



ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE DEVELOPMENT OF THE PROPOSED MOKALA MANGANESE MINE

OCTOBER 2015

**SUBMITTED FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE
NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) AND THE
NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (ACT 59 OF 2008) IN
RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY
APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES
DEVELOPMENT ACT (ACT 28 OF 2002) (AS AMENDED)**

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EXECUTIVE SUMMARY

INTRODUCTION TO THE PROPOSED PROJECT

Mokala Manganese (Pty) Ltd (Mokala) is a South African company of which Ntsimbintle Mining (Pty) Ltd owns 51%, with the remaining 49% owned by Blue Flacon 222 Trading (Pty) Ltd.

Mokala is proposing to establish a new opencast manganese mine on the remaining extent of the farm Gloria 266, located 4 km north-west of the town Hotazel in the Joe Morolong Local Municipality, Northern Cape Province. Refer to Figure 1 and Figure 2 for the regional and local settings respectively.

In broad terms the proposed Mokala Manganese project will comprise open cast activities, a dry crushing and screening plant, overburden rock dumps, product and run-of mine stockpiles, topsoil stockpiles, mine related facilities such as workshops, stores and various support infrastructure and services. Further to this, the proposed project will require:

- The realignment of the R380 road on the farm Kipling 271 and across the remaining extent of the farm of Gloria 266 as this road currently bisects the proposed mining project site
- Upgrading of the intersection to the proposed mine on portion 1 of the farm Gloria 266 and also serving the existing Gloria Mine
- The realignment of a section of the Ga-Mogara drainage channel within the existing river channel. This realignment will extend onto the farm Umtu 281.

LEGAL FRAMEWORK

Prior to the commencement of the proposed project, environmental authorisation is required from various government departments. These include:

- Environmental authorisation from the Department of Mineral Resources (DMR) in terms of National Environmental Management Act No.107 of 1998 (NEMA). The proposed project incorporates several listed environmental activities. An application was submitted by Mokala to the DMR on 03 July 2015. The applicable list of activities is provided in Section 4.1. The EIA regulations being followed for this project are Regulation 982 of 04 December 2014. A copy of the NEMA application is included in Appendix E.
- A mining right and an environmental authorisation from the Department of Mineral Resources (DMR) in terms of the Mineral and Petroleum Resources Development Act No. 28 of 2002 (MPRDA). The mining right application was submitted by Mokala to the DMR on 03 July 2015. A single scoping

report and EIA and EMP report supporting the new mining right application and associated infrastructure will be submitted to the DMR for decision making.

- A water use license from the Department of Water and Sanitation (DWS) in terms of the National Water Act No. 36 of 1998 (NWA). The applicable water uses in terms of Section 21 of the NWA include (a), (b), (c), (g), (i) and (j).
- A waste management license from the DMR in terms of the National Environmental Management: Waste Act No. 59 of 2008 (NEM:WA). The applicable list of activities as currently set out in the legislation (and which is possibly subject to change) is provided in Section 4.1. A copy of the NEM:WA application is included in Appendix E. The NEMA/NEM:WA application was submitted to the DMR on 03 July 2015. On 24 July 2015, the list of waste management activities was amended to include the reclamation and management of residue stockpiles and deposits (Activity 4(11) of Category B). It follows that activity 4(11) of Category B had not been promulgated at the time of submitting the initial NEMA/NEM:WA application, but is now relevant to the proposed project. It follows that the NEM:WA application should be amended to include this activity. Clarity on how this process should be undertaken is still to be obtained for the DMR.

STAKEHOLDER ENGAGEMENT

The stakeholder engagement process commenced prior to scoping and has continued throughout the environmental assessment process. As part of this process, authorities and interested and affected parties (IAPs) were given the opportunity to attend public meetings, submit questions and comments to the project team, and review the background information document, scoping report and now the EIA and EMP report. All comments that have been submitted to date by the authorities and IAPs have been included and addressed in the EIA and EMP report. Further comments arising from the EIA and EMP report review process will be handled in a similar manner.

IMPACTS AND MITIGATION MEASURES

This report provides an assessment of the potential impacts of the proposed project and provides measures to prevent or mitigate the impacts.

The potential impacts associated with the proposed mine activities and infrastructure can be categorised into those that have low, medium and high significance in the unmitigated scenario. All three categories of impacts require a measure of mitigation which, if successfully implemented will reduce the significance of the impacts and the related residual risk.

The table below provides a summary of the potential impacts in no particular order of importance.

Table A – Potential impact summary

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
Geology	Loss and sterilization of mineral resources	Mineral resources can be sterilised and/or lost through the placement of infrastructure and activities in close proximity to mineral resources, by preventing access to potential mining areas, and through the disposal of mineral resources onto mineralised waste facilities (overburden stockpiles) or as backfill in the open pit. Cross discipline planning to avoid mineral sterilisation can help to mitigate the unacceptable sterilisation of resources, without compromising safety requirements.	High	Low
Topography	Hazardous excavations, surface subsidence and infrastructure that can be harmful to people and animals	Hazardous excavations and infrastructure include all structures into or off which third parties and animals can fall and be harmed. Included in this category is surface subsidence associated with mining areas. Related mitigation measures focus on infrastructure safety as well as on limiting access to third parties and animals.	High	Low
Soil and land capability	Loss of soil resources and land capability through contamination	Soil is a valuable resource that support a variety of ecological functions and is the key to re-establishing post closure land capability. Soil and related land capability can be compromised through pollution and through physical disturbance through compaction, removal and erosion. Related mitigation measures focus on pollution prevention, implementing soil conservation procedures and limiting site clearance to what is absolutely necessary.	Medium	Low
	Loss of soil resources and land capability through physical disturbance		High	Low
Biodiversity	Physical destruction of biodiversity	Areas of high ecological sensitivity are functioning biodiversity areas with species diversity and associated intrinsic value. In addition, some of these areas host protected species. The linking areas have value because of the role they play in allowing the migration or movement of flora and fauna between the areas which is a key function for the broader ecosystem. Development of the project has the potential to impact on biodiversity both through physical destruction (mainly during infrastructure establishment and mine development) and on-going physical disturbance during all project phases. Related mitigation measures focus on limiting the project footprint area, implementation of a biodiversity offset and operation controls to limit on-going disturbance.	High	Medium
	General disturbance of biodiversity		High	Low
Surface water	Contamination of surface water resources	The proposed project has the potential to contaminate surface water resources. Related mitigation measures focus on pollution prevention, monitoring and risk based response to identified pollution occurrences.	High	Low
	Alteration of surface water drainage	Rainfall and surface water run-off are collected in all areas that have been designed with water containment infrastructure. The collected run-off will therefore be lost to the catchment	High	M (Low at closure)

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
	patterns	and can result in the alteration of drainage patterns and reduction to downstream surface water users. Further to this the project requires the realignment of the Ga-Mogara drainage channel. Related mitigation measures focus on minimising the footprint areas associated with containing rainfall and runoff and diverting clean run-off away from the project site. In addition to this, design measures associated with the realignment of the Ga-Mogara drainage channel focus on replicating natural curves, making use of natural soils and vegetating with indigenous species.		Low (realignment)
Groundwater	Contamination of groundwater resources	The nature of the proposed project is such that it presents a potential for the contamination of groundwater resources that in some cases may be used by third parties for domestic and livestock watering purposes. Related mitigation measures focus on pollution prevention, monitoring and risk based response to identified contamination occurrences.	Medium	Low
	Reducing groundwater levels and availability	The pumping of seepage water from the open pit and the abstraction of water from boreholes for the use as potable and process water has the potential to cause a lowering of groundwater levels. Lowering of groundwater levels has the potential to impact on third party boreholes that may be utilised for domestic and livestock watering. Related mitigation measures focus on monitoring and risk based response to identified groundwater reduction impacts.	Low	Low
Air	Air pollution	The main contaminants associated with the proposed project include: inhalable particulate matter less than 10 and 2.5 microns in size (PM10 and PM2.5), the manganese (Mn) element of the particulates, larger total suspended particulates (TSP) that relate to dust fallout, and gas emissions mainly from vehicles and generators. At certain concentrations, contaminants can have health and/or nuisance impacts. Related mitigation measures focus on pollution prevention, monitoring and risk based response to identified pollution occurrences.	High (Mn element – limited to the operational phase) Medium (High for PM2.5 and PM10 in operational phase)	Medium (Low for dust fallout)
Noise	Increase in disturbing noise levels	Noise pollution (disturbance and nuisance) will have different impacts on different receptors because some are very sensitive to noise and others are not. Based on modelled results, noise impacts are unlikely to extend to the town Hotazel. Modelled results indicate that a limited increase in noise levels is expected at the nearest sensitive receptors (Kalagadi Mine and Gloria Mine Village). Related mitigation measures focus on noise pollution prevention and monitoring when required.	Medium	Low
Blasting	Blasting impacts	Blast related impacts to third parties and property can be caused by fly rock, vibrations and air blast. Related mitigation measures focus on blast controls, monitoring and risk based response to identified blast impact occurrences.	High	Medium
Traffic	Disturbance of roads by project related	The proposed project will result in an increase in traffic volumes along the R380 and R31. Potential traffic safety risks include: pedestrian accidents and vehicle accidents. Related	High	Medium

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
	traffic	mitigation measures focus on road and pedestrian safety.		
Visual	Negative visual impacts	Visual impacts are assessed by considering changes to the visual landscape. Mine infrastructure and activities will change this landscape and the changes will have different impacts that will vary between the different viewpoints and the associated visual receptors. Related mitigation measures focus on landscaping interventions particularly during the decommissioning and rehabilitation stages.	Medium	Medium (Low at closure)
Heritage, cultural and paleontological resources	Destruction of heritage, cultural and paleontological resources	Various cultural and heritage resources have been identified in the proposed project area. No potential for paleontological resources exist. The proposed project has the potential to damage low significance heritage/cultural resources. Related mitigation measures focus on avoidance and preservation as a first priority.	Medium	Low
Socio-economic	Economic impact	Mokala's net contribution to the local, regional and national economy is positive and significant. Part of this contribution is through employment, procurement, investment, tax contributions, and foreign exchange earnings. The objective of the related mitigation measures is to enhance the positive economic impacts and limit the negative economic impacts. Part of this objective is to enhance the contribution to the local economy in particular.	High positive	High positive
	Inward migration impacts	Mines tend to bring with them an expectation of employment in all project phases prior to closure. This expectation can lead to the influx of job seekers to an area which could cause: an increase of people moving through the area, pressure on the capacity of existing communities and possibly also the development of informal settlements. In general, both increased movement of poor people into an area and informal settlements are associated with poor standards of living which can promote disease, crime and a general threat to the safety and security of an area. Linked to this influx of people is the potential inability of receiving areas to supply basic services such as water, food, electricity, health, education and sanitation. Related mitigation measures focus on cooperation with the local municipal authorities, skills development, employment, procurement and social development.	High	Medium
Land use	Change in land use	Mokala currently undertakes prospecting related activities on the remaining extent of the farm Gloria 266. The remaining extent of the farm Gloria 266 is currently zoned as agriculture in terms of the Joe Morolong Local Municipality. It follows that although no on-site third party land use will be physically impacted, the current zoning requires amendment. Other land uses within and surrounding the proposed project area include: mining, agriculture (Ad-hoc livestock grazing and game), residential areas and infrastructure (existing road network and Telkom lines). In addition to this, a land claim has been lodged on the farm Kipling 271. These land uses may be negatively impacted by one or more of the above mentioned environmental and social impacts. Related mitigation measures focus on mitigation of potential environmental and socio-economic impacts described above and measures to	High	Medium (Low at closure)

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
		promote the continuation of surrounding land uses.		

ENVIRONMENTAL STATEMENT

The assessment of the proposed project presents the potential for significant negative impacts to occur (in the unmitigated scenario in particular) on the bio-physical, cultural and socio-economic environments both on the project sites and in the surrounding area. With mitigation these potential impacts can be prevented or reduced to acceptable levels.

It follows that provided the EMP is effectively implemented there is no environmental, social or economic reason why the project should not proceed.

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CONTENTS

EXECUTIVE SUMMARY	I
INTRODUCTION.....	X
PART A – SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT	I
1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER	1-1
1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT	1-1
1.2 EXPERTISE OF THE EAP.....	1-1
2 PROJECT DESCRIPTION	2-1
3 LOCALITY MAP	3-1
4 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY	4-1
4.1 LISTED AND SPECIFIED ACTIVITIES	4-1
4.2 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN	4-13
4.2.1 CONSTRUCTION PHASE.....	4-13
4.2.2 OPERATIONS PHASE.....	4-18
4.2.3 DECOMMISSIONING AND CLOSURE	4-43
5 POLICY AND LEGISLATIVE CONTEXT.....	5-1
6 NEED AND DESIRABILITY OF THE PROPOSED PROJECT	6-1
6.1 ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES	6-1
6.2 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT	6-2
7 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT ON THE SITE INCLUDING THE PROCESS FOLLOWED TO DEFINE THE PREFERRED DEVELOPMENT ALTERNATIVES	7-1
7.1 DETAILS OF THE DEVELOPMENT FOOTPRINT CONSIDERED	7-1
7.1.1 PROPERTY OR LOCALITY	7-1
7.1.2 TYPE OF ACTIVITY TO BE UNDERTAKEN	7-1
7.1.3 DESIGN OR LAYOUT	7-1
7.1.4 TECHNOLOGY	7-2
7.1.5 OPERATIONAL ASPECTS.....	7-2
7.1.6 THE “NO-GO” ALTERNATIVE.....	7-3
7.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED	7-3
7.2.1 DATABASE	7-4
7.2.2 BACKGROUND INFORMATION DOCUMENT (BID)	7-4
7.2.3 REGULATORY AUTHORITIES NOTIFICATIONS	7-4
7.2.4 SITE NOTICES AND ADVERTISEMENTS	7-4
7.2.5 SCOPING MEETINGS – IAPS AND REGULATORY AUTHORITIES	7-4
7.2.6 RELEVANT REGULATORY AUTHORITIES AND IAPS	7-5
7.2.7 REVIEW OF THE SCOPING REPORT	7-6
7.2.8 REVIEW OF THE EIA AND EMP REPORT	7-7
7.3 SUMMARY OF ISSUES RAISED BY IAPS	7-7
7.4 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT AND ALTERNATIVES	7-28
7.4.1 BASELINE ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY.....	7-28
7.4.1.1 GEOLOGY.....	7-28

7.4.1.2	TOPOGRAPHY	7-39
7.4.1.3	CLIMATE.....	7-39
7.4.1.4	SOIL	7-47
7.4.1.5	LAND CAPABILITY.....	7-51
7.4.1.6	BIODIVERSITY	7-53
7.4.1.7	SURFACE WATER.....	7-63
7.4.1.8	GROUNDWATER	7-69
7.4.1.9	AIR QUALITY	7-76
7.4.1.10	NOISE	7-78
7.4.1.11	VISUAL ASPECTS	7-81
7.4.1.12	TRAFFIC	7-82
7.4.1.13	HERITAGE/CULTURAL AND PALAEOLOGICAL RESOURCES	7-86
7.4.1.14	SOCIO-ECONOMIC	7-89
7.4.2	CURRENT LAND USES.....	7-93
7.4.3	DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE	7-98
7.4.4	ENVIRONMENTAL AND CURRENT LAND USE MAP(S)	7-99
7.4.5	ENVIRONMENT AND CURRENT LAND USE MAP.....	7-99
7.5	ENVIRONMENTAL IMPACTS AND RISKS OF THE ALTERNATIVES	7-102
7.6	METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS	7-120
7.7	POSITIVE AND NEGATIVE IMPACTS IN TERMS OF SITE LAYOUT ALTERNATIVES.....	7-121
7.8	POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RESIDUAL RISK	7-126
7.9	MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED.....	7-132
7.10	STATEMENT MOTIVATING THE PREFERRED ALTERNATIVE.....	7-132
7.10.1	SITE LAYOUT ALTERNATIVES	7-132
7.10.2	WATER SUPPLY ALTERNATIVES	7-132
7.10.3	TRANSPORTATION ALTERNATIVES	7-132
8	FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE THROUGH THE LIFE OF THE ACTIVITY.....	8-1
8.1	DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY IMPACTS	8-1
8.2	DESCRIPTION OF THE PROCESS UNDERTAKEN TO ASSESS AND RANK THE IMPACTS AND RISKS	8-1
8.3	A DESCRIPTION OF THE ENVIRONMENTAL IMPACTS AND RISKS IDENTIFIED DURING THE ENVIRONMENTAL ASSESSMENT PROCESS	8-1
8.4	ASSESSMENT OF THE SIGNIFICANCE OF EACH IMPACT AND RISK AND AN INDICATION OF THE EXTENT OF TO WHICH THE ISSUE AND RISK CAN BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MITIGATION MEASURES.....	8-5
9	ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK.....	9-1
10	SUMMARY OF SPECIALIST REPORT FINDINGS.....	10-1
11	ENVIRONMENTAL IMPACT STATEMENT.....	11-1
11.1.1	SUMMARY OF KEY FINDINGS OF THE EIA	11-1
11.1.2	FINAL SITE MAP	11-2
11.1.3	SUMMARY OF THE POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES.....	11-2
12	IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES FOR INCLUSION IN THE EMPR	12-1
12.1	PROPOSED MANAGEMENT OBJECTIVES AND OUTCOMES FOR ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS	12-1

12.1.1	IMPACTS THAT REQUIRE MONITORING PROGRAMMES.....	12-2
12.1.2	ACTIVITIES AND INFRASTRUCTURE.....	12-2
12.1.3	MANAGEMENT ACTIONS.....	12-3
12.1.4	ROLES AND RESPONSIBILITIES.....	12-3
13	FINAL PROPOSED ALTERNATIVES.....	13-1
14	ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION.....	14-1
15	ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.....	15-1
15.1	ENVIRONMENTAL ASSESSMENT LIMIT.....	15-1
15.2	PREDICTIVE MODELS IN GENERAL.....	15-1
15.3	TOPOGRAPHY.....	15-1
15.4	CLIMATE.....	15-1
15.5	SOILS AND LAND CAPABILITY.....	15-1
15.6	BIODIVERSITY.....	15-1
15.7	SURFACE WATER.....	15-2
15.8	GROUNDWATER.....	15-3
15.9	GEOCHEMISTRY.....	15-5
15.10	AIR QUALITY.....	15-6
15.11	NOISE.....	15-7
15.12	VISUAL ASPECTS.....	15-7
15.13	BLASTING.....	15-7
15.14	HERITAGE/ CULTURAL AND PALAEOLOGICAL RESOURCES.....	15-7
15.15	ECONOMIC LAND USE AND SUSTAINABILITY.....	15-8
15.16	TRAFFIC IMPACT ASSESSMENT.....	15-8
15.17	CLOSURE COST ESTIMATE.....	15-8
16	REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED.....	16-1
16.1.1	REASONS WHY THE ACTIVITY SHOULD BE AUTHORIZED OR NOT.....	16-1
16.1.2	CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION.....	16-1
16.1.2.1	SPECIFIC CONDITIONS FOR INCLUSION IN THE EMPR.....	16-1
16.1.2.2	REHABILITATION REQUIREMENTS.....	16-1
17	PERIOD FOR WHICH AUTHORISATION IS REQUIRED.....	17-1
18	UNDERTAKING.....	18-1
19	FINANCIAL PROVISION.....	19-1
19.1.1	METHOD TO DERIVE THE AMOUNT TO MANAGE AND REHABILITATE THE ENVIRONMENT.....	19-1
19.1.2	CONFIRM THAT THE AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE.....	19-2
20	DEVIATIONS FROM SCOPING REPORT AND APPROVED PLAN OF STUDY.....	20-1
20.1.1	DEVIATION FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS.....	20-1
20.1.2	MOTIVATIONS FOR DEVIATION.....	20-1
21	SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY.....	21-1
21.1.1	IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON.....	21-1
21.1.2	IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT.....	21-1
22	OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.....	22-1
	PART B – ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT.....	II

23	DETAILS OF THE EAP	23-1
24	DESCRIPTION OF THE ASPECTS OF THE ACTIVITY	24-1
25	COMPOSITE MAP	25-1
26	DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS.....	26-1
26.1	DETERMINATION OF CLOSURE OBJECTIVES.....	26-1
26.2	THE PROCESS FOR MANAGING ENVIRONMENTAL DAMAGE AS A RESULT OF UNDERTAKING THE ACTIVITY.....	26-1
26.3	POTENTIAL RISK OF ACID MINE DRAINAGE	26-1
26.4	STEPS TAKEN TO INVESTIGATE, ASSESS AND EVALUATE THE IMPACT OF ACID MINE DRAINAGE	26-1
26.5	ENGINEERING OR MINE DESIGN SOLUTIONS TO AVOID OR REMEDY ACID MINE DRAINAGE.....	26-1
26.6	MEASURES IN PLACE TO REMEDY RESIDUAL OR CUMULATIVE IMPACT FROM ACID MINE DRAINAGE	26-1
26.7	VOLUMES AND RATE OF WATER USE FOR MINING	26-2
26.8	HAS A WATER USE LICENCE BEEN APPLIED FOR.....	26-2
26.9	IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES.....	26-3
27	IMPACT MANAGEMENT OUTCOMES.....	27-1
28	IMPACT MANAGEMENT ACTIONS.....	28-1
29	FINANCIAL PROVISION.....	29-1
29.1	DETERMINATION OF THE AMOUNT OF THE FINANCIAL PROVISION	29-1
29.1.1	DESCRIPTION OF THE CLOSURE OBJECTIVES AND THE ALIGNMENT WITH THE BASELINE ENVIRONMENT.....	29-1
29.1.2	CONFIRMATION THAT THE CLOSURE OBJECTIVES HAVE BEEN CONSULTED WITH LANDOWNERS AND IAPS	29-1
29.1.3	REHABILITATION PLAN.....	29-2
29.1.4	COMPATIBILITY OF THE REHABILITATION PLAN WITH THE CLOSURE OBJECTIVES	29-2
29.1.5	CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION.....	29-2
29.1.6	CONFIRMATION THAT THE FINANCIAL PROVISION WILL BE PROVIDED	29-3
30	MECHANISMS FOR MONITORING COMPLIANCE AND PERFORMANCE AGAINST THE EMP.....	30-1
30.1	FREQUENCY OF PERFORMANCE ASSESSMENT REPORT	30-5
31	ENVIRONMENTAL AWARENESS PLAN	31-1
31.1	MANNER IN WHICH APPLICANT INTENDS TO INFORM EMPLOYEES OF THE ENVIRONMENTAL RISKS	31-1
31.1.1	ENVIRONMENTAL POLICY.....	31-1
31.1.2	STEPS TO ACHIEVE THE ENVIRONMENTAL POLICY OBJECTIVES	31-2
31.1.3	TRAINING OBJECTIVES OF THE ENVIRONMENTAL AWARENESS PLAN	31-3
31.1.3.1	GENERAL CONTENTS OF THE ENVIRONMENTAL AWARENESS PLAN.....	31-4
31.2	MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION	31-5
31.2.1	ON-GOING MONITORING AND MANAGEMENT MEASURES.....	31-5
31.2.2	PROCEDURES IN CASE OF ENVIRONMENTAL EMERGENCIES.....	31-5
31.2.2.1	GENERAL EMERGENCY PROCEDURE	31-5
31.2.2.2	IDENTIFICATION OF EMERGENCY SITUATIONS	31-7
31.2.3	TECHNICAL, MANAGEMENT AND FINANCIAL OPTIONS	31-7
32	SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY.....	32-1
33	UNDERTAKING	33-1
34	REFERENCES	34-1

LIST OF FIGURES

FIGURE 1: REGIONAL SETTING.....	XIII
FIGURE 2: LOCAL SETTING	XIV
FIGURE 3: INFRASTRUCTURE PLAN	4-12
FIGURE 4: PROPOSED INTERSECTION UPGRADE TO THE GLORIA MINE (SIYAZI, MARCH 2015).....	4-16
FIGURE 5: CONCEPTUAL PROCESS FLOW DIAGRAMME	4-22
FIGURE 6: TYPICAL DESIGN OF A TRAPEZOIDAL DRAIN.....	4-24
FIGURE 7: TYPICAL DESIGN OF A EARTH BERM	4-25
FIGURE 8: TYPICAL DESIGN OF A RECYCLED WATER POND.....	4-26
FIGURE 9: CONCEPTUAL STORMWATER MANAGEMENT PLAN (AECOM, OCTOBER 2015)	4-27
FIGURE 10: CONCEPTUAL DESIGN OF THE PROPOSED TEMPORARY GA-MOGARA RIVER REALIGNMENT.4-30	
FIGURE 11: CONCEPTUAL SECTION OF THE PROPOSED TEMPORARY GA-MOGARA RIVER REALIGNMENT (SLR, OCTOBER 2015).....	4-31
FIGURE 12: CONCEPTUAL DESIGN SECTION OF THE PROPOSED PERMANENT GA-MOGARA RIVER REALIGNMENT (SLR, OCTOBER 2015)	4-32
FIGURE 13: WET SEASON WITH 5.1 L/S GROUNDWATER INFLOW.....	4-34
FIGURE 14: DRY SEASON WITH 2.5 L/S GROUNDWATER INFLOW	4-35
FIGURE 15: LOCAL GEOLOGICAL SETTING OF THE PROPOSED PROJECT AREA	7-31
FIGURE 16: PERIOD, DAY- AND NIGHT-TIME WIND ROSES (AIRSHED, SEPTEMBER 2015).....	7-45
FIGURE 17: SEASONAL WIND ROSES (AIRSHED, SEPTEMBER 2015)	7-46
FIGURE 18: SOIL FORMS (TERRA AFRICA, JULY 2015)	7-50
FIGURE 19: LAND USE CAPABILITY (EMS, JULY 2015)	7-52
FIGURE 20: VEGETATION TYPES (EMS, AUGUST 2015).....	7-58
FIGURE 21: BIODIVERSITY SENSITIVITY (EMS, AUGUST 2015).....	7-59
FIGURE 22: GRIQUALAND WEST CENTER OF ENDEMISM (EMS, AUGUST 2015).....	7-60
FIGURE 23: CATCHMENTS.....	7-67
FIGURE 24: FLOODLINES (SLR, OCTOBER 2015).....	7-68
FIGURE 25: BOREHOLES SELECTED FOR GROUNDWATER QUALITY SAMPLING (SLR, OCTOBER 2015)..	7-75
FIGURE 26: NOISE SAMPLING POINTS (AIRSHED, SEPTEMBER 2015)	7-80
FIGURE 27: EXISTING ROAD NETWORK LAYOUT (SIYAZI, MARCH 2015)	7-85
FIGURE 28: HERITAGE SITES LOCATED WITHIN THE PROPOSED PROJECT AREA.....	7-88
FIGURE 29: REGIONAL LAND USE MAP	7-100
FIGURE 30: LOCAL LAND USE MAP	7-101
FIGURE 31: SITE LAYOUT ALTERNATIVES	7-125
FIGURE 32: MONITORING PLAN	30-6

LIST OF TABLES

TABLE 1: DETAILS OF THE EAPS	1-1
TABLE 2: DESCRIPTION OF THE PROPERTY.....	2-1
TABLE 3: LIST OF ACTIVITIES/INFRASTRUCTURE ASSOCIATED WITH THE PROPOSED PROJECT.....	4-2
TABLE 4: DESCRIPTION OF THE LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT	4-8
TABLE 5: CONSTRUCTION PHASE TRAFFIC: MATERIALS AND STAFF.....	4-15
TABLE 6: SUMMARY OF OPEN CAST ACTIVITIES	4-19
TABLE 7: PROJECT DATA THAT PROVIDES PERSPECTIVE AND SCALE OF THE PROPOSED PROJECT....	4-19

TABLE 8: SUMMARY OF PROCESSING PLANT ACTIVITIES.....	4-20
TABLE 9: DETAILS OF THE RECYCLED WATER PONDS.....	4-25
TABLE 10: OPERATIONAL PHASE TRAFFIC: MATERIALS AND STAFF	4-36
TABLE 11: DESIGN FEATURES CHARACTERISTICS FOR THE OVERBURDEN STOCKPILE	4-37
TABLE 12: SAFETY CLASSIFICATION CRITERIA FOR THE OVERBURDEN STOCKPILE	4-38
TABLE 13: RESULTS OF OVERBURDEN CLASSIFICATION.....	4-39
TABLE 14: LEGAL FRAMEWORK.....	5-1
TABLE 15: SCOPING REPORT REQUIREMENTS.....	5-2
TABLE 16: SUMMARY OF ISSUES RAISED BY IAPS AND REGULATORY AUTHORITIES	7-8
TABLE 17: GENERAL STRATIGRAPHIC PROFILE FOR THE KALAHARI MANGANESE FIELD (SLR, OCTOBER 2015).....	7-30
TABLE 18: ACID BASE ACCOUNTING RESULTS FOR THE PROPOSED PROJECT (SLR, AUGUST 2015)	7-33
TABLE 19: MINERALOGY (%) FOR SAMPLES FOR THE PROPOSED PROJECT AREA.....	7-35
TABLE 20: LEACHATE RESULTS FOR THE PROPOSED PROJECT (SLR, AUGUST 2015).....	7-37
TABLE 21: SUMMARY OF MONTHLY RAINFALL DATA FOR THE PROPOSED PROJECT AREA (SLR, OCTOBER 2015).....	7-41
TABLE 22: FIVE GREATEST DEPTH OF RAINFALL RECORDED AT THE WINTON WEATHER STATION (SLR, OCTOBER 2015)	7-41
TABLE 23: WETTEST PERIODS RECORDED ON CONSECUTIVE DAYS (SLR, OCTOBER 2015)	7-42
TABLE 24: SUMMARY OF EVAPORATION DATA (SLR, OCTOBER 2015)	7-42
TABLE 25: MONTHLY TEMPERATURE DATA (AIRSHED, SEPTEMBER 2015).....	7-43
TABLE 26: VEGETATION TYPES IDENTIFIED WITHIN THE PROPOSED PROJECT AREA (EMS, AUGUST 2015)	7-54
TABLE 27: ALIEN AND INVASIVE SPECIES LOCATED WITHIN THE PROPOSED PROJECT AREA (EMS, AUGUST 2015).....	7-55
TABLE 28: BIRD SPECIES OF CONSERVATION CONCERN LIKELY TO OCCUR WITHIN THE PROPOSED PROJECT AREA (EMS, AUGUST 2015).....	7-61
TABLE 29: MAMMAL SPECIES OF CONSERVATION CONCERN POTENTIALLY AND/OR OCCURRING IN THE PROJECT AREA (EMS, AUGUST 2015).....	7-62
TABLE 30: PEAK FLOWS FOR THE GA-MOGARA DRAINAGE CHANNEL (SLR, OCTOBER 2015).....	7-65
TABLE 31: HYDROCENSUS BOREHOLES (SLR, OCTOBER 2015).....	7-71
TABLE 32: BOREHOLES SELECTED FOR GROUNDWATER SAMPLING (SLR, OCTOBER 2015).....	7-72
TABLE 33: GROUNDWATER QUALITY DATA (SLR, OCTOBER 2015).....	7-74
TABLE 34: SUMMARY OF NOISE SAMPLING SURVEY (AIRSHED, SEPTEMBER 2015).....	7-79
TABLE 35: INTERSECTIONS RELEVANT TO THE PROPOSED PROJECT.....	7-83
TABLE 36: ROAD CHARACTERISTICS (SIYAZI, MARCH 2015).....	7-83
TABLE 37: PEAK-HOUR TRAFFIC COUNTS AT THE RELEVANT INTERSECTIONS ALONG THE R380 (SIYAZI, MARCH 2015).....	7-84
TABLE 38: HERITAGE RESOURCES LOCATED WITHIN THE PROPOSED PROJECT AREA.....	7-87
TABLE 39: SOCIO ECONOMIC PROFILE - POPULATION	7-90
TABLE 40: SOCIO-ECONOMIC PROFILE – TOILET FACILITIES.....	7-90
TABLE 41: SOCIO-ECONOMIC PROFILE– POTABLE WATER ACCESS	7-91
TABLE 42: SOCIO-ECONOMIC PROFILE – REFUSE REMOVAL	7-91
TABLE 43: SOCIO-ECONOMIC PROFILE – EDUCATION	7-92
TABLE 44: SOCIO-ECONOMIC PROFILE – EMPLOYMENT	7-92
TABLE 45: LANDOWNERS LOCATED WITHIN THE PROPOSED PROJECT AREA.....	7-94
TABLE 46: LANDOWNERS ADJACENT TO THE PROPOSED PROJECT AREA.....	7-94
TABLE 47: LIST OF IMPACTS IDENTIFIED FOR THE PROPOSED PROJECT INCLUDING ALTERNATIVES ..	7-103

TABLE 48: CRITERIA FOR ASSESSING IMPACTS	7-120
TABLE 49: POSITIVE AND NEGATIVE IMPACTS ASSOCIATED WITH SITE LAYOUT ALTERNATIVES.....	7-122
TABLE 50: POSSIBLE MITIGATION MEASURES AND ANTICIPATED LEVEL OF RESIDUAL RISK.....	7-126
TABLE 51: LIST OF POTENTIAL IMPACTS AS THEY RELATE TO PROJECT ACTIONS / ACTIVITIES / PROCESSES.....	8-1
TABLE 52: ASSESSMENT OF SIGNIFICANT IMPACTS AND RISKS.....	9-2
TABLE 53: SUMMARY OF SPECIALIST REPORTS.....	10-1
TABLE 54: SUMMARY OF POTENTIAL IMPACTS.....	11-1
TABLE 55: ENVIRONMENTAL OBJECTIVES AND OUTCOMES.....	12-1
TABLE 56: ESTIMATED COSTS FOR IMPLEMENTING TECHNICAL AND MANAGEMENT OPTIONS.....	19-1
TABLE 57: MEASURES TO REHABILITATE THE ENVIRONMENT AFFECTED BY THE LISTED ACTIVITIES ...	26-3
TABLE 58: DESCRIPTION OF IMPACT MANAGEMENT OUTCOMES.....	27-1
TABLE 59: DESCRIPTION OF IMPACT MANAGEMENT ACTIONS	28-1
TABLE 60: WASTE MANAGEMENT PROCEDURES FOR GENERAL AND HAZARDOUS WASTE	28-16
TABLE 61: SOIL MANAGEMENT PRINCIPLES.....	28-17
TABLE 62: FINANCIAL PROVISION (SLR, SEPTEMBER 2015).....	29-2
TABLE 63: MONITORING OF COMPLIANCE AND PERFORMANCE IN TERMS OF EMPR	30-1
TABLE 64: EMERGENCY RESPONSE PROCEDURES.....	31-8
TABLE 65: AIR POLLUTION EVALUATION CRITERIA FOR PM10 AND PM2.5.....	XXV
TABLE 66: DUST FALL OUT LIMITS	XXV
TABLE 67: INFRASTRUCTURE AND RESIDENTIAL AREAS WITHIN CLOSE PROXIMITY TO THE PROPOSED PROJECT AREA.....	XXXII

LIST OF APPENDICES

APPENDIX A: PROOF OF EAP QUALIFICATIONS	A
APPENDIX B: CURRICULUM VITAE OF EAP	B
APPENDIX C: LOCAL AND REGIONAL SETTING	C
APPENDIX D: SITE LAYOUT	D
APPENDIX E: STAKEHOLDER ENGAGEMENT DOCUMENTS.....	E
APPENDIX F: IMPACT RATING FOR EACH POTENTIAL IMPACT	F
APPENDIX G: COMPOSITE MAP	G
APPENDIX H: GROUNDWATER IMPACT ASSESSMENT REPORT	H
APPENDIX I: GEOCHEMISTRY IMPACT ASSESSMENT REPORT	I
APPENDIX J: SOILS AND LAND CAPABILITY IMPACT ASSESSMENT REPORT	J
APPENDIX K: BIODIVERSITY IMPACT ASSESSMENT REPORT	K
APPENDIX L: SURFACE WATER IMPACT ASSESSMENT REPORT	L
APPENDIX M: AIR QUALITY IMPACT ASSESSMENT REPORT	M
APPENDIX N: NOISE IMPACT ASSESSMENT REPORT	N
APPENDIX O: TRAFFIC IMPACT ASSESSMENT REPORT	O
APPENDIX P: BLASTING ASSESSMENT	P
APPENDIX Q: HERITAGE/CULTURAL AND PALEONTOLOGICAL IMPACT ASSESSMENT REPORT	Q
APPENDIX R: ECONOMIC AND SUSTAINABILITY LAND USE ANALYSIS	R
APPENDIX S: CLOSURE COST ASSESSMENT	S

ACRONYMS AND ABBREVIATIONS

Acronyms / Abbreviations	Definition
ABA	Acid Base Accounting
ADEs	Aquifer dependant ecosystem
AP	Acid Potential
BID	Background information document
BIFF	Banded Iron Formation
CBA	Critical biodiversity area
C	Carbon
CO	Carbon monoxide
CO ₂	Carbon dioxide
DAFF	Department of Agriculture, Forestry and Fisheries
DALA	Department of Agriculture and Land Affairs
DENC	Department of Environment and Nature Conservation
DMR	Department of Mineral Resources
DRDLR	Department of Rural Development and Land Reform
DWS	Department of Water and Sanitation
DPWRT	Department of Public Works, Roads and Transport
DWEA	Department of Water and Environmental Affairs
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment
EMPr	Environmental management programme report
IAPs	Interested and/or affected parties
IUCN	International Union for Conservation of Nature
IFC	International Finance Corporation
mamsl	Metres above mean sea level
Mokala	Mokala Manganese (Pty) Ltd
MPRDA	Mineral and Petroleum Resources Development Act
Mn	Manganese
NCNCA	Northern Cape Nature Conservation Act No. 9 of 2009
NEMA	National Environmental Management Act
NEM:WA	National Environmental Management: Waste Management Act
NFA	National Forest Act No. 84 of 1998
NFEPA	National Freshwater Ecosystem Priority Areas 2011
NP	Neutralising Potential
NNP	Net Neutralising Potential
PAG	Potentially Acid Generating
NPAES	National Protected Areas Expansion Strategy 2008
NWA	National Water Act, 1998
NO	Nitrogen oxide
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM _{2.5}	Inhalable particulate matter
PM ₁₀	Thoracic particulate matter
ROM	Run-of-mine
ppb	parts per billion
SACNSP	South African Council for Natural Scientific Professionals
SAHRA	South African Heritage Resources Agency

Acronyms / Abbreviations	Definition
SANS	South African National Standards
SANBI	South African National Botanical Institute
SLR	SLR Consulting (South Africa) (Pty) Ltd
TSP	Total suspended particles
SO ₂	Sulphur dioxide
VOCs	Volatile organic compounds
WR2005	Water Resources of South Africa, 2005
XRD	X-Ray Diffraction

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE DEVELOPMENT OF THE PROPOSED MOKALA MANGANESE MINE

INTRODUCTION

INTRODUCTION TO THE PROPOSED PROJECT

Mokala Manganese (Pty) Ltd (Mokala) is a South African company of which Ntsimbintle Mining (Pty) Ltd owns 51%, with the remaining 49% owned by Blue Flacon 222 Trading (Pty) Ltd.

Mokala is proposing to establish a new opencast manganese mine on the remaining extent of the farm Gloria 266, located 4 km north-west of the town Hotazel in the Joe Morolong Local Municipality, Northern Cape Province. Refer to Figure 1 and Figure 2 for the regional and local settings respectively.

In broad terms the proposed Mokala Manganese project will comprise open cast activities, a dry crushing and screening plant, overburden rock dumps, product and run-of mine stockpiles, topsoil stockpiles, mine related facilities such as workshops, stores and various support infrastructure and services. Further to this, the proposed project will require:

- The realignment of the R380 road on the farm Kipling 271 and across the remaining extent of the farm of Gloria 266 as this road currently bisects the proposed mining project site
- Upgrading of the intersection to the proposed mine on portion 1 of the farm Gloria 266 and also serving the existing Gloria Mine
- The realignment of a section of the Ga-Mogara drainage channel within the existing river channel. This realignment will extend onto the farm Umtu 281.

The EIA process comprises two phases: a scoping phase and an environmental impact assessment phase combined with the environmental management programme (EIA and EMP) phase. This report describes the EIA and EMP phase for the proposed project.

SLR Consulting (South Africa) (Pty) Ltd (SLR), an independent firm of environmental consultants, has been appointed by Mokala to undertake the environmental assessment process for the proposed project.

LEGAL FRAMEWORK

Prior to the commencement of the proposed project, environmental authorisation is required from various government departments. These include:

- Environmental authorisation from the Department of Mineral Resources (DMR) in terms of National Environmental Management Act No.107 of 1998 (NEMA). The proposed project incorporates several listed environmental activities. An application was submitted by Mokala to the DMR on 03 July 2015.

The applicable list of activities is provided in Section 4.1. The EIA regulations being followed for this project are Regulation 982 of 04 December 2014. A copy of the NEMA application is included in Appendix E.

- A mining right and an environmental authorisation from the Department of Mineral Resources (DMR) in terms of the Mineral and Petroleum Resources Development Act No. 28 of 2002 (MPRDA). The mining right application was submitted by Mokala to the DMR on 03 July 2015. A single scoping report and EIA and EMP report supporting the new mining right application and associated infrastructure will be submitted to the DMR for decision making.
- A water use license from the Department of Water and Sanitation (DWS) in terms of the National Water Act No. 36 of 1998 (NWA). The applicable water uses in terms of Section 21 of the NWA include (a), (b), (c), (g), (i) and (j).
- A waste management license from the DMR in terms of the National Environmental Management: Waste Act No. 59 of 2008 (NEM:WA). The applicable list of activities as currently set out in the legislation (and which is possibly subject to change) is provided in Section 4.1. A copy of the NEM:WA application is included in Appendix E. The NEMA/NEM:WA application was submitted to the DMR on 03 July 2015. On 24 July 2015, the list of waste management activities was amended to include the reclamation and management of residue stockpiles and deposits (Activity 4(11) of Category B). It follows that activity 4(11) of Category B had not been promulgated at the time of submitting the initial NEMA/NEM:WA application, but is now relevant to the proposed project. It follows that the NEM:WA application should be amended to include this activity. Clarity on how this process should be undertaken is still to be obtained for the DMR.

OTHER APPROVALS / PERMITS

Other approvals/permits needed for the proposed project are listed below. In this regard, there are other approvals that are required prior to construction and/or commissioning of the mining and related activities. This list does not cover occupational health and safety legislation requirements.

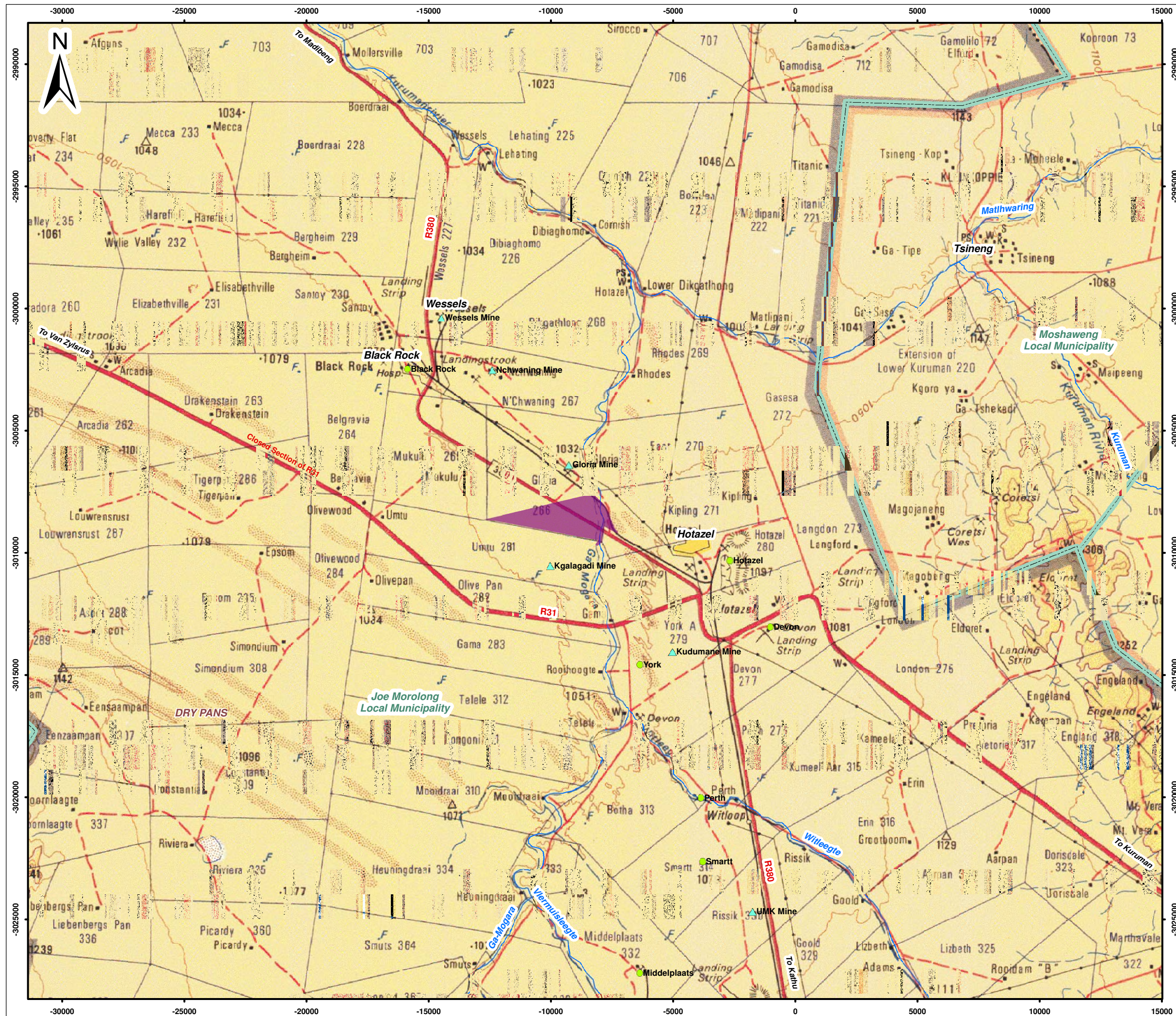
- Prior to removing or damaging any protected plant species, the necessary permits will be obtained from DWS in terms of the National Forests Act, 84 of 1998.
- Prior to storage, handling, transportation and disposal of explosives the relevant licenses and written permissions are required in terms of the Explosives Act, 25 of 1956, and the Mine Health and Safety Act, 29 of 1996, as amended.
- The re-routing of Telkom line that runs parallel to the R380 will require approval from Telkom.

EIA AND EMP PHASE OBJECTIVES

The objectives of the environmental assessment process are as follows:

- The identification of policies and legislation that is relevant to the proposed project
- To describe the need and desirability of the proposed project
- To describe the proposed project including alternatives that are being considered

- To provide an assessment of the environmental and social impacts taking into account all project alternatives
- To identify measures to avoid, manage or mitigate identified impacts including the residual risks that need to be managed and monitored



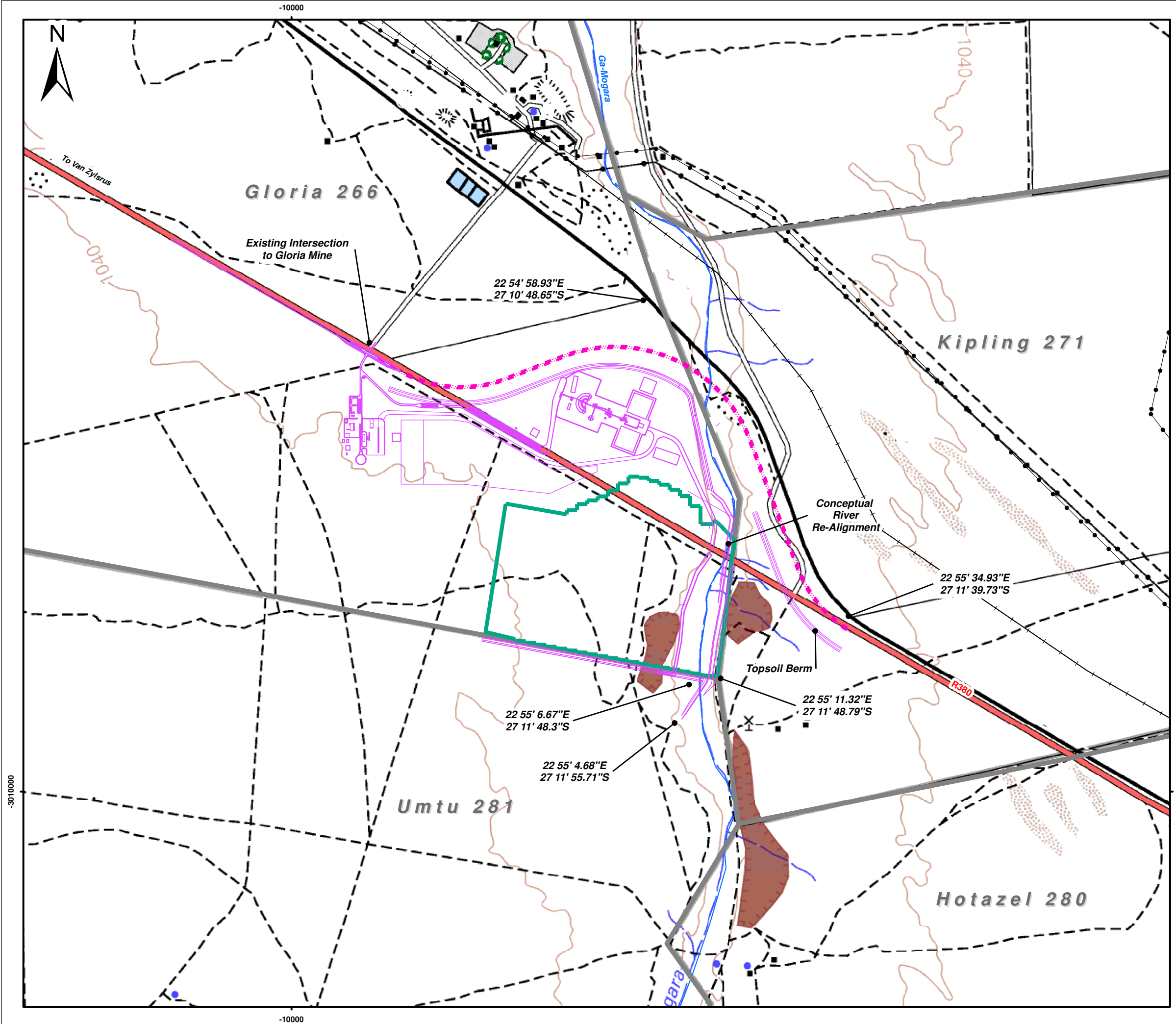
- Legend**
- Proposed Project Area
 - Local Municipalities
 - Operating Manganese Mines
 - Closed/Dormant Mines
 - Rivers
 - Roads

0 2 4 Kilometers
 Scale: 1:150 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

MOKALA MANGANESE (PTY) LTD

Figure 1
 Regional Setting

SLR
 SLR Consulting (Africa) (Pty) Ltd
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 Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978



- Legend**
- Proposed Infrastructure
 - · - · Proposed Road Re-Alignment of R380
 - Proposed Open Pit Area
 - - - Tracks/Paths
 - ▭ Farm Boundaries
 - Rivers
 - Powerlines
 - +— Railway
 - Historical Borrow Pits
 - Roads

0 400 800 Meters
 Scale: 1:18 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

MOKALA MANGANESE (PTY) LTD

Figure 2
Local Setting

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PART A – SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

The details of the environmental assessment practitioners (EAPs) that were involved in the preparation of this scoping report are provided in Table 1 below.

TABLE 1: DETAILS OF THE EAPS

Details	Project manager and author	Reviewer
Name of the practitioner	Natasha Daly	Brandon Stobart
Tel No.:	011 467 0945	011 467 0945
Fax No.:	011 467 0978	011 467 0978
E-mail address	ndaly@slrconsulting.com	-

Neither SLR nor any of the specialists involved in the environmental assessment process have any interest in the project other than fair payment for consulting services rendered as part of the environmental assessment process.

1.2 EXPERTISE OF THE EAP

Natasha Daly holds a BSC Honours degree in Geography and Environmental Management and has approximately 6 years of relevant experience (Curriculum Vitae attached in Appendix B). Brandon Stobart is a director at SLR, has over 17 years of relevant experience (Curriculum Vitae attached in Appendix B) and is registered as an environmental assessment practitioner with the interim certification board. The proof of this registration is attached in Appendix A. Both Natasha Daly and Brandon Stobart have been involved in several impact assessments for large scale mining development in Southern Africa.

2 PROJECT DESCRIPTION

A description of the property on which the proposed project is located is provided in Table 2.

TABLE 2: DESCRIPTION OF THE PROPERTY

Farm Name	<ul style="list-style-type: none"> • Remaining extent and portion 1 of the farm Gloria 266 • The farm Kipling 271 • The farm Umtu 281
Application area (Ha)	Approximately 154 ha will be disturbed as part of the proposed project.
Magisterial district	Located within the Kuruman Magisterial District and in the John Taolo Gaetseane District Municipality
Local municipality	Joe Morolong Local Municipality
Distance and direction from nearest town	Located approximately 4 km north-west of the town Hotazel
21 digit Surveyor General Code for each farm portion	Remaining extent of the farm Gloria 266: CO410000000026600000 Portion 1 of the farm Gloria 266: CO410000000026600001 The farm Umtu 281: CO410000000028100000 The farm Kipling 271: CO410000000027100000
Co-ordinates (Also illustrated on Figure 2)	Western point: 22° 52' 24.53" E and 27° 11' 21.34" S Northern point: 22° 54' 58.93" E and 27° 10' 48.65" S Eastern point: 22° 55' 34.93" E and 27° 11' 39.73" S Southern point: 22° 55' 11.32" E and 27° 11' 48.79" S Southern point (River realignment): 22° 55' 6.67" E and 27° 11' 48.3" S and 22° 55' 4.68" E and 27° 11' 55.71" S

3 LOCALITY MAP

The local and regional setting of the proposed project site is illustrated in Figure 1 and Figure 2.

4 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

An infrastructure plan of the proposed project, showing the location and extent of all of the activities is detailed in Table 3 and illustrated in Figure 3.

4.1 LISTED AND SPECIFIED ACTIVITIES

The activities and infrastructure associated with the proposed project are listed in Table 3 below and are illustrated in Figure 3 (where relevant). In each case the relevant NEMA and/or possible NEM:WA listed activities which will be triggered by the proposed project for the various activities and infrastructure has been provided in Table 3. A description of each of the listed activities identified is provided in Table 4.

TABLE 3: LIST OF ACTIVITIES/INFRASTRUCTURE ASSOCIATED WITH THE PROPOSED PROJECT

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
Site preparation			
Selective clearing of vegetation in areas designated for surface infrastructure	Approximately 154 ha	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Earthworks			
Stripping and stockpiling topsoil and sub-soil and the establishment of a topsoil stockpile area and berm	<ul style="list-style-type: none"> Topsoil stockpile (Approximately 5 ha and 15 114m³) Topsoil berm located along the R380 realignment route (Approximately 8.3 ha and 72 450 m³) Topsoil berm located on the southern edge of the open pit (Approximately 1.7 ha and 149 248.57m³) 	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Cleaning, grubbing and bulldozing activities	This forms part of the overall 154 ha of disturbance.		
Digging trenches and foundations.			
Establishing storm water controls (channels, berms) as per storm water management plan			
Bulk earthworks including shaping and lining of pond walls and building safety berms			
Civil works			
General building activities and erection of structures	This forms part of the overall 154 ha of disturbance.	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Foundation excavations and compaction			
Mixing of concrete and concrete work			
Steel work (including grinding, welding and erection)			
Open pit mining			
Open pit mining	Approximately 93 ha	X	GNR. 983 (Activity 12) GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
Backfilling the open pit with overburden rock			GNR. 984 (Activity 6) GNR. 984 (Activity 17) GNR. 984 (Activity 15)
Blasting and drilling	Within the open pit as discussed above		GNR. 983 (Activity 12) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Processing plant			
Plant area: • Primary crusher • Secondary crusher and • Screening plant	Plant area: • Primary crusher (approximately 0.41 ha) • Secondary crusher (approximately 0.10 ha) • Screening plant (approximately 0.04 ha)	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 21) GNR. 985 (Activity 12)
Truck loading facility	Approximately 0.5 ha		GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 985 (Activity 12) GNR. 984 (Activity 17)
Transportation			
Internal haul roads, turning circle and upgrading the intersection to Gloria Mine	Internal haul roads (approximately 4.6 ha), turning circle (approximately 0.18 ha) and upgrading intersection at Gloria Mine (approximately 0.96 ha)	X	GNR. 983 (Activity 24) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Widening of existing gravel roads	Approximately 2 ha		GNR. 983 (Activity 28) GNR. 983 (Activity 56) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Realignment of the R380	Approximately 3.7 ha		GNR. 983 (Activity 24) GNR. 983 (Activity 28)

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
			GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 984 (Activity 27) GNR. 985 (Activity 12)
Loading, hauling and transportation of ROM, product and materials	Within transport and material handling infrastructure discussed above		GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Conveyors and weighbridge	Conveyors (approximately 0.06 ha) and weighbridge (approximately 0.101 ha)		GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Mineralised waste			
Temporary overburden rock stockpiles and berms	<ul style="list-style-type: none"> Temporary Overburden rock stockpiles (Approximately 16 ha and approximately 4 206 375 m³) Overburden rock berm located along the river realignment (Approximately 2.3 ha) Backfilled open pit 	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 6) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12) GNR. 921 (Category B 4(7)) GNR. 921 (Category B 4(8)) GNR. 921 Category B 4(10)
Product stockpiles: <ul style="list-style-type: none"> Fine stockpiles Supplementary fines stockpile Product stockpile Supplementary product stockpile 	<ul style="list-style-type: none"> Fines stockpiles (approximately 1 ha - 5000 tons) Supplementary fines stockpile (approximately 1ha – 2000 tons) Product stockpile (approximately 1 ha – 28 000 tons) Supplementary product stockpile (approximately 1 ha – 2800 tons) 		GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 6) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
ROM stockpile: Low grade and high grade	Low grade (approximately 1.03 ha and 140 000m ³) and high grade stockpile (approximately 1 ha and 140 000m ³).		GNR. 983 (Activity 27) GNR. 983 (Activity 28)

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
			GNR. 984 (Activity 6) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Sewage treatment plant	Approximately 0.02 ha. Capacity to treat 60m ³ per day.		GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Non-mineralised waste (General and hazardous waste)			
Temporary disposal of general waste (building rubble, domestic waste, cleared vegetation, construction material (electrical/wood/steel) off cuts, wood chips and fencing at waste yard	Waste yard (approximately 0.01 ha)	N/A	Not applicable
Temporary disposal of hazardous waste (light bulbs, lubricants, paint and explosive packaging and empty cement bags at waste yard			
Disposal and/or treatment of contaminated soils			
Removal of waste by contractor for recycling, re-use and/or final disposal at permitted waste disposal facilities	Not applicable		
Water supply, use and management			
Establishment of water supply boreholes	Approximately 0.01 ha	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Realignment of the Ga-Mogara drainage channel	Approximately 2.47 ha		GNR. 983 (Activity 12) GNR. 983 (Activity 19) GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15)

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
			GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Establishment of a water treatment plant	Approximately 0.04 ha		GNR. 983 (Activity 10) GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Establishment of stormwater controls: <ul style="list-style-type: none"> Main tower tank Recycle water pond 1 Recycle water pond 2 Recycle water pond 3 Recycle water pond 4 Fire water tank Ground level potable and elevated process water tanks 	<ul style="list-style-type: none"> Main tower tank (approximately 0.01 ha -70m³) Recycle water pond 1 (approximately 0.26 ha – 7 966.7 m³) Recycle water pond 2 (approximately 0.68 ha – 20 466.1 m³) Recycle water pond 3 (approximately 0.048 ha – 1 442.2 m³) Recycle water pond 4 (approximately 0.114 ha – 3433.9 m³) Fire water tank (approximately 0.02 ha – 70m³) Ground level potable (214 m³) and elevated process water tanks (70m³) (combined approximately 0.07 ha) 		GNR. 983 (Activity 10) GNR. 983 (Activity 13) GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 6) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Power supply and use			
Use of generators	Approximately 0.01 ha	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Mini sub-station	Approximately 0.01 ha		GNR. 983 (Activity 11) GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Realignment of a Telkom line that runs parallel to the R380	Approximately 3.7 ha		GNR. 983 (Activity 12) GNR. 983 (Activity 27) GNR. 983 (Activity 28)

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
			GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Support services			
Supporting infrastructure: <ul style="list-style-type: none"> Administrative block: Offices, kitchen, canteen, training centre, mustering centre and clinic/emergency room Flammable store Change house Stores Workshop and washbays Truck staging areas and truck staging toilet facility Control room Security gate and office 	Supporting infrastructure: <ul style="list-style-type: none"> Administrative block: Offices, kitchen, canteen, training centre, mustering centre and clinic/emergency room (approximately 0.12 ha) Flammable store (approximately 0.03 ha ha) Change house (approximately 0.01 ha) Stores (approximately 0.07 ha) Workshop and washbays (approximately 0.16 ha) Truck staging areas and truck staging toilet facility (approximately 1.00 ha) Control room (approximately 0.004 ha) Security gate and office (approximately 0.15 ha) 	X	GNR. 983 (Activity 27) GNR. 983 (Activity 28) GNR. 984 (Activity 15) GNR. 984 (Activity 17) GNR. 985 (Activity 12)
Establishment of fuel storage facility and refuelling bays	Approximately 0.10 ha and will consist of two 100m ³ above ground diesel storage tanks.		GNR. 983 (Activity 14) GNR. 983 (Activity 28) GNR. 983 (Activity 27) GNR. 984 (Activity 15) GNR. 985 (Activity 12) GNR. 984 (Activity 17)
General site management			
Appointment of contractors	Not applicable	N/A	Not applicable
Site management (monitoring, inspections, maintenance, security, access control)			
Environmental awareness training and emergency response			
On-going rehabilitation of facilities/disturbed areas			
Implementing and maintaining management plans			
Demolition			
Dismantling and demolition of infrastructure and	Within the project footprint described above	N/A	Not applicable

Description of activity	Aerial extent of the activity (ha or m ³)	Listed activity	Listed activity number and applicable listing notice
equipment.			
Utilisation of site supporting services (access control and security, portable toilets at digging sites and open cast pits, diesel bowsers (re-fuelling equipment))			
Rehabilitation			
Backfill and profiling of all pits and voids with provision for preventing surface subsidence	Approximately 93 ha	X	GNR. 921 (Category B 4(7)) GNR. 921 (Category B 4(8))
Replacing soil resources	Approximately 141 (Road realignment and river realignment are permanent)	N/A	Not applicable
Slope stabilisation and erosion control			
Landscaping			
Re-vegetation of disturbed areas and where infrastructure was removed			
Removal of alien invasive species from rehabilitated sites			
Restoration of natural drainage patterns as far as practically possible (excludes the realignment of the Ga-Mogara drainage channel)			
Rehabilitation of access roads	Approximately 6.6 ha		
Maintenance and aftercare			
Initiation of aftercare and maintenance program	Approximately 154 ha	N/A	Not applicable
Maintenance of rehabilitated areas			

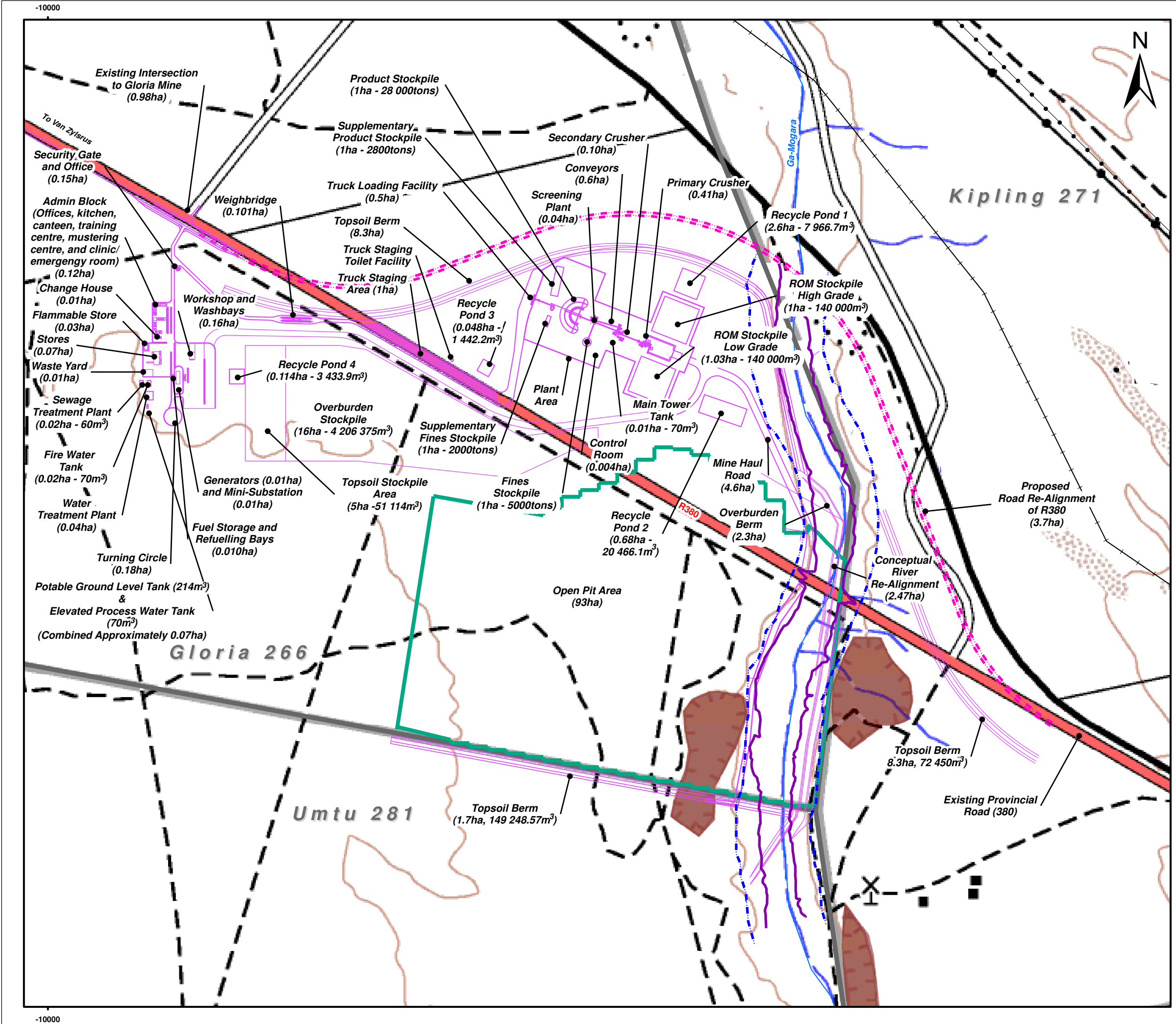
TABLE 4: DESCRIPTION OF THE LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

Activity number	Listed activity
NEMA Listing Notice 1 GNR.983	
10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.
11	The development of facilities or infrastructure for the transmission and distribution of

Activity number	Listed activity
	electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.
12	The development of- (i) canals exceeding 100 square metres in size (ii) channels exceeding 100 square metres in size (iii) bridges exceeding 100 square metres in size (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square metres in size; (ix) slipways exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads or road reserves.
13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.
14	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
19	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) a watercourse; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

Activity number	Listed activity
24	The development of - (i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; (ii) a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres but excluding – (a) roads which are identified and included in activity 27 of Listing Notice 27 in Notice 2 of 2014; or roads where the entire road falls within an urban area
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 km – (iii) where the existing reserve is wider than 13.5 metres; or (iv) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.
NEMA Listing Notice 2: GNR.984	
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
17	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
21	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.

Activity number	Listed activity
27	The development of - (i) a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); (ii) a road administered by a provincial authority; (iii) a road with a reserve wider than 30 metres; or (iv) a road catering for more than one lane of traffic in both directions; but excluding the development and related operation of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies.
NEMA Listing Notice 3: GNR. 985	
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA 'or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on even in urban areas; or iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.
NEM:WA Listed Activities GNR 921	
Category B 4(7)	The disposal of any quantities of hazardous waste to land
Category B 4(8)	The disposal of general waste to land covering an area in excess of 200m ² and with a total capacity exceeding 25 000 tons.
Category B 4(10)	The construction of a facility for a waste management activity listed in Category B of this schedule



- Legend**
- - - 100m River Buffer
 - 100yr Floodlines
 - - - Tracks/Paths
 - Proposed Infrastructure
 - - - Proposed Road Re-Alignment of R380
 - Proposed Open Pit Area
 - Farm Boundaries
 - Rivers
 - Powerlines
 - Railway
 - Historical Borrow Pits

0 200 400 Meters
 Scale: 1:10 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

MOKALA MANGANESE (PTY) LTD

Figure 3
Infrastructure Plan

SLR
 SLR Consulting (Africa) (Pty) Ltd
 P O Box 1596, Cramerview, 2060, South Africa
 Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

4.2 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

Information provided in the following section was provided to SLR by the Mokala project team.

In broad terms the proposed Mokala Manganese mining project will comprise open cast activities, a dry crushing and screening plant, temporary overburden rock dumps, product and run-of mine stockpiles, topsoil stockpiles, mine related facilities such as workshops, stores and various support infrastructure and services. Further to this, the proposed project will require:

- The realignment of the R380 road on the farm Kipling 271 and across the remaining extent of the farm of Gloria 266 as this road currently bisects the proposed mining project site
- Upgrading the intersection to the Gloria Mine on Portion 1 of the farm Gloria 266
- Realigning a section of the Ga-Mogara drainage channel within the existing river channel. This realignment will extend onto the farm Umtu 281.

Further detail is provided in the sections below.

4.2.1 CONSTRUCTION PHASE

CONSTRUCTION PHASE ACTIVITIES

The key construction activities associated with the proposed project include:

- Site establishment of temporary offices, portable toilets, contractor lay down area; temporary workshop and wash bay and temporary non-mineralised waste storage facilities
- Clearing of vegetation in accordance with the relevant vegetation management procedures
- Stripping and stockpiling of soil resources and earthworks in accordance with the relevant soil conservation procedures
- Sourcing of material for construction
- Establishment of stormwater management facilities such as recycle water ponds and clean water realignment berms
- Preparing stockpile areas (product, overburden and ROM)
- Establishment of sewage treatment plant and water treatment plant
- Construction of administrative block
- Installation of main tower tank, potable and process water tanks and the fire water tank
- Realignment of the R380, upgrading the intersection to the Gloria Mine, and establishment of internal haul roads and parking area
- Realignment of the Ga-Mogara drainage channel within the existing channel
- Construction of stockpile areas and platforms
- Construction of a crushing, screening and loading plant
- Establishment of access control facilities.

CONSTRUCTION PHASE FACILITIES

The construction phase facilities include:

- Contractor's laydown areas
- Workshop/maintenance area for servicing and maintaining equipment and vehicles
- Temporary waste collection and storage area
- Store for the storing and handling of fuel, lubricants, solvents, paints and construction substances
- Parking area for cars and equipment
- Mobile site offices
- Portable ablution facilities
- Change houses
- Soil and overburden rock stockpiles
- Water management infrastructure
- Security and access control
- Main access road and turning circle

Construction facilities will either be removed at the end of the construction phase or incorporated into the layout of the operational mine.

WATER SUPPLY AND MANAGEMENT FOR THE CONSTRUCTION PHASEStormwater control for construction

Storm water measures outlined in Section 4.2.2 will be established at the start of the respective construction phase.

Potable water

During the construction phase, potable water will be made available from either on-site boreholes or the Vaal Ga-Mogara Water Supply Scheme. Water from on-site boreholes will be subjected to a reverse osmosis water treatment process prior to use. During the construction phase it is anticipated that approximately 90 000 litres of water will be used on a daily basis.

TRANSPORTATION (ROUTES AND MECHANISMS) FOR THE CONSTRUCTION PHASEAccess to the proposed site

Access to the proposed site will be via the existing R380. During the construction phase the existing R380 will be realigned as the R380 currently traverses the proposed project site. In addition to this, the current intersection to the Gloria Mine (Figure 3) will be upgraded in order to cater for additional traffic utilising the intersection as a result of Mokala's operations. The upgrade of the intersection will include an additional turning lane into the proposed Mokala Mine and an additional right turn lane to the Gloria Mine. Refer to Figure 4 for an illustration of the proposed intersection upgrade.

Turning circle

During the construction phase a turning circle will be established near the administrative block as illustrated in Figure 3.

Transportation of workers and supplies to site

During the construction of the proposed project there will be workers travelling to and from site, vehicles supplying input materials and machinery, and vehicles removing waste material. Table 5 below provides a conceptual indication of the traffic associated with the construction phase.

TABLE 5: CONSTRUCTION PHASE TRAFFIC: MATERIALS AND STAFF

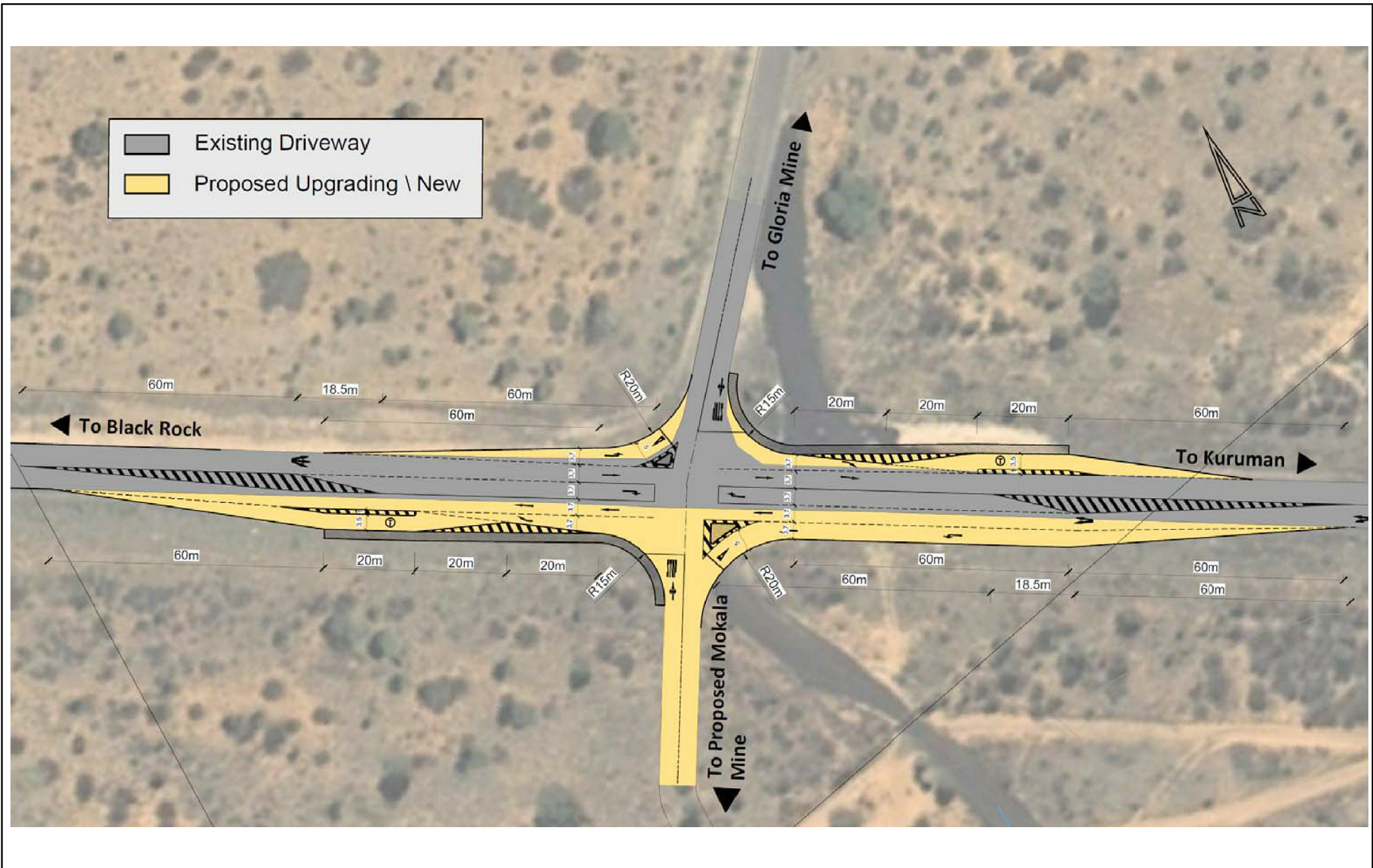
Item	Trips to and from site per day	Transportation routes
Construction materials and waste removal transported by trucks	15 trucks per day (30 trips per day)	Traffic will make use of the existing R380 towards Hotazel and/or Kathu and the R31 towards Kuruman
Construction consumables transported by trucks	10 trucks per day (20 trips per day)	
Construction employees transported by private vehicles	Approximately 11 vehicles per day (22 trips per day)	
Construction employees transported by taxis/busses	Approximately 14 vehicles per day (28 trips per day)	

Pipeline

A series of pipelines will be established as part of the proposed project for the conveyance of potable water, process water and sewage effluent. Pipelines will be installed to convey all process and potable water within the water reticulation system (Section 4.2.2). All water reticulation piping will be HDPE standard and will vary in size (50mm to 225mm) across the proposed project site. Pipelines with a minimum diameter of 100mm will be installed to convey sewage effluent from the change houses and the administrative block to the sewage treatment plant.

Conveyors

Conveyors will be established within the proposed plant area to convey ore between the primary crusher station, the screening station, the secondary crusher station and the product and fines stockpiles. The conveyors will range in width from 750mm to 1200mm. All the conveyors will be equipped with apron slabs to collect spillage.



PROPOSED INTERSECTION UPGRADE TO THE GLORIA MINE
(SIYAZI, MARCH 2015)

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FIGURE 4

POWER SUPPLY AND USE FOR THE CONSTRUCTION PHASE

During the construction phase generators will be used as the primary power supply. A total of 1 megawatt will be required during the construction phase. During the construction phase power will be required for drilling, welding and construction lighting.

NON-MINERALISED WASTE MANAGEMENT FOR THE CONSTRUCTION PHASEDomestic and industrial waste

Facilities for the temporary storage of non-mineralised waste associated with the project will be provided. The types of waste that could be generated during the construction phase: hazardous industrial waste (such as packaging for hazardous materials, used oil, lubricants), general industrial waste (such as scrap metal, contaminated wood and building rubble), and domestic waste (such as packaging and food waste). These wastes will be temporarily handled and stored on site before being removed for recycling by suppliers and approved waste handling companies, reuse by scrap dealers or final disposal at permitted waste disposal facilities at either Kuruman, Deben, Hotazel or Kimberley.

Sewage

Construction workers will make use of portable toilets that will be serviced on a regular basis. The sewage will be removed off-site by a certified contractor and disposed at a licensed facility in either Kuruman, Deben, Hotazel or Kimberley.

EMPLOYMENT AND HOUSING FOR THE CONSTRUCTION PHASE

The proposed project will create approximately 321 jobs during the construction phase. No construction workers will be housed on-site. Construction workers will be accommodated in nearby towns.

OPERATING HOURS FOR THE CONSTRUCTION PHASE

It is anticipated that the construction phase will consist of 1 shift per day from 06h00 to 18h00 from Monday to Friday and a half day on Saturday, when work will consist of a half shift from 06h00 to 12h00. In cases where emergency action is required or critical activities are required, motivation will be made for the extension of these hours within the provisions of the regulations.

SECURITY AND ACCESS CONTROL

A fence will be established around the perimeter of the proposed project site. A designated access control and security office will be established at the access of the mine leading off the R380. The position of the security office is illustrated in Figure 3.

CONSTRUCTION PHASE TIMING

It is envisaged that construction phase activities will commence during the first quarter of 2017 and will continue for a period of approximately 16 months.

4.2.2 OPERATIONS PHASE

SURFACE INFRASTRUCTURE

Operational phase surface infrastructure is listed below and is illustrated in Figure 3.

- Open pit area
- Plant area consisting of a Primary crusher, Screening plant and Secondary crusher
- Topsoil stockpiles and berms
- Temporary overburden rock stockpile and berm
- Truck loading facility, truck staging toilet facility and truck staging area
- Fines stockpiles, supplementary fines stockpile, product stockpile, supplementary product stockpile and ROM stockpiles (high grade and low grade)
- Stormwater management facilities such as berms and recycled water ponds (1 to 4)
- Sewage treatment plant
- Water treatment plant
- Water holding facilities (main tower tank, fire water tank and ground level potable and elevated process water tanks)
- Fuel storage area and refuelling bays
- Generators and mini sub-station
- Weighbridge
- Administrative block: Offices, kitchen, canteen, training centre, mustering centre and clinic/emergency room
- Flammable store
- Change house and stores
- Workshop and washbay
- Control room
- Waste yard for the temporary storage of general and hazardous wastes
- Internal haul roads and turning circle
- Security gate and office

MINING METHOD – OPEN CAST ACTIVITIES

The proposed project will comprise conventional open cast strip mining methods. Following site preparation and initial earthworks, both excavation and drill and blast methods will be used to loosen the overburden rock and ore. Truck and shovel methods will be used to load and haul the box cut materials to the overburden rock stockpiles and the run-of-mine (ROM) to the relevant delivery point. Topsoil and overburden rock stripped during the mining operations will be used in the on-going rehabilitation processes. Table 6 summaries the associated open cast activities. Table 7 includes project data that provides perspective and scale to the proposed project. The proposed open pit area is illustrated in

Figure 3. It is important to note that although not specifically illustrated, a small section of the open pit to the south will not be mined due to the poor grade of the ore.

TABLE 6: SUMMARY OF OPEN CAST ACTIVITIES

Activity	Description
Topsoil stripping	Topsoil will be stripped and stockpiled separately in accordance with the conservation management procedures.
Drilling and blasting	Once the topsoil and overburden rock material has been removed, the hard overburden rock will be drilled as per a predetermined design. Charges for blasting will be designed to prevent excessive ground vibration, fly rock and air blast.
Removal of overburden rock	The removal of the overburden rock above the ore body will be done by means of dozing / loading and hauling with large equipment. Apart from the overburden rock stockpile that is required for the initial box cut, the overburden rock material will be placed into the previously mined out void. Topsoil will be placed on top of the backfilled overburden thus ensuring that the rehabilitation is done concurrently to the mining (rollover mining). Some overburden rock will be utilised for the establishment of platforms, internal haul roads and for construction of the fills and pavement layers to the diverted R380 Provincial road.
Mining progression and strips	The initial box cut will be developed on the eastern boundary of the open pit where the manganese seam is the shallowest. Mining will then progress towards the west. Each mine strip will have a width of 50m and a total of 2 strips will be open at any given time.
Removal of ore	The run of mine (ROM) ore will be transported via dump trucks to one of two designated ROM stockpiles (high grade and low grade) prior to being fed into the processing plant.

TABLE 7: PROJECT DATA THAT PROVIDES PERSPECTIVE AND SCALE OF THE PROPOSED PROJECT

Feature	Detail
Target ore body	The resource to be mined is the manganese ore body of the Kalahari Manganese field.
Depth of the open pit	The depth of the open pit will range between 40 m to 180 m.
Tonnages	It is anticipated that approximately 1 to 1.3 million tons of ore will be mined per year
Size of initial box cut	The capacity of the initial boxcut is approximately 5 135 613m ³ . It should however be noted that approximately 450 000 to 500 000m ³ of overburden material from the initial box cut will be used for road and platform construction.
Grade target	37.5% Mn ROM

PROCESSING PLANT

The processing plant has been designed to generate saleable manganese ore product which meets certain grades and size specifications needed to satisfy further processing by third parties in furnace smelting production of ferroalloys as well as the sale of manganese ore to the market. The processing plant comprises a primary crushing station, a screening station and secondary crushing station, product stockpiling and loading facilities. Table 8 summarises the processing plant activities. A conceptual flow diagramme is illustrated in Figure 5.

TABLE 8: SUMMARY OF PROCESSING PLANT ACTIVITIES

Activity	Description
Primary crushing station	An excavator or front end loaders will be used to load the ore delivered from the ROM stockpile into a primary crushing feed bin. The ore is withdrawn from the feed bin with a vibrating grizzly feeder located at the bottom of the feed bin. The vibrating grizzly feeder transfers the ore directly to the jaw crusher in order to reduce the material to a size required by the downstream processes. The jaw crusher reduces the ore with a maximum of 700mm to – 180mm. The crushed ore is transferred from a jaw crusher onto a series of conveyor belts which will transfer the crushed ore into a surge bin.
Screening station	<p>The crushed material from the surge bin in the primary crushing station will be withdrawn from the surge bin via a vibrating feeder that will feed the crushed ore onto a conveyor. The conveyor will transfer the material to the triple deck screen. The upper deck will cut at -75mm + 25mm, the middle deck at -25mm +9m and the bottom deck at -9mm.</p> <p>Oversize material (+ 75mm) from the screening process will be sent to the secondary crushing station by means of a conveyor.</p> <p>Correctly sized material (-75 mm +25 mm and -25mm + 9mm) will be fed from the middle and bottom decks to a product stockpile via conveyor from where it will be moved by front end loaders and conveyors to the truck loading facility from where the product will be removed off-site via truck for sale to third parties. Provision has been made for a smaller supplementary product stockpile to accommodate any overflow from the product stockpile. Product from the supplementary product stockpile will be re-circulated back to the product stockpile or loaded directly onto the truck loading facility.</p> <p>The fines screened (-9 mm) out from the screening station will feed onto a conveyor that will deliver the fines onto a fines stockpile. Front end loaders will remove the fines from the fines stockpile and load onto trucks where the fines will be removed off-site via truck for sale to third parties. Provision has been made for a smaller supplementary fines stockpile to accommodate any overflow from the fines stockpile. Product from the supplementary fines stockpile will be re-circulated back to the fines stockpile or loaded directly onto trucks.</p>
Secondary crushing station	Oversize material from the screening station will be fed to a secondary surge bin at the secondary crushing station in order to reduce any oversize material to the required specifications. Material from the secondary surge bin is withdrawn via a vibrating pan feeder and transferred to the secondary cone crusher. The re-crushed material will be re-circulated back to the screening station via a conveyor. Any oversize material still present in the secondary crushing station will continue to be re-circulated until the required product specification is reached.
Dust suppression	Dust suppression will be utilised at all major dust generating points. The spray water pump will be fed by a JOJO tank from where it will supply water to spray nozzles in strategic positions.
Wash-down	The plant will also have high pressure wash water pumps that will supply water for wash-down and cleaning for maintenance operations. Dedicated JOJO tanks filled with process water will be used for the wash-down. The wash water used in the wash down operation will collect in dedicated sumps in all the main areas from where spillage pumps will pump the accumulated water back into a JOJO tank to be

Activity	Description
	reused as wash-down water. The wash water pumps can also be used to pump water from the JOJO tanks to dedicated water control or recycle ponds as required. The solids in the sump will be removed by a bobcat loader and disposed of at the fines dump and then sold as fines when dried out.

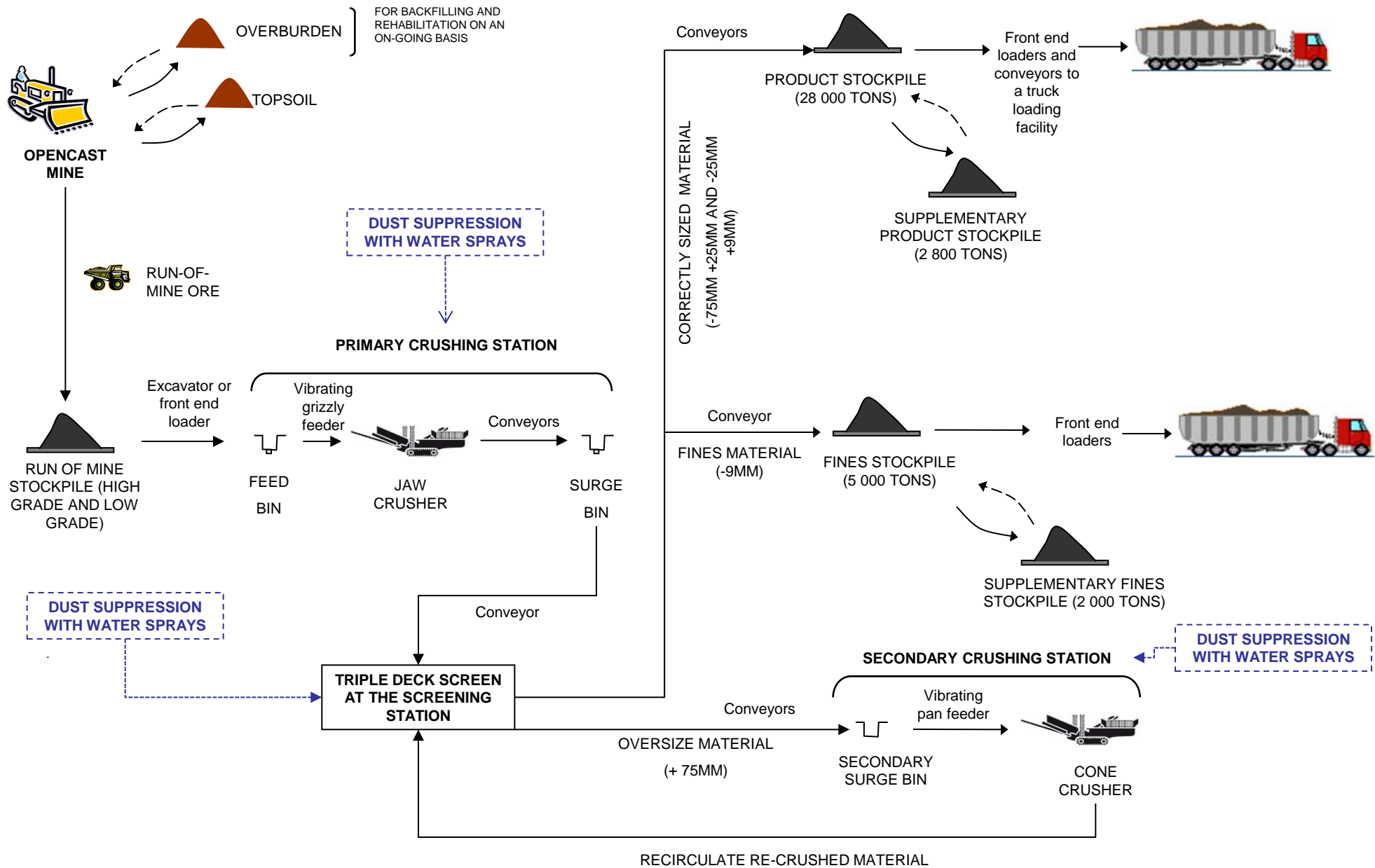


FIGURE 5: CONCEPTUAL PROCESS FLOW DIAGRAM

TOPSOIL STOCKPILES AND BERM

A designated topsoil stockpile area with a capacity of approximately 51 114 m³ will be established as part of the proposed project (Figure 3). Additional topsoil berms will be established adjacent to the realigned R380 and to the south of the open pit area and will have a capacity of approximately 72 450 m³ and 149 248.57 m³ respectively (Figure 3). All topsoil will be used as part of con-current rehabilitation.

WATER SUPPLY AND USE FOR THE OPERATIONAL PHASEPotable Water

Potable Water will be made available from on-site boreholes and/or the Vaal Ga-Mogara water pipeline. Where water is sourced from on-site boreholes this water will be subjected to a reverse osmosis water treatment process prior to use. A total of 62 350 l/day of potable water will be required as part of the proposed project.

Process water

Process make-up water will be sourced from on-site boreholes, treated sewage effluent and/or water from pit dewatering (if available). In addition to this, re-cycled shower water will also be used as process water. Process water will not be subjected to treatment prior to use. A total of 40 000 l/day of process water will be required as part of the proposed project.

Fire water

A fire water network will be installed as part of the proposed project which will feed water to hose reels at designated points within the administrative block, stores, workshops, washbays, and change house. Fire water will be sourced from on-site boreholes (untreated) and/or water from the Vaal Ga-Mogara pipeline and will be stored in a 70m³ dedicated fire water tank (Figure 3). Gas installed or fire extinguishers will be used in the plant area and the mini substation as these areas do not require civil installations.

Water treatment plant

The reverse osmosis water treatment plant will be able to handle a maximum capacity of 5m³ per peak hour and will be designed as a single integrated unit. The position of the water treatment plant is illustrated in Figure 3. Water from the water treatment plant is pumped to a ground level potable water tank from where the water will be used in the administrative block and change house. Any brine in the water treatment plant will be pumped to the recycled water ponds for use in the processing plant.

STORMWATER MANAGEMENT SYSTEM FOR THE OPERATIONAL PHASE

Information provided in this section was sourced from the surface water management plan developed for the proposed project by Aecom (Aecom, October 2015) and included in the surface water assessment (Appendix L) including the Mokala project team.

Water management facilities for the control of stormwater and for pollution prevention will be designed to meet the requirements of Regulation 704 (4 June 1999) for water management on mines. The two main principle sections of Regulation 704 (4 June 1999) that are applicable to the stormwater management of the proposed project include:

- Regulation 6 which describes the capacity requirements of clean and dirty water systems. Clean and dirty water systems must be kept separate and must be designed, constructed, maintained and operated such that these systems do not spill more than once in 50 years.
- Regulation 7 which requires that measures which must be taken to protect water resources from all dirty water or substances which cause or are likely to cause pollution of a water resource either through natural flow or by seepage.

Clean water will be diverted away from dirty areas by means of earth berms, the location of which is illustrated in Figure 9. The clean water will be discharged back to the natural environment. Dirty water on-site will be collected by a series of trapezoidal drains and earth berms and will be directed to one of four recycled water ponds. Further information pertaining to these recycled water ponds is provided in the section below. The typical design of a trapezoidal drain and earth berm is illustrated in Figure 6 and Figure 7 respectively.

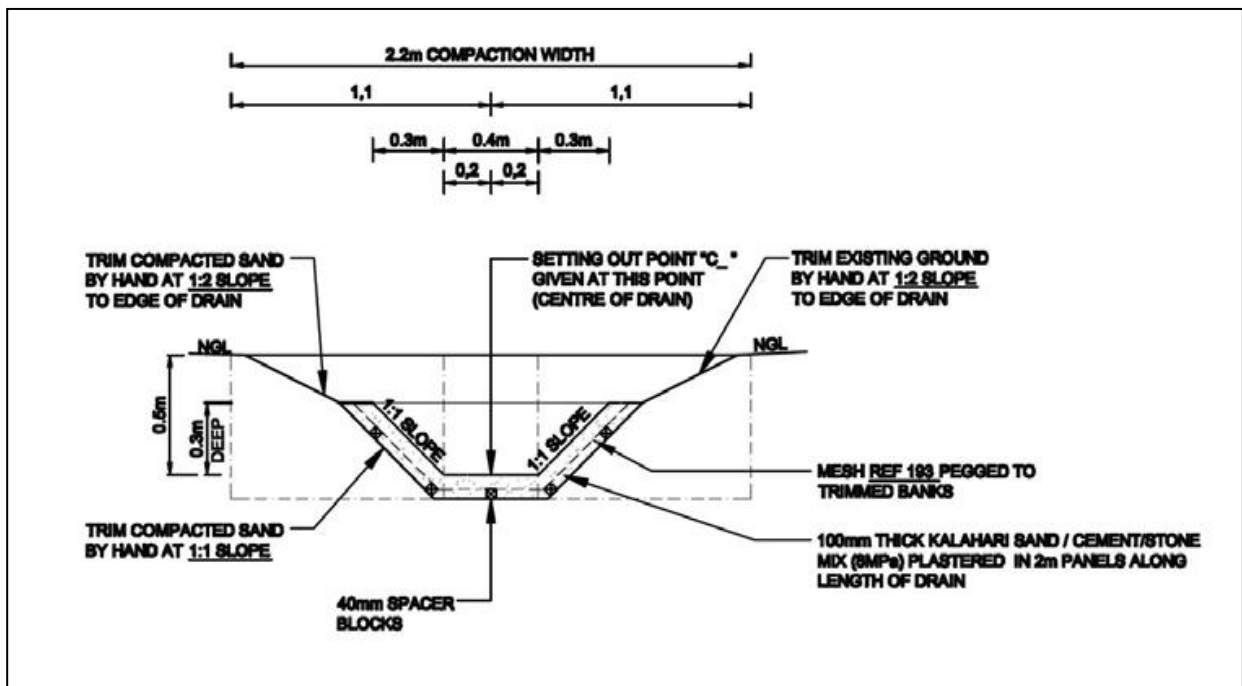


FIGURE 6: TYPICAL DESIGN OF A TRAPEZOIDAL DRAIN

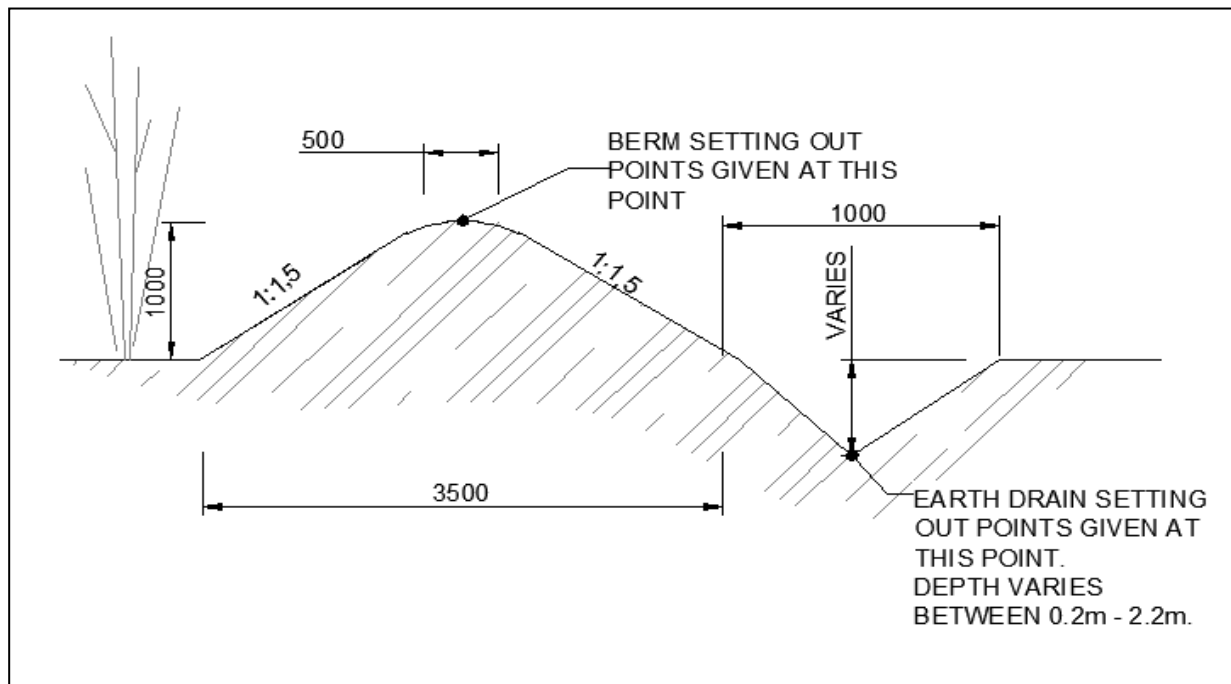


FIGURE 7: TYPICAL DESIGN OF A EARTH BERM

Stormwater management dams – containment of dirty water

Dirty water run-off on-site including pit dewatering and brine from the water treatment plant will be contained in one of four recycled water ponds. Water from the recycled water ponds will be used as dust suppression within the plant. Further details regarding the various recycled water ponds is provided in Table 9 below. The position of the recycled water ponds are illustrated in Figure 9. Refer to Figure 8 for a typical design of a recycled water pond.

TABLE 9: DETAILS OF THE RECYCLED WATER PONDS

Recycled water pond	Capacity (m ³)	Purpose
Recycled water pond 1	7 966 m ³	Will contain dirty run-off water from the processing plant and ROM stockpile area
Recycled water pond 2	20 466 m ³	Will contain dirty run-off water from the haul roads to the plant area, any overflow from recycled water pond 1 and 4, water from the open pit, brine from the water treatment plant and any washdown water from the plant.
Recycled water pond 3	1 442 m ³	Will contain dirty run-off water from the truck staging area, the main haul road running between the plant area and the administrative block.
Recycled water pond 4	3 433.9 m ³	Will contain dirty run-off water from administrative block, main stores and workshop, the open pit brine from the water treatment plant and any washdown water from the plant.

All the recycled water ponds will be equipped with silt traps for silt reclamation and will also be equipped with spindle pumps to re-circulate water with the plant process or to pump any overflow between the various recycle water ponds.

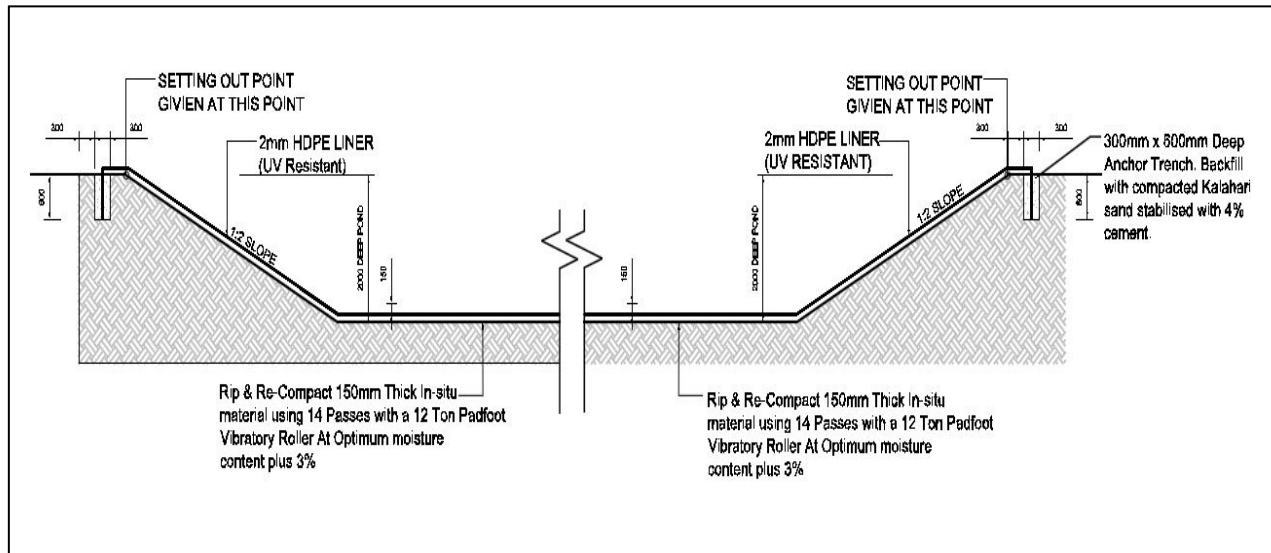


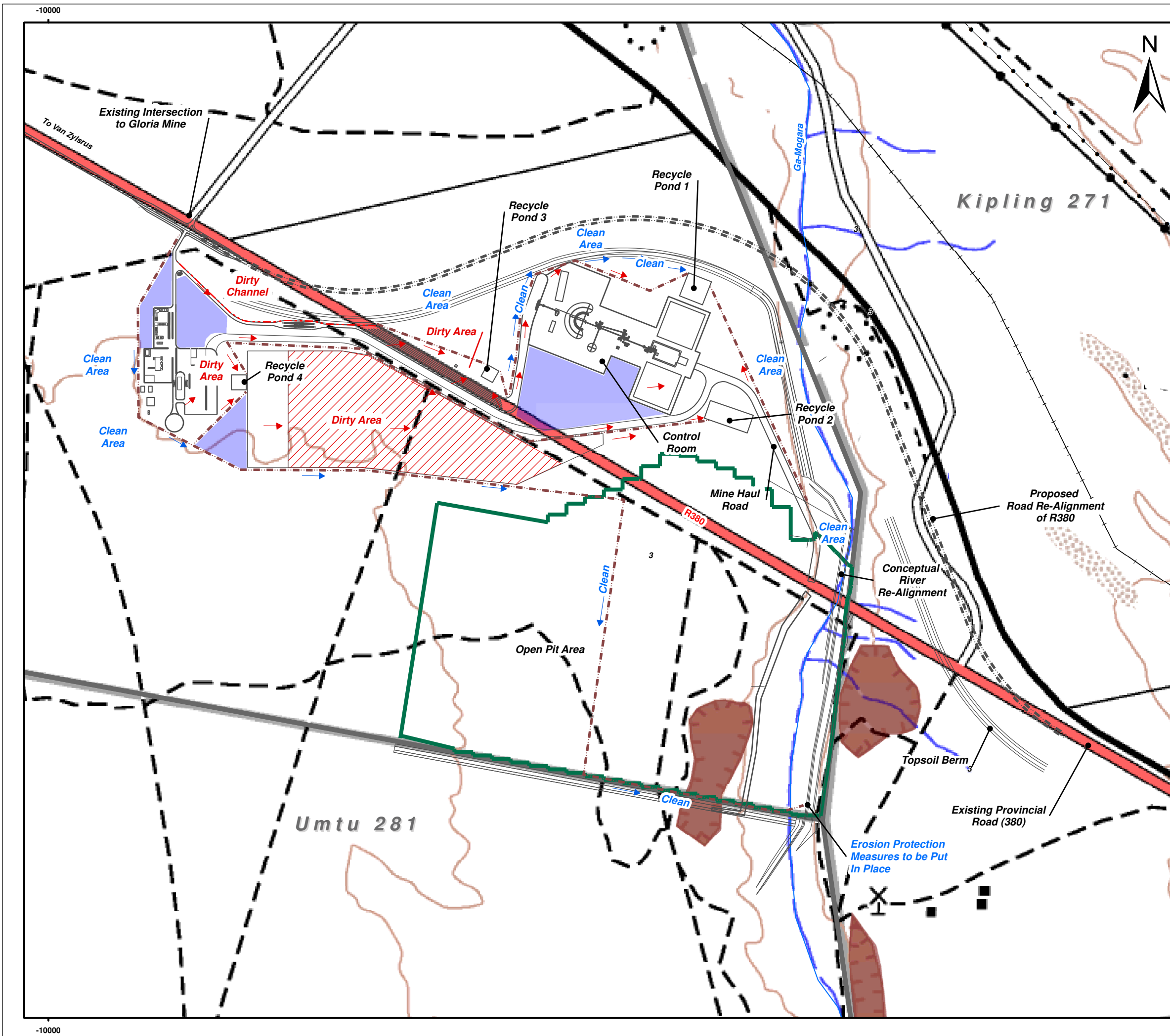
FIGURE 8: TYPICAL DESIGN OF A RECYCLED WATER POND

An elevated process water tank (Figure 9) will store water from on-site boreholes prior to being subjected to the reverse osmosis water treatment plant. The elevated process water tank will have a capacity of 70m³ and will be constructed from steel panels mounted on a steel tank stand.

The main storage facility of process water is the main tower tank (Figure 9) and stores water from, borehole water, treated sewage effluent from the sewage treatment plant including any run-off and water from the pit and from the recycled water ponds. This main tower tank will have a capacity of approximately 70m³ and will be constructed from steel panels mounted on a steel tank stand. Water from the main tower tank will be distributed to various JOJO tanks within the processing plant area for use as washdown water and dust suppression water.

Stormwater management dams – containment of dirty water

A ground level potable water tank with a capacity of 217m³ will be established to store treated water from the reverse osmosis water treatment plant and/or any clean water from the Vaal Ga-Mogara water supply scheme. The ground level potable water tank will be constructed from steel panels on a concrete foundation.



- Legend**
- - Tracks/Paths
 - Proposed Infrastructure
 - - - Proposed Road Re-Alignment of R380
 - █ Proposed Open Pit Area
 - ▭ Farm Boundaries
 - Rivers
 - Powerlines
 - Railway
 - Historical Borrow Pits
- Stormwater Management Plan**
- - - Berm
 - - - Dirty Channel
 - Clean Stormwater
 - Dirty Stormwater
 - ▨ Dirty Area
 - Stormwater Infiltration Area

0 200 400 Meters
 Scale: 1:10 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

MOKALA MANGANESE (PTY) LTD

Figure 9
Conceptual Stormwater Management Plan
 (AECOM, October 2015)

SLR
 SLR Consulting (Africa) (Pty) Ltd
 P O Box 1596, Cramerview, 2060, South Africa
 Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

DISTURBANCE OF WATERCOURSES

Regulation 704 of the NWA requires that infrastructure including residue facilities should not be located within 100m from any watercourse or within the 1:100 year floodline, whichever is the greatest.

Topsoil stockpile berm and haul road

The proposed topsoil berm and the haul road running from the plant to the open pit will be located within the 1:100 year drainage line as illustrated in Figure 3 and as such does not comply with Regulation 704 of the NWA. Prior to the establishment of these facilities the necessary approvals/exemptions will need to be obtained from the DWS.

Open pit

With reference to Figure 3, the extent of the open pit falls within the existing Ga-Mogara drainage channel and as such does not comply with Regulation 704 of the NWA. It follows that as part of the proposed project, the Ga-Mogara drainage channel will be realigned and will therefore require both water licence approval and exemption from Regulation 704 of the NWA. It is proposed that a temporary channel to allow the mining of the ore within the 1:100 year buffer is constructed for the first 3 years. After a period of approximately 3 years the open pit adjacent to the Ga-Mogara drainage channel will have been backfilled which will then allow a permanent channel realignment to be constructed that closely matches the existing Ga-Mogara drainage channel in terms of shape, morphology, soil and vegetation. The temporary channel realignment is illustrated in Figure 10 and the conceptual section is provided in Figure 11.

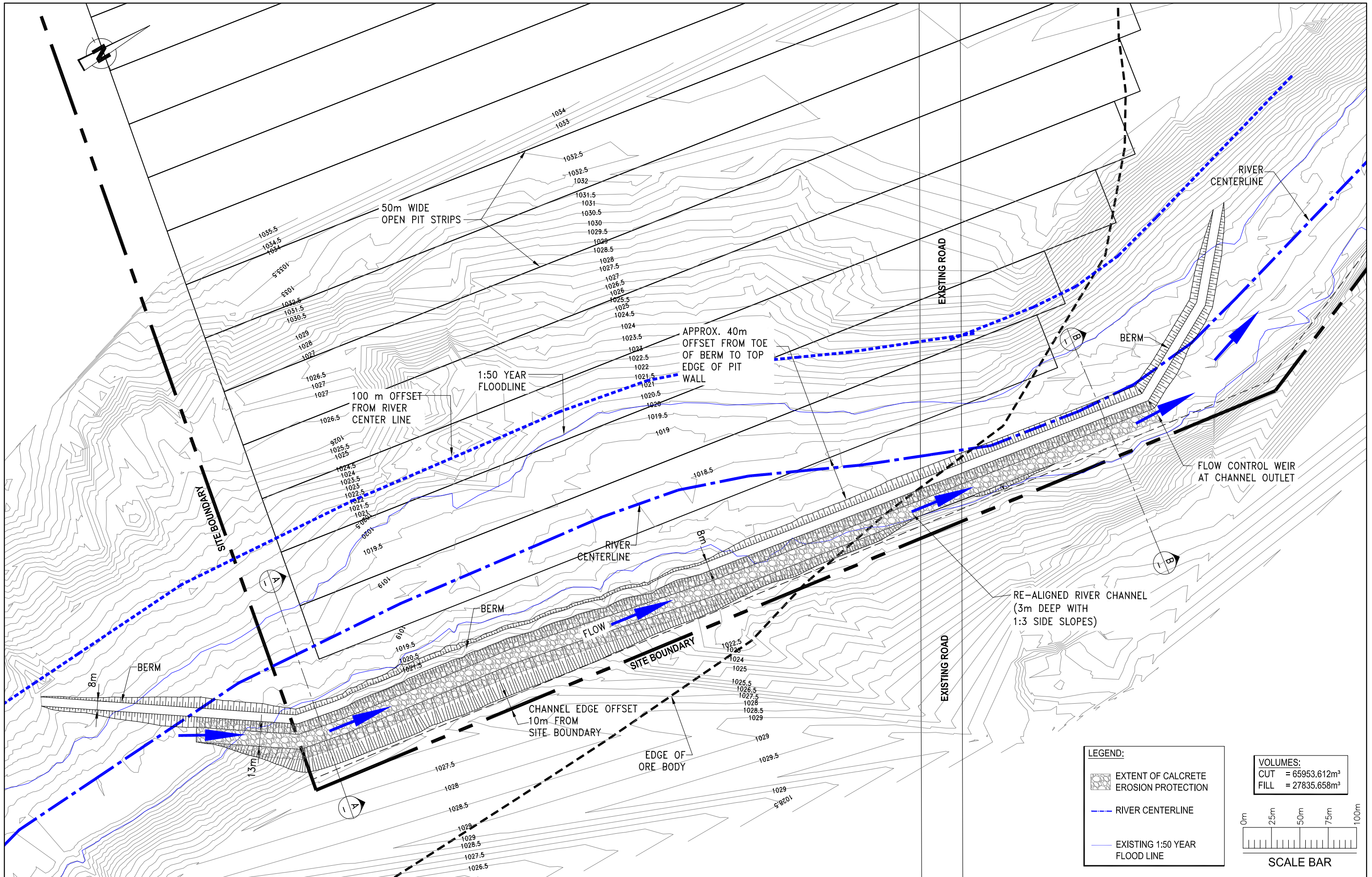
The temporary channel realignment is located along the eastern boundary of the Mokala mine site to maximise access to the ore body on the property. The channel realignment berm ties into the western bank of the Ga-Mogara drainage channel at both the upstream and downstream ends. The upstream end of the channel realignment will be extended beyond the property boundary onto the farm Umtu 281. The temporary channel realignment from its natural course will cover a distance of approximately 900 m. The temporary channel realignment will allow for the continuation of natural flow should this occur and is design to cater for flood events.

A conceptual section of the proposed permanent channel realignment is shown in Figure 12. Once that part of the pit adjacent to the river channel has been backfilled an additional 40 m width will be available to form the permanent channel realignment giving an overall channel width of approximately 80 m. Backfilling the pit with clay overburden will create a thick water impermeable barrier preventing seepage into the pit. Overfilling that part of the pit adjacent to the channel will ensure that the finished ground level remains proud of the river bed after consolidation of the fill has occurred. In effect a wide low clay berm will form the western bank of the permanent channel realignment. Increasing the width of the permanent realignment channel enables the required conveyance to be achieved without significantly increasing the

flow velocities above that experienced in the existing river channel. Maintaining the same flow regime as the existing river channel allows the permanent realignment of the natural fluvial sediments without risk of damage to the channel from erosional forces. The greater conveyance capacity of the channel will also allow the growth of natural vegetation without adverse effects on flood levels. Within the greater available width the natural morphology of the existing channel can also be replicated, including a low flow channel, pools and curvature in plan.

Realignment of the R380

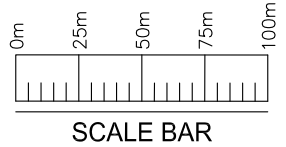
As part of the proposed project, the R380 will be realigned. This realignment will cross the Ga-Mogara drainage channel. It follows that as part of the proposed project, the realignment of the R380 requires both a water licence approval and exemption from Regulation 704 of the NWA. The proposed new river crossing will incorporate 17 culverts each with a diameter of 1.20m which provides for more flood capacity than the current crossing on the R380. This crossing will be permanent. The increased waterway and improved road vertical curve will improve the road alignment over the river and will comply with the South African National Road Agency standards.



LEGEND:

- EXTENT OF CALCRETE EROSION PROTECTION
- RIVER CENTERLINE
- EXISTING 1:50 YEAR FLOOD LINE

VOLUMES:
 CUT = 65953.612m³
 FILL = 27835.658m³



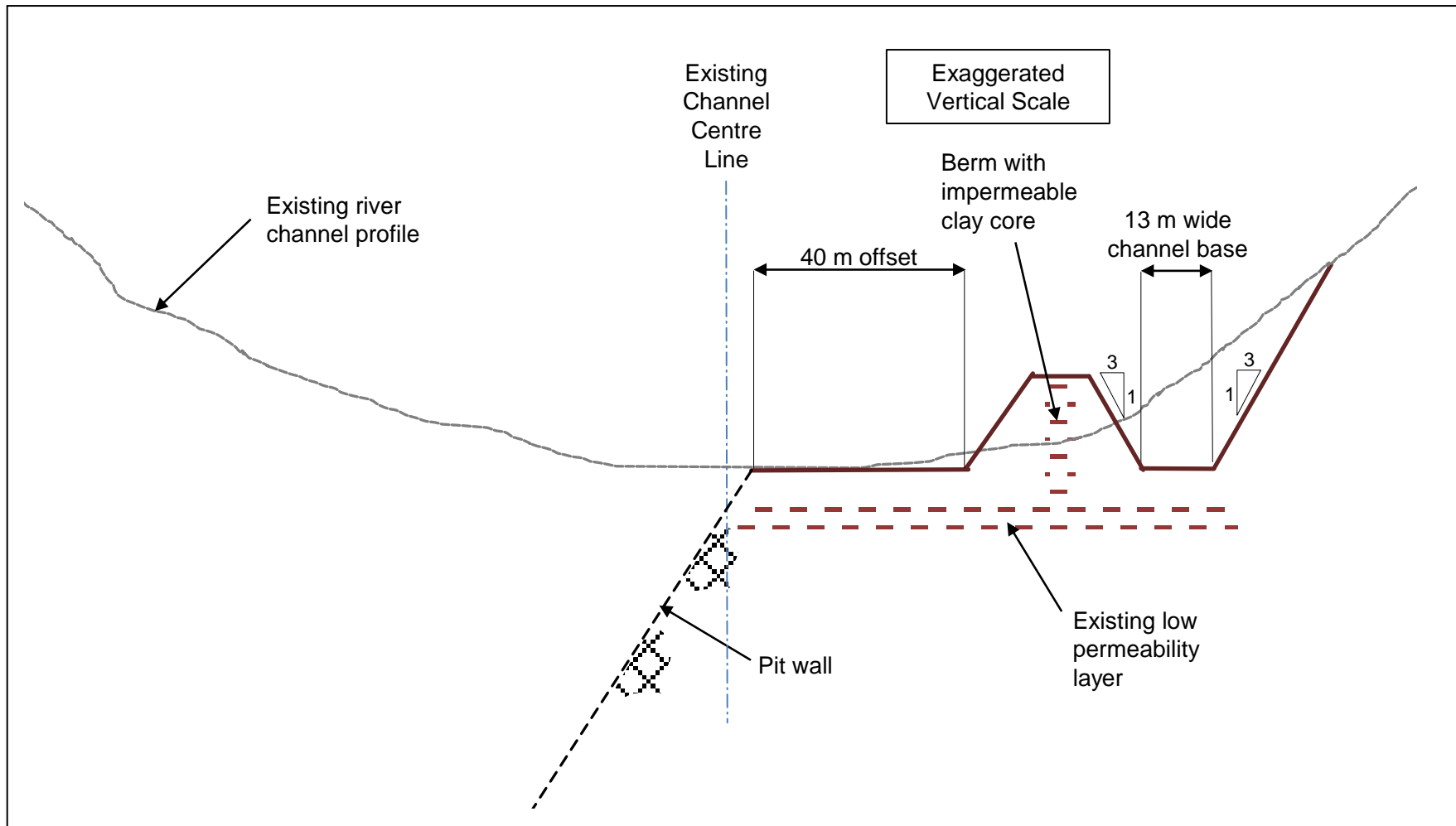


FIGURE 11: CONCEPTUAL SECTION OF THE PROPOSED TEMPORARY GA-MOGARA RIVER REALIGNMENT (SLR, OCTOBER 2015)

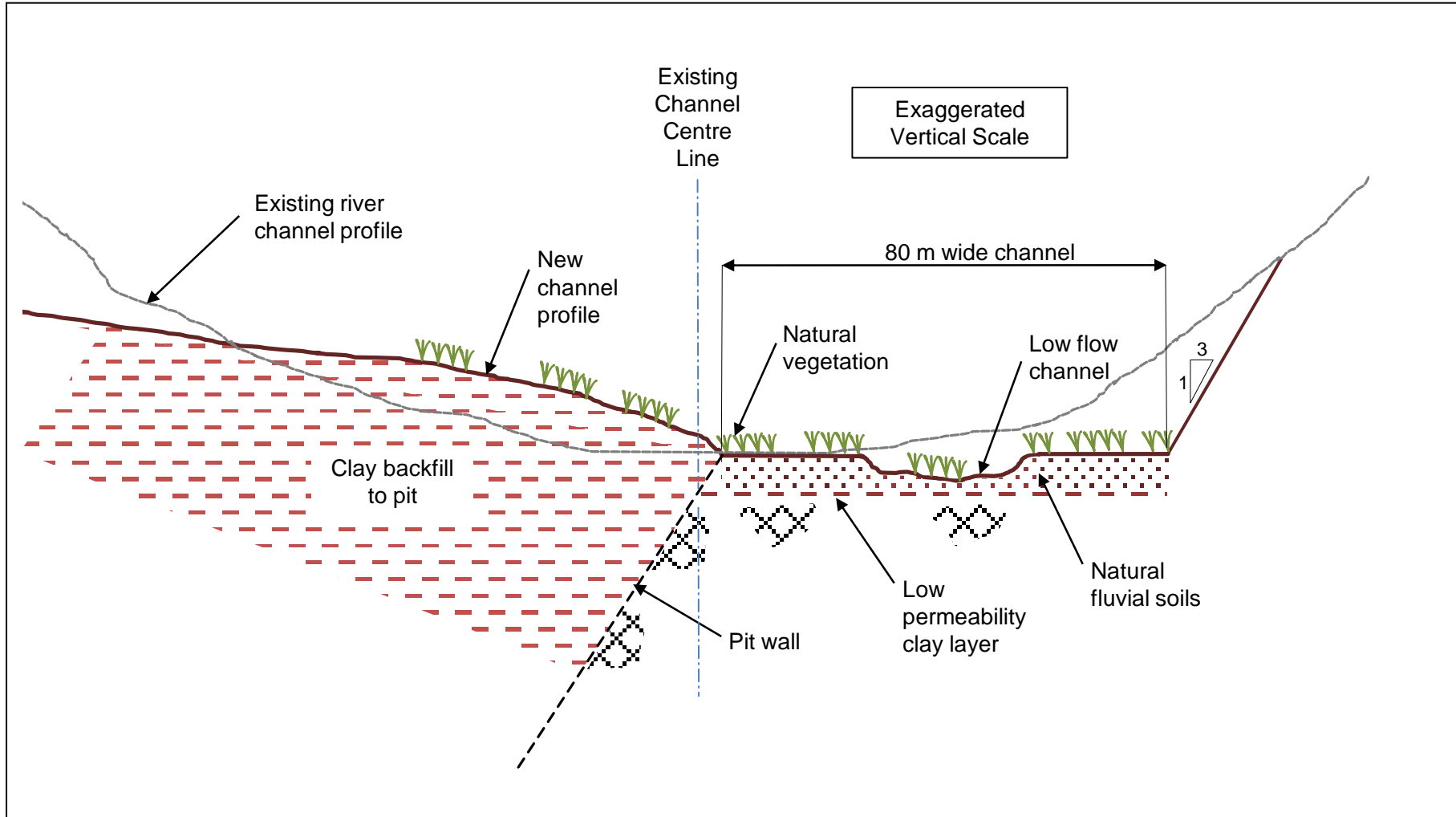


FIGURE 12: CONCEPTUAL DESIGN SECTION OF THE PROPOSED PERMANENT GA-MOGARA RIVER REALIGNMENT (SLR, OCTOBER 2015)

WATER BALANCE

Information in this section was sourced from the surface water study (SLR, October 2015) undertaken for the proposed project and included in Appendix L.

A site wide water balance model has been prepared to understand flows within the Mokala Mine's operational water circuit during wet and dry seasons. The wet and dry season water balances are illustrated in Figure 13 and Figure 14 respectively.

The dry water balance indicates that the Vaal Ga-Mogara Water Supply Scheme will be required to supply potable water to the site, in the order of 1 075 m³/month, during dry periods. There will be no need to import plant makeup water due to the availability of pit ground water inflows and the recycling of the water treatment plant effluent. As the plant recycles its water internally its actual daily water use is only that which is required to replace any losses and not the stated mining water consumption of 40 000 l/d. There will be an excess of 2 882 m³/month available from recycled water pond 2 for use as dust suppression outside of the plant area. Alternatively any excess water and also be treated in the water treatment plant and re-used within the water system as potable water.

As pit groundwater inflows and storm water are not going to be treated for potable water use the wet water balance also requires potable water to be imported from the Vaal Ga-Mogara Water Supply Scheme. With respect to the supply of potable water there is therefore no difference between the dry and wet water balance results. The wet water balance does however result in total of 9 344 m³/month of storm water entering the four recycled water ponds during an average wet month (February). This results in 14 116 m³/month of excess water, which will be used for dust suppression outside of the plant area. Alternatively any excess water and also be treated in the water treatment plant and re-used within the water system as potable water.

The water balance therefore shows that during both wet and dry periods the mine will rely on the Vaal Ga-Mogara Water Supply Scheme for the supply of potable water unless a portion of the anticipated excess is treated in the RO plant for use as potable water. It is important to note that is recommended that only 36 000 l/day of borehole water is abstracted for mining water consumption purposes for a period of 10 hours. This will allow for the boreholes at Mokala to recover.

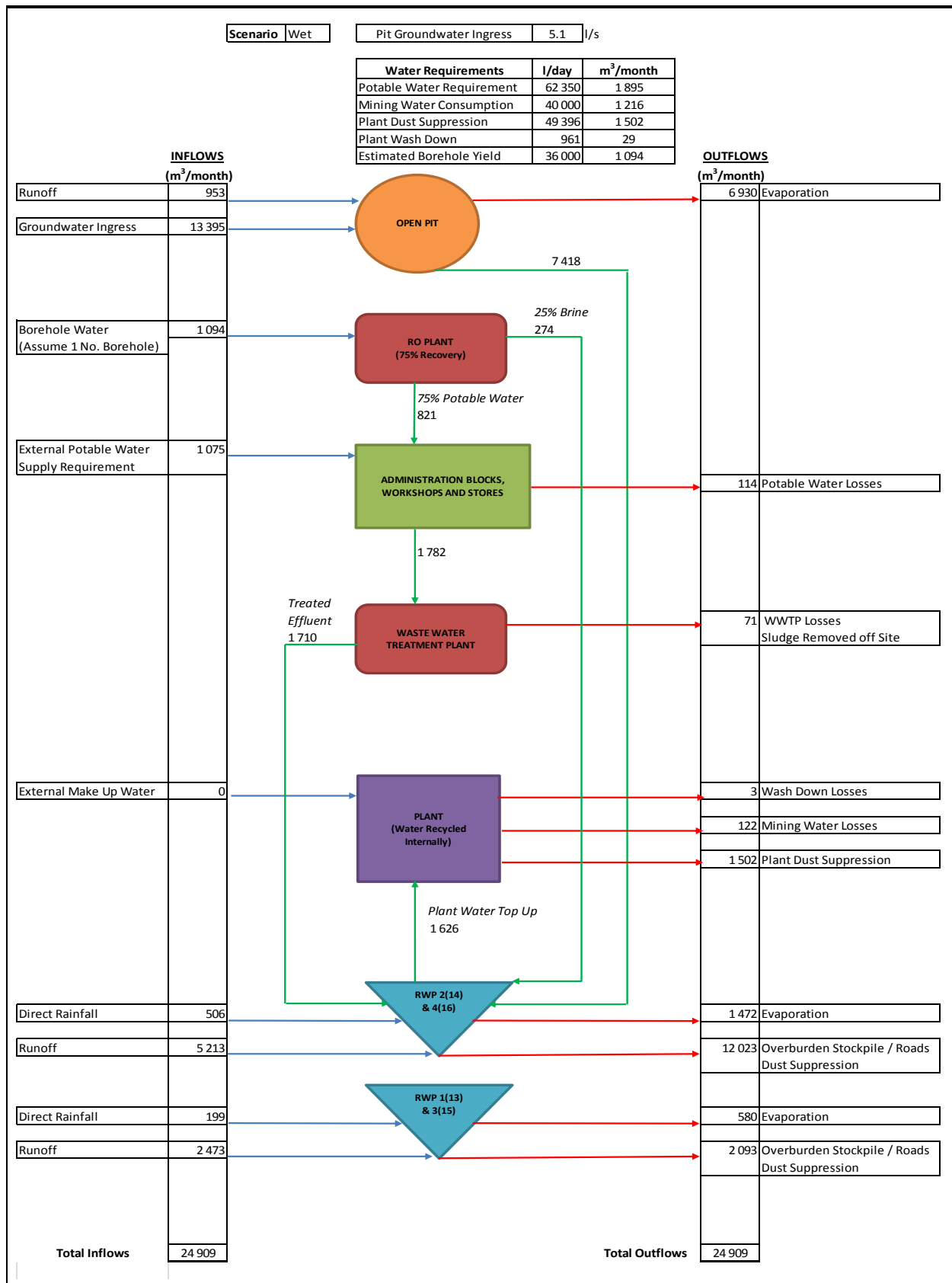


FIGURE 13: WET SEASON WITH 5.1 L/S GROUNDWATER INFLOW

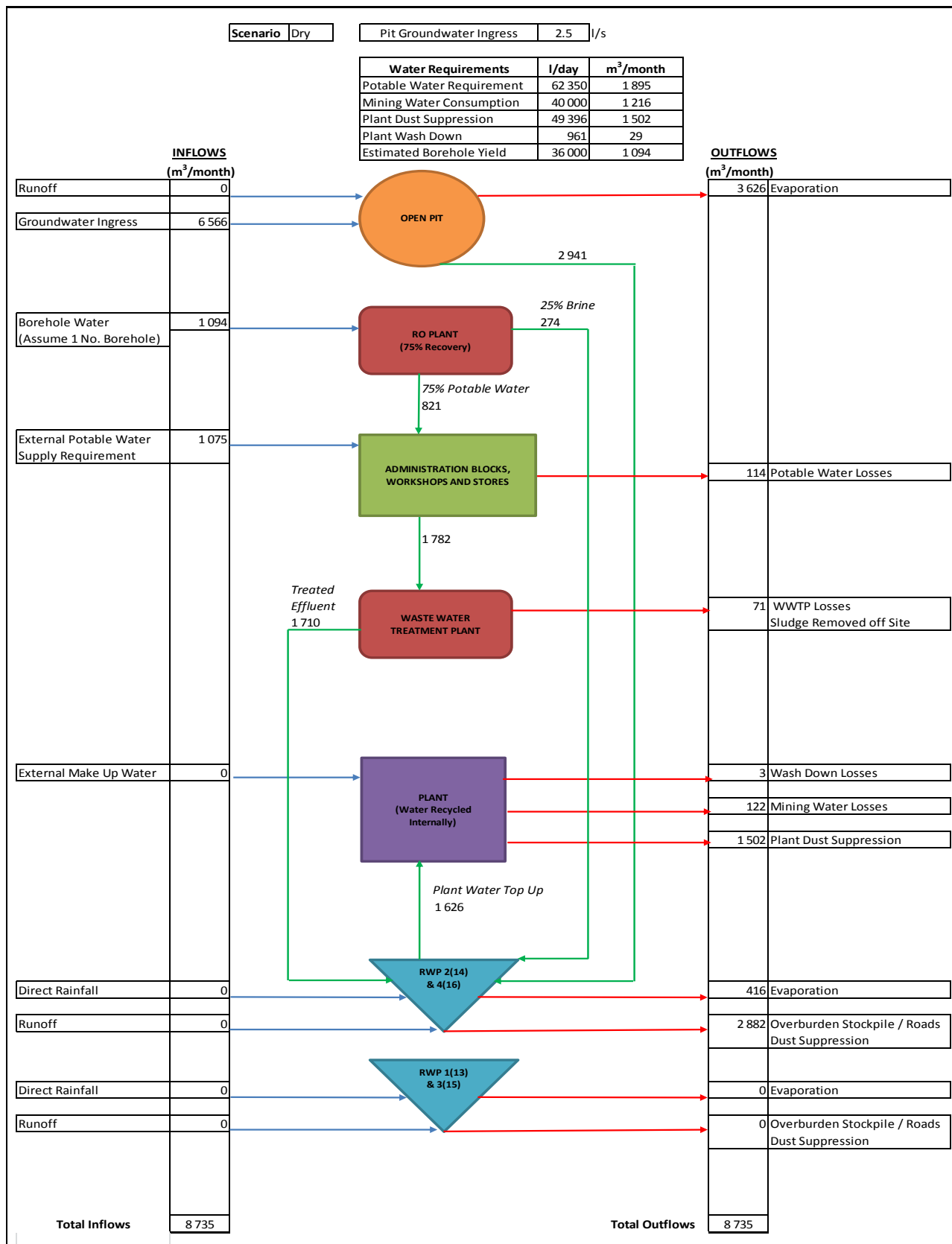


FIGURE 14: DRY SEASON WITH 2.5 L/S GROUNDWATER INFLOW

TRANSPORTATION (ROUTES AND MECHANISMS) FOR THE OPERATIONAL PHASEInternal haul roads

Within the proposed site boundary haul roads will be established. These haul roads will consist of a combination of widening existing gravel roads as well as the establishment of new haul roads. All haul roads within the proposed site boundary will be stabilised using an on-going treatment with a cationic 60% emulsion as used on some of the neighbouring mines (or approved similar product).

Access to the site

Access to the proposed project site will be via an upgraded intersection that services the Gloria Mine (Figure 4) as discussed in Section 4.2.1.

Transportation of workers and supplies to site

During the operation of the proposed project there will be workers travelling to and from site, trucks supplying input materials and machinery, consumables and trucks removing ore from site. Table 10 below provides a conceptual indication of the traffic associated with the operational phase.

TABLE 10: OPERATIONAL PHASE TRAFFIC: MATERIALS AND STAFF

Item	Trips to and from site per day	Transportation routes
Transportation of ore off-site by truck	130 trucks per day (Approximately 260 trips per day)	Traffic will make use of the existing R380 towards Hotazel and/or Kathu and the R31 towards Kuruman
Operational materials, machinery and consumables transported by trucks	4 trucks per day (Approximately 8 trips per day)	
Operational employees transported by private vehicles	Approximately 30 vehicles per day (Approximately 60 trips per day)	
Operational employees transported by taxis/busses	Approximately 32 vehicles per day (Approximately 64 trips per day)	

Conveyors

During the operation phase the proposed project will make use of the conveyor network as discussed in Section 4.2.1. The conveyors are designed to operate 24 hours a day for five and a half days a week, excluding maintenance days and public holidays.

Pipelines

During the operations phase, the project will make use of the pipeline network as discussed under Section 4.2.1.

POWER SUPPLY AND USE FOR THE OPERATIONAL PHASE

Generators will be used as the primary power supply until such time as sufficient Eskom power becomes available in the future. Three generators each with a capacity of 1000 kVA will be required during the operational phase. One of the generators will be for standby purposes and will only be used when required. The generators and mini sub-station will be located near the administrative area (Figure 3). A Synchronising Panel will be installed and will have three 550V feeders, one for the main processing plant area, one for the supply of power to the administrative area, and the third will be a spare. Power from the generators will be stepped up via a 1250kVA transformer at the administrative area in order to step up the power supply for the processing plant. This transformer will in turn feed power via an underground cable to the control room at the processing plant (Figure 3) where the mini substation is located with a capacity of 550V in order to supply the processing plant with power.

MINERALISED WASTE MANAGEMENT FOR THE OPERATIONAL PHASE

Overburden stockpile

Overburden rock associated with the proposed project will be temporarily stockpiled and then backfilled into the open pit as part of the on-going rehabilitation initiative. Material from the initial boxcut will be stored on-site until the rehabilitation of the final open pit void, when the box cut material will be placed back into the pit. In compliance with Section 4 of GN. 632 of the NEM:WA, the design features characteristics associated with the overburden stockpile are provided in Table 11 below.

TABLE 11: DESIGN FEATURES CHARACTERISTICS FOR THE OVBURDEN STOCKPILE

Feature	Detail
Physical Dimensions	Foot print area: Approximately 16ha
	Height: Approximately 25m
Physical Characteristics	Size distribution: 1m ³ rock to fines
	Void ratio: Approximately 0.5
	Due to the drop height from the end of tipping into the open pit and the final height of fill, the material should settle fairly well.
Chemical Characteristics	With reference to Section 7.4.1.1, the ABA results show that the total sulphur content and more importantly the sulphide sulphur content of all samples are low, with the majority below the laboratory detection limit of <0.01%. The low sulphide sulphur content suggests the potential to generate acid is negligible. In addition, the neutralising potential ratio (NPR) of all samples is above 2, (minimum NPR 392), which implies all lithologies have sufficient neutralising potential to offset the low acid potential. The paste pH for all samples was neutral to alkaline and indicates that there is little potential for the generation of short-term acidity.
Transport and placement	All material will be loaded onto trucks and transported to designated product stockpiles
Stormwater management	Stormwater trenches / berms around the upstream boundaries of the overburden stockpiles that direct clean stormwater run-off around and away from the overburden stockpile.
Lining	Given the temporary nature of the stockpiles and the limited associated pollution risks no lining will be provided.
Side slopes	The side slope will be constructed at approximately 1 vertical horizontal.

Feature	Detail
Under Drains	Given the temporary nature of the stockpiles no under drains will be provided.
Access and Access control	Internal haul roads will be used for access. A perimeter fence is not planned around the overburden stockpile. Rather a perimeter fence around the whole proposed mine area.
Waste Minimisation	Waste rock will be used for on-going rehabilitation and final closure of the open pit.
Dust control	No dust control will be provided at the overburden stockpile because these are not seen as a significant dust emission sources given the particle size distribution.
Closure	All the stockpile material will be removed for final closure of the open pit.

The safety classification for the overburden stockpiles was determined in accordance with the South African Code of Practice for Mine Residue Deposits (SANS 10286:1998) and the requirements of Section 3(c) of GN 527 of the MPRDA. The summarised safety classification is included in Table 12 below.

TABLE 12: SAFETY CLASSIFICATION CRITERIA FOR THE OVERBURDEN STOCKPILE

Criteria No.	Criteria	Comment	Safety Classification	
1	No. of Residents in Zone of Influence	0 (Low hazard)	No residents were noted within the zone of influence.	Low Hazard
		1 -10 (Medium hazard)		
		>10 (High hazard)		
2	No. of Workers in Zone of Influence	<10 (Low hazard)	Minimal workers will be located in the zone of influence as the main activities will take place in the pit area	Low Hazard
		11 – 100 (Medium hazard)		
		>100 (High hazard)		
3	Value of third party property in zone of influence	0 – R2 Million (Low hazard)	No formal assessment of the value of property has been done in the zone of influence. The characteristics of the overburden dumps are such that catastrophic failures will be localised and no extended flow will be experienced.	Low Hazard
		R2 – R20 million (Medium hazard)		
		>R20 million (High hazard)		
4	Depth to underground mine workings	>200 m (Low hazard)	No underground activities are located within the zone of influence	Low Hazard
		50 m – 200 m (Medium hazard)		
		<50 m (High hazard)		

With reference to Table 12 above, the waste rock stockpiles is classified as a low safety risk.

Environmental classification for the overburden stockpile

In accordance with Section 5 GN. 632 of the NEM:WA, overburden stockpiles need to be classified taking into account Regulation 8 of GN R. 634 of 2013, which references the following associated National Norms and Standards:

- National Norms and Standards for the assessment of waste for landfill disposal (GN R.635 of 2013).
- National Norms and Standards for disposal of waste to landfill (GN R. 636 of 2013).

A total of nine samples, representative of overburden to be stockpiled temporarily as part of the proposed project were selected. The result of the classification are summarised in Table 13 below.

TABLE 13: RESULTS OF OVERBURDEN CLASSIFICATION

Sample ID	Material Type	Waste Type	Reason for Classification	Landfill Class
MO1	Kalahari	Type 3	Total Concentrations: Ba, Cr(VI) and Hg	Class C
MO2	Kalahari	Type 3	Total Concentrations: Ba, Cu and Mn	Class C
MO6	Dwyka	Type 3	Total Concentrations: As, Ba, Cr(VI), Cu, Mn and NO ₃	Class C
MO8	Mooibraai Dolomite	Type 3	Total Concentrations: As, Cr (VI), Mn	Class C
MO9	Sand	Type 3	Total Concentrations: Ba	Class C
MO11	Upper BIF	Type 3	Total Concentrations: Cu, Mn	Class C
MO14	Middle BIF	Type 3	Total Concentrations: As, B, Ba and Mn	Class C
MO22	Calcrete	Type 3	Total Concentrations: Ba, Cu, Mn	Class C
MO23	Calcrete	Type 3	Total Concentrations: Co, Cr(VI) and Cu	Class C

Based on the outcome of the assessment undertaken in accordance with the national Norms and Standards, the results suggests that the overburden stockpile including the backfilling of the open pit with overburden material will require a composite Class C liner which comprises both a HDPE geomembrane and a clay liner. This outcome is not considered appropriate and as such a risk based approach is recommended that focusses on the protection of groundwater quality in the context of practical constraints rather than a formulaic application of the Norms and Standards for the following reasons:

- The threshold limits in the Norms and Standards do not take into account the baseline concentration of groundwater resources. In this regard, baseline concentrations are already elevated and the water should not be used for domestic use.
- Based on the modelled groundwater results, the limited contamination plume is expected to migrate 200m from the temporary overburden stockpile within the shallow aquifer over a period of 100 years, while the contamination plume for the deep aquifer is expected to migrate 500m over a period of 100 years in a north westerly direction. The modelled results indicate that the contamination plume associated with the backfilled open pit is likely to extend 320m from the open pit in a westerly direction. No third party boreholes used for either domestic or livestock watering purposes are located within the contamination plume of the proposed project.

- The open pit acts as a sink causing groundwater to flow from the outside areas towards the open pit. The majority of the contaminants are mobilised and collected in the lowest groundwater elevation, in the open pit area.
- The overburden stockpile is temporary in nature and will only remain on surface for the duration of the proposed project.
- It is not practically possible to line an open pit that is designed with con-current backfilling. There are multiple reasons for this. A key consideration is that the method of blasting overburden from one new strip into the previously mined strip will damage any liner system. A related issue is that the side and footwalls of the open pit are not smooth surfaced making it impossible to introduce a liner system. The pit will be at its deepest at approximately 180m. No liner will completely withstand this type of loading without deformation.
- Given that the surface stockpile is temporary, that related seepage mostly reports to the pit and that at the end of open pit operation the stockpile will be placed into the pit. It is also not deemed necessary to line the temporary stockpile.
- A portion of the material that will be placed on the temporary stockpile is material excavated without the need for blasting as it will be free dig with no blasting contamination. This supports a lower classification of the material in terms of NEM:WA.

Taking the above into consideration Mokala will work together with the relevant departments in order to investigate alternative liner requirements for the overburden stockpile.

Run of Mine (ROM) stockpiles

Two designated ROM stockpiles (High grade and Low grade) will be established as part of the proposed project (Figure 3). The capacity of the high grade ROM stockpile is 140 000m³ and the capacity of the low grade stock pile is 140 000m³. The ROM pad will be established by means of removing topsoil which will be stockpiled. The sand below the topsoil will be removed to a depth of approximately 0.5m below ground level and will be filled with either banded iron formation (BIF) or calcrete which will be obtained from the open pit.

Product stockpiles

Numerous product stockpiles will be established as part of the proposed project. These include the fines stockpile, the supplementary fines stockpile, the product stockpile and the supplementary stockpile. Details pertaining to the use of each of these stockpiles are included in Table 8. The fines stockpile will be able to cater for a maximum capacity of 5000 tons at any given time, while the supplementary fines stockpile will have a maximum capacity of 2000 tons at any given time. The product stockpile will be able to cater for a maximum capacity of 28 000 tons at any given time, while the supplementary product stockpile will have a maximum capacity of 2800 tons at any given time. The surface of each of the stockpiles will be established by means of removing topsoil which will be stockpiled. The sand below the

topsoil will be removed to a depth of approximately 0.5m below ground level and will be filled with either banded iron formation (BIF) or calcrete which will be obtained from the open pit.

NON-MINERALISED WASTE MANAGEMENT FOR THE OPERATIONAL PHASE

Domestic and industrial waste

Facilities for the temporary storage of non-mineralised waste associated with the proposed project will be provided. The types of waste that could be generated on site during the operational phase include: hazardous industrial waste (such as packaging for hazardous materials, used oil, lubricants), general industrial waste (such as scrap metal and building rubble), medical waste (such as swabs, bandages) from the staff medical station, and domestic waste (such as packaging, canteen waste and office waste). These wastes will be temporarily handled and stored on site at the waste yard before being removed for recycling by suppliers, appointed waste contactors or reuse by scrap dealers or final disposal at permitted waste disposal facilities in either Kuruman, Deben, Hotazel or Kimberley.

Sewage

All sewage will be treated in a package sewage treatment facility to be established on site. It is anticipated that the sewage treatment plant will be sequencing batch reactor system which is a type of activated sludge process. Sewage effluent will be collected from the administrative block, truck staging toilet area and change houses and will be pumped to the sewage treatment plant via a series of pipelines. The sewage treatment plant will be able to treat approximately 60m³ of sewage effluent per day. The treated sewage effluent will be pumped via pipelines to the main tower tank for re-use within the process. It is anticipated that approximately 2m³ of sewage sludge will be generated on a daily basis which will be removed off-site by a certified contractor for disposal at a licensed facility.

BLASTING

Blasting will take place as part of the proposed project. It should however be noted that blasting is limited to day-time hours.

OTHER SUPPORT SERVICES AND FACILITIES

Other support services associated with the proposed project include the following:

- A designated fuel storage area consisting of two 100m³ above ground tanks diesel storage tanks (Figure 3) which will be placed onto a concrete surface and will be surrounded by a bund wall which will be capable of containing 110% capacity to prevent seepage of spillages. The fuel storage area will also consist of a designated refuelling bay for all mine related vehicles.
- Weighbridge for final weighing of trucks prior to dispatching with ore
- Admin block comprising offices, kitchen area, canteen, training centre, mustering centre (gathering centre), clinic and emergency room will be established (Figure 3).
- Flammable store

- Change house and stores
- Workshop and washbays used for servicing equipment and general maintenance
- A control room will be established at the processing plant area that will be used to operate the plant (Figure 3).
- Designated parking areas for light vehicles, surfaced with a wearing course will be established for use by administrative staff, visitors and contractors
- A truck staging area will be established for the temporary parking of heavy vehicles.
- Lighting masts will be established on-site of which the position will be determined by an electrical engineer. The placement of the lights will however take into account existing traffic utilising the R380.

EMPLOYMENT AND HOUSING

The proposed project will allow for the creation of approximately 370 jobs during the operational phase. Nobody will be housed on-site as part of the proposed project. Operational workers will be accommodated in nearby towns.

OPERATING HOURS

At this stage it is expected that the proposed mine will be operational 24 hours a day for 5½ days a week (Monday to Friday and half of Saturday). It is anticipated that there will be three eight hour shifts (06h00 to 14h00, 14h00 to 22h00 and 22h00 to 06h00) per day during the operations phase.

LIFE OF MINE

It is anticipated that mining and processing activities will reach full production in 2018. The anticipated life of mine is approximately 15 years.

4.2.3 DECOMMISSIONING AND CLOSURE

The environmental objective for closure is to minimise the impacts associated with the closure and decommissioning of the mine and to restore the land to a useful land use not dissimilar to the pre mining land use. The conceptual closure plan objectives and principles include the following:

- Environmental damage is minimised to the extent that they are acceptable to all parties involved
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of wilderness and grazing is achieved
- All surface infrastructure, excluding the realignment of the R380 will be removed from site after rehabilitation and the open pit will be completely backfilled.
- Maintenance of the realigned river channel so that long term natural flows can continue.
- Mine closure is achieved efficiently, cost effectively and in compliance with the law.
- The social and economic impacts resulting from mine closure are managed in such a way that negative socio-economic impacts are minimised.

5 POLICY AND LEGISLATIVE CONTEXT

This section outlines the key legislative requirements applicable to the proposed project. Table 14 below provides a summary of the applicable legislative context and policy.

TABLE 14: LEGAL FRAMEWORK

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context
Mineral and Petroleum Resources Development Act No. 28 of 2002 (MPRDA) and Regulations	As outlined in Table 15	Mokala has applied for a mining right in terms of the MPRDA. A mining right application was submitted on 03 July 2015 to the Department of Mineral Resources.
National Environmental Management Act No. 107 of 1998 (NEMA)	As outlined in Table 15	An application for environmental authorisation in terms of listed activities in accordance to NEMA has been applied for. The NEMA application was submitted on 03 July 2015 to the Department of Mineral Resources. A copy of the application form is attached in Appendix E.
Regulations 983 (Listing Notice 1), 984 (Listing Notice 2) and 985 (Listing Notice 3) in terms of NEMA	As outlined in Section 4.1	
Guideline on the need and desirability in terms of the Impact Assessment (EIA) Regulations, 2010, GNR. 891 of 2014.	Section 6	Need and desirability has been taken into account as part of project planning.
National Environment Management: Waste Act No. 59 of 2008 (NEM:WA)	Section 4.1	An application for a waste management license in terms of the NEM:WA was submitted on 03 July 2015 to the Department of Mineral Resources. A copy of the application form is attached in Appendix E.
Regulation 921 in terms of NEM:WA	Section 4.1	
Regulations regarding the planning and management of residue stockpiles and deposits from a prospecting, mining, exploration or production operation in terms of NEM:WA, Regulation 632.	Section 4.2.2	Informs the design requirements for the overburden stockpiles associated with the proposed project.
National Norms and Standards for the assessment of waste for landfill disposal (GNR 635 of 2013)		
National Norms and Standards for the disposal of waste to landfill (GNR 636 of 2013)		
National Water Act No. 36 of 1998 (NWA)	Section 7.4.1.7, 7.8, and 28	A water use license application will be submitted to the Department of Water and Sanitation for various water uses in accordance to Section 21 of the NWA. As part of the water use license application, exemption in terms of Regulation 704 of 1999 will be applied for.
Regulation 704 of 1999 in terms of the NWA	Section 7.1.3, 7.4.1.7, 7.8 and 28	
National Environmental Management: Biodiversity Act No. 10 of 2004 (NEM:BA)	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.
Mining and Biodiversity Guideline (DEA et al, 2013)	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context
National Freshwater Ecosystem Priority Areas 2011 (NFEPA)	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.
National Veld and Forest Fire Act No. 101 of 1998	Section 7.8 and 28	Fire management has been taken into account as part of project planning.
International Union for Conservation of Nature (IUCN)	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.
National Forest Act No. 84 of 1998 (NFA)	Section 7.4.1.6	An integrated permit application will have to be made to the DENC to obtain the required permission to remove and/or translocate protected species in terms of the NFA and the NCNCA.
Northern Cape Nature Conservation Act No. 9 of 2009 (NCNCA)	Section 7.4.1.6	
Conservation of Agriculture Resources Act No. 43 of 1983	Section 7.4.1.6	Agriculture has been taken into account as part of project planning.
National Protected Areas Expansion Strategy 2008 (NPAES)	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.
South African National Botanical Institute (SANBI) Integrated Biodiversity Information	Section 7.4.1.6	Biodiversity has been taken into account as part of project planning.
Joe Morolong Local Municipality Integrated Development Plan	Sections 7.4.1.14	Land planning has been taken into account as part of project planning.
Joe Morolong Spatial Development Framework	Section 6	Land planning has been taken into account as part of project planning.
John Taolo Gaetsewe District Municipality Integrated Development Plan	Sections 7.4.1.14	Land planning has been taken into account as part of project planning.
National Heritage Resource Act No. 25 of 1999	Section 7.1.3, 7.4.1.13, 7.8 and 28	Heritage has been taken into account as part of project planning.
Northern Cape Planning and Development Act No. 7 of 1998	Section 7.7 and Section 28	Submission of a re-zoning application
Spatial Planning and Land Use Management Act No. 16 of 2013.		
National Atmospheric Emission Reporting Regulations in terms of the National Environmental Management: Air Quality Act 39 of 2004 (the Reporting Regulations).	Section 28	Registration on the National Emissions Inventory System
South African Code of Practice for Mine Residue Deposits (SANS 10286:1998)	Section 4.2.2	Mine residue planning has been taken into account as part of project planning.

This document has been prepared strictly in accordance with the DMR EIA and EMP Report template format, and was informed by the guidelines posted on the official DMR website. This is in accordance with the requirements of the MPRDA. In addition, this report complies with the requirements of the National Environmental Management Act (NEMA) (Act 107 of 1998). The relevant criteria are indicated in Table 15.

TABLE 15: SCOPING REPORT REQUIREMENTS

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
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EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
Part A of DMR report template	Appendix 3 of the NEMA regulations	-
The EAP who prepared the report	Details of the EAP who prepared the report.	Section 1.1
Expertise of the EAP	Details of the expertise of the EAP, including curriculum vitae.	1 and Appendix B
Description of the property	The location of the activity, including - the 21 digit Surveyor General code of each cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties.	Section 2
Locality plan	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	Section 3
Description of the scope of the proposed overall activity	A description of the scope of the proposed activity, including all listed and specified activities triggered.	Section 4.1
Description of the activities to be undertaken	A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and a description of the associated structure and infrastructure related to the development	Section 4.2
Policy and legislative context	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Section 5
Need and desirability of the proposed activity	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Motivation for the preferred development footprint within the approved site including	A motivation of the preferred development footprint within the approved site including	Section 7
A full description of the process followed to reach the proposed development footprint within the approved site	A full description of the process followed to reach the proposed development footprint within the approved site	Section 7
Details of the development footprint alternatives considered	Details of all the alternatives considered.	Section 7.1
Details of the public participation process followed	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 7.2
Summary of issues raised by IAPs	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Section 7.3
Environmental attributes associated with the development footprint alternatives	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 7.4

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts including the degree of the impacts	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated.	Section 7.5
Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 7.6
The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected.	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 7.7
The possible mitigation measures that could be applied and the level of risk	The possible mitigation measures that could be applied and level of residual risk.	Section 7.8
Motivation where no alternative sites were considered	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	Section 7.9
Statement motivating the alternative development location within the overall site	A concluding statement indicating the preferred alternatives, including preferred location within the approved site.	Section 7.10
Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout) through the life of the activity	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 8
Assessment of each identified potentially significant impact and risk	An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated.	Section 9
Summary of specialist reports	Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 10
Environmental impact statement	An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures	Section 11

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
	and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	
Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	Section 12
Final proposed alternatives	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	Section 13
Aspects for inclusion as conditions of authorisation	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 14
Description of any assumptions, uncertainties and gaps in knowledge	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 15
Reasoned opinion as to whether the proposed activity should or should not be authorised	Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 16
Period for which environmental authorisation is required	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Section 17
Undertaking	An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&As, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties	Section 18
Financial provision	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Section 19
Deviation from the approved scoping report and plan of study	An indication of any deviation from the approved scoping report, including the plan of study, including any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and a motivation for the deviation	Section 20
Other information required by the competent authority	Any specific information required by the competent authority.	Section 21

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
Other matter required in terms of section 24(4)(a) and (b) of the Act.	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Section 22
Part B of the DMR report template	Appendix 4 of the NEMA regulations	-
Details of EAP	Details of the EAP who prepared the EMPr and the expertise of that EAP to prepare the EMPr, including a curriculum vitae	Section 23
Description of the aspects of the activity	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 24
Composite map	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers	Section 25
Description of impact management objectives including management statements	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities	Section 26
The determination of closure objectives		Section 26.1
The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity	-	Section 26.2
Potential acid mine drainage	-	Section 26.3
Steps taken to investigate, assess and evaluate the impact of acid mine drainage	-	Section 26.4
Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage	-	Section 26.5
Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage	-	Section 26.6
Volumes and rate of water use required for the mining	-	Section 26.7
Has a water use license been applied for?	-	Section 26.8
Impacts to be mitigated in their respective phases	-	Section 26.9
Impact management outcomes	A description and identification of impact management outcomes required for the aspects contemplated in paragraph	Section 27
Impact management actions	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which	Section 28
Financial provision		Section 29

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the scoping report
	causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon	The method of monitoring the implementation of the impact management actions	Section 30
	The frequency of monitoring the implementation of the impact management actions	
	An indication of the persons who will be responsible for the implementation of the impact management actions	
	The time periods within which the impact management actions must be implemented	
	The mechanism for monitoring compliance with the impact management actions	
	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	
Environmental Awareness Plan	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 31
Specific information required by the competent authority	Any specific information that may be required by the competent authority	Section 32
Undertaking	-	Section 33

6 NEED AND DESIRABILITY OF THE PROPOSED PROJECT

The need and desirability of the proposed project is described below. This section has been compiled taking into account the need and desirability guidelines in terms of the environmental impact assessment regulations 891 of 2014.

6.1 ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

Due to the nature of mining projects, impacts on sensitive biodiversity areas, linkages between biodiversity areas and related species and the role that they play in the ecosystem are probable. The proposed project also has the potential to directly disturb vegetation, vertebrates and invertebrates. In addition to this, soil is a valuable resource that supports a variety of ecological functions. The proposed project has the potential to damage soil resources through physical disturbance and/or contamination, which has a direct impact on the potential loss of the natural capability of the land.

As part of the proposed project, an independent biodiversity and soil specialist were appointed to determine the sensitivity of the proposed project area. In this regard the proposed project site does include areas of high biodiversity sensitivity as well as protected tree species *Vachellia erioloba* (Camel Thorn), *Vachellia haematoxylon* (Grey Camel Thorn) (refer to Section 7.4.1.6 for further information), which will be impacted as part of the proposed project (Refer to Appendix F for the detailed assessment). Linked to this, is the loss of soil functionality and related land capability as an ecological driver for vegetation and ecosystems that rely on soil (Refer to Appendix F for the detailed assessment).

Measures that were considered to avoid the destruction and disturbance of biodiversity and the loss of soil resources included limiting the project footprint to what was absolutely necessary. In this regard and with reference to section 7.1.3, planned infrastructure has been positioned within close proximity of the ore body. This allows for the western section of the proposed project area to remain undisturbed by activities associated with the proposed project. Where sensitive biodiversity areas and the removal of protected trees could not be avoided, mitigation measures that focus on ensuring ecological sustainability include the implementation of a biodiversity offset. Other mitigation measures focus on backfilling the open pit to ensure that no final void remains after closure and that rehabilitation aims at restoring pre-mining land capability to grazing and wilderness potential.

The proposed project will require the realignment of the Ga-Mogara drainage channel. The impacts associated with this activity are discussed in Appendix F. With reference to Section 7.1.6, as part of the proposed project, not proceeding with the realignment was considered, however if the realignment is not undertaken approximately 2 million tons of ore will be lost and as such the project will not be viable. Mitigation measures focus on ensuring the design of the river realignment will allow for the continuation of

natural flow of the Ga-Mogara drainage channel in both the temporary and permanent realignment design phases (Section 4.2.2). Further to this, the permanent realignment will focus on replicating aspects of the existing Ga-Mogara drainage channel. In this regard, the permanent realignment will aim to look as natural as possible and will therefore include natural curves, make use of natural soils and be vegetated using indigenous species.

6.2 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

The proposed project will result in positive socio-economic impacts (Refer to Appendix F for the detailed assessment). In this regard, the proposed development of the mine supports the national SA economy at a macro level by generating exports that will leverage foreign income to the country. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees. This is in line with the Joe Morolong Spatial Development Framework (JMLM, September 2012) which identifies the promotion of mining job creation as one of the strategies to guide spatial development within the Joe Morolong Local Municipality given that mining forms the backbone of employment and is the main source of income within the local municipality. Further to this, through employment (321 during construction and 370 during operation), persons at the proposed mine will gain skills in the construction and operation of a mine and development which contributes to the building of the nation. Management measures that will be implemented to further enhance positive socio-economic impacts include the employment of people in local communities (as far as possible), formal bursary and skills development provided to people in the closest communities and the implementation of a procurement mentorship programme which provides support to local businesses. Further to this, the proposed development will also ensure local economic development through the implementation of projects identified in the social and labour plan (SLP). The projects identified in the SLP are in line with the Joe Morolong Local Integrated Development Plan and aims to contribute towards the socio-economic development of the area as well as the areas from which the majority of the workforce is sourced. SLP projects that will be implemented by Mokala are focussed on infrastructure and job creation. The identification of infrastructure related SLP projects was highlighted as one of the priority needs of communities by the Joe Morolong Local Municipality.

Due to the expectation of employment associated with mining projects there is an potential for negative socio-economic impacts to occur (Refer to Appendix F for the detailed assessment). In this regard, an influx of job seekers to an area which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security. Management measures that will be implemented to manage and remedy these impacts include the implementation of a health policy on HIV/AIDs and tuberculosis, working together with local and regional authorities to address social service constraints and to monitor and prevent the development of informal settlements. In addition to this, no

housing will be established on-site and formal communication structures and procurement procedures will be developed (Refer to Section 28 for further detail).