produced by dry LIMS separation, followed by ball milling for a process throughput of around 11 Mtpa (Sylvester et al, 2013).

Figure 45 shows the simplified process flow diagram for the Nevada iron ore project, a similar flow diagram is envisaged for the XIF project. Descriptions of the equipment in this flow diagram are below.

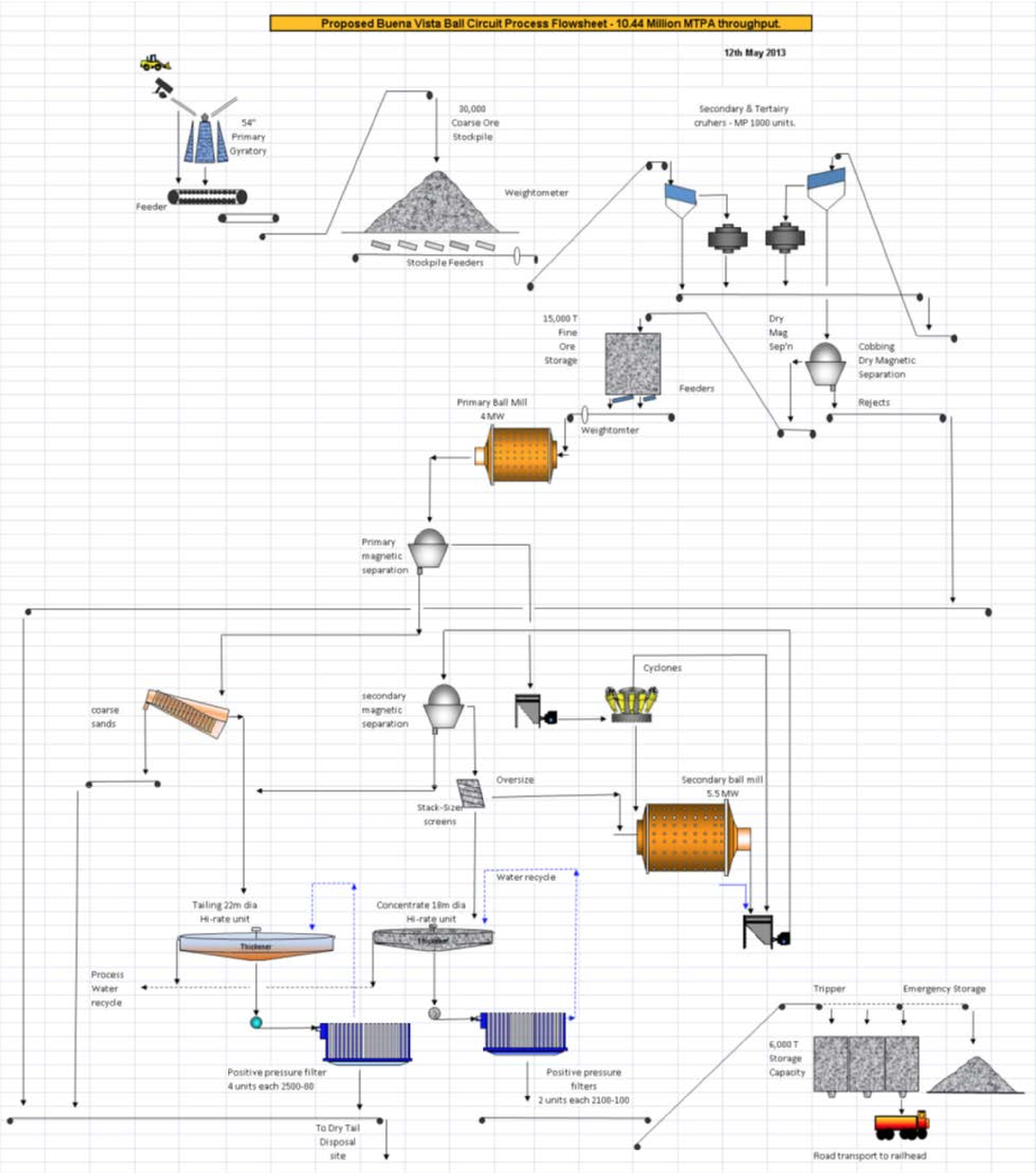


Figure 28. Nevada Iron project process flow sheet with basic concept and equipment selection. After Sylvester et al, 2013.

Primary Crushing at the Nevada Iron ore project, XIF Project will likely be similar

Trucks of ~100 tonnes deliver the ore direct to the primary crusher tipping point, or to the ROM ore storage facility for blending to the crusher. The ROM ore storage capacity is around 30,000 tonnes with low grade (XIF DIM equivalent) and high grade (XIF MBA equivalent) stored separately for blending to the crusher.

A 1,370mm cm by 1,880mm primary gyratory crusher reduces the ore to nominal 160mm product is discharged to a coarse ore product bin below the crusher for controlled discharge to the conveyor system delivering to the coarse ore storage facility ahead of the fine crushing section.

Fine Crushing and Cobbing at the Nevada Iron ore project, XIF Project will likely be similar

"The coarse ore is drawn from the coarse ore bin and fed to a secondary crusher screen for by-pass of fines at nominal 30 mm. Oversize from the screen passes directly to the MP1000 secondary standard crusher for reduction to nominally minus 50 mm operating in open circuit with a 30 mm closed side setting.

Combined by-pass fines and crusher product is conveyed to the tertiary circuit for screening and separation of the fine-ore-product at nominally 10 mm. Oversize from the screen passes to the MP1000 tertiary shorthead crushers set at nominally 10 mm closed side set to generate a discharge of approximately 20 mm. Tertiary crusher discharge combines with the secondary product for recycle to the tertiary screen.

Product from the crushing circuit at nominally minus 10 mm passes to a series of parallel holding bins ahead of Dry Magnetic Separators (DFA units} which are highly efficient drum units fitted with axial pole magnets. These magnets reduce the carryover of non-magnetics associated with conventional dry drum magnets resulting in a cleaner magnetic product. Dry waste from the pre-concentrating stage is conveyed to the waste dumps. The magnetic concentrate product passes as fine ore to the fine ore bins ahead of the grinding circuit.

The crushing circuit operates at approximately 6,000 hours per annum which at a design throughput of 10.44 million tonnes per year equates to an average rate of 1,740 tonnes per hour."

Fine Ore Storage and Milling at the Nevada Iron ore project, XIF Project will likely be similar

"The wet milling and wet LIMS circuit operates at 8,000 hours per annum which assuming a waste rejection of 40% in pre-concentration equates to an average throughput rate of 783 dry tonnes per hour. A fine ore storage facility of 20,000 tonnes live capacity between crushing and milling ensures one full day of production storage ahead of grinding. The ore is reclaimed by two rows of feeders discharging onto the primary ball mill feed conveyor. A weightometer on the mill feed conveyor monitors the tonnage and controls the feeders below the coarse ore bin to maintain a constant load to the milling. A single stage primary ball mill 5 m in diameter by 10 m effective grinding length (EGL) equipped with a 4000-kW drive motor reduces the particle size from nominal 10 mm down to a nominal product sizing of 80% passing 500 µm. The ball mill discharge is trammel screened to protect the discharge pumps.

Product from the primary grinding are distributed to the primary low intensity magnetic separators (LIMS) for further removal of waste from the ore feed."

Primary Wet Low Intensity Magnetic Separation at the Nevada Iron ore project, XIF Project will likely be similar

"The primary magnetic separation stage consists of a total of six double drum each 1.2 m diameter by 3 m long LIMS units. Adequate space is provided to install one additional unit if required in the future.

Tailing rejects from the primary LIMS passes to a sands spiral rake classifier system for recovery of the coarse sand fraction for delivery by conveyor to the sands storage facility for dry disposal either with the pre-concentrator rejects to the mine waste dumps, or to a separate a sand stockpile. The sand product is expected to have a moisture content of about 15%. The fines from the classifier are pumped to the tailings thickener for dewatering ahead of disposal.

Concentrate from the primary LIMS section are pumped to the secondary grinding circuit for further grinding and up-grading to final concentrate specification."

Secondary Grinding at the Nevada Iron ore project, XIF Project will likely be similar

"Primary LIMS concentrate is cycloned to densify the product for secondary milling in one grinding mill of 5.5 m diameter by 10 m effective grinding length equipped with a 5.5 MW drive. The fines from the cyclone are combine with the secondary mill discharge as feed to the secondary LIMS separation for final cleaning."

Secondary LIMS Circuit at the Nevada Iron ore project, XIF Project will likely be similar

"Product from the secondary grinding ball mill circuit at approximately P80 of 63 µm passes to two modules of secondary LIMS. Each module will consist of four triple 1.2 m diameter by 3 m long drum LIMS units. Adequate space will be allowed in the layout to accommodate two additional triple drum units into each module if required in the future.

Tailings from the secondary LIMS will combine with the fine tailing from the primary LIMS as feed to the tailing thickener.

Magnetic concentrate from the secondary LIMS circuit will be pumped to a distributor which in turn feeds two Derrick stack-sizer screens equipped with screen cloths of 75 to 90 µm for rejection of coarse middling from the concentrate stream. The overflow from the stack-sizers will pass directly to the secondary mill feed, where there will be an additional release of locked magnetite from waste. The screen underflow will be the final concentrate product."

7.2. XIF Concentrate Product Loading and Transport

It is plausible that the XIF iron ore concentrate product at around 67% Fe could be conveyed from the processing plant concentrate storage area to a rail head area for transportation to the next stage of beneficiation or port facilities. These options and transport routes will be developed in the proposed options scoping study and Block 1 PEA.

It is envisaged that a fleet of road trucks will deliver the concentrate to either the rail-head or a slurry pipe line loading facility or the next stage beneficiation facilities which could be Selibe Phikwe etc. Again, these strategies will be looked at in more detail in the options scoping study and Block 1 PEA.

7.3. Energy, Water and Other Process Materials

The main input to processing the XIF magnetite ore will be power and water. Ore processing requires only minor quantities of flocculent and no other chemical additives.

Electrical Power Usage at the Nevada Iron ore project, XIF Project will likely be similar

The total installed power based on a comparison to the Nevada Iron ore project in Nevada is estimated at about 15 MW the predominant user in the operation being the processing facility at approximately 14 MW. The annual power draw is estimated therefore to be about 114,250 MWh equal to 10.94 kWh/tonne primary crusher feed.

Process Water Usage at the Nevada Iron ore project, XIF Project will likely be similar

The most significant water loss is likely the make-up water required. Where this could be in the order of 2,157,450 m3 per year, this is within the range of a water bore hole field in the local area, see the section on hydrogeology below.

7.4. XIF Project Infrastructure

Transport

There is very limited infrastructure currently, there is a regional tarmacked road network that passes just next to the project area and access to this is no problem. However there is no local rail network, as such this will have to be the focus of the initial option study to decide the best way forward for the project, where 'by trucking could work for a small initial start-up, and then progress to a slurry pipeline to port facilities or beneficiation facilities or a rail line to these location or a combination of the two?

Grid Power

The local area currently get a 66 Kv power line from Namibia, this however will be superseded by a power line that is currently being built (infrastructure being developed currently) whereby a main national power grid line from central Botswana will be set up supplying the local area with a 132 kV line, see Figure 45. This is likely to be finished within a year or so from now and will be available for use within likely Block 1 mining timeframes. It is envisaged that power from this line will be enough for the initial Block 1 power usage. However, if a larger scale mine was to be developed and power usage went up there is scope for BPC to upgrade this line to a 220 kV or even a 400-kV line.

Figure 29. The Botswana national transmission grid expansion plan that is currently occurring, note the 132-kV line that is currently being built to Shakawe. After Thema, 2013

7.5. Mine Closure

Mine closure and reclamation of any future mine will be performed in accordance with regulations and guidelines. Waste rock and residue disposal facilities will be constructed to mitigate adverse environmental effects and monitored routinely in accordance with an approved waste rock management plan. All buildings and facilities not identified for a post-mining use will be removed from the site during the salvage and site demolition phase. Mine closure costs could be in the order of $4 to 5million.

8. Geotechnical Data Review: Geotechnical Properties of the XIF and Country Rock Domains

8.1. Introduction

Geotechnical core logging is performed to understand the physical rock properties and normally forms part of an evaluation project. These physical properties define the likely performance of the rock materials during mining. As such high-quality data on the physical properties of materials to be intersected during mining are required for high quality mine designs (Read & Stacey, 2010). The immediate purpose of this logging program was to describe the geotechnical properties of the materials, which together with the existing geological model can enhance our understanding of the deposit as the project advances through to feasibility. Rock mass rating adopted from Bieniawski, 1989 and ISRM, 1981, within Read and Stacey, 2010, has been used to classify both the ore rock and country rock Geodomains.

8.2. Geological Setting and Geodomains Logged

The local geology comprises a sedimentary succession (part of the Neoproterozoic Katangan Supergroup) metamorphosed to greenschist and amphibolite grade, as well as various intrusive overlying the granitic basement; these lithologies can broadly be correlated with those in the Zambian-Congolese Copperbelt. The XIF is contained within the Grand Conglomerate diamictite unit that is interpreted as glacial origin marker horizon within the Neoproterozoic of the region. Figure 47 illustrate the general stratigraphy of the XIF and the local geology.

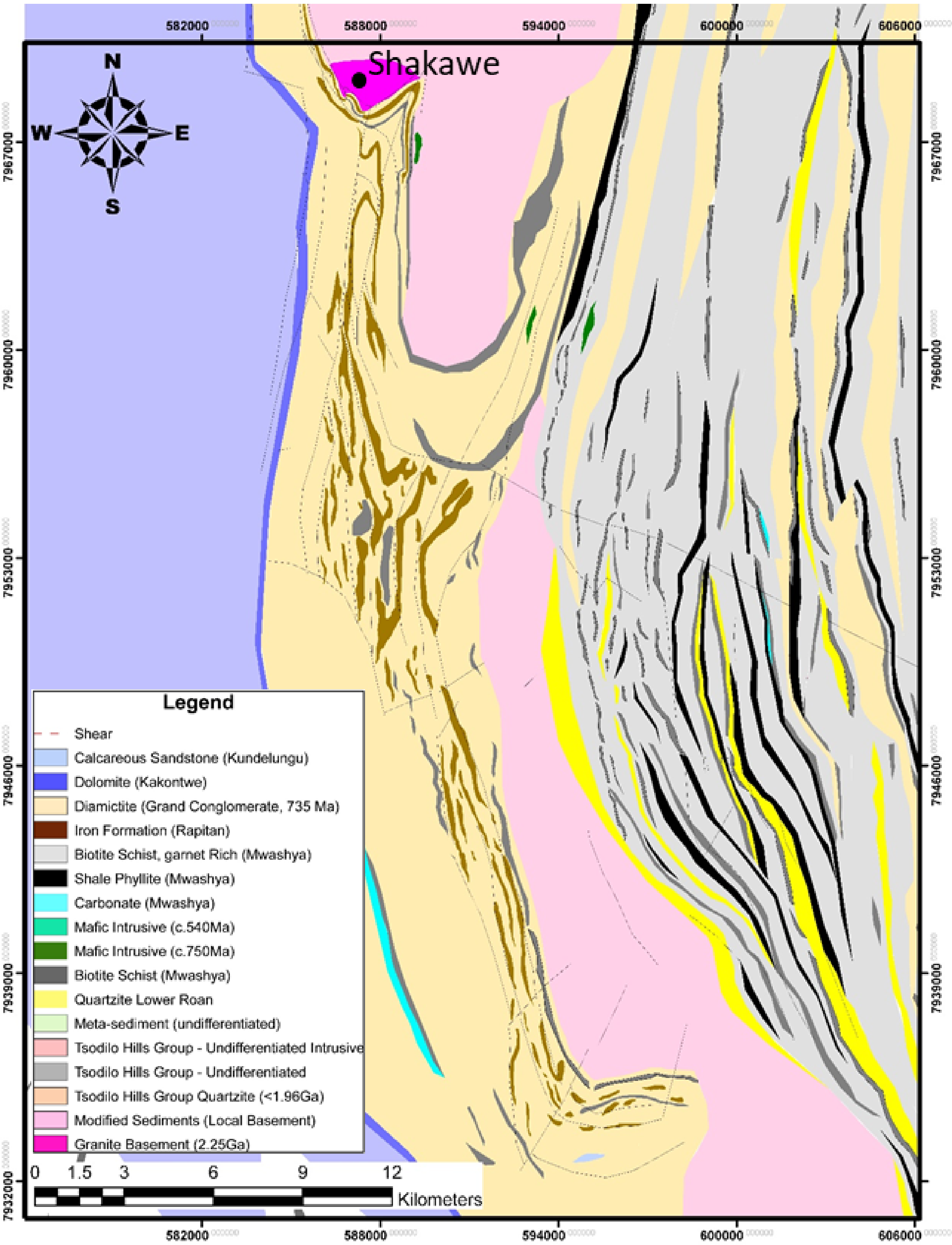


Figure 30. Local geology map showing main stratigraphic units and faults.

The XIF mineralization has been geodomained into the following:

8.2.1. Mineralized Rock Units

MBA - Fresh Banded magnetite formation

MBA is a Grey-black rock that is generally well banded with dark (magnetite rich) bands and light (quartz and silicate rich) bands. It's now metamorphosed and recrystallized to amphibolite facies. (Figure 48).

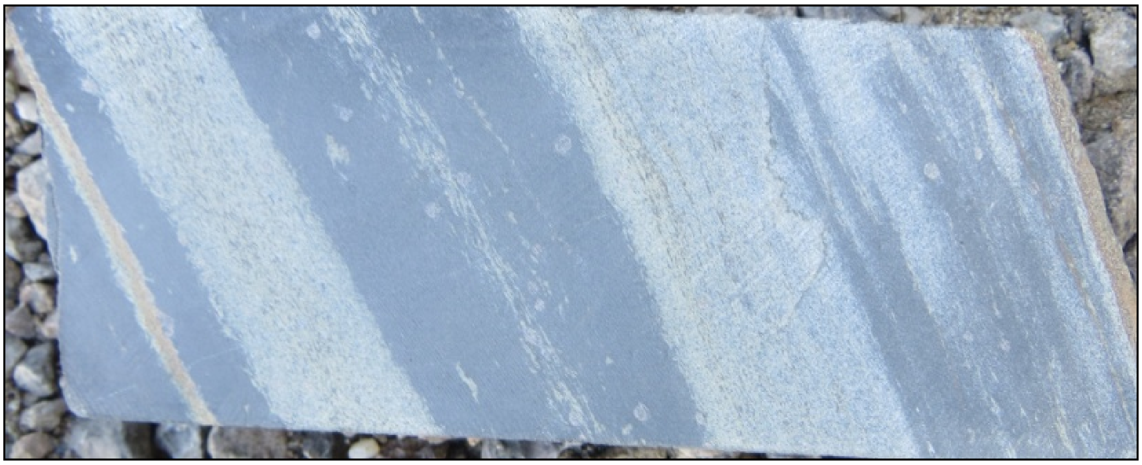


Figure 31. Banded magnetite formation (MBA).

MBW - Weathered banded magnetite

This is a reddish-brown rock that represents near surface partially weathered MBA material. Clay development is limited and the material is not observed to be "sticky" with clays. (Figure 49).

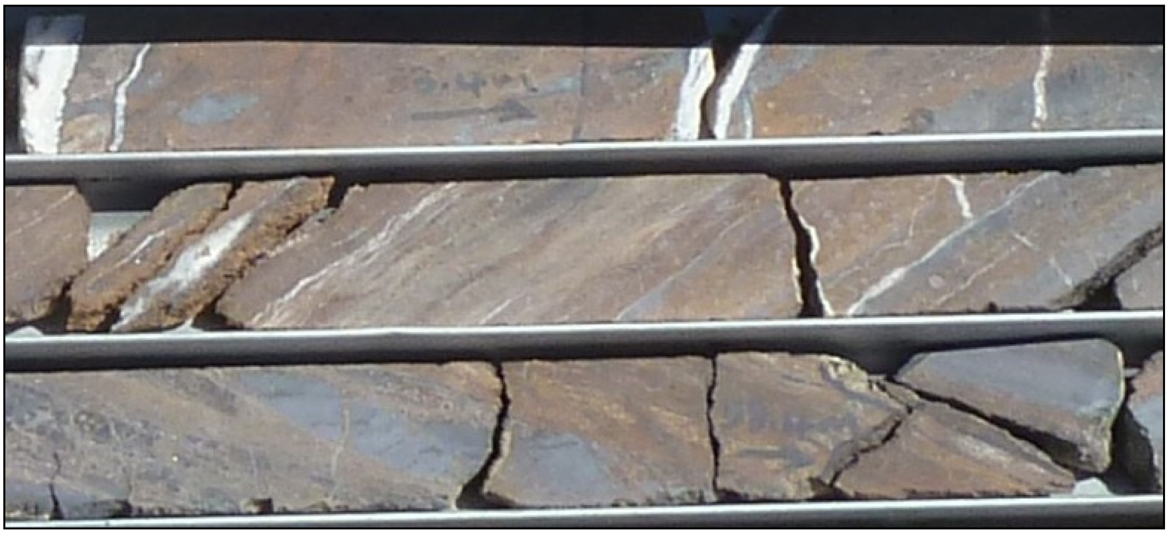


Figure 32. Weathered banded magnetite (MBW).

DIM - Magnetic Diamictite schist

DIM has with rare dolomite, granite, quartz pebbles with a very similar appearance to the un-mineralised diamictite (coded DIA), however, the DIA is non-magnetic. DIM is generally a well-foliated schist with a high percentage of magnetite. There is no obvious segregation of magnetite as seen in MBA, so whilst it does not have a classic BIF form, it is still an iron formation material. The genetic origin is suggested as a ferruginous, silty to sandy shale or semi-pelitic sediment with varying contents of Ca and Mg, which has been metamorphosed to amphibolite facies. (Figure 50).

Figure 33. Magnetic Diamictite schist (DIM).

DMW - Weathered magnetic diamictite schist.

Represents near surface partially weathered DIM material. The magnetite is variably oxidised to hematite (martite) and goethite but not fully decomposed. As with MBW, clay development is limited.

MGS - Magnetite garnet schist.

Magnetite and Garnet are the dominant minerals; however, abundance is quite variable. MGS can have a sub-banded to sub-foliated nature, and can appear similar to MBA when magnetite is dominant. The genetic origin is suggested as an iron-rich calcareous (±Mg) shaly semi-pelagic sediment, which has been metamorphosed to amphibolite facies.

8.2.2. Country Rock

CAC – Calcrete Kalahari Overburden. Cream white calcrete overburden highly broken with dissolution structures (Figure 51).

Figure 34. Cream white Calcrete overburden overlying dark grey diamictite schist.

DIA - Diamictite schist

DIA has a very similar appearance to the magnetic diamictite (coded DIM) explained above, however, the DIA is non-magnetic and it's the most predominant country rock. (Figure 52).

Figure 35. Diamictite schist with granitic clasts.

SCH – Schist. Greyish black quartz-biotite-mascovite-phlogopite schist (Figure 53).

Figure 36. Schist (SCH).

BAS - Basement. Massive course grained pink granitic rock with mica matrix (Figure 54).

Figure 37. Granitic basement (BAS).

GST – Un-magnetic garnetiferous-amphibolite schist. Comprised of porphyroblastic garnets with grunerite and biotite matrix (Figure 55).

Figure 38. Garnetiferous-amphibolite schist.

8.3. Structural Geology

Structural logging of the drill core was undertaken in the above Geodomains. This consisted of observation and description of various core-scale structures as well as construction of dip logs in vertical drillholes. This analysis indicates that the structure of the area to be very complex and likely developed by both early extensional tectonism during basin formation, as well as during subsequent poly-phase syn-metamorphic deformation likely formed during crustal shortening tectonism. During the crustal shortening tectonism, two principal deformation events (D1 and D2) are recorded in the structures, and likely formed during a progressive deformation event rather than during two deformation events separated by a large time interval (Nelson, 2012), see Figure 56. The structural measurements show that in general terms holes on the western part of Block 1 have low to moderate dips whereas holes on the east have steeper dips.

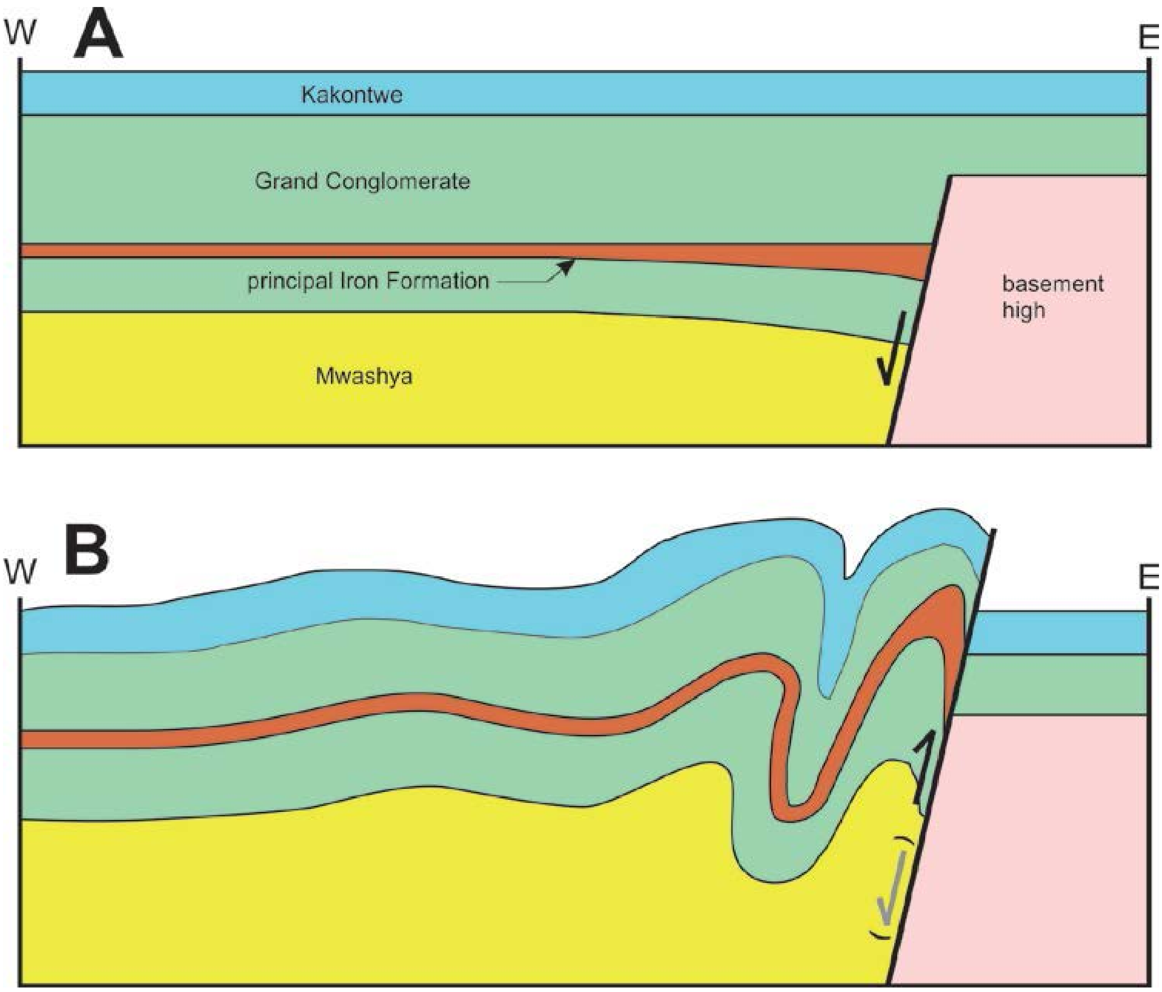


Figure 39. Structural deformation of the XIF deposit. After Nelson, 2010.

8.4. Geotechnical Logging

Xaudum Iron Formation (XIF) drill core totaling 5,320.25 m from 36 holes of Block 1 were logged for geotechnical properties. The following parameters were captured, analyzed and were used to calculate the RMR using Bieniawski 1989 RMR system:

- RQD
- Weathering Grade – This is where the degree of weathering is captured.
- Intact Rock Strength (IRS) - based on the ISRM standard for estimation of rock strength R0 to R6.
- Structural Logging
    - o Discontinuity / Fracture Count

8.5. Results and Discussions

8.5.1. Weathering

Shallow chemical weathering affects the lithologies directly under the Kalahari cover (CAC and sand cover). The weathering is non-pervasive and results in a rusty coating of the XIF, rather than material decomposition. The weathering alters magnetite into hematite and other iron oxides locally. However, the average vertical depth of weathering varies between 0 and 60 m in the Block 1 area, and averages approximately 17 m; it is not considered a material volume of material when compared to the fresh material.

8.5.2. Intact rock strength

Rock strength was estimated in the field using the ISRM 1981 field rock strength index. A summary is provided in Figure 57. The hardest Geodomains (BAS,GST, MBA, MGS) have been classified as R4 in the range of 50 –100 MPa and considered very strong, the second hardest Geodomains are DIA, DIM, MBW of R3 in the range of 25 to 50 MPa considered strong. The third hardest Geodomain is the DMW of R2 in the range of 2 to 25 MP considered medium strong. Only the CAC is a weak Geodomain of R1 in the range 5 to 25 MPa. Generally, the XIF and its country rock are strong rock except the over burden CAC that is characterized with dissolution and weak carbonate material.

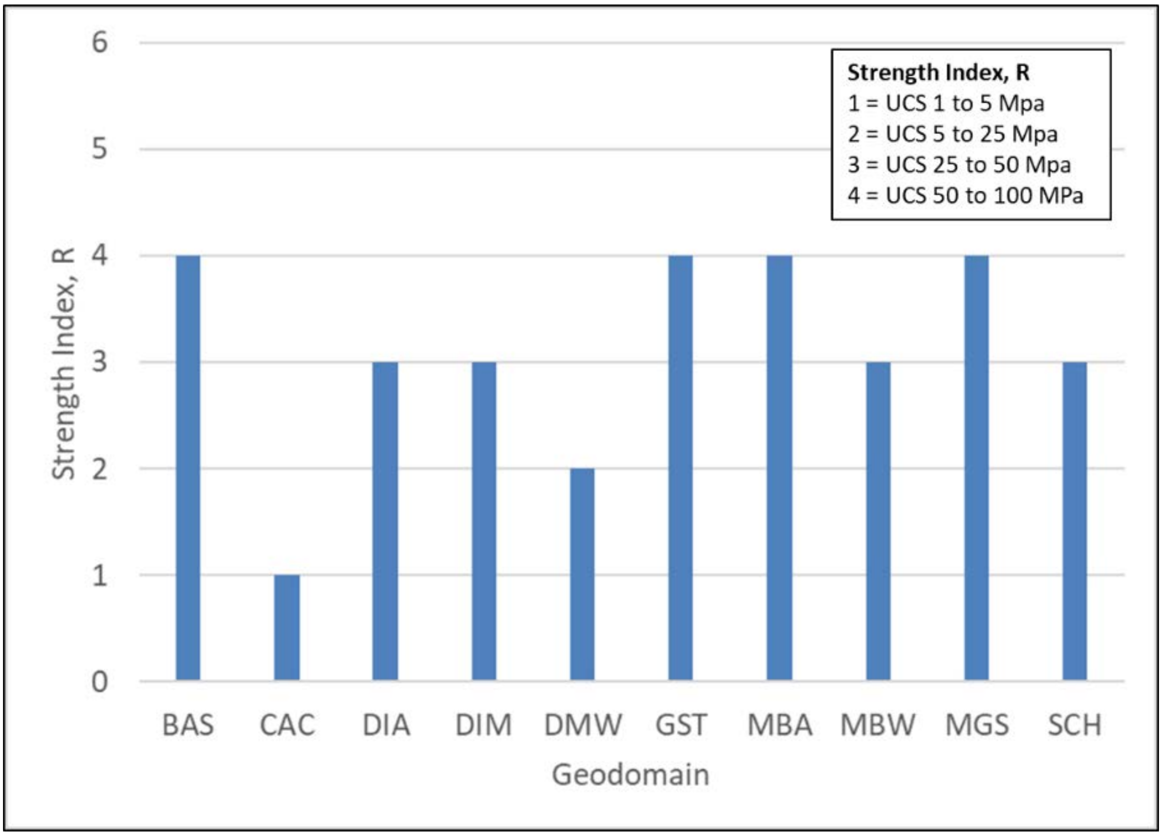


Figure 40. Intact rock strength of the different Geodomains.

8.6. RMR89 Classification

The Intact Rock strength, RQD and discontinuity spacing measurements were used to calculate rock mass rating for the XIF Geodomain using Bieniawski 1989 RMR system. Whereby:

- RMR89 = A1+A2+A3+A4+A5+B (see Appendix 1 for further explanation of these parameters).

8.6.1. Parameters and Assumptions made

- **A1 = Strength of Intact Rock Material**: The field strength of all intact recovered materials, from transported and residual soils through to fresh rock is recorded using the codes detailed in the logging card. The classification system is based on the ISRM standard for estimation of rock strength. Where a material is comprised of materials with different strengths, the strength of the weaker material should be recorded to give a conservative estimate of material strength.

- **A2 = Drill Core Quality - RQD:** The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varies from 0% for completely broken core to 100% for core in solid sticks.
- **A3 = Spacing of Discontinuities (Fracture Count/Joint count):** The number of fractures per interval is used to calculate the fracture frequency and is expressed as fractures per metre. Only naturally occurring fractures or breaks are counted in this measurement for every 3 m interval of drill core run. The interval was divided by the joint count to get the spacing of discontinuities.
- **A4 = Condition of Discontinuities:** A conservative a rating of 20 was applied for all the Geodomains. Rating of 20 means that the discontinuities in the XIF Geodomains are slightly rough surfaces and separation < 1 mm with highly weathered walls.
- **A5 = Ground water condition:** The ground water condition was assumed to be wet with a conservative rating of 7 since these units occur below or within the water table.
- **B = Rating adjustment for discontinuity orientation**: A conservative rating of -10 has been assumed for Geodomains. Rating of -10 means the strike and dip of the XIF Geodomains are unfavorable. Selection of this conservative rating was based on the structural studies made by Nelson (2012) where he indicated that the structures measured on the eastern part of Block 1 are steep.

Note that **A4**, **A5** and **B** have been derived from are plausible but somewhat conservative assumptions and hence will potentially give a lower RMR89 than can be expected as more detailed geotechnical studies are undertaken as the project advances. As such the RMR89 values presented here can be considered as towards the low end and may go up when more geotechnical and hydrogeological studies are undertaken.

A summary of the average RMR89 values for each Geodomain is presented in Table 11. All the Geodomains are classified as fair rock except for weathered banded magnetite (MBW) Geodomain was of classified as poor rock. Generally, these rocks are competent and hard. The majority of the Geodomains have IRS of above R3 with good RQD of mostly above 80 %. Same applies for the fracture spacing of more than 1 m.

There is a comparatively limited amount of data for some of the minor Geodomains, such as the granitic basement (BAS), and the Schist (SCH), hence more data will be needed to ascertain their values to a higher degree of precision.

Figure 58 is a graphical representation of the date presented in Table 11 to show the relative spread of RMR89 for each Geodomain.

Table 9.The Bieniawski RMR89 classification for the different XIF Geodomains.

Domain	No. of intervals	IRS code	**IRS rating**	RQD10 (%)	**RQD Rating**	Fracture spacing (m)	**Fracture spacing rating**	**Condition of discontinuity (assumed) Rating**	**Ground water (assumed) Rating**	**Rating adjustment for disco orientations**	**Total RMR**	**Class**	**Description**
BAS	11	R4	**7**	98	**20**	1.4	**15**	**20**	**7**	**-10**	**59**	**III**	**Fair rock**
GST	129	R4	**7**	92	**20**	1.34	**15**	**20**	**7**	**-10**	**59**	**III**	**Fair rock**
DIM	424	R3	**4**	93	**20**	1.13	**15**	**20**	**7**	**-10**	**56**	**III**	**Fair rock**
MBA	192	R4	**7**	86	**17**	0.7	**5**	**20**	**7**	**-10**	**56**	**III**	**Fair rock**
MGS	81	R4	**7**	88	**17**	1.07	**15**	**20**	**7**	**-10**	**56**	**III**	**Fair rock**
SCH	11	R3	**4**	95	**20**	1.77	**15**	**20**	**7**	**-10**	**56**	**III**	**Fair rock**
DIA	824	R3	**4**	85	**17**	0.93	**15**	**20**	**7**	**-10**	**53**	**III**	**Fair rock**
DMW	91	R2	**2**	65	**13**	0.37	**10**	**20**	**7**	**-10**	**42**	**III**	**Fair rock**
CAC	85	R1	**1**	54	**13**	0.35	**10**	**20**	**7**	**-10**	**41**	**III**	**Fair rock**
MBW	18	R3	**4**	44	**8**	0.22	**10**	**20**	**7**	**-10**	**39**	**IV**	**Poor rock**

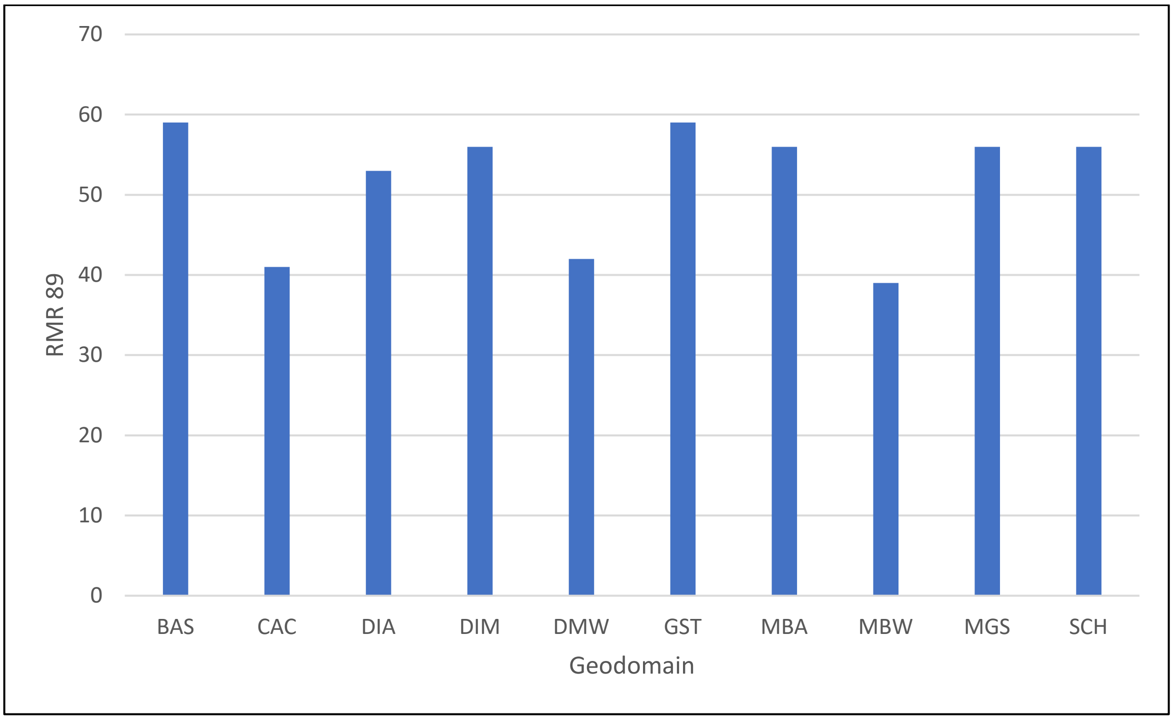


Figure 41. The graph representation of the Bieniawski RMR89 classification for the different Geodomains.

8.7. Pit slope angle suggested by SRK (2014)

SRK (Baker, 2014) categorized the Geodomains using RQD values into geotechnical zones and assigned a “GZONE” as inputs to the pit optimization process to define the Block 1 resources. Table 12 below shows these Gzones and some general comments on the appropriateness of these pit angle given the stage the project is at.

Table 10. Pit slope angles assigned to the Geodomains grouped as Gzones

GZONE (Baker, 2014)	**General Geology (Geodomain) (Baker, 2014)**	**Pit slope angle suggested by SRK (Baker, 2014)**	**Total RMR89 ratings**	**General Comments on the suitability of these pit slope angles based on the calculated RMR89**
GZONE 1	Kalahari sand loose (SAK)	26°	Zero as its soils strength	A pit slope angle of 26° appears appropriate for these loose Kalahari loose sands, given that these are generally soil strength loose sands, with little to no apparent strength, and as such the pit angles are relying on the general angle of repose for loose sand which is around 26°.
GZONE 2	Calcrete (CAC)	45°	41 (Fair rock)	A pit slope angle of 45° appears appropriate for the calcrete (CAC) Geodomain, given it has a rating of 41.
GZONE 3	Oxidized ore material MBW and DMW	45	MBW = 39 and DMW = 42	A pit slope angle 45° appears to be a good conservative angle given these weathered rock domains have a RMR89 of 39 poor rock and 42 fair rock respectively. More detailed geotechnical and hydrogeological work maybe be able to increase these angles however.
GZONE 4	Fresh material MBA and DIM	50	MBA = 56 and DIM = 56	A pit slope angle 50° appears to be a fairly conservative angle given these fresher domain rocks have RMR89 of 56 fair rock and 56 fair rock respectively. As such more detailed geotechnical and hydrogeological work maybe be able to increase these angles however.

8.8. Conclusions

The XIF Geodomains are generally fair rocks as indicated by the intact rock strength and the average RMR89 for each domain, the only exceptions are the SAK, CAC and MBW which are on the lower end. However more detailed geotechnical and hydrogeological work needs to be done as the project advances to build up a more robust RMR89 and a geotechnical model.

9. Environmental Impact of the XIF Project

The Project is located in northwest Botswana between Sepopa and Shakawe west of the main Sehitwa – Mohembo highway along which there are few settlements, some cattle posts, and arable fields. Access off the main highway is limited to a few calcrete tracks, some cut lines and dry river valleys. The project is well removed from the Tsodilo Hills and Okavango Delta World Heritage sites. All project activities will be located outside conservation areas and as such there are no restrictions that affect Gcwihaba's prospecting licenses.

The Project area is located in a wholly separated ecosystem of the Kalahari-Highveld transition zone which is relatively species poor and has few (5%) endemic plants, BioTracks Botswana, 2013.

BioTracks Botswana in undertook a Preliminary Flora/Fauna and Archaeological Survey, and subsequent Environmental Management Plan for Tsodilo (Gcwihaba) XIF related drilling in northwest Botswana, see BioTracks Botswana, 2013. Tsodilo undertakes all of its exploration in accordance with the principles and recommendations and mitigation within this document.

9.1. Preliminary Flora/Fauna and Archeology Survey ad Associated EMP

Quote BioTracks Botswana, 2013, Taken from the Executive Summary:

"Executive Summary"

"Tsodilo Resources Limited has commissioned Biotrack Botswana (Pty) Ltd to undertake a pre exploration drilling Environmental Management Plan for the area in north-western Ngamiland, between Sepopa and Shakawe. The area west of the main Sehitwa – Mohembo highway is a wilderness area with a few scattered settlements and cattle posts/arable fields. Access is limited to a few calcrete tracks and dry river valleys."

"*Prospecting activities will be concentrated in the Kalahari-Highveld transition zone that separates the Zambezian and Karoo-Namib regional centres of endemism in the Kalahari Basin. The Zambezian zone is typified as a mesic savannah or woodland dominated by Baikiaea plurijuga, the so called Zambezian Baikiaea Woodland ecoregion, with a relatively high* *biodiversity and endemism. By contrast the adjacent Kalahari Highveld zone is relatively species poor and has few endemic species (5 % endemic plants as compared to 54% endemic plants in the Zambezian zone)."*

"The greatest environmental concerns with the proposed Prospecting activities are shown below."

"In general prospecting or exploration has minimal short term and insignificant long-term impact on the environment if precautions are taken and responsible exploration methodology is practiced. Noise, dust, tracks, rubbish and waste are the most common short-term impacts. Planning access routes and restricting vehicle movement to these routes are effective mitigation measures for these impacts. Further restriction of the camp and drill sites to specific areas, restricting the collection of fire wood and the removal of rubbish and waste ameliorates long term effects."

"It should be ensured that land owners are contacted and informed of the proposed plans and that suitable access is obtained in agreement with the owner. An acrimonious relationship could develop if the surface owner does not allow reasonable access or the prospecting company does not act reasonably."

"Access by large drilling equipment, drill pad construction and sump construction all have short term effects, but these can be reduced through careful planning and rehabilitation. Care should be taken that fuel and lubricants are not spilled. Drilling very deep holes may take weeks or months and thus drill rigs could be on site for a fair length of time. Small areas of land (generally not more than 1 to 2 ha each) will need to be cleared for drilling sites, campsites and roads. The significance of this impact is expected to be low if properly managed."

"Public participation is a principle entrenched in Botswana environmental legislation through the EIA Regulations under the Environmental Assessment Act (No 10 of 2011) and associated guidelines. The principles of public participation outlined in this Act should be followed when informing the owners and lessees of surface rights of the intent to conduct prospecting operations. Knowledgeable individuals from local communities should be engaged on a temporary basis to help find the owners of arable fields and cattle posts, where they are encroached upon by drilling activities, as well as when drilling occurs on the outskirts of villages. In order to maintain good working relationships, flexibility on the part of Tsodilo Resources drilling crews will be required in situations where interested and affected parties (IAPs) cannot

be found. It is vitally important that the level of engagement and information sharing that Tsodilo Resources has so far maintained with Local Di (Kgosi) and other key stakeholders is maintained throughout the prospecting programme."

"If the proximity of the prospecting area is close to residential and tourist areas, the potential for visual, noise and dust impacts will need to be carefully managed. Tsodilo Hills is of particular concern and it is recommended that no drilling occurs within the fenced 'buffer zone' of this World Heritage Site. As a further precaution it is recommended that the sites of any proposed drilling within 3 kms of Tsodilo Hills is first cleared with the Local Kgosi and that local guides are used to establish the best access routes to the proposed drilling sites. In this manner prospecting impacts can be reduced from potentially 'Very High' to 'Low'.

"Dry season prospecting is optimal from the point of view of access, as many areas of black cotton soil will become hazardous to traverse with vehicles and heavy machinery after it has rained. The environmental impact of the highest potential concern at this time however is veld fires as the fuel load and herbaceous biomass of many sites within the proposed Prospecting area is high enough to support a fire. Careful management of camp and drill sites can effectively mitigate this concern to zero, although the potential for fire to act a regional level once started, with profound effects upon ecosystem dynamics and physiognomy must be emphasised."

"The Forest Act of 1968, as amended by Act No.8 of 2005, declared ten tree species as protected, most belonging to the Fabaceae family. Those suffering the most from these current threats in the proposed Prospecting area include Pod Mahogany Afzelia quanzensis, Rhodesian Teak Baikiaea plurijuga, Msasa Trees Brachystegia spp, False Mopane Guibourtia coleosperma and Kiaat or African Teak Pterocarpus angolensis. Veld fires have already impacted heavily upon these species and reduced areas of woodland or tree savannah to bush savannah and/or open grassland. The collection of firewood and veld products from standing trees (dead or alive) in the Prospecting area must be avoided at all times."

"Prospecting activities, if not carried out responsibly, can be associated with a loss of wilderness and habitat fragmentation when it expands into remote wilderness areas, such as western Ngamiland. Adverse impacts can be minimised by proper planning and reconnaissance, that as far as is possible utilises existing tracks and cut lines for access by drilling crews and lightly clears any new access tracks that may be required. The key to the integrity of wilderness areas is the

restriction and control of access to humans, namely by limiting the number of tracks and roads, and the maintenance of mobility to wildlife, by keeping such areas open and unfenced. This is particularly important in remote areas such as western Ngamiland that are not protected and will help support the long-term viability of free ranging wild ungulates by ensuring that they can share such rangeland with humans and their livestock."

"Prospecting and borehole drilling crews must be respectful of the wilderness and its wildlife populations and avoid impacting upon it, either by poaching directly or purchasing bush meat from local residents. Particular concern surrounds the possibility of exploration boreholes passing, often illegally into the hands of livestock owners and deflecting land use away from that proposed in District and national Land use plans. The development of drinking water resources for livestock and people forms one of the major interventions in rangelands and yet when it is based upon groundwater found during exploration surveys it tends to be executed without consideration for their impact on wildlife. As Leeuw et al (2001) put it "sustainable conservation of wildlife resources requires a coherent land use policy that balances wildlife and livestock and the further development of water points.' p.305. Consequently, all exploration boreholes should be capped after use and illegal use of them reported to Tawana Land Board."

"Overall provided the critical impacts related to fire, HIV/AIDS, access provision and borehole use are effectively mitigated, monitored and managed, as recommended in this EMP the proposed Prospecting activities can be undertaken with minimal impact upon the environment."

Section:	Identified impact		Significance rating	
	Negative Impacts	Positive Impacts	Without Mitigation	With Mitigation
	Ground Water			
4.3.1	Groundwater contamination		Low	Very Low
4.3.2	Oil spillages		Low	Very Low
	Soils, land capability and land use			
4.4.1	Loss of soil resource due to erosion		Very Low	Insignificant
4.4.2	Incidence of wildfires		Very High	Insignificant
4.4.3	Vehicle entrained dust along access roads		Very Low	Insignificant
4.4.4	Noise from drilling		Very Low	Insignificant
4.4.5	Aesthetics		Medium	Low
	Natural vegetation and animal life.			
4.5.1	Disturbance of riparian habitat and tree savannah		Medium	Low
4.5.2	Loss of habitat and biodiversity		Medium	Low
4.5.3	Clearance of vegetation		Medium	Low
4.5.4	Introduction of exotic and invasive species		Medium	Very Low
4.5.5	Poaching of wildlife		Medium	Low
4.5.6	Disturbance to wildlife		Medium	Low
4.5.7	Waste disposal		Medium	Low
	Socio-economic			
4.6.1	Damage to filds and infrastructure		Medium	Very Low
4.6.2	Increases HIV and STDs		High	Low
4.6.3	Exploration boreholes used to water livestock		Very High	Insignificant
4.6.4	Increased traffic		High	Very Low
4.6.5	Increased solid waste generation		Very Low	Insignificant
4.6.6	Liquid waste management		Very Low	Insignificant
	Archaeology			
4.7.1	Loss of archaeological remains		Very High	Low

The XIF Project will apply strict international environmental standards to minimize any possible impacts the project may have on these ecosystems. Gcwihaba is in partnership the International Finance Corporation ("IFC") who is a major shareholder and is fully committed to upholding the strictest environmental and social economic standards that will ensure the protection of the environment and ecosystems in proximity to the Project area.

9.2. Current Detailed Tsodilo Environmental Management Plan (EMP)

Tsodilo has built from the excellent work by Bio Tracks and implemented its own updated EMP for this metals project and licences, this is called "*Tsodilo Iron and Metals Project_EMP_V2_General*" and can be found in the references folder. This is a detailed EMP that defines the documentation and standards that the company follows, and defined=s a number of individual management plans as follows:

- EMP001 Waste Management Plan
- EMP002 Water Management Plan

- EMP003 Erosion and Sediment Control Management Plan
- EMP004 Vegetation and Flora Management Plan
- EMP005 Fauna Management Plan
- EMP006 Fire Management Plan
- EMP007 Noise and Vibration Management Plan
- EMP008 Greenhouse and Energy Management Plan

9.3. Initial Environmental and Social Impacts Assessment (ESIA)

This project is located within an environmentally sensitive region. Thus, it goes without saying that best environmental practices and approaches will be used in regards the approach to developing this project and all prevailing environmental standards and regulations will be strictly adhered to.

Therefore, all environmental issues will be addressed surrounding the development of this project based on the best outcome of the project, where environmental implications on size of mine and location of plant and beneficiation infrastructure will all be made based on the least invasive environmental considerations.

The contractor undertaking the PEA will prepare a preliminary Environmental and Social Impact Assessment (ESIA) study to determine potential impacts of mining and production and development of this project, and make recommendation on design and location of mining and plant location areas based on this assessment. This will address issues such as minimizing the footprint of the project and plants and associated impacts. Addressing impacts of tailings, groundwater assessment and water supply options analysis, and tailoring these to have negligible environmental impact. Inclusive of a biodiversity study (Desktop) and a heritage baseline (desktop) which is important given the location of the Tsodilo Hills world heritage site to the project area.

The above assessment conducted in the PEA shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop the guidelines for a full environmental impact assessment to be conducted during the next stages of development. There will also be a list of recommendations and an Environmental road map made at this stage defining the PFS level EIA program.

10. Human Resources

10.1. Employment of Local Labor Force

Tsodilo already has as one of its core beliefs and policies that it must employee as much as it can from the local populations in the closes villages and towns to its projects. In fact, Tsodilo already employees many of its local work force from the XIF project area, such as from villages like Shakawe, and Sepopa, that are within the Block 1 area. For the many years (+20 years) that Tsodilo and its subsidiaries have been exploring in north-west Botswana it has employed many locally derived people for this local area, we find that the people for this Ngamiland region are very hard working, reliable and honest people. Whilst it is true that there is a major lack of skilled people in this area, Tsodilo has taken their employees on and trained them n exploration and the work required for successful exploration and core drilling program and related work.

There will be a need to employee a skilled workforce from the greater Botswana population and somewhat overseas when the XIF project goes into more advanced evaluations stages and ultimately mining. However, Tsodilo will look to the populations of the local area for the vast majority of its unskilled and semi-skilled work force.

10.2. Building Specialist Capacity Prior to Mining

There is a risk to the project timelines in regards to the Human Resources issues surrounding obtaining work permits for skilled specialists for the project at the evaluation stage, and then on into the development stage of the project. It is the opinion of Tsodilo that whilst this is a risk to the development of the project in terms of delays, the risk is low to moderate.

Tsodilo policy is to fill as many positions with Botswana citizens as possible and to train locals in as many positions as possible. One key area in ensuring we comply with this policy is that those with experience especially those non-Motswana employees that have been employed in specialist roles pass on their knowledge by training and mentoring its Batswana employees to empower them and so there is a succession plan built in.

Further to this Tsodilo will explore all avenues of acquiring Botswana citizens for as many positions as possible which includes advertising roles in local and national media outlets and newspapers, and to liaise with the Department of Labor and Social Security and consult their known databases for example. There are times when given the specific specialized job requirements that the only outside foreign nationals can fill the roles, and at such time it is incumbent on the company to make applications for work permits to fill these roles in a timely manner.

To date Tsodilo has not had any significant issues or delays in acquiring work permits for any of its skilled foreign work force and contractors. In fact, Tsodilo has maintained excellent relationships with the Departments of Labor and Social Security, and Immigration and Citizenship within the Botswana Ministry of Labor & Home Affairs (MLHA). This has allowed Tsodilo to gain an excellent understanding of the procedures and documentations processes that create are required to complete rapid work permit applications with a good high success rate. Whereby the company streamlines our approach based on our in-depth understanding and experience in delivering successful work permit applications. There could also be some potential high-level discussions with the government if required.

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