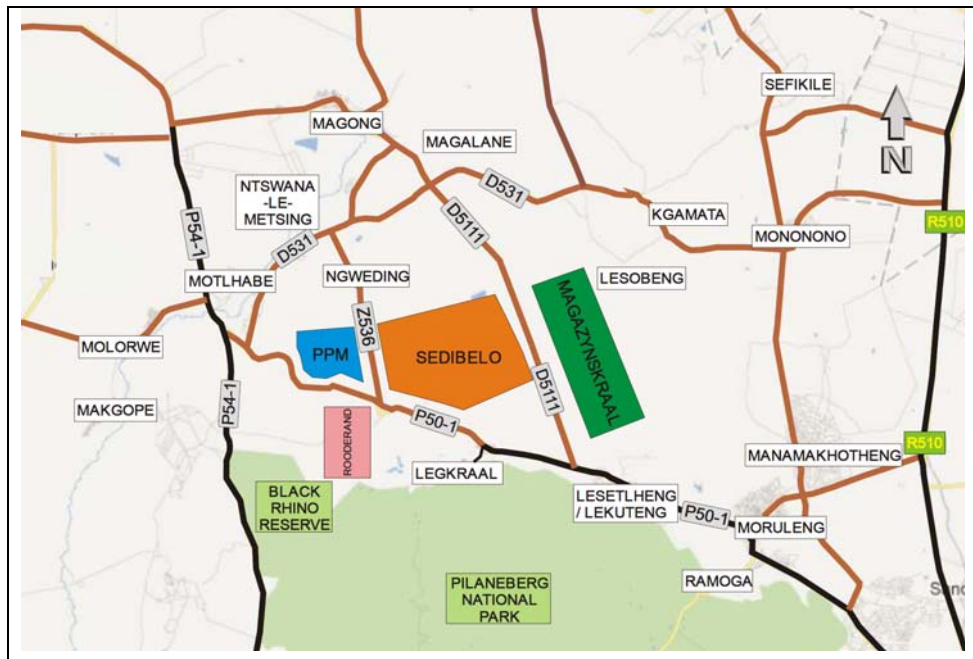


APPENDIX J: TRAFFIC STUDY

MEMORANDUM

TRAFFIC IMPACT STATEMENT

PROPOSED PILANESBERG PLATINUM MINE PLANT EXPANSION



JANUARY 2019

Prepared for:

SLR Consulting (Africa) (Pty) Ltd
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Prepared by:

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NEMA Regulations (2014) (as amended) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Refer to page IV and attached curriculum vitae.
The expertise of that person to compile a specialist report including a curriculum vitae	
A declaration that the person is independent in a form as may be specified by the competent authority	Refer to page III.
An indication of the scope of, and the purpose for which, the report was prepared	Page 6.
An indication of the quality and age of base data used for the specialist report	Section 2.1. Traffic count data.
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 3.
The duration date and season of the site investigation and the relevance of the season to the outcome of the assessment	Not relevant to traffic data.
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 2.1. Traffic count data.
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure inclusive of a site plan identifying site alternatives	Not relevant.
An identification of any areas to be avoided, including buffers	Not relevant.
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Not relevant.
A description of any assumptions made and any uncertainties or gaps in knowledge;	Not relevant.
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Not relevant.
Any mitigation measures for inclusion in the EMPr	Section 3.
Any conditions for inclusion in the environmental authorisation	Section 3.
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	None.
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and regarding the acceptability of the proposed activity or activities	Section 3.
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Not relevant.
A description of any consultation process that was undertaken during the course of preparing the specialist report	Not relevant.
A summary and copies of any comments received during any consultation process and where applicable all responses thereto	Not relevant.
Any other information requested by the competent authority.	Not relevant.

Declaration of Independence

I, Leon Roets, hereby declare that Siyazi Gauteng Consulting Services (Pty) Ltd, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Consultant name: Leon Roets

Signature:

A handwritten signature in black ink, appearing to read 'Roets', written over a horizontal line.

Date: 08 February 2019

VERIFICATION PAGE


PROJECT NAME:	PROPOSED PILANESBERG PLATINUM MINE PLANT EXPANSION	
<u>Project No:</u> 14011	<u>Date:</u> January 2019	<u>Report Status:</u> Final
<u>Prepared by:</u> Siyazi Gauteng Consulting Services (Pty) Ltd P O Box 71333 Willows, Gauteng Province 0041		<u>Commissioned by:</u> SLR Consulting (Africa) (Pty) Ltd SLR Africa (Block 7) Fourways Manor Office Park 2191, Cnr Roos and Macbeth Streets Fourways, Johannesburg, 2060
<u>Author:</u> Paul van der Westhuizen		<u>Report reviewed by and compiled under the supervision of:</u> Leon Roets (Pr Eng) Professional Number: 960547
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<u>Declaration by registered professional:</u>		
The undersigned has been appointed as the registered professional for this Traffic Impact Statement and has applied due diligence to the content of this report and endeavoured to ensure that the TIS is free of technical errors and takes full responsibility for its contents.		
Name:	Leon Roets	
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Qualifications:	B Eng (Civil Eng.)	
ECSA Registration Number:	960547 (Attached to report)	
Signature:		

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Section 1

INTRODUCTION

Siyazi Gauteng Consulting Services (Pty) Ltd was appointed by SLR Consulting (Africa) (Pty) Ltd. to provide traffic engineering related input for the proposed plant expansion of the existing Pilanesberg Platinum Mine (PPM Mine) located on the Farms Tuschenkomst 135 JP and Witkleifontein 136 JP to the west and north-west of the Pilanesberg National Park in the North West Province. Refer to **Figure 1.1** for a graphical presentation of the locality of the existing PPM Mine.

In broad terms the approved existing mining operation comprises the following:

- a) Open pit mine;
- b) Temporary and permanent waste rock stockpiles;
- c) Temporary topsoil dumps;
- d) Haul roads;
- e) River diversion;
- f) Processing facility;
- g) Tailings storage facility (TSF);
- h) Sewage treatment facility;
- i) Mining contractors' site complexes;
- j) Offices;
- k) Workshops; and
- l) Other support infrastructure.

Currently the PPM Mine excavate approximately 420 000 tonnes of ore per month from the open pit mine for initial processing on site and the excavated ore is transported on private internal haul roads to the processing plant. After initial processing approximately 10 000 tonnes of concentrate is exported per month via road transport to off-site third-party processing facilities for further processing. The last mentioned results in an average of 200 vehicle trips outbound per month (average of 50 tonnes per truck) or 9 outbound vehicle trips per day.

Staff currently employed includes 350 mining workers during the morning shift, 200 mining workers during the afternoon shift and 200 mining workers during the night shift. Most staff currently makes use of existing public transport which consists of minibus taxis and busses.

It is proposed by the PPM Mine to expand the existing processing facility (Plant) which will incorporate the following:

- a) A hydrometallurgical processing facility for the extraction of PGMs and base metals;
- b) UG2 milling and flotation circuit to process ore from the proposed Sedibelo Platinum Mine operation once commissioned;

- c) Additional support and services infrastructure, including:
 - i. The upgrade of the existing sewage treatment facility;
 - ii. Existing waste storage area that will be relocated to an area outside the plant; and
 - iii. Existing training centre that will be relocated to an area outside the plant..

Furthermore, a number of community based initiatives have been established at the mine, such as:

- a) A DMS aggregate crusher and brick project;
- b) Waste composting area;
- c) Nursery;
- d) Vegetable garden; and
- e) A Car wash bay.

Access to and from the existing and proposed mining related activities are currently provided from Road P50-1, and no additional access is deemed necessary for the proposed plant expansion. Refer to **Figure 1.2** for the proposed plant expansion and layout of the existing PPM mine.

The purpose of this document is to provide traffic engineering related input on the potential impact that potential additional vehicle traffic anticipated to be generated due to the proposed plant expansion could have on the existing roads network adjacent the PPM Mine.

The following authorities are relevant for the roads network adjacent to the PPM Mine:

- a) North West Department of Public Works and Roads;
- b) Moses Kotane Local Municipality.
- c) Bakgatla Ba Kgafela Traditional Administration (BBKTA)

The following sections elaborate on the:

- a) **Section 2:** Detailed Information Related to Findings and Recommendations.
- b) **Section 3:** Findings and Recommendations.

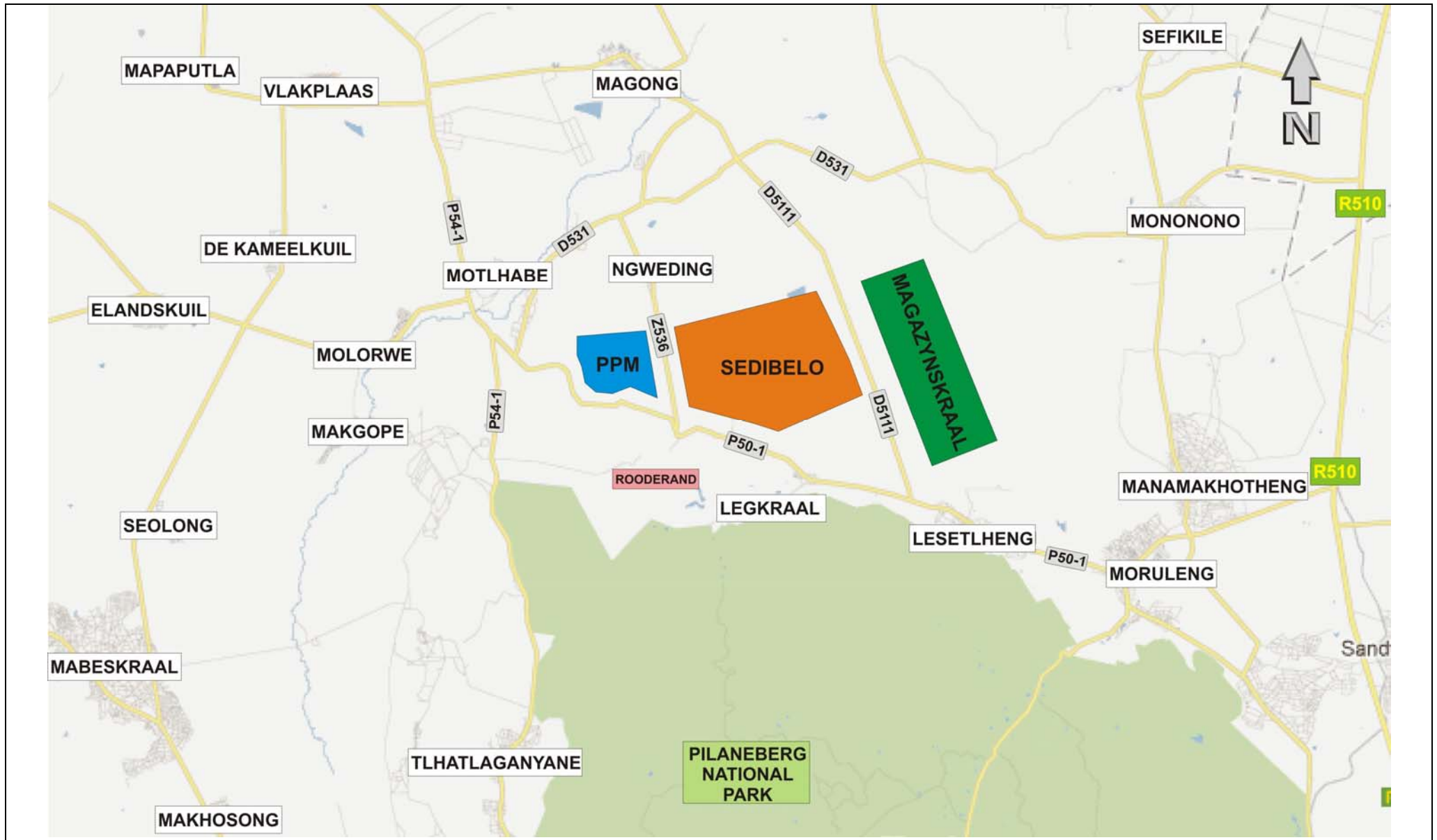


FIGURE 1.1: LOCALITY OF EXISTING PPM MINE

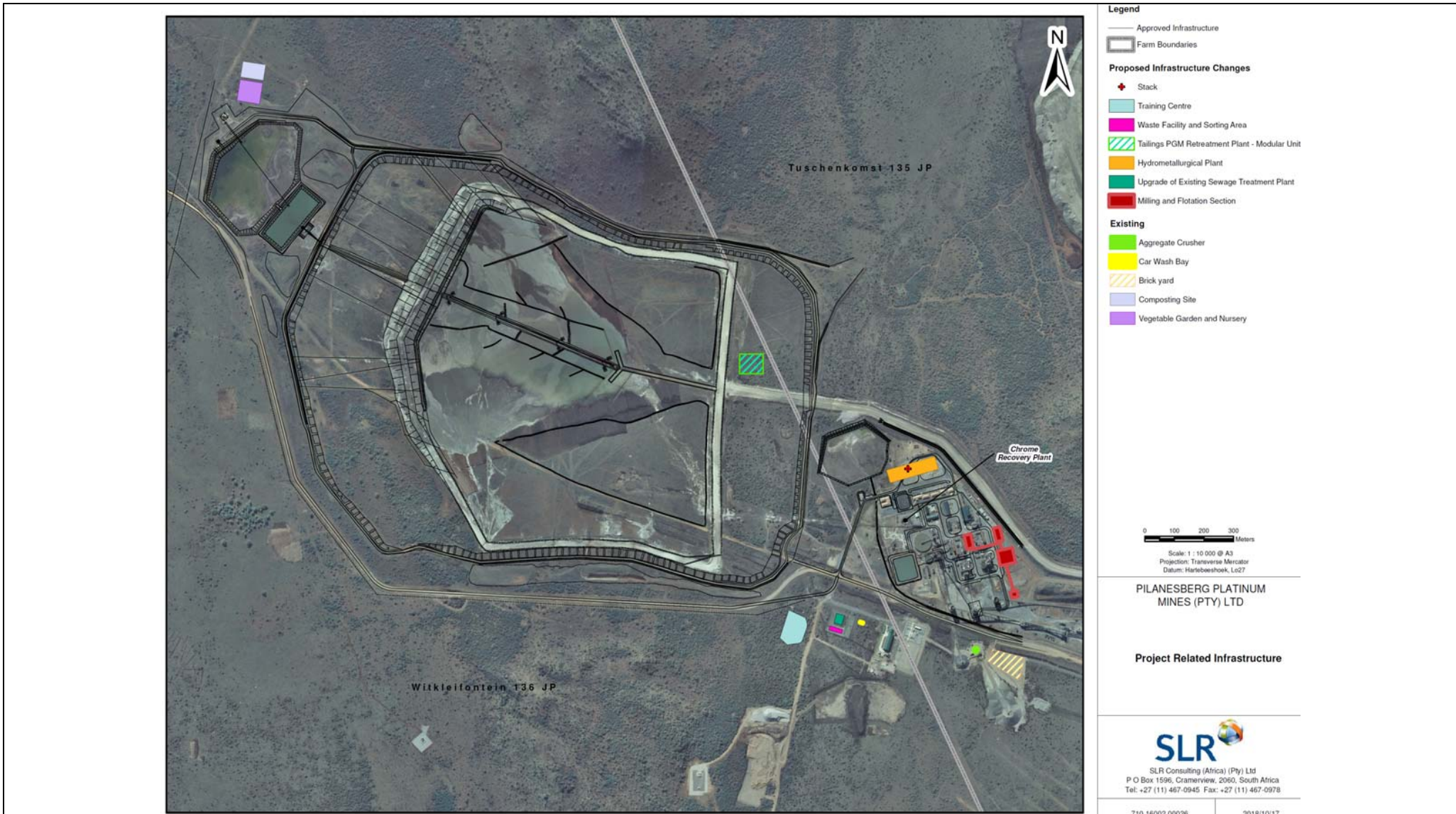


FIGURE 1.2: PROPOSED PLANT EXPANSION AND LAYOUT OF THE EXISTING PPM MINE

Source: SLR Consulting (Africa) (Pty) Ltd.

Section 2

DETAILED INFORMATION RELATED TO FINDINGS AND RECOMMENDATIONS

The purpose of **Section 2** is to provide the detailed information related to the findings and recommendations:

- a) Vehicle traffic volumes at the existing intersection that provides access to the PPM Mine from and to Road P50-1;
- b) Anticipated additional vehicle trips to be generated by the proposed plant expansion;
- c) Other traffic related matters.

The following subsections elaborate on the above mentioned.

2.1 TRAFFIC COUNTS AS BASIS FOR MAKING TRAFFIC CALCULATIONS

In order to gain a better understanding of the traffic patterns and movements adjacent to the PPM Mine, manual traffic counts were conducted at the intersection of Road P50-1 and PPM Mine Access Road. Traffic counts were conducted on the following dates:

- a) Friday 27 January 2012 (06:00 to 18:00);
- b) Friday 24 March 2014 (13:00 to 17:00); and
- c) Friday 01 December 2017 (13:00 to 17:00).

The last mentioned manual traffic counts were conducted in order to determine the change in traffic volumes and patterns at the relevant intersection between 2012 and 2017. **Table 2.1** below provides a summary of the change in traffic volumes between the 2012, 2014 and 2017 manual traffic counts respectively.

TABLE 2.1: CHANGE IN TRAFFIC VOLUMES AT THE INTERSECTION OF ROAD P50-1 AND THE PPM MINE ACCESS ROAD		
DATE OF TRAFFIC COUNT	TOTAL VEHICLES OBSERVED (13:00 TO 17:00)	APPROXIMATE PERCENTAGE GHANGE PER ANNUM FROM LAST TRAFFIC COUNT
Friday 27 January 2012	226	-
Friday 28 March 2014	269	9.1% (Increase per annum)
Friday 1 December 2017	257	-1.5% (Decrease per annum)
Percentage change per annum from 2012 to 2017		2.64% (Increase)

It is possible to conclude from **Table 2.1** that:

- 1) The increase in vehicle traffic volumes between the relevant traffic counts conducted in 2012 and 2014 was due to other chrome mining activities within the area; and
- 2) Vehicle traffic volumes increased slightly with 2.64% between 2012 and 2017 during the relevant hours that the manual traffic counts were conducted which is regarded as normal growth for background traffic within South Africa.

2.2 DETERMINATION OF ADDITIONAL VEHICLE TRIPS EXPECTED TO BE GENERATED DUE TO THE PROPOSED PLANT EXPANSION

2.2.1 Vehicle trips anticipated to be generated during the construction phase of the proposed plant expansion

As part of the construction of the proposed plant expansion, it is planned that approximately 70 skilled and 300 unskilled workers will be employed that will work one shift per day (day shift) and will reside in nearby villages. Construction workers will mainly make use of existing public transport already available in the area. Should the existing public transport operations not have sufficient capacity available, as a worst case scenario it is anticipated that an additional 48 vehicle trips inbound and 30 vehicle trips outbound in the morning peak and 30 vehicle trips inbound and 48 vehicle trips outbound in the afternoon peak could be generated.

In the event that bus transport is provided for unskilled workers it is anticipated that an additional 24 vehicle trips inbound and 6 vehicle trips outbound in the morning peak and 6 vehicle trips inbound and 24 vehicle trips outbound in the afternoon peak could be generated.

It is also planned that approximately 100 heavy vehicles will deliver construction equipment and materials to the PPM Mine and will occur over the timeframe of the construction phase. The last mentioned generally occur outside of background vehicle traffic peak times. It is important to take note that vehicle trips anticipated to be generated during the construction phase is not permanent and will only be relevant for a maximum of 24 months.

Table 2.2 provides a summary of the vehicle trips anticipated to be generated during the construction phase if public transport is utilised for unskilled workers due to the proposed plant expansion as a worst case scenario while **Table 2.3** provides a summary of the vehicle trips anticipated to be generated during the construction phase if bus transport is utilised for unskilled workers.

TABLE 2.2: SUMMARY OF THE VEHICLE TRIPS ANTICIPATED TO BE GENERATED DURING THE CONSTRUCTION PHASE IF PUBLIC TRANSPORT IS UTILISED FOR UNSKILLED WORKERS

Item	Component	Num Workers per Day	% Workers active during Peak Hour	Num Workers Active per Peak Hour	Num Trucks Per Day	% Trucks active during Peak Hour	Num Trucks active during Peak Hour	Assumed Ave. Num Persons per Veh	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations			
										If Inward Movement is relevant Value = 1	Num Veh Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Num Veh Trips for Outwards Direction	Total Num Veh Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Veh during Peak Hour	Trip Dist. %		Trip Generation	
																In	Out	In	Out
AM Peak Hour																			
1.	Skilled Construction Workers (Own transport)	70	100%	70				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	18	0	0	18	0,25	100%	0%	18	0
2.	Unskilled Construction Workers (Public transport)	300	100%	300				10,0	Trips per Worker (10 Persons per taxi). Taxi drop off workers and leave empty.	1	30	1	30	60	0,20	50%	50%	30	30
3.	Heavy vehicles delivering construction materials (Once off events)				0	0%	0	0,0	Plant construction materials are envisaged to be delivered outside of the vehicle traffic peaks.	0	0	0	0	0	0,00	0%	0%	0	0
TOTAL														78				48	30
PM Peak Hour																			
1.	Skilled Construction Workers (Own transport)	70	100%	70				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	18	0	0	18	0,25	0%	100%	0	18
2.	Unskilled Construction Workers (Public transport)	300	100%	300				10,0	Trips per Worker (10 Persons per taxi). Taxi drop off workers and leave empty.	1	30	1	30	60	0,20	50%	50%	30	30
3.	Heavy vehicles delivering construction materials (Once off events)				0	0%	0	0,0	Plant construction materials are envisaged to be delivered outside of the vehicle traffic peaks.	0	0	0	0	0	0,00	0%	0%	0	0
TOTAL														78				30	48

TABLE 2.3: SUMMARY OF THE VEHICLE TRIPS ANTICIPATED TO BE GENERATED DURING THE CONSTRUCTION PHASE IF BUS TRANSPORT IS UTILISED FOR UNSKILLED WORKERS

Item	Component	Num Workers per Day	% Workers active during Peak Hour	Num Workers Active per Peak Hour	Num Trucks Per Day	% Trucks active during Peak Hour	Num Trucks active during Peak Hour	Assumed Ave. Num Persons per Veh	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations			
										If Inward Movement is relevant Value = 1	Num Veh Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Num Veh Trips for Outwards Direction	Total Num Veh Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Veh during Peak Hour	Trip Dist. %		Trip Generation	
																In	Out	In	Out
AM Peak Hour																			
1.	Skilled Construction Workers (Own transport)	70	100%	70				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	18	0	0	18	0,25	100%	0%	18	0
2.	Unskilled Construction Workers (Bus transport)	300	100%	300				50,0	Trips per Worker (50 Persons per bus). Bus drop off workers and leave empty.	1	6	1	6	12	0,04	50%	50%	6	6
3.	Heavy vehicles delivering construction materials (Once off events)				0	0%	0	0,0	Plant construction materials are envisaged to be delivered outside of the vehicle traffic peaks.	0	0	0	0	0	0,00	0%	0%	0	0
TOTAL														30				24	6
PM Peak Hour																			
1.	Skilled Construction Workers (Own transport)	70	100%	70				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	18	0	0	18	0,25	0%	100%	0	18
2.	Unskilled Construction Workers (Bus transport)	300	100%	300				50,0	Trips per Worker (50 Persons per bus). Bus drop off workers and leave empty.	1	6	1	6	12	0,04	50%	50%	6	6
3.	Heavy vehicles delivering construction materials (Once off events)				0	0%	0	0,0	Plant construction materials are envisaged to be delivered outside of the vehicle traffic peaks.	0	0	0	0	0	0,00	0%	0%	0	0
TOTAL														30				6	24

2.2.2 Vehicle trips anticipated to be generated due to the proposed plant expansion

The proposed plant will be designed to process 110 000 tonnes of concentrate per annum of which the current PPM operations would likely provide approximately 50% of this capacity, with the additional capacity coming from the proposed Sedibelo Platinum Mine when it's commissioned. Transportation of ore from the proposed Sedibelo Platinum Mine to the PPM plant is anticipated to be done via internal haul roads.

With the proposed plant expansion, it is important to take note that the 5 000 tonnes per month of platinum concentrate that is currently exported to third-party facilities for further processing will no longer be exported to an off-site facility and will instead be processed further on site.

It is anticipated that the following additional vehicle trips will be generated due to the operations of the proposed plant expansion:

- a) An additional total of 70 skilled workers will be employed and will work over three 8-hour shifts. Skilled workers generally make use of private transport and as a worst case scenario it is anticipated that approximately 6 vehicle trips inbound and 6 vehicle trips outbound would be generated during vehicle traffic peak times;
- b) An additional total of 70 unskilled workers will be employed and will work over three 8-hour shifts. Unskilled workers are envisaged to mostly make use of existing public transport to and from the mine. Should the existing public transport operations not have sufficient capacity available, as a worst case scenario it is anticipated that an additional 3 vehicle trips inbound and 3 vehicle trips outbound could be generated during the vehicle traffic peak times due to the proposed plant expansion;
- c) Transportation of coal to site of approximately 150 tonnes per week, resulting in approximately 5 vehicle trips inbound and 5 vehicle trips outbound per week (Assumed 1 vehicle trip inbound and 1 vehicle trip outbound during vehicle traffic peak times as a worst case scenario);
- d) 1 heavy vehicle transporting filter cake off site per week. As a worst case scenario resulting in 1 vehicle trip inbound and 1 vehicle trip outbound during vehicle traffic peak times;
- e) 1 heavy vehicle transporting PGM off site every two weeks. As a worst case scenario resulting in 1 vehicle trip inbound and 1 vehicle trip outbound during vehicle traffic peak times;
- f) Precious metals will be transported off-site with air transport; and
- g) The community brick making project would result in approximately 12 vehicle trips per week. As a worst case scenario resulting in 1 vehicle trip inbound and 1 vehicle trip outbound during vehicle traffic peak times.

The maximum vehicle trips anticipated to be generated due to the proposed plant expansion operational phase during the vehicle traffic peak times as a worst case scenario was therefore anticipated to be 26 vehicle trips (13 vehicle trips in and 13 vehicle trips out). **Table 2.4** provides a summary of the vehicle trips anticipated to be generated during the operational phase due to the proposed plant expansion as a worst case scenario.

TABLE 2.4: SUMMARY OF THE VEHICLE TRIPS ANTICIPATED TO BE GENERATED DURING THE OPERATIONAL PHASE (AM PEAK)

Item	Component	Num Workers per Day	% Workers active during Peak Hour	Num Workers Active per Peak Hour	Num Trucks Per Day	% Trucks active during Peak Hour	Num Trucks active during Peak Hour	Assumed Ave. Num Persons per Veh	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations							
										If Inward Movement is relevant Value = 1	Num Veh Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Num Veh Trips for Outwards Direction	Total Num Veh Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Veh during Peak Hour	Trip Dist. %		Trip Generation					
																In	Out	In	Out				
AM Peak Hour																							
1.	Skilled Mine Workers (Own transport)	70	33%	23,3331				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	6	1	6	12	0,50	50%	50%	6	6				
2.	Unskilled Mine Workers (Public transport)	70	33%	23,3331				10,0	Trips per Worker (10 Persons per taxi). One shift in, other shift out.	1	3	1	3	6	0,24	50%	50%	3	3				
3.	Heavy vehicles delivering coal to plant				1	100%	1	1,0	100% of delivery vehicles expected during peak periods as worst case scenario	1	1	1	1	2	2,00	50%	50%	1	1				
4.	Heavy vehicles exporting filter cake from site (1 truck per week)				1	100%	1	1,0	Planned 1 truck per week. 100% of delivery vehicles expected during peak periods as worst case scenario.	1	1	1	1	2	2,00	50%	50%	1	1				
5.	Heavy vehicles exporting concentrate from site (1 truck every 2 weeks)				1	100%	1	1,0	Planned 1 truck every 2 weeks. 100% of delivery vehicles expected during peak periods as worst case scenario.	1	1	1	1	2	2,00	50%	50%	1	1				
6.	Export of precious metals from site (Via Air Transport)				0	0%	0	0,0	Precious metals to be transported off site via air transport	0	0	0	0	0	0,00	0%	0%	0	0				
7.	Community brick making project (Heavy and light vehicles collecting bricks)				3	20%	1	1,0	Approximately 12 vehicles per week. 20% expected during peak periods as worst case scenario.	1	1	1	1	2	2,50	100%	100%	2	2				
TOTAL														26								13	13

TABLE 2.4: SUMMARY OF THE VEHICLE TRIPS ANTICIPATED TO BE GENERATED DURING THE OPERATIONAL PHASE (PM PEAK)

Item	Component	Num Workers per Day	% Workers active during Peak Hour	Num Workers Active per Peak Hour	Num Trucks Per Day	% Trucks active during Peak Hour	Num Trucks active during Peak Hour	Assumed Ave. Num Persons per Veh	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations				
										If Inward Movement is relevant Value = 1	Num Veh Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Num Veh Trips for Outwards Direction	Total Num Veh Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Veh during Peak Hour	Trip Dist. %		Trip Generation		
																In	Out	In	Out	
PM Peak Hour																				
1.	Skilled Mine Workers (Own transport)	70	33%	23,3331				4,0	Trips per Worker (4 Persons per Vehicle). One shift in, other shift out.	1	6	1	6	12	0,50	50%	50%	6	6	
2.	Unskilled Mine Workers (Public transport)	70	33%	23,3331				10,0	Trips per Worker (10 Persons per taxi). One shift in, other shift out.	1	3	1	3	6	0,24	50%	50%	3	3	
3.	Heavy vehicles delivering coal to plant				1	100%	1	1,0	100% of delivery vehicles expected during peak periods as worst case scenario	1	1	1	1	2	2,00	50%	50%	1	1	
4.	Heavy vehicles exporting filter cake from site (1 truck per week)				1	100%	1	1,0	Planned 1 truck per week. 100% of delivery vehicles expected during peak periods as worst case scenario.	1	1	1	1	2	2,00	50%	50%	1	1	
5.	Heavy vehicles exporting concentrate from site (1 truck every 2 weeks)				1	100%	1	1,0	Planned 1 truck every 2 weeks. 100% of delivery vehicles expected during peak periods as worst case scenario.	1	1	1	1	2	2,00	50%	50%	1	1	
6.	Export of precious metals from site (Via Air Transport)				0	0%	0	0,0	Precious metals to be transported off site via air transport	0	0	0	0	0	0,00	0%	0%	0	0	
7.	Community brick making project (Heavy and light vehicles collecting bricks)				3	20%	1	1,0	Approximately 12 vehicles per week. 20% expected during peak periods as worst case scenario.	1	1	1	1	2	2,50	100%	100%	2	2	
TOTAL														26					13	13

2.3 OTHER TRAFFIC RELATED MATTERS

Table 2.5 provides a summary of the following:

- a) Access related matters; and
- b) Road safety.

TABLE 2.5: SUMMARY OF OTHER TRAFFIC RELATED MATTERS

Item	Description of Element	General Comments	Specific Issues	Actions Required
1.	ACCESS RELATED MATTERS			
1.1	Access Points	a) The Pilanesberg Platinum Mine currently gains access to and from Road P50-1. b) No additional access points are deemed necessary.	a) None.	a) From a road safety point of view it is recommended that should the relevant sections of Road P50-1 be upgraded to paved road in future that dedicated right turn lanes be provided as part of the intersection layout.
2.	ROAD SAFETY ISSUES			
2.1	General Road Safety	The following are typical elements related to the road network, which cause road safety problems in rural areas and which need to be addressed on a continuous basis: a) Pedestrian movements (Road Crossings) b) Insufficient public transport facilities c) Lack of reflective studs for visibility during the night at strategic points d) Lack of pedestrian walkways to separate pedestrian and vehicle movements at strategic points e) Lack of provision and quality of road marks f) Lack of provision and quality of road signs g) Improper road safety training for workers as well as adjacent community /ies.	a) There are currently pedestrian movements at the existing PPM mine accesses within the vehicle movement areas (road surfaces) b) No pedestrian walkways are provided at the existing PPM mine accesses resulting in workers waiting within the road boundaries.	a) It is important for all existing and proposed mining developments to collaborate with the North West Department of Public Works and Roads to set up a road maintenance plan to maintain the relevant road network. b) It is recommended to provide pedestrian walkways along the access road.

FINDINGS AND RECOMMENDATIONS

Based on a site inspection of the existing road network adjacent to the existing mining development, traffic surveys, calculations and reference to the relevant traffic impact assessment guideline documents, the following findings and recommendations were made:

3.1 FINDINGS

The following are discussed in terms of the findings for the proposed plant expansion:

- a) Traffic impact during the respective phases with mitigation; and
- b) Site accessibility.

3.1.1 TRAFFIC IMPACT DURING THE RESPECTIVE PHASES WITH MITIGATION

a) Traffic Impact During The Construction Phase

Owing to the type, nature and location of the proposed plant expansion, it is expected that the vehicle trips anticipated to be generated during the construction phase will have a manageable impact on traffic. Recommendations made as part of **Section 3.2** should be considered in order to mitigate and minimize the potential impact of the anticipated vehicle trips to be generated during the construction phase.

b) Traffic Impact During The Operational Phase

Owing to the type, nature and location of the proposed plant expansion, it is expected that the vehicle trips anticipated to be generated during the operational phase will have an insignificant and manageable impact on traffic. Recommendations made as part of **Section 3.2** should be considered in order to mitigate and minimize the potential impact of the anticipated vehicle trips to be generated during the operational phase.

3.1.2 SITE ACCESSIBILITY

Access to the PPM Mine and the proposed plant expansion is from an existing access intersection on Road P50-1. The existing access point was evaluated in terms of available sight distances, safety and functionality and sufficient space for vehicles passing stationary vehicles waiting to make turning movements. No additional accesses are deemed necessary.

3.2 RECOMMENDATIONS

The following recommendations are made to mitigate and minimize the potential impact due to the anticipated vehicle trips to be generated by the proposed plant expansion:

- a) In order to minimize and mitigate the impact of anticipated vehicle trips to be generated due to the proposed plant expansion during the construction phase, the following is recommended:
 - i. Consider the provision of bus transport for the transportation of unskilled construction workers in order to reduce the number of vehicle trips anticipated to be generated during to the construction phase;
 - ii. Consider planning for construction workers shift starting and ending times to be different from that of the existing mining operations; and
 - iii. Schedule delivery of heavy loads which includes plant construction materials and components at times other than the background traffic peak periods.
- b) Pedestrian walkways should be provided along the mine access road to ensure a split between vehicular and pedestrian movements and to ensure a safe environment for pedestrians; and
- c) From a road safety point of view it is recommended that, should the relevant sections of Road P50-1 be upgraded to paved road in future, dedicated right turn lanes should be provided as part of the intersection layout at all existing access intersection to the PPM mine to ensure that traffic flow of the main road is not blocked by vehicles waiting to turn right.

To conclude based on the findings and recommendations of this traffic investigation, Siyazi see no reason for the proposed projects not to go ahead from a traffic engineering point of view.

Suid-Afrikaanse Raad vir Ingenieurswese



Hiermee word
gesertifiseer
dat

Leon Roets

geregistreer is as

Professionele Ingenieur

kragtens die Wet op die Ingenieurswese-professie van Suid-Afrika
1990 (Wet 114 van 1990)

Datum *14 November 1996*

Registrasienuommer *960547*

President

Registrateur



ENGINEERING COUNCIL OF SOUTH AFRICA

Registration No.: 960547
 Enquiries: Queen Nyembezi
 Tel: (011) 607-9500
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 E-Mail: queen@ecsa.co.za



28 November 2016

Mr L Roets Pr Eng
 P O Box 11182
 BENDOR PARK
 0699

Dear Mr Roets

**RENEWAL OF PROFESSIONAL REGISTRATION IN TERMS OF SECTION 22(1) OF THE
 ENGINEERING PROFESSION ACT, 2000 (ACT 46 OF 2000)**

Please be informed that your application for the renewal of your professional registration, in terms of Section 22(1) of the Engineering Profession Act, 2000 (Act 46 of 2000), has been successful and your registration has been renewed for a further period of five (5) years until 14 November 2021.

Congratulations, on the continued recognition of your status as a Professional Engineer.

Yours faithfully

A handwritten signature in black ink that reads 'Joel Matshela Mmapulane'.

Joel Matshela Mmapulane
 Manager: Education, Accreditation and CPD





Die Suid-Afrikaanse Instituut van Siviele Ingenieurswese

Hiermee word gesertifiseer dat

Leon Koets

behoorlik verkies is as

Lid

Lidnommer: 206744

van

Die Suid-Afrikaanse
Instituut van Siviele Ingenieurswese
op

29 September 2006

Uitgereik onder die seël van die Instituut
Onder resoluëie van die Raad

President

Uitvoerende Direkteur





SOUTH AFRICAN ROAD FEDERATION

This is to certify that

Leon Roets

ID No: 6510145135085

Has successfully attended a 5 day course on

ROAD SAFETY AUDITS

CPD VALIDATION NUMBER: SARF 14/0003/17 (5 CREDITS)

SARF

better roads

Stefan Lotter
Presenter

Innocent Jumo
SARF President

13TH JULY – 17TH JULY 2015
GAUTENG – SANRAL – NORTHERN REGION

TRANSPORT & TRAFFIC ENGINEER CV

PERSONAL PARTICULARS

Name and Surname: Leon Roets
 Identity Number: 6510145135085
 Nationality: South African
 Prof. Registration: 960547 - Professional Engineer



ACADEMIC QUALIFICATIONS

B Eng. (Civil Eng.) University of Pretoria, 1988

PROFESSIONAL MEMBERSHIP

Engineering Council of South Africa (ECSA)

EMPLOYMENT RECORD

01/2002 – Current: Traffic Engineer Technical Director to SIYAZI Group of Companies
 01/2002 – Current: Office Manager for SIYAZI Limpopo (Pty) Ltd
 01/2002 – Current: Director and shareholder, SIYAZI Holdings (Pty) Ltd, SIYAZI Limpopo, SIYAZI-Thula, SIYAZI Gauteng and SIYAZI Free State
 07/1996 – 12/2003: Office Manager for all SIYAZI activities in the Limpopo Province
 07/1996 – 12/2003: Director and shareholder, SIYAZI Transportation & Services CC
 11/1994 – 06/1996: Representative of Africon Consulting Engineers Inc., Transportation Planning Division in the then Northern Province, based in Polokwane
 08/1992 - 10/1994: Africon Consulting Engineers Inc., Transport Planning Division in Pretoria
 06/1990 - 08/1992: Lexetran, Transport Planning Division of the then Van Wyk & Louw Group

Mr Roets has a total of 24 years experience. He is a Transport and Traffic Engineer with wide experience in transportation planning and modelling, data processing as well as Traffic Impact Studies.

MR ROETS COMPLETED A CONSIDERABLE NUMBER OF TRAFFIC IMPACT STUDIES FOR ALL TYPES OF DEVELOPMENTS, WHICH VARIES FROM BASIC RESIDENTIAL DEVELOPMENTS TO MAJOR SHOPPING CENTRE DEVELOPMENTS. THE FOLLOWING PROVIDES A SUMMARY OF SOME OF THE PROJECTS SPECIFICALLY RELATED TO MINE ACTIVITY:

Project	Client
Siyazi Transport & Technical and Liaison Assistance for Tripartite Forum (Twickenham)	Rustenburg Platinum Mine Limited- Mogalakwena Section
Mogalakwena Section Mine - Road Safety	Anglo American
Existing Aquarius Platinum Mine (Rustenburg) Transport Route Investigation (Proposed ROM Ore Transport by Road from K6 and Kwezi Shafts to AQPSA Kroondal Smelter)	SLR Consulting Engineers (Metago)
Twickenham Platinum Mines Integrated Transport Management Plan	WorleyParsons
7-day Electronic Counts for Two Rivers Platinum Mines	Two Rivers Platinum Mine
Proposed Scheiding Chrome Mine, Limpopo Province	Prime Resources (Pty) Ltd
Traffic Impact Assessment for Fumani Gold Mine	Ages (Pty) Ltd
Proposed CSP and PV Solar Power Plants near Jacobsdal, Free State	SLR Consulting Engineers
Proposed Siyanda Chrome Smelter, Northam, Limpopo	SLR Consulting Engineers
Traffic assessment for AQPSA, Rustenburg	SLR Consulting Engineers
Existing PPM mine near Pilanesberg, North West Province expansion	SLR Consulting Engineers
Proposed Musonoi Mine Situated near the Town of Kolwezi, Democratic Republic of Congo: Traffic Impact Assessment	Metago Environmental Engineers (PTY) ltd
Botswana Traffic Impact Assessment	SLR Consulting Engineers (Metago)
Proposed division of Road P50-1 near Pilanesberg	SLR Consulting Engineers (Metago)
Development of The Eastern Limb Mining Land Transport Strategy (ELM-LTS)	Steelpoort Valley Producers Forum
Proposed Kotulo Tsatsi Solar Park near Kenhardt, Northern Cape	Savannah Environmental (Pty) Ltd
Proposed Leeuw Mining Coral Mine: Utrecht KZN	SLR Consulting Engineers (Metago)
Proposed Moonlight Iron Ore Mining Development situated in the Waterberg District of the Limpopo Province: Traffic Impact Assessment	SLR Consulting Engineers (Metago)

Project	Client
Proposed Upgrading Kinsenda Copper Mine, Situated near the town of Likasi, in the DRC	SLR Consulting Engineers (Metago)
Traffic Impact Assessment for Intersection between Windhoek and Swakopmund	Metago Environmental Engineers (Pty) Ltd
Traffic Impact Assessment: Proposed Hawerklip Railway Station Situated on the Farm Matjisgoedkuil 266-IR Near Delmas	Metago Environmental Engineers (Pty) Ltd
Road Safety Project for Road R555	Steelpoort Producers Forum
Road Safety Project for Road R37, between Olifantsrivier and Burgersfort	Steelpoort Producers Forum
Kameni Product Transport Feasibility Study	Kameni
Proposed New PGM Mine Situated on the Farms Kalkfontein and Buffelshoek in the Steelpoort Area	Metago Environmental Engineers (Pty) Ltd
Proposed New Manganese Mining Operation, NCMC: Traffic Impact Assessment, Kuruman	Metago Environmental Engineers (Pty) Ltd
Project Management Road N11, Road Safety Project	Economic Sector Forum
Twickenham Public Transport System	Twickenham Platinum Mine
Road Master Plan for Mines in the Sekhukhune District	Steelpoort Producers Forum
Traffic Related Input for Realignment of Road N11	Economic Sector Forum in conjunction with SANRAL
Access to the Polokwane Smelter (Road R37)	Economic Sector Forum
Greenfield Expansion Project, Traffic Impact Assessment for Lwala Smelter	Semancor
Road R37 upgrade in Burgersfort for SANRAL	Steelpoort Producers Forum
Road Master Plan for Burgersfort	Steelpoort Producers Forum
Application to upgrade the existing Access Road D4170 to Road R37 (Modikwa Platinum Mine)	Steelpoort Producers Forum
New concentrator and smelter complex at Hercul's Bokfontein Chrome Mine on the farm Bokfontein 448 JQ near Brits in North West Province	Metago Environmental Engineers (Pty) Ltd
Proposed Development of a Manganese Mining Operation	Metago Environmental Engineers (Pty) Ltd
R555/Tweefontein Road Safety Project (Xtrata)	Xstrata Alloys Lion Ferrochrome
Traffic Related Input for Road R555	Steelpoort Producers Forum
Proposed Manganese Mining Operation On Portion 1 Of The Farm Lehating 741 Near Hotazel, Northern Cape Province	SLR Consulting Engineers (Metago)
Proposed Mokala Manganese Mine Situated Near Hotazel, Northern Cape Province	SLR Consulting Engineers (Metago)
Background Information on the Environmental Assessment for the proposed expansion of Eland Platinum Mine	Metago Environmental Engineers (Pty) Ltd
Development of an opencast and underground coal mining operation – Keaton Mine	Metago Environmental Engineers (Pty) Ltd
Mogalakwena Economic Sector, Transport related input for Mogalakwena Economic Sector	Economic Sector Forum
Traffic Counts Road R37	Steelpoort Producers Forum
Planning of multi modal facility for Burgersfort	Steelpoort Producers Forum
Provide input into traffic safety along Road R37	Steelpoort Producers Forum
Input into the transport of workers (Dilokong corridor)	Steelpoort Producers Forum
Strategy for Travel Demand Management for the Greater Tubatse Municipality and modelling for the R37 road	Steelpoort Producers Forum
Strategy to transport workers at the Modikwa Shaft	Modikwa Mine

SOME OF MR ROETS' OTHER TRAFFIC AND TRANSPORT ENGINEERING EXPERTISE AND EXPERIENCE INCLUDE THE FOLLOWING:

a) Shopping Centres that Range from 2 000 m² to 60 000 m²

b) Various Filling Station Developments

c) Integrated Transport Plans for Various Local and District Municipalities

- Vhembe
- Ba-Phalaborwa
- Polokwane
- Sekhukhune
- Thulamela
- Limpopo
- Mogalakwena

d) Public Transport Plans for Various Local and District Municipalities

- Mopani
- Vhembe
- Tubatse
- Capricorn

e) Design and Layout of Traffic Light System

f) Residential Development that vary from 100 to 12 000 stands

In conclusion the following are relevant:

The above-mentioned successful projects are a clear indication that Mr Roets is fully committed to sustainable development, and believes strongly in the following principles:

- a) Providing safe, secure and reliable traffic-related facilities
- b) Maintaining a balance between traffic engineering and the potential to create job opportunities. In other words, doing everything possible to take certain measures that would ensure the functionality of the proposed developments
- c) Acting as a link between the developer and the relevant authority to ensure that development takes place successfully
- d) Using his knowledge of local circumstances and conditions to the benefit of the local community, in order to stimulate job creation
- e) Using his expertise, experience and qualifications to best effect in the belief that these should serve as a catalyst for job creation as far as is practically possible.

Leon Roets has the distinct advantage of possessing profound knowledge of transport and traffic issues of engineering. This in-depth knowledge in various fields, combined with the extensive knowledge that Siyazi has gained and also his record of successful co-operation with transport-related role players, his knowledge of the road network and the transport environment, probably makes Leon Roets one of the best candidates to provide traffic-related input for this project.

