APPENDIX R: TRAFFIC STUDY

MEMORANDUM

TRAFFIC IMPACT ASSESSMENT

PROPOSED JINDAL MELMOTH IRON ORE PROJECT NEAR MELMOTH, KWAZULU-NATAL PROVINCE

MARCH 2023

Prepared for:
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DOCUMENT INFORMATION

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1	August 2022	Traffic Impact Assessment	LR
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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
TIA	Traffic Impact assessment
RoM	Run-of-Mine
MRA	Mineral Rights Area
LoS	Levels of Service
ESIA	Environmental and Social Impact Assessment
mtpa	Million tonnes per annum

This report was prepared, taking into account the requirements of Appendix 6 as set out in the NEMA Regulations (2014) as amended in 2017.

NEMA Regulations (2014) (as amended) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Refer to page Vi 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 V
An indication of the scope of, and the purpose for which, the report was prepared	Section 1, Page 1
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 specifically 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	Section 2.4
An identification of any areas to be avoided, including buffers	Section 2.4
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;	Section 2.4
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2.1.1
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Section 3
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	Section 3
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	To be conducted
Any other information requested by the competent authority.	Not relevant

Requirements applied as part of this study when undertaking an Initial Site Sensitivity Verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified.

Requirements for initial site sensitivity verification	**Comment**
The Initial Site Sensitivity Verification must be undertaken by an environmental assessment practitioner or a registered specialist with expertise in the relevant environmental theme being considered.	Refer to verification page (Page Vi) for specialist details.
The Initial Site Sensitivity Verification must be undertaken through the use of:	
A desk top analysis, using satellite imagery.	Refer to section 2.4 of the report.
A preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity	Refer to section 2.4 of the report.

Declaration of Independence

I, Leon Roets, hereby declare that Siyazi Thula Transportation Planning (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:

Date: 07 March 2023

VERIFICATION PAGE

PROJECT NAME:	TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED JINDAL MELMOTH IRON ORE PROJECT NEAR MELMOTH, KWAZULU-NATAL PROVINCE	
Project No:	**Date:**	**Report Status:**
20015	March 2023	Final F2-2ed
Prepared by:		**Commissioned by:**
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Author: Paul van der Westhuizen **Contact information:** Cell: +27 79 690 8069 Email: paul@siyazi.co.za		**Report reviewed by and compiled under the supervision of:** Leon Roets (Pr Eng) Professional Number: 960547 **Contact information:** Cell: +27 82 371 0253 Email: leon@siyazi.co.za

Declaration by registered professional:

The undersigned has been appointed as the registered professional for this Traffic Impact Assessment and has applied due diligence to the content of this report and endeavoured to ensure that the TIA is free of technical errors and takes full responsibility for its contents.

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Qualifications:	B Eng (Civil Eng.)
ECSA Registration Number:	960547 (See Appendix G)
Signature:	

BASIS OF REPORT

This document has been prepared by Siyazi Thula Consulting Services (Pty) Ltd. with reasonable skill, care, and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Jindal Iron Ore (Pty) Ltd. (the Client), as part or all the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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EXECUTIVE SUMMARY

Siyazi Thula Transportation Planning (Pty) Ltd. was appointed by SLR Consulting (South Africa) (Pty) Ltd. to conduct a Traffic Impact Assessment (TIA) for the proposed Southern Block portion of the proposed Jindal Melmoth Iron Ore Project (Jindal MIOP).

Jindal Iron Ore (Pty) Ltd. ('Jindal'), a subsidiary of the multinational Indian conglomerate Indian Steel and Power Limited (JSPL), is proposing the development of an open cast iron ore mine on a site located 25 km southeast of Melmoth, within the Mthonjaneni Local Municipality and the King Cetshwayo District Municipality in the KwaZulu-Natal Province. Jindal held two prospecting rights over an area with an extent of up to 20 170 ha which expired on 17 and 24 February 2022.

Jindal's intent is to consolidate the Prospecting Rights for the North and South Blocks into a single Mining Right. However, development of the mine and mining infrastructure would be undertaken in a phased approach with mining and a processing plant currently only proposed to be undertaken in the south-eastern section of the South Block, where the iron ore resource has been defined through previous prospecting. Infrastructure would be developed to support this mining operation. The Mining Right Application (MRA) and Environmental and Social Impact Assessment (ESIA) will consider the entire extent of the MRA area, but with a specific focus on Phase 1 (South Block) of the Melmoth Iron Ore Project (Jindal MIOP).

In order to determine the status quo of the existing adjacent road network and intersections in terms of vehicle traffic volumes and road safety, data was collected as part of a Baseline Assessment which included the North and South Blocks. The data was collected by means of manual vehicle traffic counts at potentially affected intersections as well as a visual inspection of the existing relevant road network and potentially affected intersections by means of a site visit which was done on Friday 09 April 2021.

Ultimately all the gathered information as mentioned above, and data for the South Block presented in this report, was evaluated from a traffic engineering point of view to determine or identify potential mitigating measures that could possibly be required to mitigate the potential impact on the adjacent road network and intersections due to vehicle traffic that might be generated as part of the Jindal MIOP activities.

In terms of the representation of the data collected as part of the Baseline Assessment, it is important to take note that investigations as part of this study focus on the South Block only. In order to ensure ease of reference between this report and the Baseline Assessment, Numbering of intersections were kept as per the Baseline Assessment. Points A and B, intersections relevant to the North Block along Road P47-4 (R66), were not included as part of this report.

The purpose of this study was to undertake an assessment of the potential vehicle traffic volumes that could be generated by the Jindal MIOP, and:

a) The traffic impact that the change in land use would have on the road and transport-related infrastructure.
b) Whether it is possible to accommodate the Jindal MIOP within acceptable norms from a traffic engineering point of view.
c) The mitigating measures required to accommodate the Jindal MIOP within acceptable traffic engineering norms.

The following findings came from the study conducted:

a) Levels of Service at intersections under investigation.

Current Levels of Service at intersections under investigation was found to be acceptable and was determined to remain acceptable for all scenarios investigated with the Jindal MIOP, and no mitigating measures are required from an intersection performance perspective. Improvements are recommended from a road safety perspective.

b) Vehicle Trips anticipated to be generated by the Jindal MIOP and capacity of existing road network to accommodate the anticipated vehicle trips to be generated by the .

Anticipated vehicle trips were determined by means of trip generation calculations for relevant proposed phases for the proposed mining activities and were concluded as illustrated below.

<u>Anticipated Vehicle Trips: Construction Phase:</u>
AM Peak: 52 trips in, 27 trips out.
PM Peak: 27 trips in, 52 trips out.

<u>Anticipated Vehicle Trips: Operational Phase – 5 years from Base year:</u>
AM Peak: 84 trips in, 75 trips out.
PM Peak: 75 trips in, 84 trips out.

<u>Anticipated Vehicle Trips: Operational Phase 10 Years from Base year:</u>
AM Peak: 124 trips in, 81 trips out.
PM Peak: 81 trips in, 124 trips out.

It could be concluded that the existing road network has vehicle capacity available to accommodate the anticipated number of vehicle trips proposed to be generated by the Jindal MIOP.

c) Potential Axel Loads (E80s) due to the Jindal MIOP

High-level calculations were conducted to determine the anticipated axel loads (E80s) on Road PROW15 due to the transportation of mined product between the plant and the Nkwalini Railway Siding due to the Jindal MIOP. Further input based on the above calculations with regard to road pavement layers and requirements would be required by a pavement design specialist.

d) Sensitivity of road sections and intersections from a traffic engineering perspective.

It was found that:

i. In terms of existing conditions (without the Jindal MIOP), most of the existing road network and intersections under investigations (apart from **Point D**) is considered to have a low sensitivity from a traffic engineering perspective.

ii. In terms of existing conditions (without the Jindal MIOP), the intersection of Road R66, Shop Access and Road PROW314 (**Point D**) is considered to have a medium sensitivity from a traffic engineering perspective, due to the retail activities at this intersection which create vehicular traffic and pedestrian movements (Potential vehicle/pedestrian conflict). Implementing

road safety mitigating measures, which include traffic calming and pedestrian crossings/walkways regardless of the Jindal MIOP, would reduce the sensitivity to low.

iii. In terms of anticipated future conditions with the Jindal MIOP, most of the existing road network and intersections would still be considered to have a low sensitivity from a traffic engineering perspective, apart from the following mentioned in points (iv) and (v).

iv. A change in sensitivity for sections of Road D395 and Road L745 are envisaged due to potential heavy vehicle movement as part of the Jindal MIOP, as these road sections contain residential areas along the road sections, and therefore these road sections would be considered to have a medium sensitivity from a traffic safety perspective. Road safety awareness campaigns and training are recommended for mine workers and communities, although the sensitivity would remain ongoing as long as mine activities contribute vehicular traffic along these road sections.

v. From a road safety perspective, a change in sensitivity for the intersection of Road R66 and Road PROW15 (**Point F**) is envisaged due to potential heavy vehicle movement as part of the Jindal MIOP (right-turn movements by heavy vehicles), and due to the lack of a dedicated right-turn lane on the northern approach of Road R66. Implementing a right-turn lane along Road R66 on the northern approach at Point F is envisaged to reduce the sensitivity of the relevant intersection to a low sensitivity.

e) Mine infrastructure proposed to be located over sections of Road D395.

Access to and from the Jindal MIOP infrastructure is proposed to be gained directly from Road D395 which is classified as a U4b road. Road D395 currently traverse through the proposed site of the Jindal MIOP where mining infrastructure is proposed and would need to be diverted to accommodate the Jindal MIOP infrastructure.

f) Proposed access route to the Jindal MIOP from Road P47-7 (R66).

As part of access from and to the Jindal MIOP, a more direct access route is proposed which would ultimately link up with the existing intersection of Road P47-7 (R66) and Road PROW15 (**Point F**). No dedicated right-turn lane exists at **Point F** which results in a road safety risk and **Point F** might need to be repositioned to the south to accommodate a right-turn lane due to limited space between **Point F** and the river crossing approximately 30 metres to the north.

The proposed access route would need more detailed investigation as part of the detailed design phase which should include consultation with roads authorities and the local community. The proposed access

route would also be utilised by heavy vehicles transporting processed product from the Jindal MIOP to the Nkwalini railway siding for loading onto trains. Access to the Nkwalini railway siding is currently at **Point E**.

The proposed access route is regarded as acceptable from a traffic engineering point of view. Final requirements and approval should be obtained as part of the detailed design phase.

g)	Non-motorised transport: Pedestrian movement	Pedestrian activity was observed during the relevant site visit at the intersections under investigation, dominantly at **Point D** where retail activities are present, and loading and off-loading of public transport occurs. Potential for vehicle/pedestrian conflict where no non-motorised facilities like pedestrian crossings exist.
h)	Non-motorised transport: Public Transport	Public transport within the South Block is limited, while public transport is available along Road P47-7 (R66).

Based on the relevant information gathered, assessments, and analyses done as part of the TIA for Jindal MIOP, the following recommendations are made:

Recommendations outside the proposed Jindal MIOP

a) Road safety mitigating measures at **Point D,** which includes pedestrian crossings/ walkways, should be implemented.

Recommendations with (due to) the proposed Jindal MIOP

a) If not implemented without the Jindal MIOP, and regardless of the Jindal MIOP, road safety mitigating measures at **Point D** (as above) should be implemented by the local authority.
b) The following is recommended at the intersection of Roads P47-4 (R66) and PROW 15 (**Point F**):

    i) Recommended to provide a dedicated right-turn lane on the northern approach of Road R66.
    ii) Provision of dedicated right-turn lane would require relocating the existing intersection to the south in order to accommodate the right-turn lane, due to an existing bridge to the north.
    iii) Recommended to provide a dedicated left-turn lane on the southern approach of Road R66 and western approach of Road PROW15.

c) Regardless of the Jindal MIOP, road safety mitigating measures at **Point D,** which includes pedestrian crossings/ walkways, should be implemented.
d) Public transport loading and off-loading bays should be identified and assessed as part of the detail design phase in order to minimise conflict between heavy vehicles and public transport.

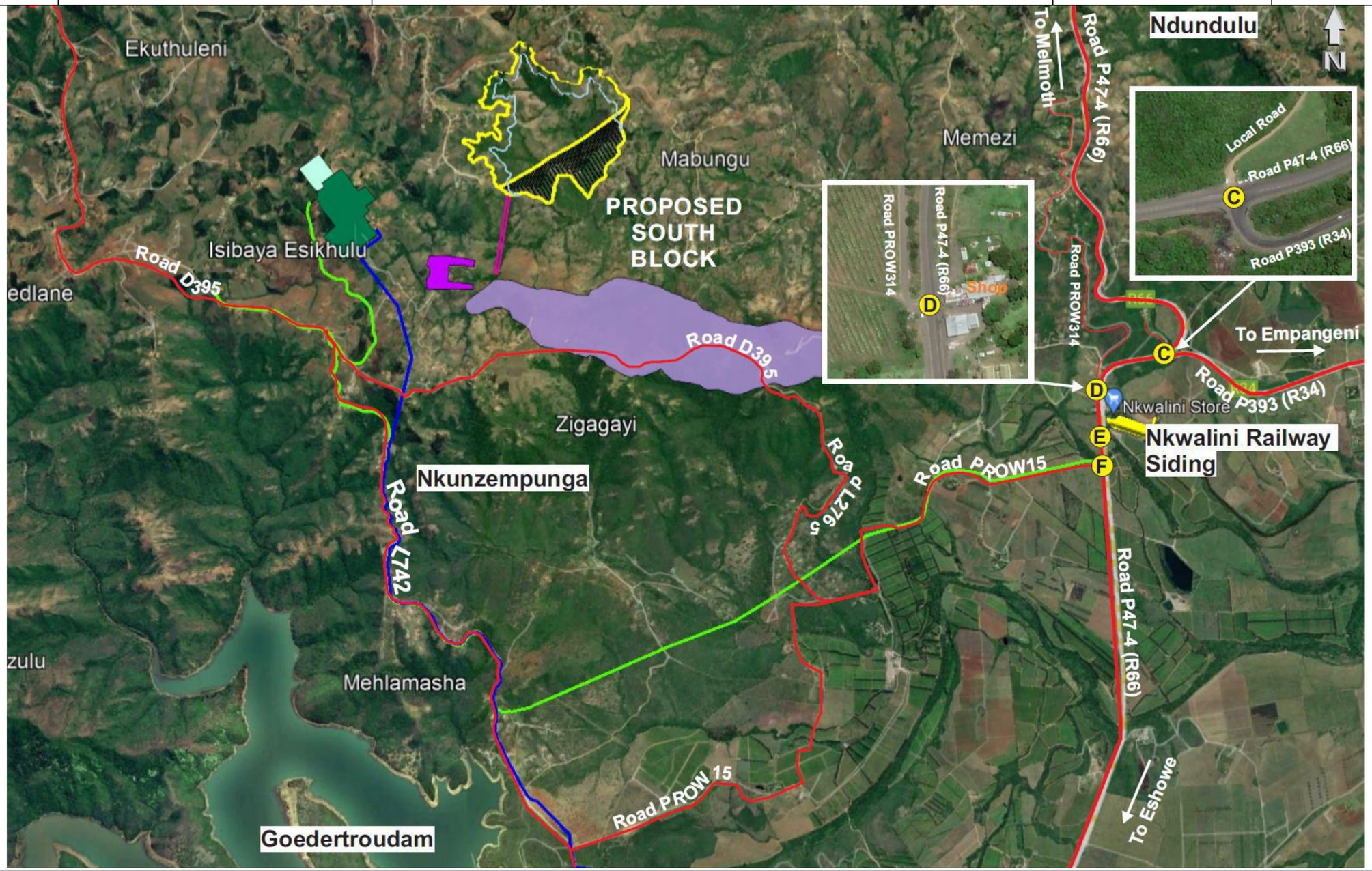
e) Access to and from the Jindal MIOP infrastructure from Road D395 would require further investigation as part of the detailed design phase in terms of re-routing or diverting the relevant section of Road D395.
f) The proposed access route to the Jindal MIOP would need more detailed investigation as part of the detailed design phase, which should include consultation with roads authorities and the local community.
g) Due to limited public transport available within the area where the Jindal MIOP site is proposed to be located, might result in a shortage of public transport available for workers to and from the Jindal MIOP, Contracted transport to strategic points where public transport is readily available is therefore recommended. Existing operators within the area should be approached in order to build capacity and support local empowerment.
h) On-site circulation which includes parking, access gate, security and operations, with specific reference to heavy vehicles, should be further addressed as part of the detail design phase.
i) Due to heavy vehicles proposed to transport processed product between the proposed plant and railway siding, and the anticipated slow movement of heavy vehicles on public roads, it is recommended that investigations should be conducted as part of the detail design phase in terms of the potential requirement of climbing/ passing lanes.
j) Detailed investigations should be conducted in conjunction with the relevant road authority in terms of the existing quality and potential life span of the existing road surface layers of the roads where consumables, processed product and workers will be transported.
k) A road maintenance plan should be prepared in conjunction with the relevant road authority on public roads where trucks will operate as soon as the project has been approved to ensure that the consumables, processed product and workers can be transported at all times.

In conclusion, Siyazi Thula Transportation Planning (Pty) Ltd is of the opinion that the Jindal MIOP would have a manageable impact on the relevant roads network during all phases as long as:

a) the mitigating measures are implemented as recommended as part of **Section 3** of this report.
b) Run-of-mine (ROM) ore is transported within mine site boundaries (not making use of public roads)
c) The processed product is exported to the Nkawlini Railway Siding by road and further transported by rail.

The Jindal MIOP is therefore recommended to be granted authorisation.

POINT	INTERSECTION STATUS	INTERSECTION	GPS CO-ORDINATES	
			LATITUDE	LATITUDE
C	Existing	Roads P47-4 (R66), P393 (R34) and Local Road	S 28°43'16.69"	E 31°31'49.41"
D	Existing	Roads P47-4 (R66), PROW314 and Shop Access	S 28°43'31.08"	E 31°31'27.47"
E	Existing	Road P47-4 (R66) and Nkwalini Railway Siding Access Road	S 28°43'40.54"	E 31°31'28.52"
F	Existing	Roads P47-4 (R66) and PROW15	S 28°43'51.50"	E 31°31'29.65"



GRAPHICAL PRESENTATION OF THE BROADER LOCALITY OF THE AREA WHERE THE JINDAL MIOP IS PROPOSED AND THE RELEVANT INTERSECTIONS UNDER INVESTIGATION

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Section 1

1. INTRODUCTION

Siyazi Thula Transportation Planning (Pty) Ltd. was appointed by SLR Consulting (South Africa) (Pty) Ltd (SLR) to conduct a Traffic Impact Assessment (TIA) for the proposed South Block portion of the proposed Jindal Melmoth Iron Ore Project (Jindal MIOP).

Jindal Iron Ore (Pty) Ltd (Jindal), a subsidiary of the multinational Indian Conglomerate Indian Steel and Power Limited (JSPL) is proposing the development of an open cast iron ore mine on a site located 25 km southeast of Melmoth, within the Mthonjaneni Local Municipality and the King Cetshwayo District Municipality in the KwaZulu-Natal Province. Jindal held two prospecting rights over an area with an extent of up to 20 170 ha which has expired on 17 and 24 February 2022. The Mining Right Application (MRA) for the North and South Blocks was accepted by the Kwazulu-Natal Department of Mineral Resources and Energy on 24 May 2022.

The activities as part of the Jindal MIOP will include:

a) The development of open pit iron ore operations.
b) Primary crusher.
c) Waste rock dump.
d) Processing plant.
e) Incoming power yard.
f) Tailing storage facility (TSF) and associated infrastructure (part of a separate Environmental Authorisation process).

Jindal's intent is to consolidate the Prospecting Rights for the North and South Blocks into a single Mining Right. However, development of the mine and mining infrastructure would be undertaken in a phased approach with mining currently only proposed to be undertaken in the south-eastern section of the South Block, where the iron ore resource has been defined through previous prospecting. Infrastructure would be developed to support this mining operation. The MRA and Environmental and Social Impact Assessment (ESIA) will consider the entire extent of the MRA area, but with a specific focus on Phase 1 (South Block) of the Jindal MIOP.

Figure 1.1 provides a graphical presentation of the Jindal MIOP site layout, as provided by SLR.

The following off-site vehicle traffic related activities are anticipated due to the proposed Jindal MIOP:

a) Transport of processed product from the proposed processing plant to be located at the South Block via public roads to the existing Nkwalini Railway Siding where the processed product would then be transported further by rail (rail transport not considered as part of this Environmental Authorisation).
b) Delivery of consumables and mining components.
c) Transport of workers to and from the Jindal MIOP via bus, taxi, or private transport.

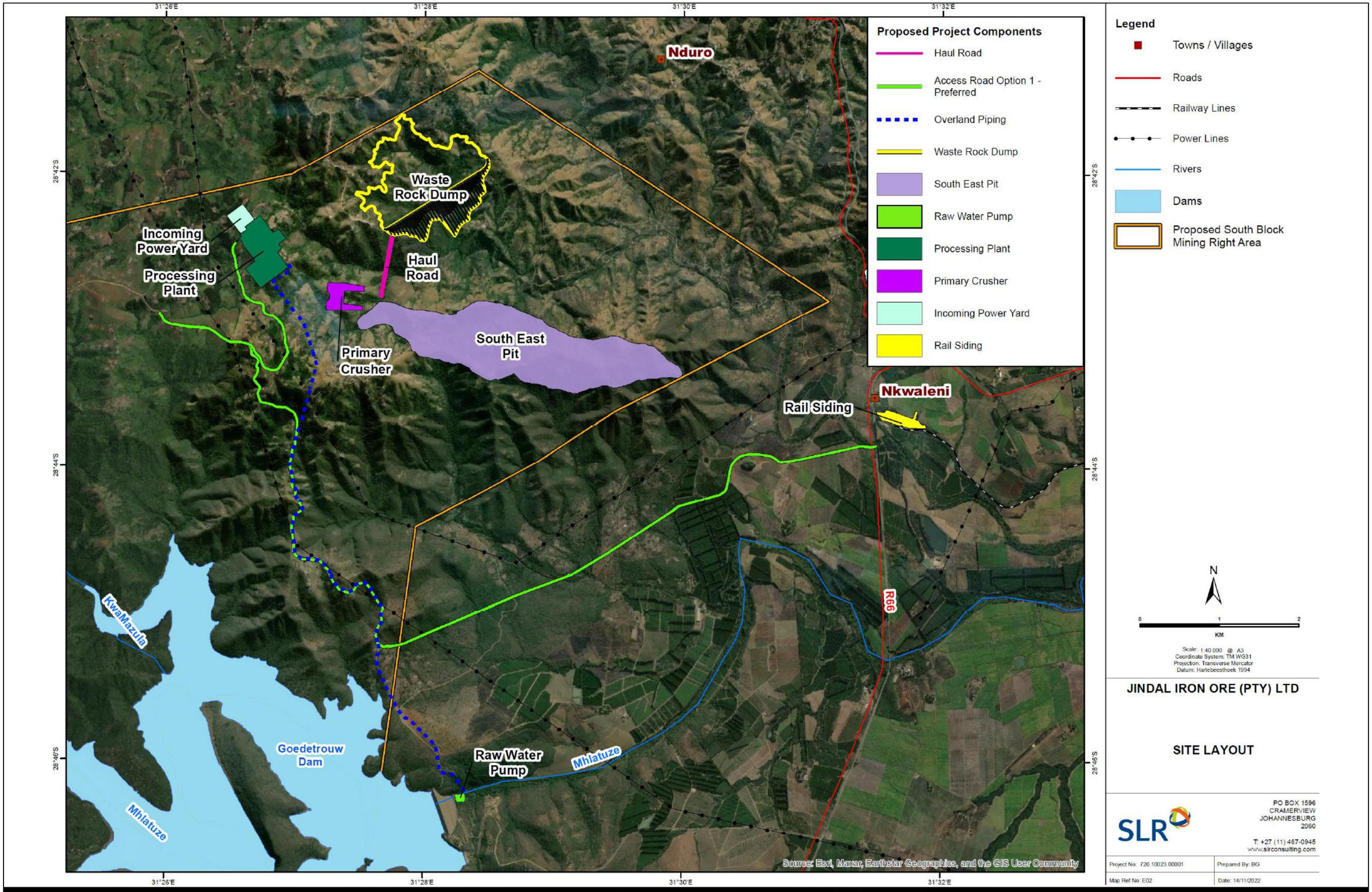

FIGURE 1.1: GRAPHICAL PRESENTATION OF THE JINDAL MIOP SITE LAYOUT

In order to determine the status quo of the existing adjacent road network and intersections in terms of vehicle traffic volumes and road safety, data was collected as part of a Baseline Assessment which included the North and South Blocks. The data was collected by means of manual vehicle traffic counts at potentially affected intersections as well as a visual inspection of the existing relevant road network and potentially affected intersections by means of a site visit which was done on Friday 09 April 2021.

Ultimately all the gathered information as mentioned above, and data for the South Block presented in this report, was evaluated from a traffic engineering point of view to determine or identify potential mitigating measures that could possibly be required to mitigate the potential impact on the adjacent road network and intersections due to vehicle traffic that might be generated as part of the Jindal MIOP activities.

In terms of the representation of the data collected as part of the Baseline Assessment, it is important to take note that investigations as part of this study focus on the South Block only. In order to ensure ease of reference between this report and the Baseline Assessment, numbering of intersections was kept as per the Baseline Assessment. Points A and B, intersections relevant to the North Block along Road P47-4 (R66), were not included as part of this report.

The purpose of this study is to undertake an assessment of the potential vehicle traffic volumes that could be generated by the Jindal MIOP, and:

a) The traffic impact that the change in land use would have on the road and transport-related infrastructure.
b) Whether it is possible to accommodate the Jindal MIOP within acceptable norms from a traffic engineering point of view.
c) The mitigating measures required to accommodate the Jindal MIOP within acceptable traffic engineering norms.

Figure 1.2 provides a graphical presentation of the broader locality of the area where the Jindal MIOP is proposed, and the relevant intersections investigated as part of this investigation.

Table 1.1 provides a summary of information of the Jindal MIOP activities. It is important to take note that the anticipated timeline, as depicted by the last-mentioned table, provides an estimated timeline in terms of months and/or years that is planned for and does not depict the exact month and/or year that implementation and operations would take place.

POINT	INTERSECTION STATUS	INTERSECTION	GPS CO-ORDINATES	
			LATITUDE	LATITUDE
C	Existing	Roads P47-4 (R66), P393 (R34) and Local Road	S 28°43'16.69"	E 31°31'49.41"
D	Existing	Roads P47-4 (R66), PROW314 and Shop Access	S 28°43'31.08"	E 31°31'27.47"
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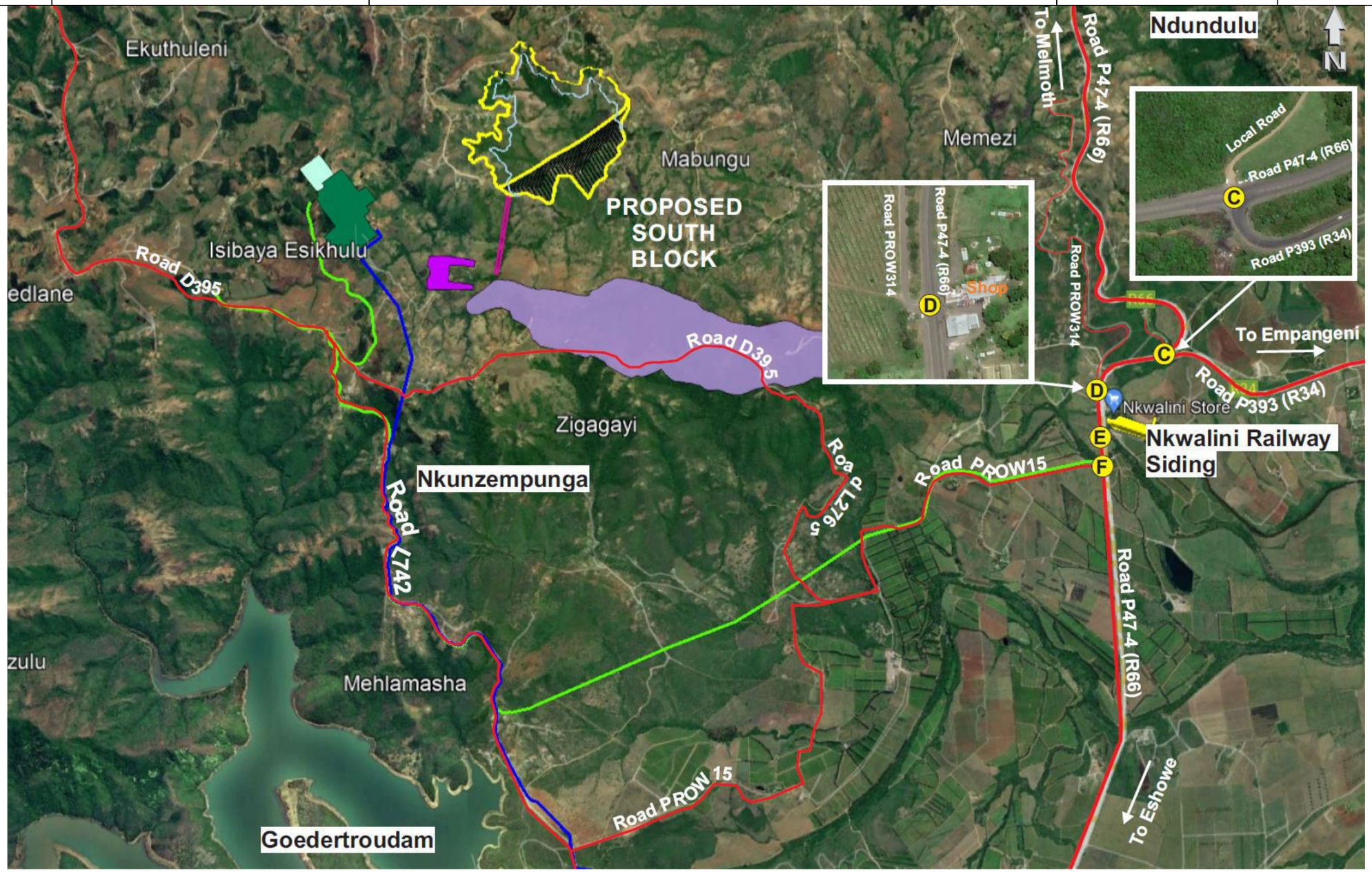


FIGURE 1.2: GRAPHICAL PRESENTATION OF THE BROADER LOCALITY OF THE AREA WHERE THE JINDAL MIOP IS PROPOSED AND THE RELEVANT INTERSECTIONS UNDER INVESTIGATION

TABLE 1.1: SUMMARY OF THE EXTENT OF THE JINDAL MIOP FOR THE RESPECTIVE PHASES					
DESCRIPTION		**PHASE**			
		CONSTRUCTION	**OPERATIONAL**	**DECOMMISSIONING**	**CLOSURE**
Duration of phase		5 Years.	± 25 years (LOM).	3 Years.	3 Years.
ROM production rate		Not relevant.	32 mtpa milling rate.	Not relevant.	Not relevant.
ROM transport		Not relevant.	On site to processing plant.	Not relevant.	Not relevant.
Production (Iron Ore Concentrate)		Not relevant.	At peak production – 7.3 mtpa.	Not relevant.	Not relevant.
Iron Ore Concentrate Transport		Not relevant.	Plant to Nkwalini railway siding via truck, 676 loads per day. Rail to Richards Bay.	Not relevant.	Not relevant.
Number of construction staff per day		500.	Not relevant.	Not relevant.	Not relevant.
Number of shifts for construction staff per day		One.	Not relevant.	Not relevant.	Not relevant.
Mode of transport for construction workers		Private vehicles, Taxi, and Bus.	Not relevant.	Not relevant.	Not relevant.
Operational Phase: 5 years from Base year (2028)	**Mine Staff and Labour Mine management, staff, and admin (1 Shift per day)**	Not relevant.	35 staff per day, 35 active during shift.	Not relevant.	Not relevant.
	Mine Staff and Labour Mine operators and maintenance (2 Shifts per day, 4 shift teams)	Not relevant.	142 staff per day, 35 active per shift.	Not relevant.	Not relevant.

TABLE 1.1: SUMMARY OF THE EXTENT OF THE JINDAL MIOP FOR THE RESPECTIVE PHASES (Continue…)					
DESCRIPTION		**PHASE**			
		CONSTRUCTION	**OPERATIONAL**	**DECOMMISSIONING**	**CLOSURE**
Operational Phase: 10 Years from Base year (2033)	**Mine Staff and Labour Mine management, staff, and admin (1 Shift per day)**	Not relevant.	170 staff per day, 170 active during shift.	Not relevant.	Not relevant.
	Mine Staff and Labour Mine operators and maintenance (2 Shifts per day, 4 shift teams)	Not relevant.	627 staff per day, 157 active per shift.	Not relevant.	Not relevant.
Operational Staff Mode of Transport	**Mine management, staff, and admin (1 Shift per day)**	Not relevant.	Private vehicles: 100%.	Not relevant.	Not relevant.
	Mine operators and maintenance (2 Shifts per day, 4 shift teams)	Not relevant.	Taxi: 38%. Bus: 62%. Taxi / Bus offload workers whose shift is starting, and load workers whose shift is ending, thus one trip in, one trip out.	Not relevant.	Not relevant.
Where staff are anticipated to reside		Melmoth, Eshowe, and Empangeni.	Local community – 30%. North (Melmoth) – 20%. East (Empangeni) – 20%. South (Eshowe) – 30%.	Not relevant	Not relevant
Expected number of heavy vehicles delivering consumables to mine per week		30.	20.	Limited, occasionally	Limited, occasionally

TABLE 1.1: SUMMARY OF THE EXTENT OF THE JINDAL MIOP FOR THE RESPECTIVE PHASES (Continue…)					
DESCRIPTION		**PHASE**			
		CONSTRUCTION	**OPERATIONAL**	**DECOMMISSIONING**	**CLOSURE**
Expected percentage of heavy vehicles delivering consumables during traffic peak times		20%.	20%.	Not relevant.	Not relevant.
Expected percentage of heavy vehicles transporting concentrate during traffic peak times		Not relevant.	10%.	Not relevant.	Not relevant.
Total number of vehicle trips anticipated to be generated per day	**Number of anticipated vehicle trips to be generated for construction phase**	**AM:** 52 trips in, 27 trips out. **PM:** 27 trips in, 52 trips out.	Not relevant.	Not relevant.	Not relevant.
	<u>Operational Phase:</u> 5 years from Base year (2028)	Not relevant.	**AM:** 84 trips in, 75 trips out. **PM:** 75 trips in, 84 trips out.	Not relevant.	Not relevant.
	<u>Operational Phase:</u> 10 Years from Base year (2033)	Not relevant.	**AM:** 124 trips in, 81 trips out. **PM:** 81 trips in, 124 trips out.	Not relevant.	Not relevant.

The following scenarios were investigated as part of the TIA:

a) **Scenario 1:** 2023 peak-hour traffic **without** the Jindal MIOP (**Base year**).
b) **Scenario 2:** 2023 peak-hour traffic **with** the Jindal MIOP (**Construction Phase**).
c) **Scenario 3:** 2028 peak-hour traffic **without** the Jindal MIOP.
d) **Scenario 4:** 2028 peak-hour traffic **with** the Jindal MIOP (**Operational Phase, 5 years from Base year**).
e) **Scenario 5:** 2033 peak-hour traffic **without** the Jindal MIOP.
f) **Scenario 6:** 2033 peak-hour traffic **with** the Jindal MIOP (**Operational Phase, 10 Years from Base year**).

The scenarios developed as part of the Traffic Impact Assessment were based on anticipated timelines for construction and operations.

Although the Jindal MIOP is anticipated to be operational past the year 2033 due to a planned LOM of 25 years, predicting past the 10-year scenario of what non-mine related background vehicle traffic volumes, directional split and possible future road network changes within the area would be, would not be viable as there are too many variables which could have an impact on predictions. Variables include future potential developments, road network alterations, and economic variables in the area.

The following sections of the report elaborate on the:

a) **Section 2:** Detailed information related to data collected and investigations.
b) **Section 3:** Findings, impact assessment and recommendations.

Section 2

2. DETAILED INFORMATION RELATED TO DATA COLLECTED AND INVESTIGATIONS

The purpose of **Section 2** is to provide detailed information related to the data collected and investigations and consists of:

a) The *status quo* of the land use and road network characteristics of roads relevant to the Jindal MIOP which consists of the following information:

   i. Existing land use information.
   ii. Existing road characteristics and modal distribution.
   iii. Traffic counts as a basis for making traffic-engineering calculations.

b) The future land use and road network characteristics relevant to the Jindal MIOP which consists of the following information:

   i. Land use information, including existing and proposed approved future developments in the area other than the Jindal MIOP.
   ii. Determination of vehicle trips expected to be generated due to the Jindal MIOP.

c) The current and future levels of service at the relevant intersections under investigation.
d) Sensitive road sections and intersections related to existing and proposed conditions.
e) Access to and from the Jindal MIOP.
f) Information requested by the Kwazulu-Natal Department of Transport.
g) Other traffic-related matters.

The following subsection elaborates on the above points.

2.1 STATUS QUO OF LAND USE AND ROAD NETWORK CHARACTERISTICS

The following information is discussed in terms of the *status quo* of the existing land use and road characteristics:

a) Existing land use information.
b) Existing road characteristics and modal distribution.
c) Traffic counts conducted as a basis for making traffic calculations.

2.1.1 EXISTING LAND USE INFORMATION

The relevant properties where the Jindal MIOP is proposed to be located, are currently mostly utilised for grazing, agriculture, residential housing, roadways and some portions are vacant.

For the purpose of this traffic impact assessment, it is assumed that:

a) The vehicle traffic absorption rate (the rate at which existing developments attract vehicular traffic) by all other types of completed developments will maintain the same status for the next ten years.
b) That the average rate of growth of vehicle traffic in the area under investigation that is not relevant to the Jindal MIOP (background traffic) between the 2023 and 2033 scenarios was anticipated at 3% per annum.

2.1.2 EXISTING ROAD CHARACTERISTICS AND MODAL DISTRIBUTION

The following are relevant as part of this section:

a) **Table 2.1** contains information related to the existing intersections under investigation.
b) **Figure 2.1** provides the existing road network layout for the area under investigation.
c) **Table 2.2** provides information concerning the relevant road sections under investigation and includes the following:

    i) Relevant road section.
    ii) Picture of road section.
    iii) Existing class of road.
    iv) Proposed class of road.
    v) Road reserve widths.
    vi) Lane widths.
    vii) Median widths.

d) **Tables 2.3** and **2.4** provides a copy of the guidelines (COTO TRH26 *South African Road Classification and Access Management Manual, Version 1.0, August 2012* Rural areas) of typical road characteristics and access management requirements.

TABLE 2.1: SUMMARY OF INTERSECTION CONTROL AT EXISTING INTERSECTIONS UNDER INVESTIGATION				
POINT	**DESCRIPTION**	**INTERSECTION CONTROL**	**PEDESTRIAN ACTIVITIES**	**INTERSECTION PHOTO**
C	Intersection of Roads P47-4 (R66), P393 (R34) and Local Road	Free-flow along Road P47-4 (R66)	Limited activity observed during surveys.	
D	Intersection of Roads P47-4 (R66), PROW314 and Shop Access	Free-flow along Road P47-4 (R66)	Activity observed during surveys due to clinic and shop in vicinity and public transport loading and off-loading at lay-by facility.	
E	Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road	Free-flow along Road P47-4 (R66).	Limited activity observed during surveys.	
F	Intersection of Roads P47-4 (R66) and Road PROW15	Free-flow along Road P47-4 (R66)	Limited activity observed during surveys.	

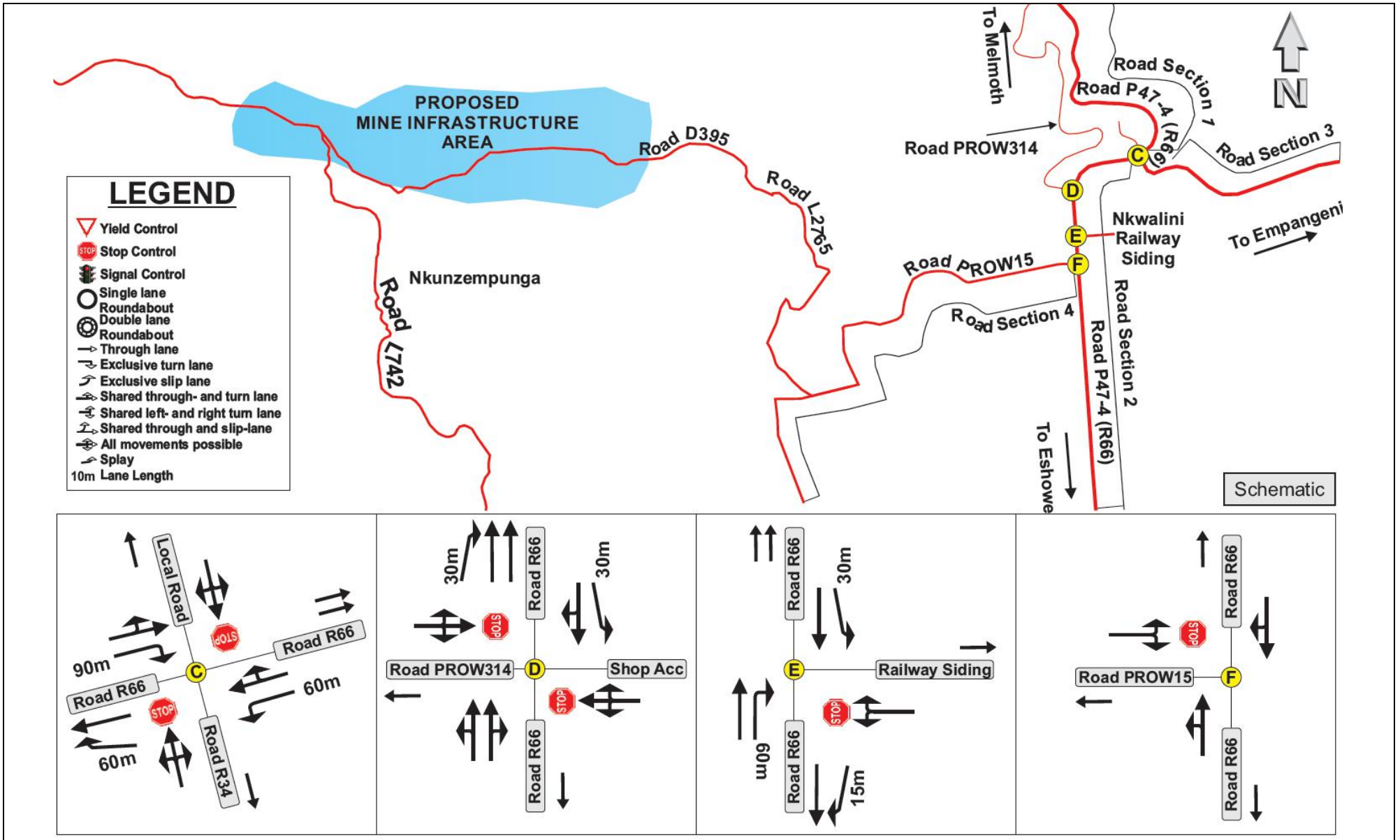


FIGURE 2.1: EXISTING ROAD NETWORK LAYOUT

Note: Points A and B are relevant to the Proposed North Block and not included as part of this report.

TABLE 2.2: SUMMARY OF ROAD CHARACTERISTICS

RELEVANT ROAD SECTION	PICTURE OF ROAD SECTION	CLASS OF ROAD ACCORDING TO KWAZULU-NATAL DEPARTMENT OF TRANSPORT GIS	CLASS OF ROAD ACCORDING TO CURRENT FUNCTIONALITY	Road Authority	Road Reserve (M)	Number of Lanes	Lane Width	Type of Surface	Median	Anticipated Traffic Growth per Annum over 10 Years	Speed Limit
Road Section 1 **Road P47-4 (R66) Section North of Point C** Road link between Melmoth and Road N2		**Primary Function:** Mobility **Class:** Principal Arterial; **Class No.:** R1; **Route No.:** R **Description:** Expressway **Spacing between Intersections:** 8km	**Primary Function:** Mobility **Class:** Minor Arterial; **Class No.:** R3; **Route No.:** R **Description:** Main Road **Spacing between Intersections:** 1.6km	KwaZulu-Natal Department of Transport	±40m	One lane per direction	3.7m	Asphalt	None.	3%	80 - 100 km/h
Road Section 2 **Road P47-4 (R66) Section South of Point C** Road link between Melmoth and Road N2		**Primary Function:** Mobility **Class:** Major Arterial; **Class No.:** R2; **Route No.:** R **Description:** Highway **Spacing between Intersections:** 5km	**Primary Function:** Access / Activity **Class:** Collector Road; **Class No.:** R4; **Route No.:** R **Description:** Collector **Spacing between Intersections:** 600 – 800m	KwaZulu-Natal Department of Transport	±40m	One lane per direction	3.7m	Asphalt	None.	3%	80 - 100 km/h

Note: 1) Refer to Figure 2.1 for a graphical presentation of the relevant road sections under investigation.

2) Information on the class of roads was obtained from the Kwazulu-Natal Department of Transport GIS database. The relevant sections of roads under investigation are although not functioning according to these classifications.

TABLE 2.2: SUMMARY OF ROAD CHARACTERISTICS (Continue…)

RELEVANT ROAD SECTION	PICTURE OF ROAD SECTION	CLASS OF ROAD ACCORDING TO KWAZULU-NATAL DEPARTMENT OF TRANSPORT GIS	CLASS OF ROAD ACCORDING TO CURRENT FUNCTIONALITY	Road Authority	Road Reserve (M)	Number of Lanes	Lane Width	Type of Surface	Median	Anticipated Traffic Growth per Annum over 10 Years	Speed Limit
Road Section 3 **Road P393 (R34)** Road link from Jindal (Road R66) to Empangeni		**Primary Function:** Mobility Class: Major Arterial; Class No.: R1; Route No.: R **Description:** Expressway **Spacing between Intersections:** 8km	**Primary Function:** Mobility Class: Minor Arterial; Class No.: R3; Route No.: R **Description:** Main Road **Spacing between Intersections:** 1.6km	KwaZulu-Natal Department of Transport	±40m	One lane per direction	3.7m	Asphalt	None.	3%	80 - 100 km/h
Road Section 4 **Road PROW15** Public Right of Way to Road R66		**Primary Function:** Access / Activity Class: Local Road; Class No.: R5; Route No.: PROW **Description:** Local Road **Spacing between Intersections:** N/a	**Primary Function:** Access / Activity Class: Local Road; Class No.: R5; Route No.: PROW **Description:** Local Road **Spacing between Intersections:** N/a	KwaZulu-Natal Department of Transport	±15m	One lane per direction	Gravel road 4.0m wide	Gravel	None.	3%	None stated, 40km/h recommended

Note: 1) Refer to Figure 2.1 for a graphical presentation of the relevant road sections under investigation.

2) Information on the class of roads was obtained from the Kwazulu-Natal Department of Transport GIS database. The relevant sections of roads under investigation are although not functioning according to these classifications.

TABLE 2.3: RURAL FUNCTIONAL ROAD CLASIFICATION

(COTO TRH26 - SOUTH AFRICAN ROAD CLASSIFICATION AND ACCESS MANAGEMENT MANUAL VERSION 1.0 AUGUST 2012)

FUNCTION			DESCRIPTION		MOBILITY				
BASIC FUNCTION	**ALTERNATE FUNCTIONAL DESCRIPTION**	**DETERMINING FUNCTION**	**CLASS NO (R_)**	**CLASS NAME**	**ORIGIN / DESTINATION**	**THROUGH TRAFFIC COMPONANT**	**REACH OF CONNECTIVITY**	**% OF BUILT KM**	**AADT (AVERAGE ANNUAL DAILY TRAFFIC)**
Mobility	Vehicle priority, vehicle only, long distance, through, high order, high speed, numbered, commercial, economic, strategic; route, arterial road or highway	Movement is dominant, through traffic is dominant, most of the traffic does not originate or terminate in the immediate vicinity; the function of the road is to carry high volumes of traffic between urban areas.	R 1	Principal Arterial*	Metro areas, large cities, large border posts, join national routes.	Exclusively	> 50km	2 - 4% Classes 1 and 2	1 000 - 100 000+
			R 2	Major Arterial*	Cities and large towns, transport nodes (harbour and international airports), smaller border posts, join major routes.	Exclusively	> 25km		500 - 25 000+
			R 3	Minor Arterial*	Towns, villages and rural settlements, tourist destinations, transport nodes (railway sidings, seaports, landing strips), small border posts, other routes.	Predominant	> 10km	6 - 12% Classes1, 2 and 3	100 - 2 000+
Access / Activity	Access, mixed pedestrian and vehicle traffic, short distance, low order, lower speed, community / farm, road, or street.	Access, turning and crossing movements are allowed, most of the traffic has an origin or destination in the district, the function of the road is to provide a safe environment for vehicles and pedestrians using access points.	R 4	Collector Road	Connect farming districts, rural settlements, tourist areas, national and private parks and mines to mobility routes.	Minimal	< 10km	20 - 25%	< 1 000
			R 5	Local Road	Farm or property access, connection to other routes.	Nil Discontinued	< 5km	65 - 75%	< 500
			R 6	Walkway (Path or Track)	Settlements, farms, transport nodes, water points.	n/a	n/a	n/a	n/a

* In rural areas, the term distributor may be preferred to arterial.

TABLE 2.4: RURAL ACCESS MANAGEMENT REQUIREMENTS AND FEATURES

(COTO TRH26 - SOUTH AFRICAN ROAD CLASSIFICATION AND ACCESS MANAGEMENT MANUAL VERSION 1.0 AUGUST 2012)

BASIC FUNCTION	DESCRIPTION		REQUIREMENTS					TYPICAL FEATURES (Use appropriate context sensitive standards for design)								
	CLASS NO (R_)	CLASS NAME	DESIGN TOPOLOGY	ROUTE NO,	ACCESS TO PROPERTY	INTERSECTION SPACING	PARKING	SPEED km/h	INTERSECTION CONTROL	TYPICAL CROSS SECTION	ROADWAY / LANE WIDTH	ROAD RESERVE WIDTH	PUBLIC TRANSPORT AND PEDESTRIAN CROSSINGS	PEDESTRIAN FOOTWAYS (CONSTRUCTED)	CYCLE LANES	ANIMAL DRAWN VEHICLES
Mobility	R 1	Principal arterial	Expressway	Yes (N)	Not allowed*	8.0km	No (off road rest stops allowed)	120	Grade separated or priority to through	2/3/4 lane, surfaced shoulders, climbing lanes	3.5 - 3.7m	60 - 80m (62m)	No	No	No	No
	R 2	Major arterial	Highway	Yes (R: 2 or 3-digit; or N)	Not allowed */**	5.0km	No (off road rest stops allowed)	120	Priority or grade separated	2/3 lane, surfaced shoulders, climbing lanes	3.5 - 3.7m	40-70m (48m)	As required	Isolated	Recreational on shoulder	No
	R 3	Minor arterial	Main road	Yes (R: 3 or 2-digit)	Not allowed */**	1.6km	No (off road rest stops allowed)	100 - 120	Priority, roundabout	2 lanes surfaced, gravel shoulders	4.0m	30-50m (30m)	As required	Isolated	Recreational widen roadway both sides	Widen shoulder
Access / Activity	R 4	Collector road	Collector	Allowed, T (tourist) or D (district)	Yes	600 - 800m	No (off road edge or in lay byes / viewpoints)	80 - 100	Priority	2 lanes surfaced or gravel, gravel shoulders	3.5m	25m	As required	Rare, isolated	Widen roadway	Widen shoulder
	R 5	Local road	Farm road	Allowed, T (tourist) or L (local)	Yes	450 - 600m	No (on verge or shoulder)	60 - 80	Priority	1/2 lane gravel, 600mm concrete strips in environmental areas		20m	As required	Rare	Use roadway	Use roadway
	R 6	Walkway	Track or pathway	No	Yes	N/a	n/a							Not constructed, formed by use		

* Access to properties sufficiently large to warrant a private intersection / interchange can be considered if access spacing requirements are met and there is no future need for public road.

2.1.3 TRAFFIC COUNTS AS BASIS FOR MAKING TRAFFIC ENGINEERING CALCULATIONS

In order to gain a better understanding of the existing traffic patterns and movements adjacent to the Jindal MIOP, 12-hour manual traffic counts were conducted at the existing intersections that would potentially be affected by the Jindal MIOP.

It is standard traffic engineering practice to conduct at least 12-hour manual traffic counts, as close as possible to a month-end Friday when traffic movement is expected to be at its highest. The relevant 12-hour manual traffic counts were conducted on Friday 09 April 2021 at the following intersections:

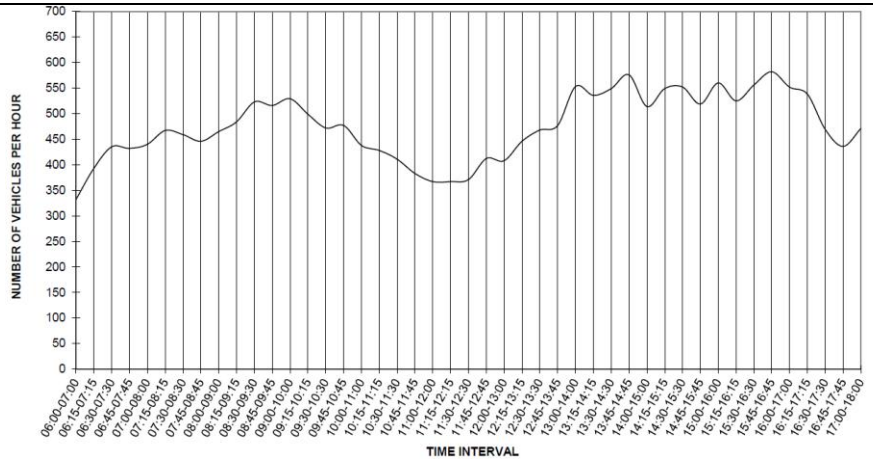
a) **Point C**: Intersection of Roads P47-4 (R66), P393 (R34) and Local Road.
b) **Point D**: Intersection of Roads P47-4 (R66), PROW314 and Shop Access.
c) **Point E**: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road.
d) **Point F**: Intersection of Roads P47-4 (R66) and PROW15.

The combined hourly totals of all the vehicle types for the traffic survey conducted on Friday 09 April 2021 between 06:00 and 18:00 are indicated in **Tables A-1** to **A-4** of **Appendix A** of this report. The description of the relevant vehicle movements at the relevant intersections appears in **Figure A-1** of **Appendix A**. **Figure B-1** provides a graphical presentation of the peak-hour traffic volumes as derived from the relevant manual traffic counts.

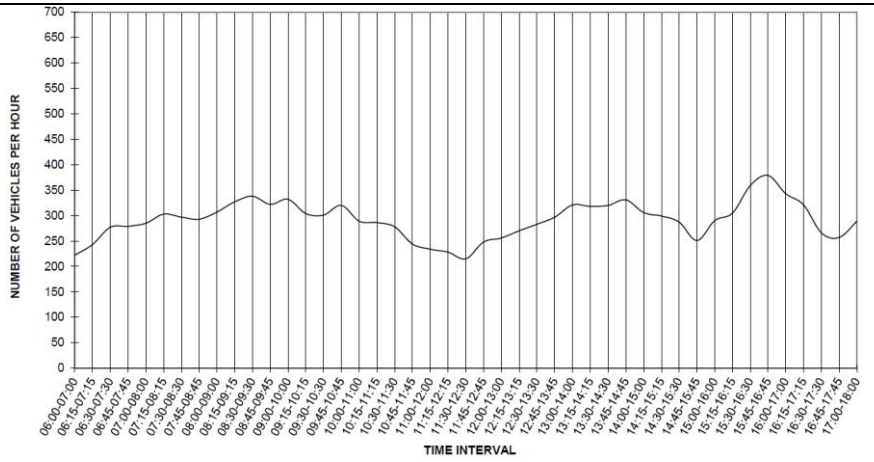
The respective peak-hour flows for the traffic count at the relevant intersections were identified as indicated in **Table 2.5** below.

TABLE 2.5: PEAK HOUR PERIODS AT THE RELEVANT INTERSECTION					
POINT	INTERSECTION	AM PEAK		PM PEAK	
		TIME INTERVAL	NUMBER OF VEHICLES	TIME INTERVAL	NUMBER OF VEHICLES
C	Roads P47-4 (R66), P393 (R34) and Local Road	07:15 to 08:15	467	15:45 to 16:45	582
D	Roads P47-4 (R66), PROW314 and Shop Access	07:15 to 08:15	303	15:45 to 16:45	379
E	Road P47-4 (R66) and Nkwalini Railway Siding Access Road	07:15 to 08:15	261	15:45 to 16:45	321
F	Roads P47-4 (R66) and PROW15	07:15 to 08:15	246	15:45 to 16:45	319

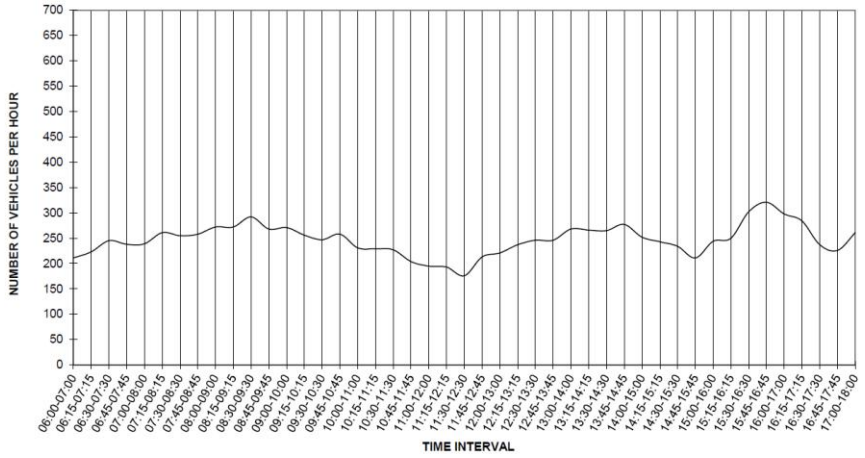
Figure 2.2 indicates the hourly traffic pattern, per 15-minute interval, for all modes of vehicles at the relevant intersections between 06:00 and 18:00 on Friday 09 April 2021. A graphical presentation of the peak-hour vehicle flows is indicated with **Figure B-1** of **Appendix B**.



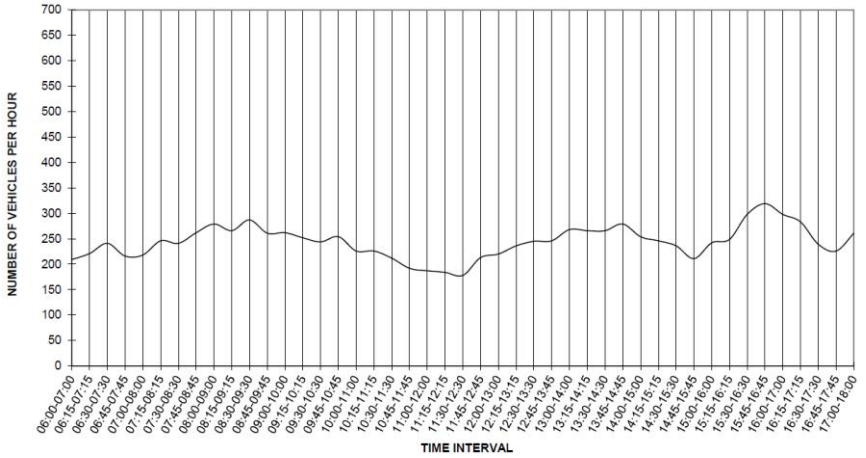
INTERSECTION OF ROADS P47-4 (R66), P393 (R34) AND LOCAL ROAD (POINT C)



INTERSECTION OF ROADS P47-4 (R66), PROW314 AND SHOP ACCESS (POINT D)



INTERSECTION OF ROAD P47-4 (R66) AND NKWALINI RAILWAY SIDING ACCESS ROAD (POINT E)



INTERSECTION OF ROADS P47-4 (R66) AND PROW15 (POINT F)

FIGURE 2.2: HOURLY TRAFFIC PATTERN PER 15-MINUTE INTERVAL FOR ALL MODES OF VEHICLES (06:00 to 18:00) AT THE RELEVANT INTERSECTIONS

2.2 FUTURE LAND USE AND ROAD CHARACTERISTICS

The following are relevant:

a) Land use information, including existing and proposed future approved developments in the area.
b) Determination of the vehicle trips anticipated to be generated by the Jindal MIOP.

The subsections below elaborate on the above-mentioned future land use and road characteristics.

2.2.1 LAND USE INFORMATION, INCLUDING EXISTING AND PROPOSED LATENT DEVELOPMENTS IN THE AREA

At the time of conducting this study, no other future developments were identified, including latent rights and / or proposed approved future developments in the area.

2.2.2 INFORMATION ABOUT THE EXPECTED FUTURE MODAL DISTRIBUTION

Figures B-3 to **B-5** of **Appendix B** indicate, in percentages, the expected vehicle trips distribution, respectively, of light vehicles and heavy vehicles for the AM and PM peak periods for the relevant scenarios.

2.2.3 DETERMINATION OF VEHICLE TRIPS EXPECTED TO BE GENERATED DUE TO THE JINDAL MIOP

Table 2.6 indicates the trip generation rates, the number of vehicle trips which are expected to be generated due to the Jindal MIOP for the construction phase while **Tables 2.7** and **2.8** provide the same for the operational phase 3 (2028) and 10 (2033) years from the Base year (2023).

The trip generation rates are based on the "*COTO TMH17, South African Trip Data Manual Version 1.01, September 2013*", information provided by the project team and assumptions made based on professional experience where information was not available.

TABLE 2.6: TRIP GENERATION RATES, EXPECTED NUMBER OF VEHICLE TRIPS TO BE GENERATED DUE TO THE JINDAL MIOP (CONSTRUCTION PHASE)

Item	Component	Number of Workers per Day	% Workers active during Peak Hour	Number of Workers Active per Peak Hour	Number of Trucks Per Day / Week	% Trucks active during Peak Hour	Number of Trucks active during Peak Hour	Assumed Average Number of Persons per Vehicle	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations			
										If Inward Movement is relevant Value = 1	Number of Vehicle Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Number of Vehicle Trips for Outwards Direction	Total Number of Vehicle Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Vehicle during Peak Hour	Trip Distribution %		Trip Generation	
																In	Out	In	Out
AM Peak Hour																			
1.	Construction Workers (Private Vehicles)	100	100%	100				4,0	Trips per Worker (4 Persons per Vehicle)	1	25	0	0	25	**0,25**	100%	0%	25	0
2.	Construction Workers (38% using Taxi Transport)	150	100%	150				10,0	Trips per Worker (10 Persons per Vehicle)	1	15	1	15	30	**0,20**	50%	50%	15	15
3.	Construction Workers (62% using Bus Transport)	250	100%	250				40,0	Trips per Worker (40 Persons per Vehicle)	1	6	1	6	12	**0,05**	50%	50%	6	6
4.	Heavy vehicles delivering consumables per week				30 per week	20%	6 during peak	1,0	20% of heavy vehicle during peak time	1	6	1	6	12	**2,00**	50%	50%	6	6
													TOTAL	**79**				**52**	**27**
PM Peak Hour																			
1.	Construction Workers (Private Vehicles)	100	100%	100				4,0	Trips per Worker (4 Persons per Vehicle)	0	0	1	25	25	**0,25**	0%	100%	0	25
2.	Construction Workers (38% using Taxi Transport)	150	100%	150				10,0	Trips per Worker (10 Persons per Vehicle)	1	15	1	15	30	**0,20**	50%	50%	15	15
3.	Construction Workers (62% using Bus Transport)	250	100%	250				40,0	Trips per Worker (40 Persons per Vehicle)	1	6	1	6	12	**0,05**	50%	50%	6	6
4.	Heavy vehicles delivering consumables per week				30 per week	20%	6 during peak	1,0	20% of heavy vehicle during peak time	1	6	1	6	12	**2,00**	50%	50%	6	6
													TOTAL	**79**				**27**	**52**

TABLE 2.7: TRIP GENERATION RATES, EXPECTED NUMBER OF VEHICLE TRIPS TO BE GENERATED DUE TO THE JINDAL MIOP (OPERATIONAL PHASE – 5 years FROM BASEYEAR)

Item	Component	Number of Workers per Day	% Workers active during Peak Hour	Number of Workers Active per Peak Hour	Number of Trucks Per Day / Week	% Trucks active during Peak Hour	Number of Trucks active during Peak Hour	Assumed Average Number of Persons per Vehicle	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations			
										If Inward Movement is relevant Value = 1	Number of Vehicle Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Number of Vehicle Trips for Outwards Direction	Total Number of Vehicle Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Vehicle during Peak Hour	Trip Distribution %		Trip Generation	
																In	Out	In	Out
AM Peak Hour (Operational Phase 2028)																			
1.	Mine Staff (One Shift per day, Private Transport	35	100%	35				4,0	Trips per Worker (4 Persons per Vehicle)	1	9	0	0	9	**0,25**	100%	0%	9	0
2.	Mine Staff (Two Shift per day, 38% using Taxi Transport)	53	25%	13				10,0	Trips per Worker (10 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	2	1	2	4	**0,33**	50%	50%	2	2
3.	Mine Staff (Two Shift per day, 62% using Bus Transport)	89	25%	22				40,0	Trips per Worker (40 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	1	1	1	2	**0,07**	50%	50%	1	1
4.	Iron Ore Concentrate Transport to Railway Siding per day				676 per day	10%	68 during peak	1,0	10% of heavy vehicle during peak time	1	68	1	68	136	**2,00**	50%	50%	68	68
5.	Heavy vehicles delivering consumables per week				20 per week	20%	4 during peak	1,0	20% of heavy vehicle during peak time	1	4	1	4	8	**2,00**	50%	50%	4	4
													TOTAL	**159**				**84**	**75**
PM Peak Hour (Operational Phase 2028)																			
1.	Mine Staff (One Shift per day, Private Transport	35	100%	35				4,0	Trips per Worker (4 Persons per Vehicle)	0	0	1	9	9	**0,25**	0%	100%	0	9
2.	Mine Staff (Two Shift per day, 38% using Taxi Transport)	53	25%	13				10,0	Trips per Worker (10 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	2	1	2	4	**0,29**	50%	50%	2	2
3.	Mine Staff (Two Shift per day, 62% using Bus Transport)	89	25%	22				40,0	Trips per Worker (40 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	1	1	1	2	**0,07**	50%	50%	1	1
4.	Iron Ore Concentrate Transport to Railway Siding per day				676 per day	10%	68 during peak	1,0	10% of heavy vehicle during peak time	1	68	1	68	136	**2,00**	50%	50%	68	68
5.	Heavy vehicles delivering consumables per week				20 per week	20%	4 during peak	1,0	20% of heavy vehicle during peak time	1	4	1	4	8	**2,00**	50%	50%	4	4
													TOTAL	**159**				**75**	**84**

TABLE 2.8: TRIP GENERATION RATES, EXPECTED NUMBER OF VEHICLE TRIPS TO BE GENERATED DUE TO THE JINDAL MIOP (OPERATIONAL PHASE – 10 YEARS FROM BASEYEAR)

Item	Component	Number of Workers per Day	% Workers active during Peak Hour	Number of Workers Active per Peak Hour	Number of Trucks Per Day / Week	% Trucks active during Peak Hour	Number of Trucks active during Peak Hour	Assumed Average Number of Persons per Vehicle	Comments	Trip Generation Calculations for Peak Hour						Final Trip Information for Traffic Engineering Calculations			
										If Inward Movement is relevant Value = 1	Number of Vehicle Trips for Inwards Direction	If Outward Movement is relevant Value = 1	Number of Vehicle Trips for Outwards Direction	Total Number of Vehicle Trips Generated during Peak Hour (In & Out)	Calculated Trip Generation Rate per Vehicle during Peak Hour	Trip Distribution %		Trip Generation	
																In	Out	In	Out
AM Peak Hour (Operational Phase 2033)																			
1.	Mine Staff (One Shift per day, Private Transport	170	100%	170				4,0	Trips per Worker (4 Persons per Vehicle)	1	43	0	0	43	**0,25**	100%	0%	43	0
2.	Mine Staff (Two Shift per day, 38% using Taxi Transport)	239	25%	60				10,0	Trips per Worker (10 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	6	1	6	12	**0,20**	50%	50%	6	6
3.	Mine Staff (Two Shift per day, 62% using Bus Transport)	388	25%	97				40,0	Trips per Worker (40 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	3	1	3	6	**0,06**	50%	50%	3	3
4.	Iron Ore Concentrate Transport to Railway Siding per day				676 per day	10%	68 during peak	1,0	10% of heavy vehicle during peak time	1	68	1	68	136	**2,01**	50%	50%	68	68
5.	Heavy vehicles delivering consumables per week				20 per week	20%	4 during peak	1,0	20% of heavy vehicle during peak time	1	4	1	4	8	**2,00**	50%	50%	4	4
													TOTAL	**205**				**124**	**81**
PM Peak Hour (Operational Phase 2033)																			
1.	Mine Staff (One Shift per day, Private Transport	170	100%	170				4,0	Trips per Worker (4 Persons per Vehicle)	0	0	1	43	43	**0,25**	0%	100%	0	43
2.	Mine Staff (Two Shift per day, 38% using Taxi Transport)	239	25%	60				10,0	Trips per Worker (10 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	6	1	6	12	**0,20**	50%	50%	6	6
3.	Mine Staff (Two Shift per day, 62% using Bus Transport)	388	25%	97				40,0	Trips per Worker (40 Persons per Vehicle) Same vehicle transporting workers for next shift leave with workers whose shift ended	1	3	1	3	6	**0,06**	50%	50%	3	3
4.	Iron Ore Concentrate Transport to Railway Siding per day				676 per day	10%	68 during peak	1,0	10% of heavy vehicle during peak time	1	68	1	68	136	**2,01**	50%	50%	68	68
5.	Heavy vehicles delivering consumables per week				20 per week	20%	4 during peak	1,0	20% of heavy vehicle during peak time	1	4	1	4	8	**2,00**	50%	50%	4	4
													TOTAL	**205**				**81**	**124**

2.2.4 DETERMINATION OF THE TOTAL TRAFFIC EXPECTED TO BE GENERATED AT THE RELEVANT INTERSECTIONS

A detailed traffic-related investigation was conducted for the construction and operational phases of the Jindal MIOP. The following figures are relevant:

a) **Figure B-1:** 2021 peak-hour traffic (background traffic) without the Jindal MIOP.
b) **Figure B-2:** Projected 2023 peak-hour traffic (background traffic) without the Jindal MIOP **(Scenario 1)** (**Base year**).
c) **Figure B-3:** Projected vehicle trip distribution for the Jindal MIOP **(Light Vehicles)**.
d) **Figure B-4:** Projected vehicle trip distribution for the Jindal MIOP **(Delivery Vehicles)**.
e) **Figure B-5:** Projected vehicle trip distribution for the Jindal MIOP **(Concentrate Transport Vehicles)**.
f) **Figure B-6:** Projected vehicle trips to be generated by the Jindal MIOP **(Construction Phase**).
g) **Figure B-7:** Projected vehicle trips to be generated by the Jindal MIOP **(Operational Phase – 5 years from Base year (2028)**.
h) **Figure B-8:** Projected vehicle trips to be generated by the Jindal MIOP **(Operational Phase – 10 Years from Base year (2033)**.
i) **Figure B-9:** Projected 2023 peak-hour traffic with the Jindal MIOP **(Construction Phase) (Scenario 2)**.
j) **Figure B-10:** Projected 2028 peak-hour traffic without the Jindal MIOP **(Scenario 3)**.
k) **Figure B-11:** Projected 2028 peak-hour traffic with the Jindal MIOP **(Operational Phase – 5 years from Base year) (Scenario 4)**.
l) **Figure B-12:** Projected 2033 peak-hour traffic without the Jindal MIOP **(Scenario 5)**.
m) **Figure B-13:** Projected 2033 peak-hour traffic with the Jindal MIOP **(Operational Phase – 10 Years from Base year) (Scenario 6)**.

2.3 DETERMINATION OF THE LEVELS OF SERVICE AT THE RELEVANT INTERSECTIONS

The ***"SIDRA Intersection"*** software was used as an aid for the design and evaluation of the relevant intersections. The following intersections were evaluated for levels of service:

a) **Point C**: Intersection of Roads P47-4 (R66), P393 (R34) and Local Road.
b) **Point D**: Intersection of Roads P47-4 (R66), PROW314 and Shop Access.
c) **Point E**: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road.
d) **Point F**: Intersection of Roads P47-4 (R66) and PROW15.

In **Appendix C, Tables C-1 to C-6** indicate the levels of service and the degree of saturation calculated for the relevant intersections for the respective scenarios:

a) **Table C-1:** Levels of service for various approaches for the year 2023 (background traffic) **without** the Jindal MIOP **(Scenario 1) (Base year)**.
b) **Table C-2:** Levels of service for various approaches for the year 2023 (background traffic) **with** the Jindal MIOP **(Construction Phase) (Scenario 2)**.

c) **Table C-3:** Levels of service for various approaches for the year 2028 (background traffic) **without** the Jindal MIOP **(Scenario 3)**.
d) **Table C-4:** Levels of service for various approaches for the year 2028 (background traffic) **with** the Jindal MIOP **(Operational Phase– 5 years from Base year) (Scenario 4)**.
e) **Table C-5:** Levels of service for various approaches for the year 2033 (background traffic) **without** the Jindal MIOP **(Scenario 5)**.
f) **Table C-6:** Levels of service for various approaches for the year 2033 (background traffic) **with** the Jindal MIOP **(Operational Phase– 10 Years from Base year (Scenario 6)**.

From **Tables C-1** to **C-6** it is possible to note that:

a) No geometric upgrading (mitigating measures) in terms of capacity and road network performance are recommended or required without or due to the Jindal MIOP.
b) Geometric upgrading (mitigating measures) in terms of road safety is recommended as part of the Jindal MIOP.
c) Refer to **Section 3** of this report for more information regarding required and recommended improvements (mitigating measures).

Refer to **Tables D-1** and **D-2** of **Appendix D** for level of service criteria descriptions for unsignalised and signalised intersections respectively.

Table 2.9 provides a summary of the predicted available reserve capacity on the various sections of roads that had been investigated for the Jindal MIOP.

TABLE 2.9: AVAILABLE RESERVE CAPACITY FOR RELEVANT ROAD SECTIONS																	
Point	Intersection	Direction of Road Section	Capacity per Lane	Number of Lanes	Total Capacity	Actual Number of Vehicles						Reserve Capacity Available					
						2023		2028		2033		2023		2028		2033	
						AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
C	Roads P47-4 (R66), P393 (R34) and Local Road	North (Local Road)	500	1	500	0	0	0	0	0	0	500	500	500	500	500	500
		East (Road R66)	900	2	1800	215	315	230	336	284	420	1585	1485	1570	1464	1516	1380
		South (Road R34)	900	1	900	145	178	152	186	188	235	755	722	748	714	712	665
		West (Road R66)	900	1	900	154	140	153	144	203	179	746	760	747	756	697	721
D	Roads P47-4 (R66), PROW314 and Shop Access	North (Road R66)	900	2	1800	144	221	149	226	184	291	1656	1579	1651	1574	1616	1509
		East (Shop Access)	Not relevant. Access road.														
		South (Road R66)	900	1	900	162	152	161	157	212	193	738	748	739	743	688	707
		West (Road PROW314)	500	1	500	13	25	15	26	18	33	487	475	485	474	482	467
E	Road P47-4 (R66) and Nkwalini Railway Siding Access Road	North (Road R66)	900	2	1800	137	212	140	215	174	279	1663	1588	1660	1585	1626	1521
		East (Railway Access)	Not relevant. Access road.														
		South (Road R66)	900	1	900	143	146	207	219	254	255	757	754	693	681	646	645
F	Roads P47-4 (R66) and PROW15	North (Road R66)	900	1	900	136	207	207	278	241	341	764	693	693	622	659	559
		South (Road R66)	900	1	900	130	149	136	150	168	195	770	751	764	750	732	705
		West (Road PROW15)	500	1	500	45	31	88	85	117	92	455	469	412	415	383	408

2.4 SENSITIVE ROAD SECTIONS AND INTERSECTIONS RELATED TO EXISTING AND PROPOSED CONDITIONS

It is important to determine the sensitivity of existing roads in order to assist in an understanding of the current baseline conditions. Sensitive road sections and intersections related to existing conditions **without** and **with** the Jindal MIOP in terms of vehicular traffic include the following:

a) Where residents and schools are located (vehicle/pedestrian conflict).
b) Free-flow legs of intersections where right-turning movements take place and where no dedicated right-turn lanes are provided.
c) Intersections with high volumes of vehicular traffic conflicts.
d) Speeding.

The following figures are presented as part of the sensitive road sections **without** and **with** the Jindal MIOP:

a) **Figures 2.3:** Sensitive road sections and intersections indicating existing sensitive areas and intersections **WITHOUT** the Jindal MIOP.
b) **Figures 2.4:** Sensitive road sections and intersections indicating proposed sensitive areas and intersections **WITH** the Jindal MIOP.
c) **Figures 2.5:** Sensitive road sections and intersections indicating sensitive areas and intersections **WITH** the Jindal MIOP **WITH** recommended mitigating measures.

With reference to **Figures 2.3, 2.4,** and **2.5**, it is possible to conclude from a traffic engineering perspective that:

a) In terms of existing conditions (without the Jindal MIOP), most of the existing road network and intersections under investigations (apart from **Point D**) is considered to have a low sensitivity from a traffic engineering perspective.
b) In terms of existing conditions (without the Jindal MIOP), the intersection of Road R66, Shop Access and Road PROW314 (**Point D**) is considered to have a medium sensitivity, from a traffic engineering perspective, due to the retail activities at this intersection which create vehicular traffic and pedestrian movements (potential vehicle/pedestrian conflict). Implementing road safety mitigating measures, which include traffic calming and pedestrian crossings/walkways regardless of the Jindal MIOP, would improve the sensitivity to low.
c) In terms of anticipated future conditions with the Jindal MIOP, most of the existing road network and intersections would still be considered to have a low sensitivity from a traffic engineering perspective, apart from the following mentioned in points (d) and (e).

d) A change in sensitivity for sections of Road D395 and Road L745 are envisaged due to potential heavy vehicle movement as part of the Jindal MIOP, as these road sections contain residential areas along the road sections, and therefore these road sections would be considered to have a medium sensitivity from a traffic safety perspective. Road safety awareness campaigns and training are recommended for mine workers and communities, although the sensitivity would remain ongoing as long as mine activities contribute vehicular traffic along these road sections.

e) From a road safety perspective, a change in sensitivity for the intersection of Road R66 and Road PROW15 (**Point F**) is envisaged due to potential heavy vehicle movement as part of the Jindal MIOP (right-turn movements by heavy vehicles), and due to the lack of a dedicated right-turn lane on the northern approach of Road R66. Implementing a right-turn lane along Road R66 on the northern approach at Point F is envisaged to improve the sensitivity of the relevant intersection to a low sensitivity.

Recommended road network improvements (mitigating measures) without and as part of the Jindal MIOP are discussed in more detail as part of **Section 3** of this report.

2.5 ACCESS TO AND FROM THE JINDAL MIOP

Access to and from the Jindal MIOP would be gained directly from Road D395 which is classified as a U4b road. Road D395 currently traverse through the site of the Jindal MIOP where mining infrastructure is proposed and would require further investigation as part of the detailed design phase in terms of re-routing or diverting the relevant section of Road D395. Refer to **Figure 2.6** for a graphical presentation of the last mentioned.

Broader access to the Jindal MIOP is currently gained via a series of local gravel roads which include Road L742, Road L2765, Road PROW15, and Road P258. All of the last mentioned road's lead to the main road, Road P47-7 (R66), which is a blacktop class R2 road which provides access to the broader area.

As part of access from and to the Jindal MIOP, a more direct access route is proposed which would ultimately link up with the existing intersection of Road P47-7 (R66) and Road PROW15 (**Point F**). The proposed access route would need more detailed investigation as part of the detailed design phase which should include consultation with roads authorities and the local community. The proposed access route would also be utilised by heavy vehicles transporting concentrate from the Jindal MIOP to the Nkwalini railway siding for loading onto trains. Access to the Nkwalini railway siding is currently at **Point E**. Refer to **Figure 2.7** for a graphical presentation of the proposed access route.

The proposed access route is regarded as acceptable from a traffic engineering point of view. Final requirements and approval should be obtained as part of the detailed design phase.

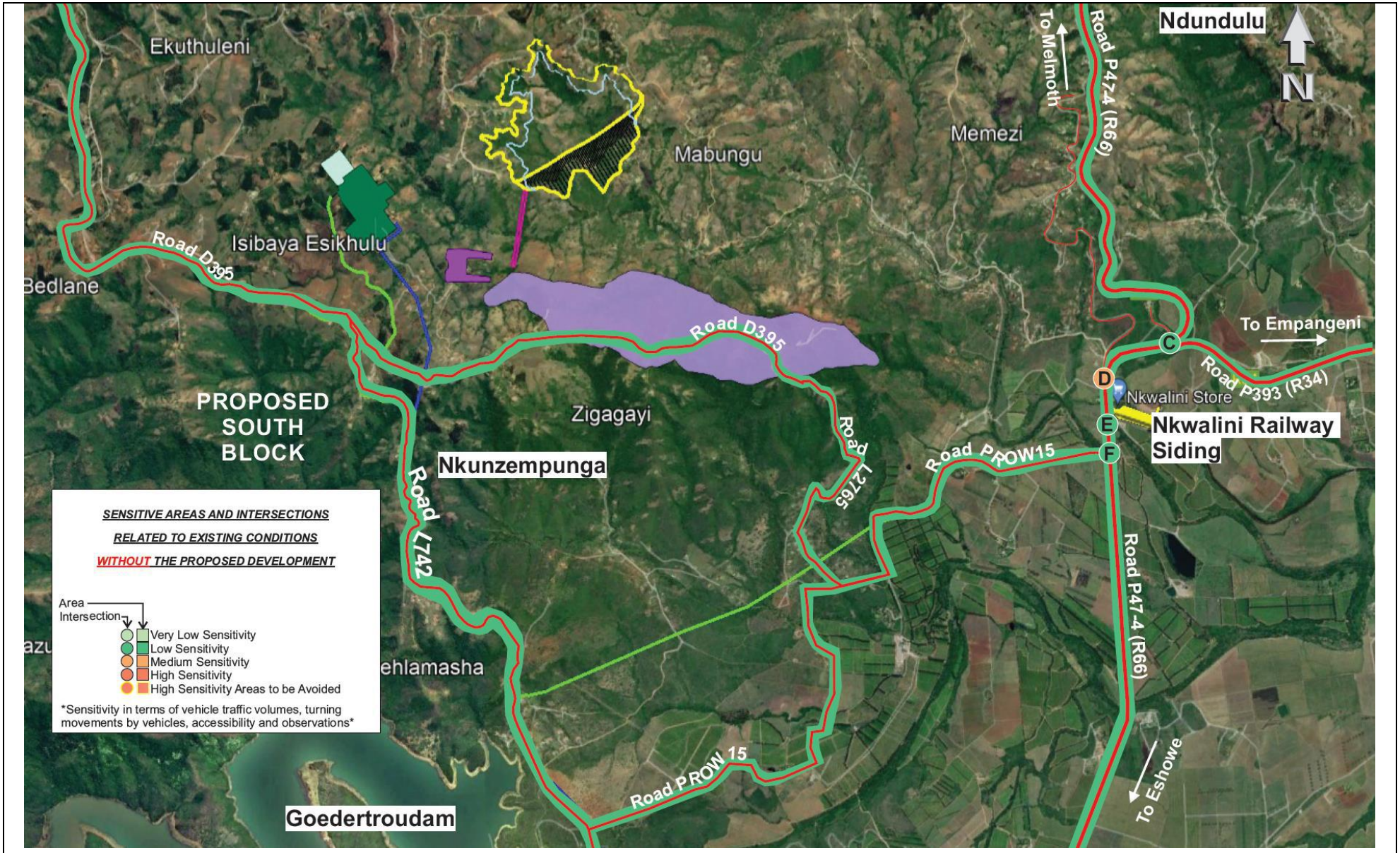


FIGURE 2.3: SENSITIVE ROAD SECTIONS AND INTERSECTIONS INDICATING EXISTING SENSITIVE AREAS AND INTERSECTIONS WITHOUT THE JINDAL MIOP

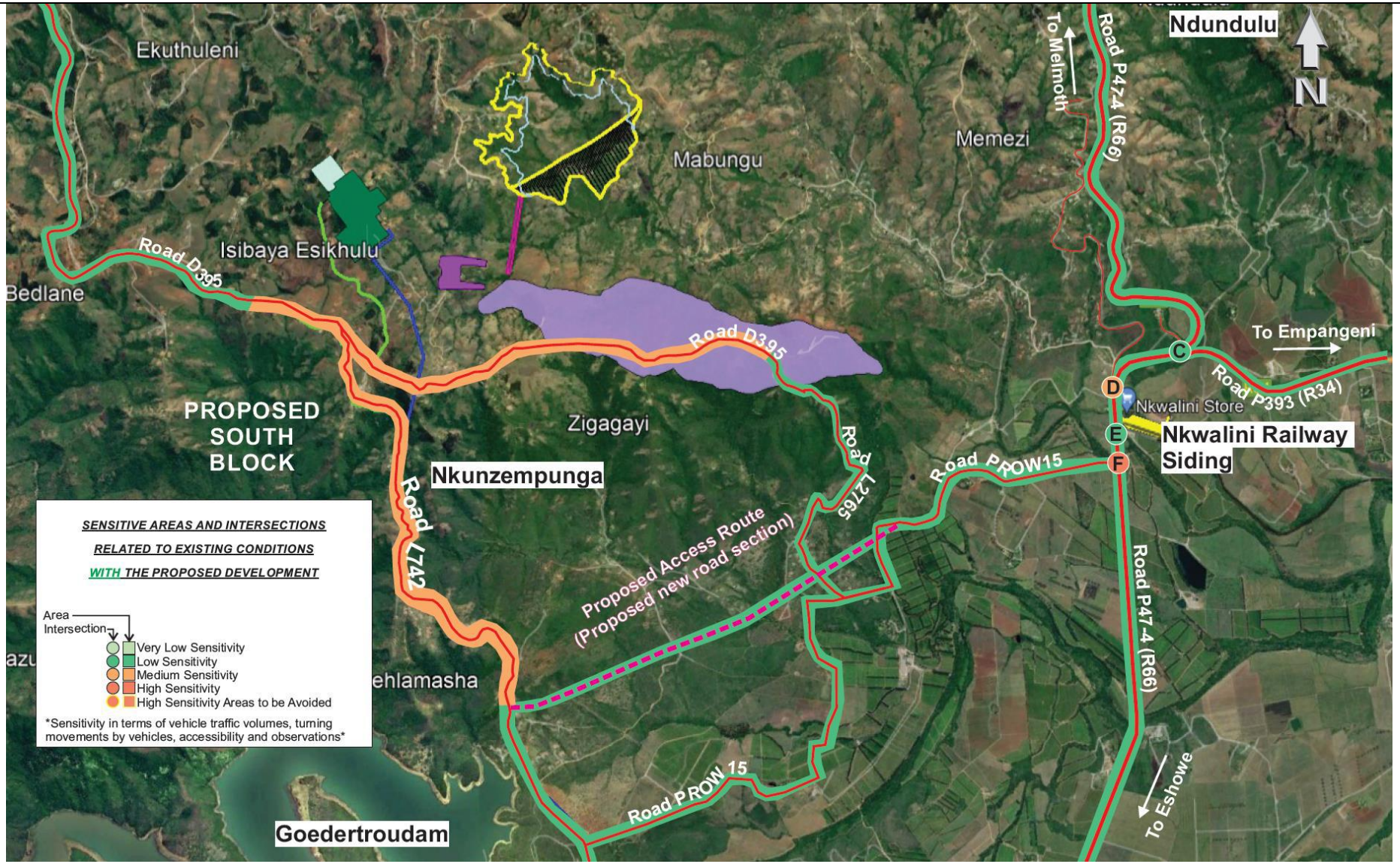


FIGURE 2.4: SENSITIVE ROAD SECTIONS AND INTERSECTIONS INDICATING PROPOSED SENSITIVE AREAS AND INTERSECTIONS WITH THE JINDAL MIOP

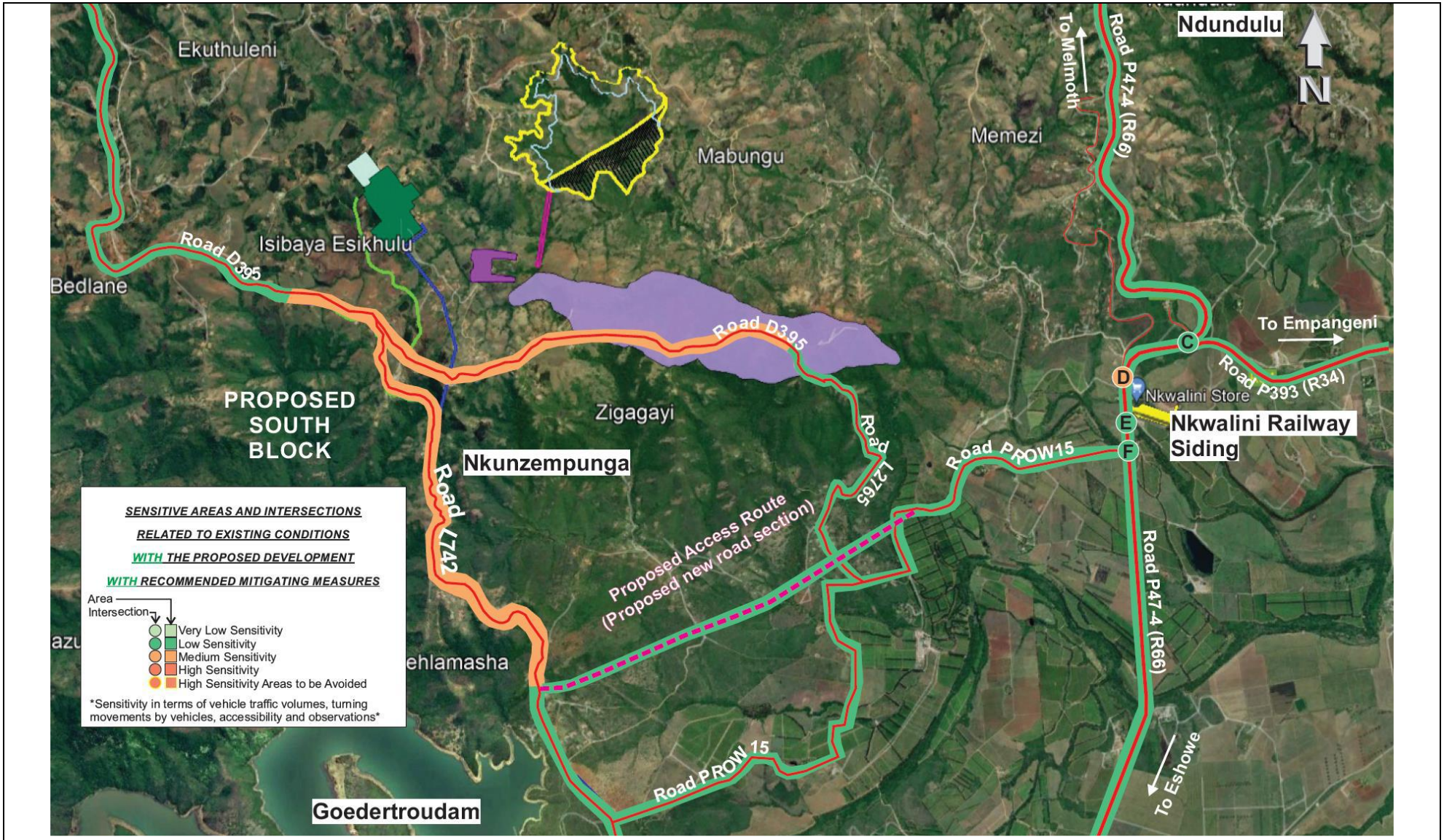


FIGURE 2.5: SENSITIVE ROAD SECTIONS AND INTERSECTIONS INDICATING SENSITIVE AREAS AND INTERSECTIONS WITH THE JINDAL MIOP WITH RECOMMENDED MITIGATING MEASURES

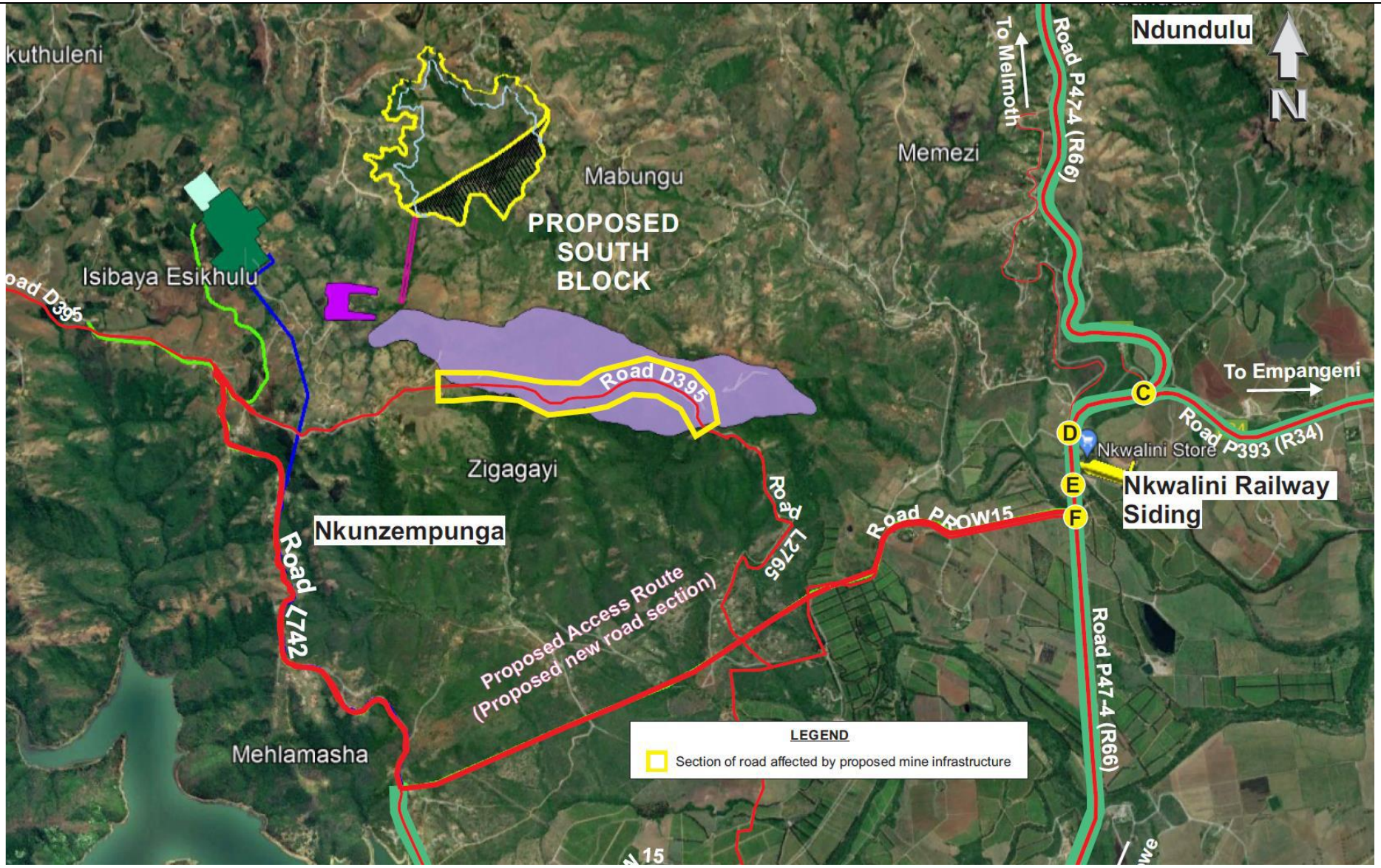


FIGURE 2.6: GRAPHICAL PRESENTATION OF ROADS WITHIN THE VICNITINY OF THE JINDAL MIOP INFRASTRUCTURE

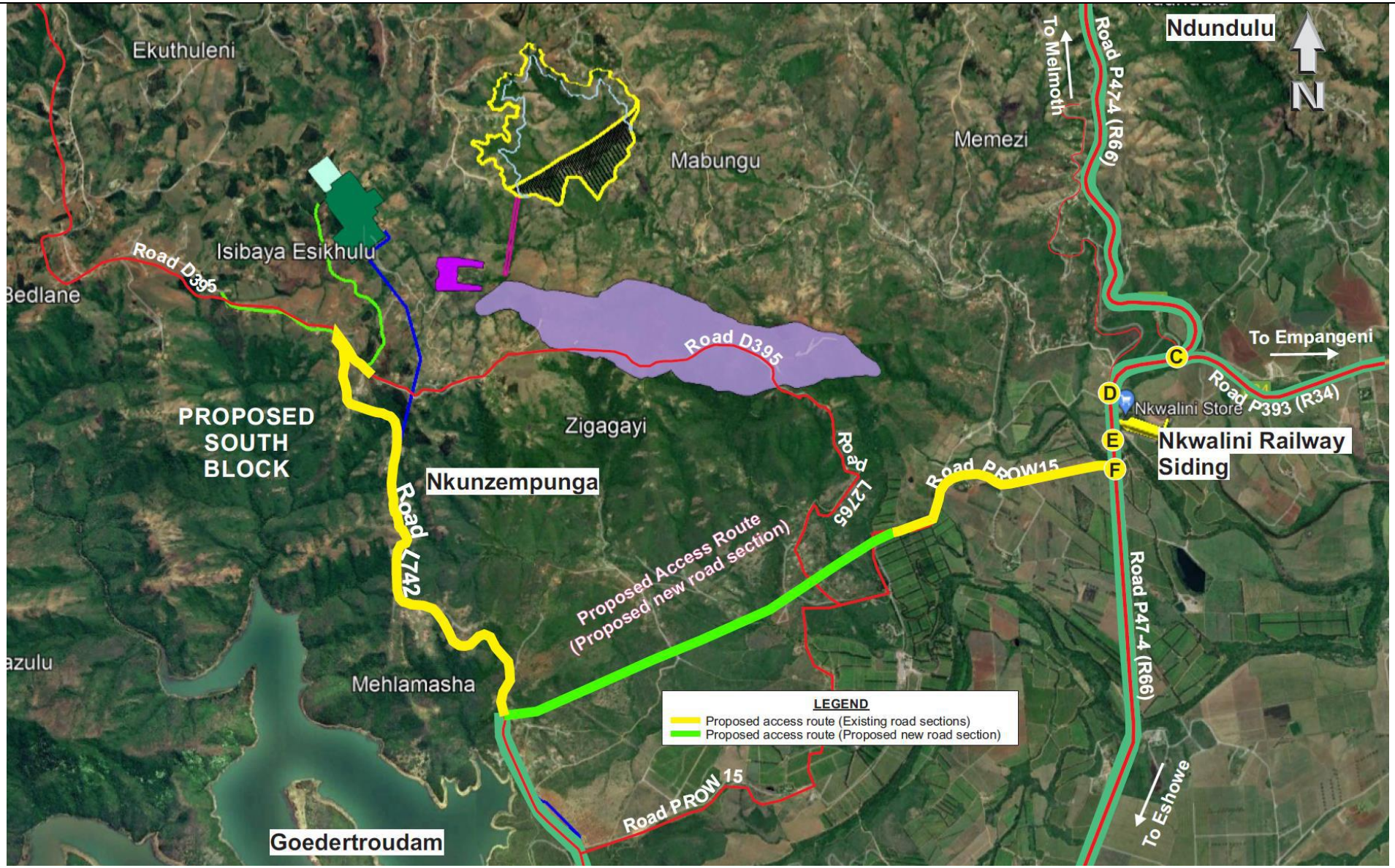


FIGURE 2.7: GRAPHICAL PRESENTATION OF THE PROPOSED ACCESS ROUTE TO AND FROM THE JINDAL MIOP

2.6 INFORMATION REQUESTED BY RELEVANT ROAD AUTHORITY

Input will be provided as part of the Detail Design Phase of the proposed project. All comments/ approval from the relevant road authority will be included as part of the applications for approval and detail design process as a separate document.

2.7 POTENTIAL AXEL LOADS (E80s) DUE TO THE JINDAL MIOP

E80s are calculated to predict the damage caused per pass to a pavement by an axle which is defined relative to the damage per pass of a standard axle load, which is defined as an **80kN single axle load** (E80). For information purposes, a high-level calculation was conducted for Road PROW15 to determine the potential axel loads (E80s) that would be created due to the transportation of concentrate to the Nkwalini Railway Siding by the Jindal MIOP. **Table 2.10** provides a summary of the outcome of the calculations.

TABLE 2.10: SUMMARY OF E80 CALCULATIONS

Total E80's per day		
Data		**PROW15**
Iron Ore Concentrate Transport to Railway Siding per day		676
Heavy vehicles delivering consumables per week		20
Max Average Daily Truck Traffic (ADTT) for 1 Direction		676
Growth Rate (%) 5 years		0%
% Short		0
% Medium		0
%Long		100
Assumed E80:short		0,00
Assumed E80:medium		0,00
Assumed E80:long		3,50
Assumed E80 total		2366
Growth Rate (%) 5 years		N/a
E80 based on 6 axle truck (Table 5 of TRH16)		
PROJECTED CUMULATIVE PAVEMENT LOADING		
2022	Growth rate (%)	0,00
	Annual average **daily E80**	2 366
	Growth Factor (gx)	1,00
2032	Cumulative Factor (fy)	3 650
	Cumulative E80	8 635 900
2042	Cumulative Factor (fy)	7 300
	Cumulative E80	17 271 800
2052	Cumulative Factor (fy)	10 950
	Cumulative E80	25 907 700

Further input based on the above calculations with regard to road pavement layers and requirements would be required by a pavement design specialist.

2.8 OTHER TRAFFIC-RELATED MATTERS

Table 2.11 provides a summary of the following:

a) Road safety.
b) Non-motorised transport.
c) Public transport.
d) Anticipated axel loads (E80s) on roads network.

TABLE 2.11: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS				
Item	**Description of Element**	**General Comments**	**Specific Issues**	**Actions Required**
1.	**ROAD SAFETY MATTERS**			
1.1	**Access to the proposed South Block and Jindal MIOP infrastructure**			
1.1.1	**Proposed Access Route**	The proposed access route is described in more detail as part of **Section 2.5**.		
1.1.2	**Access from and to main roads**	Access is proposed to the South Block from **Point F**.	a) No dedicated right-turn lane exists at **Point F** which results in a road safety risk. b) **Point F** might need to be repositioned to the south to accommodate a right-turn lane due to limited space between **Point F** and the river crossing approximately 30 meters to the north.	a) As part of the Jindal MIOP, a dedicated right-turn lane on the northern approach of Road R66 and left-turn lane on the western approach would be required from a road safety perspective. **b)** Re-position **Point F** further to the south along Road R66 to accommodate the required dedicated right-turn lane should be addressed as part of the detail design phase.

TABLE 2.11: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS				
Item	**Description of Element**	**General Comments**	**Specific Issues**	**Actions Required**
1.2	**General Road Safety**			
1.2.1	**General road safety**	The following are typical elements related to the road network, which cause road safety problems in rural and urban areas, and which need to be addressed on a continuous basis: a) Intersection layout, with specific reference to dedicated right-turn lanes, where there is heavy vehicle movement. b) Pedestrian movements (road crossings). c) Intersection alignment, such as staggered intersections. d) Insufficient public transport facilities. e) Access control for vehicle movement. f) Fencing to control animal movement.	a) Roads PROW15, L2765, L742, and D395 are gravel roads and visibility issues due to dust created by vehicles might arise due to the expected increase in vehicle volumes that will be generated by the Jindal MIOP. .	In general, the TIA will be compiled to address road safety issues as far as practically possible. Furthermore: a) It is important to collaborate with the relevant road authority to ensure that a road maintenance plan is in place in the light of the proposed increase in heavy vehicle movement. b) It is important to provide future mining and contract workers with training on road safety, with specific reference to slow moving heavy vehicles along public roads. c) Road safety and awareness campaigns should be run at the mine. d) The impact of dust and relevant road surface layers should be addressed by relevant specialist.

TABLE 2.11: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS				
Item	**Description of Element**	**General Comments**	**Specific Issues**	**Actions Required**
1.2.1	**General road safety** (Continue…)	g) Lack of or deterioration of reflective road studs for visibility during the night at strategic points, if applicable. h) Lack of pedestrian walkways to separate pedestrian and vehicle movements at strategic points. i) Lack of provision and quality of road markings. j) Lack of provision and quality of road signs. k) Improper road safety training for mine workers as well as adjacent communities.	.	
2.	**NON-MOTORISED TRANSPORT**			
2.1	**Non-motorised transport**	a) Pedestrian activity was observed during the relevant site visit at the intersections under investigation, predominantly at **Point D** where retail activities are present, and loading and off-loading of public transport occurs.	a) Potential for vehicle/pedestrian conflict where no non-motorised facilities like pedestrian crossings exist.	a) Regardless of the Jindal MIOP, road safety mitigating measures at **Point D,** which includes pedestrian crossings/ walkways, should be implemented. b) Loading and off-loading facilities should be provided at strategic points where mining related workers are proposed to be loaded and off-loaded.

TABLE 2.11: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS				
Item	**Description of Element**	**General Comments**	**Specific Issues**	**Actions Required**
3.	**PUBLIC TRANSPORT**			
3.1	**Public transport**	a) Three types of public transport commuters are relevant: i) Firstly, workers who will travel to and from the Jindal MIOP. ii) Secondly, visitors to the Jindal MIOP. iii) Public transport serving the community.	a) Public transport within the area where mining infrastructure is proposed to be constructed within the South Block is limited. b) Public transport is available along Road P47-7 (R66).	a) Contracted transport should be considered by the Jindal MIOP for the transportation of staff to and from strategic points where public transport is readily available. b) Public transport loading and off-loading bays should be identified and assessed as part of the detail design phase in order to minimise conflict between heavy vehicles and public transport.

Section 3

3. FINDINGS AND RECOMMENDATIONS

Based on a site inspection of the existing road network adjacent to the site under investigation, traffic surveys, calculations and reference to the relevant traffic engineering guideline documents, the following findings and recommendations were made:

3.1 FINDINGS

The capacity calculations for the traffic impact assessment were conducted for the years 2023 (base year), 2028 (5 years from base year) and 2033 (10 years from base year) respectively. This time frame is in line with traffic engineering guidelines and practice and is determined by the expected number of vehicle trips that could potentially be generated during any specific peak hour by a specific development.

The following are discussed in terms of the findings:

a) Summary of key findings from investigations.
b) Traffic impact during the respective phases.

3.1.1 SUMMARY OF KEY FINDINGS FROM INVESTIGATIONS

The following key findings were made from information gathered and investigations:

a) Levels of Service at intersections under investigation.	Current Levels of Service at intersections under investigation were found to be acceptable and was determined to remain acceptable for all scenarios investigated with the Jindal MIOP, and no mitigating measures are required from an intersection performance perspective. Improvements are, however, recommended from a road safety perspective.
b) Vehicle Trips anticipated to be generated by the Jindal MIOP and capacity of existing road network to accommodate the anticipated vehicle trips to be generated by the Jindal MIOP.	Anticipated vehicle trips were determined by means of trip generation calculations for relevant proposed phases for the proposed mining activities and were concluded as illustrated below. <u>Anticipated Vehicle Trips: Construction Phase:</u> AM Peak: 52 trips in, 27 trips out. PM Peak: 27 trips in, 52 trips out. <u>Anticipated Vehicle Trips: Operational Phase – 5 years from Base year:</u> AM Peak: 84 trips in, 75 trips out. PM Peak: 75 trips in, 84 trips out.

(Item b. Continue…)

Anticipated Vehicle Trips: Operational Phase 10 Years from Base year:
AM Peak: 124 trips in, 81 trips out.
PM Peak: 81 trips in, 124 trips out.

It could be concluded that the existing road network has vehicle capacity available to accommodate the anticipated number of vehicle trips proposed to be generated by the Jindal MIOP.

c) Potential Axel Loads (E80s) due to the Jindal MIOP

High-level calculations were conducted to determine the anticipated axel loads (E80s) on Road PROW15 due to the transportation of concentrate between the plant and the Nkwalini Railway Siding due to the Jindal MIOP. Further input based on the above calculations with regard to road pavement layers and requirements would be required by a pavement design specialist.

d) Sensitivity of road sections and intersections from a traffic engineering perspective.

It was found that:

i. In terms of existing conditions (without the Jindal MIOP), most of the existing road network and intersections under investigation (apart from **Point D**) is considered to have a low sensitivity from a traffic engineering perspective.
ii. In terms of existing conditions (without the Jindal MIOP), the intersection of Road R66, Shop Access and Road PROW314 (**Point D**) is considered to have a medium sensitivity from a traffic engineering perspective, due to the retail activities at this intersection which create vehicular traffic and pedestrian movements (potential vehicle/pedestrian conflict). Implementing road safety mitigating measures, which include traffic calming and pedestrian crossings/ walkways regardless of the Jindal MIOP, would improve the sensitivity to low.
iii. In terms of anticipated future conditions with the Jindal MIOP, most of the existing road network and intersections would still be considered to have a low sensitivity from a traffic engineering perspective, apart from the following mentioned in points (iv) and (v).
iv. A change in sensitivity for sections of Road D395 and Road L745 are envisaged due to potential heavy vehicle movement as part of the Jindal MIOP, as these road sections contain residential areas along the road sections, and therefore these road sections would be considered to have a medium sensitivity from a traffic

safety perspective. Road safety awareness campaigns and training are recommended for mine workers and communities, although the sensitivity would remain ongoing as long as mine activities contribute vehicular traffic along these road sections.

v. From a road safety perspective, a change in sensitivity for the intersection of Road R66 and Road PROW15 (**Point F**) is envisaged due to potential heavy vehicle movement as part of the Jindal MIOP (right-turn movements by heavy vehicles), and due to the lack of a dedicated right-turn lane on the northern approach of Road R66. Implementing a right-turn lane along Road R66 on the northern approach at Point F is envisaged to improve the sensitivity of the relevant intersection to a low sensitivity.

e) Mine infrastructure proposed to be located over sections of Road D395.

Access to and from the Jindal MIOP infrastructure is proposed to be gained directly from Road D395 which is classified as a U4b road. Road D395 currently traverses through the proposed site of the Jindal MIOP where mining infrastructure is proposed and would need to be diverted to accommodate the Jindal MIOP infrastructure.

f) Proposed access route to the Jindal MIOP from Road P47-7 (R66).

As part of access from and to the Jindal MIOP, a more direct access route is proposed which would ultimately link up with the existing intersection of Road P47-7 (R66) and Road PROW15 (**Point F**). No dedicated right-turn lane exists at **Point F** which results in a road safety risk and **Point F** might need to be repositioned to the south to accommodate a right-turn lane due to limited space between **Point F** and the river crossing approximately 30 meters to the north.

The proposed access route would need more detailed investigation as part of the detailed design phase which should include consultation with roads authorities and the local community. The proposed access route would also be utilised by heavy vehicles transporting processed product from the Jindal MIOP to the Nkwalini railway siding for loading onto trains. Access to the Nkwalini railway siding is currently at **Point E**.

The proposed access route is regarded as acceptable from a traffic engineering point of view. Final requirements and approval should be obtained as part of the detailed design phase.

g)	Non-motorised transport: Pedestrian movement	Pedestrian activity was observed during the relevant site visit at the intersections under investigation, dominantly at **Point D** where retail activities are present, and loading and off-loading by public transport occurs. there is potential for vehicle/ pedestrian conflict where no non-motorised facilities like pedestrian crossings exist.
h)	Public Transport	Public transport within the area where mining infrastructure is proposed to be constructed within the South Block is limited, while public transport is available along Road P47-7 (R66).

3.1.2 TRAFFIC IMPACT WITHOUT THE JINDAL MIOP

Table E-1, presented as part of **Appendix E,** provides a summary of the impact ratings respectively without the Jindal MIOP. **Table E-1** of **Appendix E** was derived from **Appendix F** of the report that provides the criteria used in terms of the assessments process.

It is possible to conclude from **Table E-1** that the existing conditions on the existing road network without the Jindal MIOP that:

a) From a road capacity perspective current impacts have a low significance and that no mitigating measures are required.
b) From a road safety perspective, apart from Point D, overall the other intersections and relevant road sections investigated have a low significance and no mitigating measures are required.
c) From a road safety perspective, pedestrian movement at Point D because of retail activities and public transport loading and off-loading at the intersection is regarded to have a medium significance due to a lack of pedestrian crossings and walkways, and therefore mitigating measures would be required. With the implementation of mitigating measures as recommended in **Section 3.2** of this report, the significance would improve to a positive medium.

3.1.3 TRAFFIC IMPACT DURING THE CONSTRUCTION AND OPERATIONAL PHASES WITH THE JINDAL MIOP

Tables E-2 and **E-3,** presented as part of **Appendix E,** provide a summary of the impact ratings respectively with the Jindal MIOP for the construction and operational phases. **Tables E-2** and **E-3** of **Appendix E** were derived from **Appendix F** of the report that provides the criteria used in terms of the assessments process.

It is possible to conclude from **Tables E-2** and **E-3** that in terms of the anticipated vehicle traffic to be generated by the Jindal MIOP that:

a) That vehicle capacity on the road network is available and will be able to accommodate the additional vehicle trips anticipated to be generated by the Jindal MIOP during the construction and operational phases, and therefore from a road capacity perspective has a low significance and no mitigating measures would be required.

b) It could be expected that workers of the Jindal MIOP would make use of the public transport loading and off-loading facilities as well as the retail facilities at Point D. From a road safety perspective, pedestrian movement at Point D because of retail activities and public transport loading and off-loading at the intersection is regarded to have a medium significance due to a lack of pedestrian crossings and walkways, and therefore mitigating measures would be required. With the implementation of mitigating measures as recommended in **Section 3.2** of this report, the significance would improve to a positive medium.

c) From a road safety perspective, the anticipated vehicle trips to be generated by the Jindal MIOP during the construction and operational phases would have a low significance at Points C, D, and E and no mitigating measures would be required.

d) From a road safety perspective, the anticipated vehicle trips to be generated by the Jindal MIOP during the construction and operational phases would have a high significance at Point F, and that mitigating measures would be required. With the implementation of mitigating measures as recommended in **Section 3.2**, the significance would improve to a positive high.

It is furthermore possible to conclude that owing to the type and nature of the Jindal MIOP, it is expected that the Jindal MIOP will have a manageable impact on vehicle traffic during all phases, provided that road infrastructure improvements are implemented as indicated in **Section 3.2**.

3.1.4 TRAFFIC IMPACT DURING THE DECOMMISSIONING AND CLOSURE PHASE WITH THE JINDAL MIOP

Table E-4 presented as part of **Appendix E** provides a summary of the impact ratings respectively with the Jindal MIOP for the decommissioning and closure phase. **Table E-4** of **Appendix E** was derived from **Appendix F** of the report that provides the criteria used in terms of the assessments process.

The closure phase entails the Jindal MIOP decommissioning and closure, where all mining activities cease, equipment is removed from the site, and the mining company leaves the site and rehabilitation of the site is done. From a road capacity and safety perspective, taking into consideration that the mining company has ceased all operations and vacated the site, an insignificant volume of vehicle trips would still be active on the relevant road network due to the Jindal MIOP, and is therefore anticipated to have a negligible impact on all road-related elements, and therefore have an insignificant impact.

The concerns at Point D with regards to pedestrian movements, should no mitigating measures have been implemented, would persist as long as the public transport loading and off-loading takes place, and the retail facilities are active.

3.2 RECOMMENDATIONS

The following are discussed in terms of the recommendations:

a) Detailed summary of recommended improvements (mitigating measures) without the Jindal MIOP.
b) Detailed summary of recommended improvements (mitigating measures) with the Jindal MIOP.
c) Other traffic engineering related recommendations.
d) Institutional arrangements.
e) Reasoned opinion for authorisation.

3.2.1 DETAILED SUMMARY OF RECOMMENDED IMPROVEMENTS WITHOUT THE JINDAL MIOP

Table 3.1 provides a short summary of the intersection improvements recommended **without** the Jindal MIOP, and whether the improvements are required from an Intersection performance point of view (technical/capacity) or a road safety point of view.

Figure 3.1 provides a graphical presentation of the recommended intersection and road network improvements **without** the Jindal MIOP while **Table 3.2** provides detailed information on intersection improvements recommended **without** the Jindal MIOP.

The TIA does not comment on pavement layer attributes in terms of the relevant road sections. The last-mentioned need to be based on recommendations to be made by a Pavement Design Specialist input.

TABLE 3.1: SUMMARY OF INTERSECTION IMPROVEMENTS RECOMMENDED IN TERMS OF ROAD/EARTHWORKS WITHOUT THE JINDAL MIOP			
Point	Intersection Description	**<u>WITHOUT</u>** Jindal MIOP	
		Intersection Performance Perspective	Road Safety Perspective
C	Intersection of Roads P47-4 (R66), P393 (R34) and Local Road	No improvements required.	
D	Intersection of Roads P47-4 (R66), PROW314 and Shop Access	No improvements required.	a) Road safety mitigating measures at **Point D** which includes pedestrian crossings/ walkways should be implemented.
E	Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road	No improvements required.	
F	Intersection of Roads P47-4 (R66) and PROW15	No improvements required.	

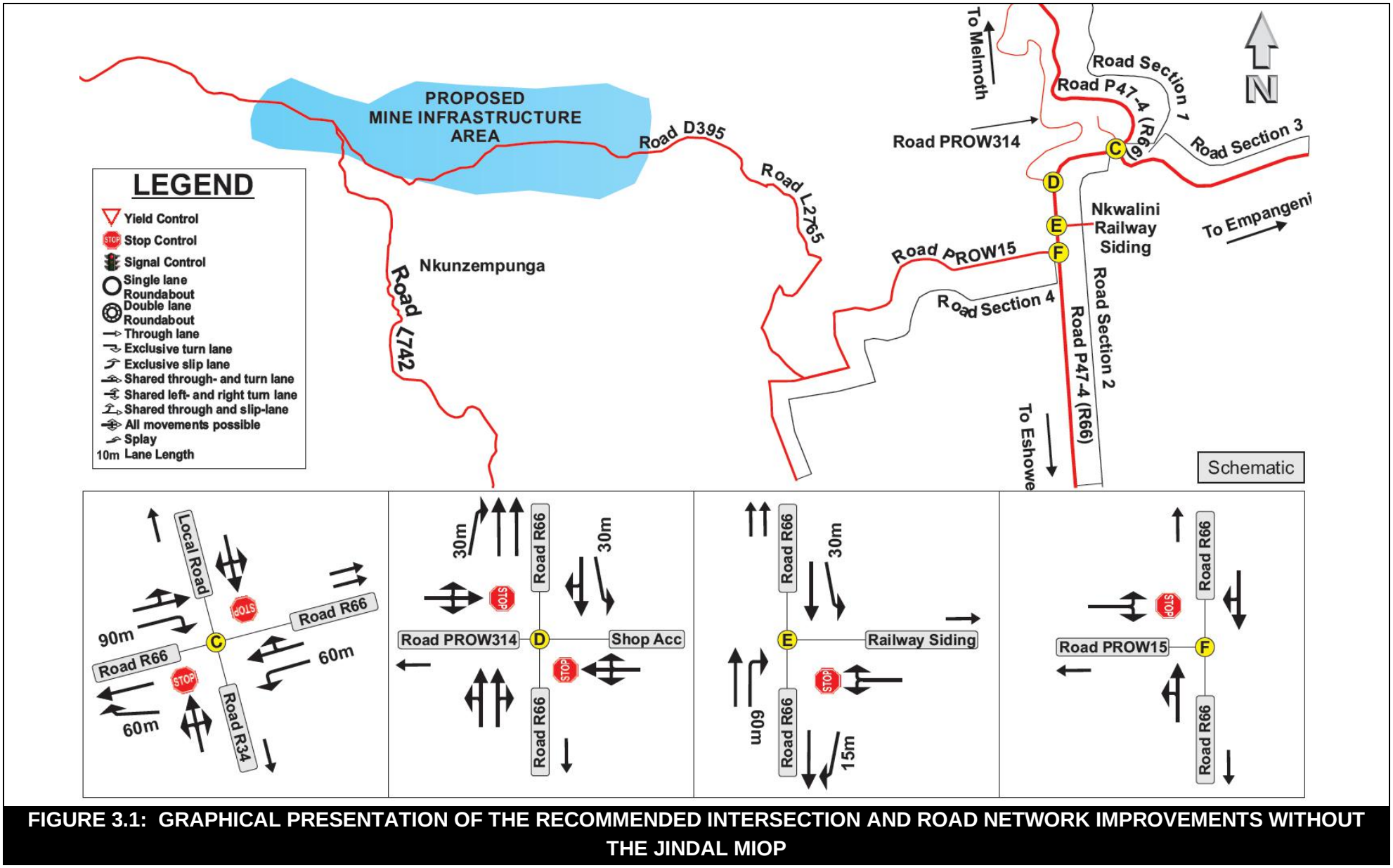


FIGURE 3.1: GRAPHICAL PRESENTATION OF THE RECOMMENDED INTERSECTION AND ROAD NETWORK IMPROVEMENTS WITHOUT THE JINDAL MIOP

TABLE 3.2: RECOMMENDED ROAD NETWORK IMPROVEMENTS WITHOUT THE JINDAL MIOP																			
POINT	INTERSECTION	APPROACH	IMPROVEMENTS RECOMMENDED																GEOMETRY DETERMINED BY MEANS OF SIDRA
			Approach Traffic Control				Extra Lanes Required (m)						Improvements Required from a Road Safety or Intersection Performance Perspective	Reflective Road Studs required at Intersection	Road Markings Required	Road Signs Required	Public Transport Loading and Off-Loading	Pedestrian Walkways	
			Free Flow	Stop	60m Radius Roundabout	Traffic Light System	Left-turn Taper	Left-turn Lane	Acceleration Lane	Acceleration Lane in Middle of Road	Dedicated Right-turn Lane	Number of Extra Through Lanes							
C	Intersection of Roads P47-4 (R66), P393 (R34) and Local Road	*North (Local Road)*	-	Yes	-	-	No improvements required or recommended.												
		East (Road R66)	Yes	-	-	-													
		South (Road R34)	-	Yes	-	-													
		West (Road R66)	Yes	-	-	-													
D	Intersection of Roads P47-4 (R66), PROW314 and Shop Access	*North (Road R66)*	Yes	-	-	-	No geometric improvements required or recommended from a road capacity perspective. Road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented.												
		East (Shop Access)	-	Yes	-	-													
		South (Road R66)	Yes	-	-	-													
		West (PROW34)	-	Yes	-	-													
E	Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road	*North (Road R66)*	Yes	-	-	-	No improvements required or recommended.												
		East (Railway)	-	Yes	-	-													
		South (Road R66)	Yes	-	-	-													
F	Intersection of Roads P47-4 (R66) and PROW15	*North (Road R66)*	Yes	-	-	-	No improvements required or recommended.												
		South (Road R66)	Yes	-	-	-													
		West (PROW15)	-	Yes	-	-													

3.2.2 DETAILED SUMMARY OF RECOMMENDED IMPROVEMENTS WITH THE JINDAL MIOP

Table 3.3 provides a short summary of the intersection improvements recommended with the Jindal MIOP, and whether the improvements are required from an Intersection performance point of view (technical/capacity) or a road safety point of view.

Figure 3.2 provides a graphical presentation of the recommended intersection and road network improvements **WITH** the Jindal MIOP while **Table 3.4** provides detailed information on intersection improvements recommended.

The TIA does not comment on pavement layer attributes in terms of the relevant road sections. The last-mentioned need to be based on recommendations to be made by a Pavement Design Specialist input.

TABLE 3.3: SUMMARY OF INTERSECTION IMPROVEMENTS RECOMMENDED IN TERMS OF ROAD/EARTHWORKS WITH THE JINDAL MIOP			
Point	Intersection Description	**WITH** Jindal MIOP	
		Intersection Performance Perspective	Road Safety Perspective
C	Intersection of Roads P47-4 (R66), P393 (R34) and Local Road	No improvements required.	
D	Intersection of Roads P47-4 (R66), PROW314 and Shop Access	No improvements required.	a) Regardless of the Jindal MIOP, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented.
E	Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road	No improvements required.	
F	Intersection of Roads P47-4 (R66) and PROW15	None.	a) Recommended to provide a dedicated right-turn lane on the northern approach of Road R66. b) Provision of dedicated right-turn lane would require relocating the existing intersection to the south in order to accommodate the right-turn lane, due to an existing bridge to the north. c) Recommended to provide a dedicated left-turn lane on the southern approach of Road R66 and western approach of Road PROW15.

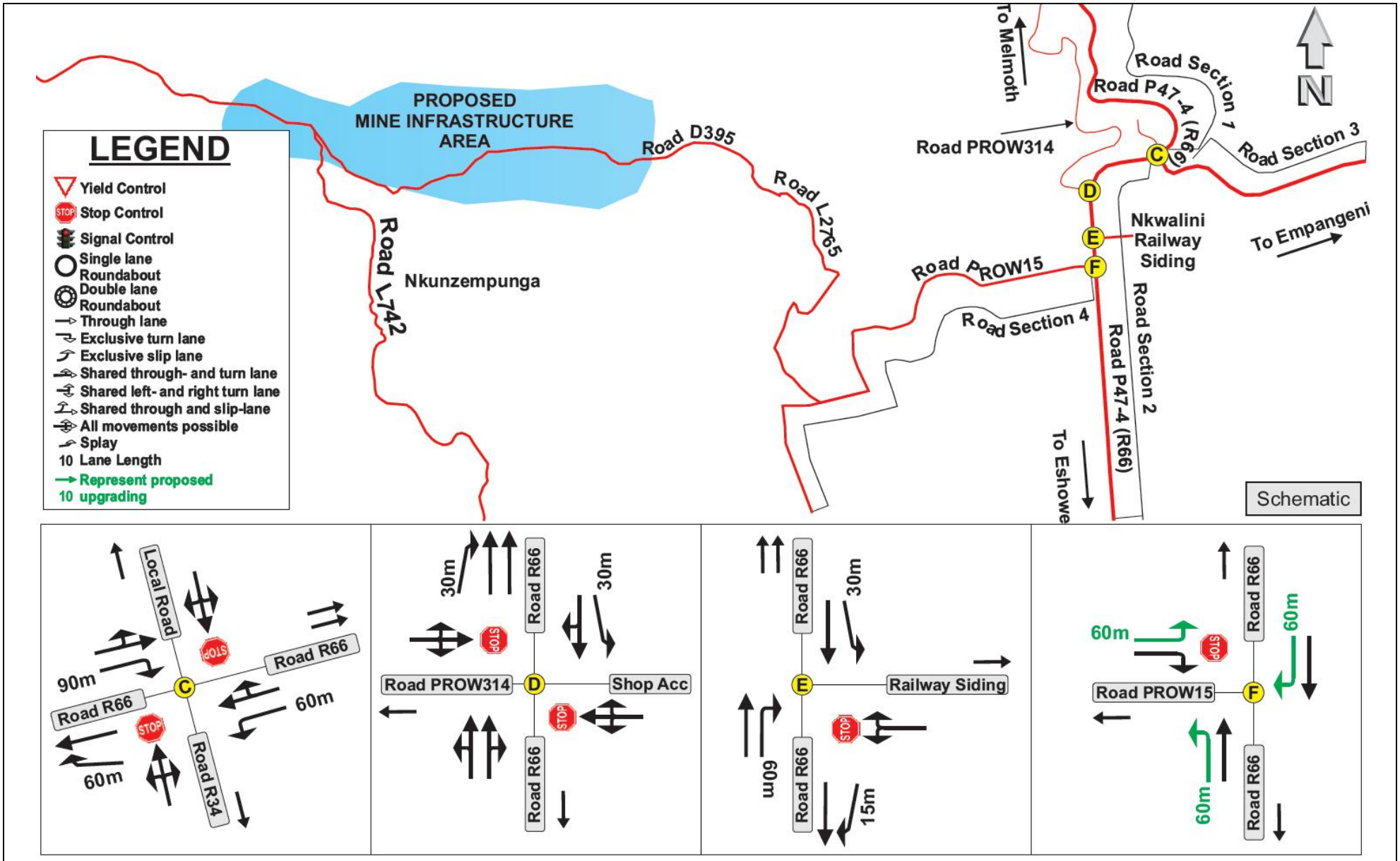
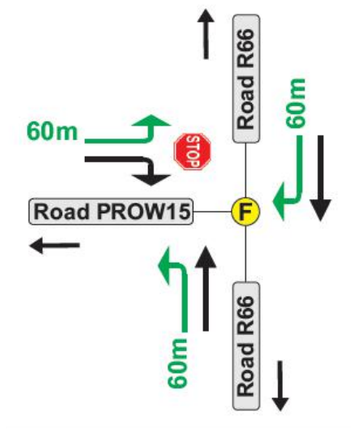


FIGURE 3.2: GRAPHICAL PRESENTATION OF THE RECOMMENDED INTERSECTION AND ROAD NETWORK IMPROVEMENTS WITH THE JINDAL MIOP

TABLE 3.4: RECOMMENDED ROAD NETWORK IMPROVEMENTS WITH THE JINDAL MIOP																				
POINT	INTERSECTION	APPROACH	IMPROVEMENTS RECOMMENDED																	GEOMETRY DETERMINED BY MEANS OF SIDRA
			Approach Traffic Control				Extra Lanes Required (m)													
			Free Flow	Stop	60m Radius Roundabout	Traffic Light System	Left-turn Taper	Left-turn Lane	Acceleration Lane	Acceleration Lane in Middle of Road	Dedicated Right-turn Lane	Number of Extra Through Lanes	Improvements Required from a Road Safety or Intersection Performance Perspective	Reflective Road Studs required at Intersection	Road Markings Required	Road Signs Required	Public Transport Loading and Off-Loading	Pedestrian Walkways	
C	Intersection of Roads P47-4 (R66), P393 (R34) and Local Road	*North (Local Road)*	-	Yes	-	-	No improvements required or recommended.													
		East (Road R66)	Yes	-	-	-														
		South (Road R34)	-	Yes	-	-														
		West (Road R66)	Yes	-	-	-														
D	Intersection of Roads P47-4 (R66), PROW314 and Shop Access	*North (Road R66)*	Yes	-	-	-	No geometric improvements required or recommended from a road capacity perspective. Regardless of the Jindal MIOP, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented.													
		East (Shop Access)	-	Yes	-	-														
		South (Road R66)	Yes	-	-	-														
		West (PROW34)	-	Yes	-	-														
E	Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road	*North (Road R66)*	Yes	-	-	-	No improvements required or recommended.													
		East (Railway)	-	Yes	-	-														
		South (Road R66)	Yes	-	-	-														
F	Intersection of Roads P47-4 (R66) and PROW15	*North (Road R66)*	Yes	-	-	-	-	-	-	-	Yes, 60m	-	-	Yes	Yes	Yes	-	-		
		South (Road R66)	Yes	-	-	-	-	Yes, 60m	-	-	-	-	-		Yes	Yes	-	-		
		West (PROW15)	-	Yes	-	-	-	-	-	-	-	-	-		Yes	Yes	-	-		

3.2.3 OTHER TRAFFIC ENGINEERING RELATED RECOMMENDATIONS

In addition to the previous recommendations made in terms of intersection geometric improvements, the following traffic engineering related actions/ improvements are recommended:

a) Regardless of the Jindal MIOP, road safety mitigating measures at **Point D** which includes pedestrian crossings/ walkways should be implemented.
b) Public transport loading and off-loading bays along Road R66 should be identified and assessed as part of the detail design phase in order to minimise conflict between heavy vehicles and public transport.
c) Access to and from the Jindal MIOP infrastructure from Road D395 would require further investigation as part of the detailed design phase in terms of re-routing or diverting the relevant section of Road D395.
d) The proposed access route to the Jindal MIOP would need more detailed investigation as part of the detailed design phase, which should include consultation with roads authorities and the local community.
e) Due to limited public transport available within the area where the Jindal MIOP is proposed there could be a shortage of public transport available for workers to and from the Jindal MIOP. Therefore contracted transport to strategic points where public transport is readily available is recommended. It is also recommended that existing operators within the area should be approached in order to build capacity and support local empowerment.
f) On-site circulation which includes parking, access gates, security and operations, with specific reference to heavy vehicles, should be further addressed as part of the detail design phase.
g) Due to slow travelling heavy vehicles proposing to transport concentrate between the proposed plant and railway siding, it is recommended that investigations should be conducted as part of the detail design phase in terms of the potential requirement of climbing/ passing lanes.

3.2.4 INSTITUTIONAL ARRANGEMENTS

The following recommendations are made in terms of the detailed design phase of roads as part of the Jindal MIOP:

a) Detailed investigations should be conducted in conjunction with the relevant road authority in terms of the existing quality and potential life span of the existing road surface layers of the roads where consumables, concentrate and workers will be transported.
b) A road maintenance plan should be prepared in conjunction with the relevant road authority on public roads where trucks will operate as soon as the project has been approved to ensure that the consumables, concentrate and workers can be transported at all times.

3.2.5 REASONED OPINION FOR AUTHORISATION

In conclusion of the findings as part of the investigations, Siyazi Thula Transportation Planning (Pty) Ltd is of the opinion that the Jindal MIOP would have a manageable impact on the relevant roads network during all phases as long as:

a) the mitigating measures are implemented as recommended as part of **Section 3** of this report.
b) ROM ore is transported within mine site boundaries (not making use of public roads).
c) The iron ore concentrate is exported to the Nkwalini Railway Siding by road and further transported by rail.

The Jindal MIOP is therefore recommended to be granted authorisation in terms of the Traffic Impact Assessment.

APPENDIX A

INFORMATION RELATED TO STATUS QUO

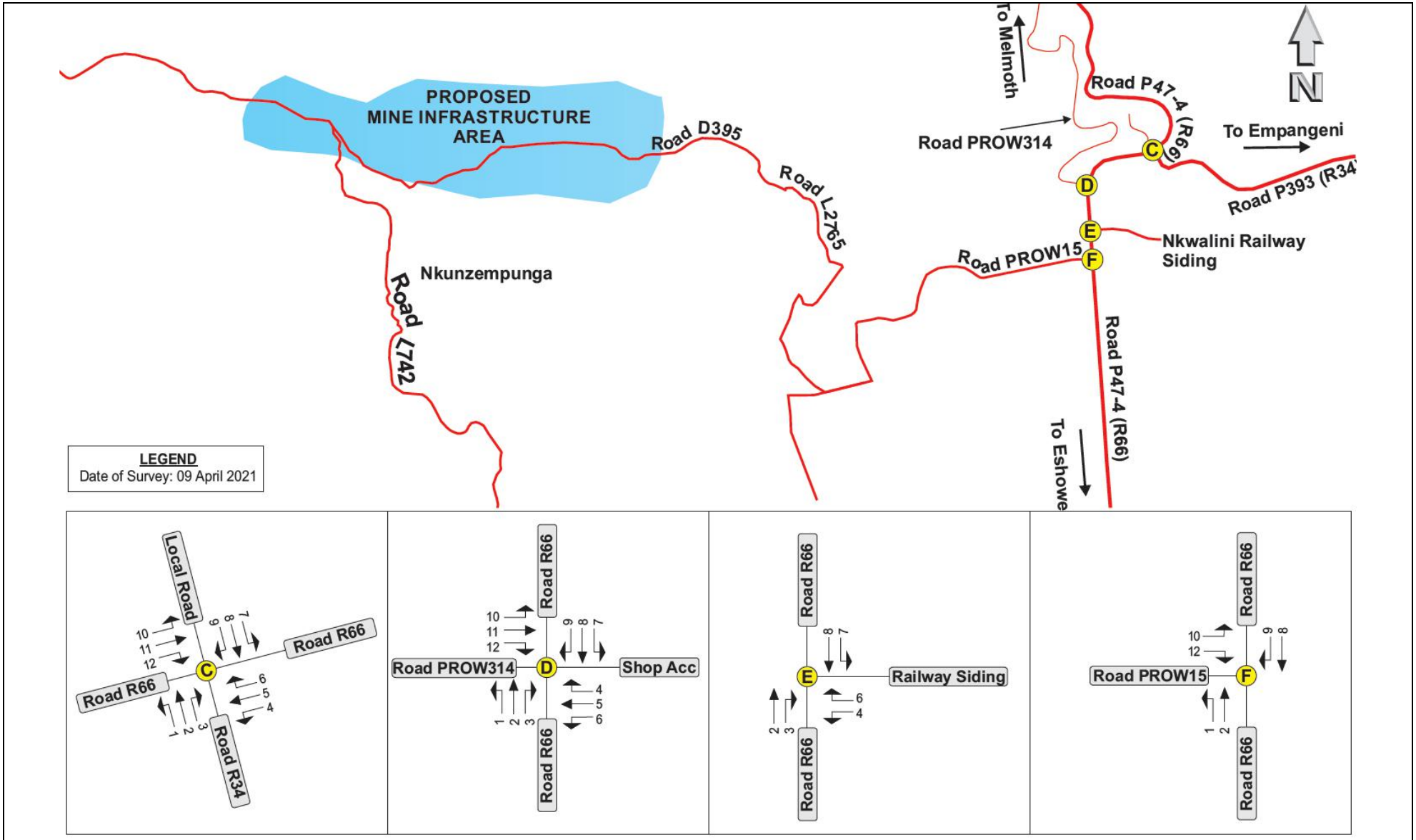


FIGURE A-1: RELEVANT MOVEMENTS RELATED TO TRAFFIC COUNTS (SOUTHERN BLOCK AREA)

TABLE A-1: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD P393 (R34) (POINT C) (09 APRIL 2021)													
TIME INTERVALS	**MOVEMENTS**												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
06:00-07:00	42	0	61	42	68	1	2	0	0	1	78	37	**332**
06:15-07:15	48	0	84	49	76	1	2	0	0	2	87	44	**393**
06:30-07:30	47	0	93	55	85	0	2	0	0	2	104	47	**435**
06:45-07:45	52	0	96	58	75	0	3	0	0	2	106	40	**432**
07:00-08:00	53	0	89	81	69	0	1	0	0	1	108	38	**440**
07:15-08:15	53	0	89	89	77	0	1	0	0	0	114	44	**467**
07:30-08:30	55	0	77	98	80	1	1	0	0	1	107	39	**459**
07:45-08:45	48	0	73	90	99	1	0	0	0	1	96	38	**446**
08:00-09:00	57	0	66	79	108	1	0	0	0	1	96	57	**465**
08:15-09:15	58	0	80	82	97	1	0	0	0	1	105	60	**484**
08:30-09:30	62	0	98	87	105	0	0	0	0	0	106	65	**523**
08:45-09:45	55	0	90	101	92	0	0	0	0	0	103	75	**516**
09:00-10:00	48	0	100	119	102	0	0	0	1	1	103	55	**529**
09:15-10:15	40	0	82	116	106	0	0	0	1	1	96	57	**499**
09:30-10:30	39	0	75	104	96	0	0	0	1	1	95	61	**472**
09:45-10:45	48	0	66	98	90	0	0	0	1	1	107	66	**477**
10:00-11:00	46	0	80	70	73	0	0	0	0	0	101	68	**438**
10:15-11:15	44	0	77	63	73	0	0	0	0	0	102	69	**428**
10:30-11:30	50	0	70	63	65	0	0	0	0	0	100	63	**411**
10:45-11:45	45	0	79	65	57	0	0	0	0	0	84	53	**383**
11:00-12:00	46	0	76	64	45	0	0	0	0	0	83	53	**367**
11:15-12:15	58	0	77	65	40	0	0	0	0	0	76	51	**367**
11:30-12:30	46	0	81	70	40	0	0	0	0	0	81	53	**371**
11:45-12:45	49	0	88	60	63	0	0	0	0	0	90	62	**412**
12:00-13:00	50	0	77	54	72	0	0	0	0	0	92	63	**408**
12:15-13:15	40	0	86	69	88	3	0	0	0	0	99	61	**446**
12:30-13:30	44	0	85	70	92	5	0	0	0	0	106	66	**468**
12:45-13:45	44	0	80	80	82	7	0	0	0	0	118	66	**477**
13:00-14:00	44	0	96	82	82	10	0	0	0	0	138	101	**553**
13:15-14:15	47	0	89	72	71	7	0	0	0	0	142	108	**536**
13:30-14:30	44	0	92	87	73	5	0	0	0	0	139	109	**549**
13:45-14:45	54	0	110	80	76	3	0	0	0	0	144	109	**576**
14:00-15:00	44	0	88	99	82	0	0	0	0	0	126	75	**514**
14:15-15:15	34	0	96	107	84	0	0	0	0	0	126	102	**549**
14:30-15:30	38	0	109	102	83	0	0	0	0	0	112	108	**552**
14:45-15:45	29	0	111	110	80	0	0	0	0	0	93	96	**519**
15:00-16:00	39	0	124	89	84	0	0	0	0	0	104	120	**560**
15:15-16:15	49	0	126	79	73	0	0	0	0	0	110	88	**525**
15:30-16:30	39	0	116	74	93	0	0	0	0	0	149	85	**556**
15:45-16:45	36	0	119	63	89	0	0	0	0	0	177	98	**582**
16:00-17:00	32	0	118	61	75	0	0	0	0	0	180	86	**552**
16:15-17:15	22	0	121	61	85	0	0	0	0	0	168	81	**538**
16:30-17:30	23	0	118	42	60	0	0	0	0	0	146	80	**469**
16:45-17:45	29	0	102	39	50	0	0	0	0	0	137	79	**436**
17:00-18:00	31	0	98	38	57	0	0	0	0	0	159	88	**471**

TABLE A-2: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD PROW314 (POINT D) (09 APRIL 2021)													
TIME INTERVALS	**MOVEMENTS**												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
06:00-07:00	1	86	0	7	1	4	0	107	3	3	4	6	**222**
06:15-07:15	1	89	7	4	1	5	4	116	4	3	3	6	**243**
06:30-07:30	1	105	8	8	1	9	10	118	4	4	4	5	**277**
06:45-07:45	3	104	9	7	2	15	12	110	5	3	4	5	**279**
07:00-08:00	3	104	10	12	2	18	13	102	7	4	4	6	**285**
07:15-08:15	6	108	8	15	4	16	13	114	3	5	3	8	**303**
07:30-08:30	6	102	8	12	4	19	13	119	3	3	2	6	**297**
07:45-08:45	6	92	7	13	3	13	13	132	2	3	3	6	**293**
08:00-09:00	6	91	8	14	2	12	18	147	0	3	2	4	**307**
08:15-09:15	5	104	5	21	3	28	18	134	3	3	2	1	**327**
08:30-09:30	7	103	4	26	4	21	14	149	4	3	2	1	**338**
08:45-09:45	5	101	5	30	5	24	18	125	4	3	2	0	**322**
09:00-10:00	8	98	6	28	6	26	18	129	4	2	5	2	**332**
09:15-10:15	5	96	4	25	4	15	21	124	2	1	5	2	**304**
09:30-10:30	5	88	11	29	3	20	22	112	2	2	5	2	**301**
09:45-10:45	5	98	13	27	10	20	21	113	5	2	4	2	**320**
10:00-11:00	4	95	10	27	13	17	19	95	5	3	1	0	**289**
10:15-11:15	9	88	13	23	12	19	16	96	5	3	2	0	**286**
10:30-11:30	7	95	6	18	12	16	13	98	4	5	1	3	**278**
10:45-11:45	9	79	4	17	8	17	9	92	1	4	1	3	**244**
11:00-12:00	7	79	5	21	4	20	7	80	4	3	1	3	**234**
11:15-12:15	4	76	4	20	5	14	8	86	4	4	0	3	**228**
11:30-12:30	8	76	5	17	5	16	11	70	5	1	1	0	**215**
11:45-12:45	6	83	9	22	1	13	14	93	5	1	1	0	**248**
12:00-13:00	6	86	8	20	1	10	16	101	5	2	1	0	**256**
12:15-13:15	6	92	9	20	0	9	15	109	4	2	3	1	**270**
12:30-13:30	2	101	11	18	0	10	19	113	4	2	2	1	**283**
12:45-13:45	10	110	6	19	2	14	23	98	5	4	4	2	**297**
13:00-14:00	12	125	9	16	2	17	24	100	2	4	6	4	**321**
13:15-14:15	12	130	8	17	4	17	23	93	2	4	4	4	**318**
13:30-14:30	16	126	5	19	4	20	23	93	1	4	5	4	**320**
13:45-14:45	8	138	6	13	5	21	21	107	2	2	4	4	**331**
14:00-15:00	9	120	5	13	6	21	22	102	2	1	2	3	**306**
14:15-15:15	13	117	4	12	4	23	22	93	3	1	3	4	**299**
14:30-15:30	9	104	7	13	5	17	22	96	3	1	5	5	**287**
14:45-15:45	11	84	6	15	3	13	18	90	1	2	4	4	**251**
15:00-16:00	10	97	5	21	4	19	16	106	1	3	4	4	**290**
15:15-16:15	10	100	8	22	4	25	17	104	1	3	6	5	**305**
15:30-16:30	14	138	5	24	4	29	15	115	2	4	4	5	**359**
15:45-16:45	19	161	5	22	3	28	15	108	2	5	5	6	**379**
16:00-17:00	21	163	4	14	1	18	14	91	2	5	5	5	**343**
16:15-17:15	23	152	1	14	3	11	14	92	1	5	3	2	**321**
16:30-17:30	21	132	1	11	2	7	11	71	1	5	3	1	**266**
16:45-17:45	18	124	3	12	2	10	12	66	1	3	3	3	**257**
17:00-18:00	18	146	3	12	2	11	10	77	1	2	3	4	**289**

TABLE A-3: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND NKWALINI RAILWAY SIDING ACCESS ROAD (POINT E) (09 APRIL 2021)

TIME INTERVALS	MOVEMENTS						
	2	3	4	6	7	8	TOTAL
06:00-07:00	87	1	3	0	5	115	**211**
06:15-07:15	97	0	0	0	6	120	**223**
06:30-07:30	114	0	0	0	8	123	**245**
06:45-07:45	115	0	0	1	23	99	**238**
07:00-08:00	116	0	2	1	21	99	**239**
07:15-08:15	121	0	2	1	21	116	**261**
07:30-08:30	115	0	2	1	21	116	**255**
07:45-08:45	105	0	2	0	6	145	**258**
08:00-09:00	105	1	1	0	3	162	**272**
08:15-09:15	111	1	1	3	7	149	**272**
08:30-09:30	111	1	1	3	7	169	**292**
08:45-09:45	108	1	1	3	7	148	**268**
09:00-10:00	109	0	0	3	9	150	**271**
09:15-10:15	103	0	0	2	4	147	**256**
09:30-10:30	102	0	0	2	2	141	**247**
09:45-10:45	113	0	0	3	2	140	**258**
10:00-11:00	103	0	0	6	0	122	**231**
10:15-11:15	106	0	0	4	0	119	**229**
10:30-11:30	94	0	0	14	1	118	**227**
10:45-11:45	79	0	0	13	1	111	**204**
11:00-12:00	81	0	0	10	1	103	**195**
11:15-12:15	74	0	0	10	2	107	**193**
11:30-12:30	89	0	0	0	1	86	**176**
11:45-12:45	98	0	0	0	1	114	**213**
12:00-13:00	100	0	0	0	1	120	**221**
12:15-13:15	107	0	0	0	1	129	**237**
12:30-13:30	114	0	0	0	1	131	**246**
12:45-13:45	126	1	0	0	2	117	**246**
13:00-14:00	146	1	1	0	2	118	**268**
13:15-14:15	149	1	1	1	1	113	**266**
13:30-14:30	146	1	1	1	1	115	**265**
13:45-14:45	151	0	1	1	0	124	**277**
14:00-15:00	133	0	0	1	0	118	**252**
14:15-15:15	134	0	0	0	0	109	**243**
14:30-15:30	120	0	0	0	0	114	**234**
14:45-15:45	101	1	0	0	0	109	**211**
15:00-16:00	112	1	0	0	2	129	**244**
15:15-16:15	115	1	0	3	2	129	**250**
15:30-16:30	153	1	0	4	5	139	**302**
15:45-16:45	181	0	0	4	5	131	**321**
16:00-17:00	184	0	0	4	3	107	**298**
16:15-17:15	174	0	0	2	3	105	**284**
16:30-17:30	152	0	0	2	0	83	**237**
16:45-17:45	142	0	0	3	0	81	**226**
17:00-18:00	164	1	0	3	0	93	**261**

TABLE A-4: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD PROW15 (POINT F) (09 APRIL 2021)							
TIME INTERVALS	**MOVEMENTS**						
	1	**2**	**8**	**9**	**10**	**12**	**TOTAL**
06:00-07:00	0	80	115	3	8	3	**209**
06:15-07:15	0	95	118	2	2	4	**221**
06:30-07:30	0	112	121	2	2	4	**241**
06:45-07:45	0	114	97	2	1	2	**216**
07:00-08:00	0	114	99	2	2	1	**218**
07:15-08:15	5	119	116	2	2	2	**246**
07:30-08:30	6	113	116	2	2	2	**241**
07:45-08:45	8	102	145	2	3	2	**262**
08:00-09:00	8	104	161	2	2	2	**279**
08:15-09:15	4	109	149	1	3	0	**266**
08:30-09:30	4	108	170	0	4	1	**287**
08:45-09:45	2	106	149	0	3	1	**261**
09:00-10:00	2	106	150	0	3	1	**262**
09:15-10:15	1	102	146	1	1	1	**252**
09:30-10:30	1	102	140	1	0	0	**244**
09:45-10:45	1	113	138	2	0	0	**254**
10:00-11:00	1	102	120	2	1	0	**226**
10:15-11:15	1	105	117	2	1	0	**226**
10:30-11:30	0	93	116	2	1	0	**212**
10:45-11:45	1	78	109	2	1	1	**192**
11:00-12:00	2	81	98	5	0	1	**187**
11:15-12:15	2	74	102	5	0	1	**184**
11:30-12:30	2	88	78	8	1	1	**178**
11:45-12:45	1	97	107	7	1	0	**213**
12:00-13:00	0	99	116	4	1	0	**220**
12:15-13:15	0	104	125	4	3	0	**236**
12:30-13:30	0	110	129	2	4	0	**245**
12:45-13:45	0	122	113	4	5	2	**246**
13:00-14:00	0	142	115	4	5	2	**268**
13:15-14:15	0	146	110	4	4	2	**266**
13:30-14:30	0	143	113	3	4	3	**266**
13:45-14:45	0	147	123	2	4	3	**279**
14:00-15:00	0	127	115	3	6	3	**254**
14:15-15:15	0	129	107	2	5	3	**246**
14:30-15:30	0	117	112	2	3	2	**236**
14:45-15:45	0	100	107	2	2	0	**211**
15:00-16:00	0	112	127	2	1	0	**242**
15:15-16:15	3	114	124	5	2	1	**249**
15:30-16:30	3	152	132	7	2	2	**298**
15:45-16:45	3	178	124	7	3	4	**319**
16:00-17:00	3	182	101	6	2	4	**298**
16:15-17:15	0	173	102	3	1	4	**283**
16:30-17:30	1	150	82	1	2	3	**239**
16:45-17:45	1	139	80	1	3	2	**226**
17:00-18:00	1	162	92	1	3	2	**261**

APPENDIX B

TRIP INFORMATION RELATED TO THE EXISTING TRAFFIC

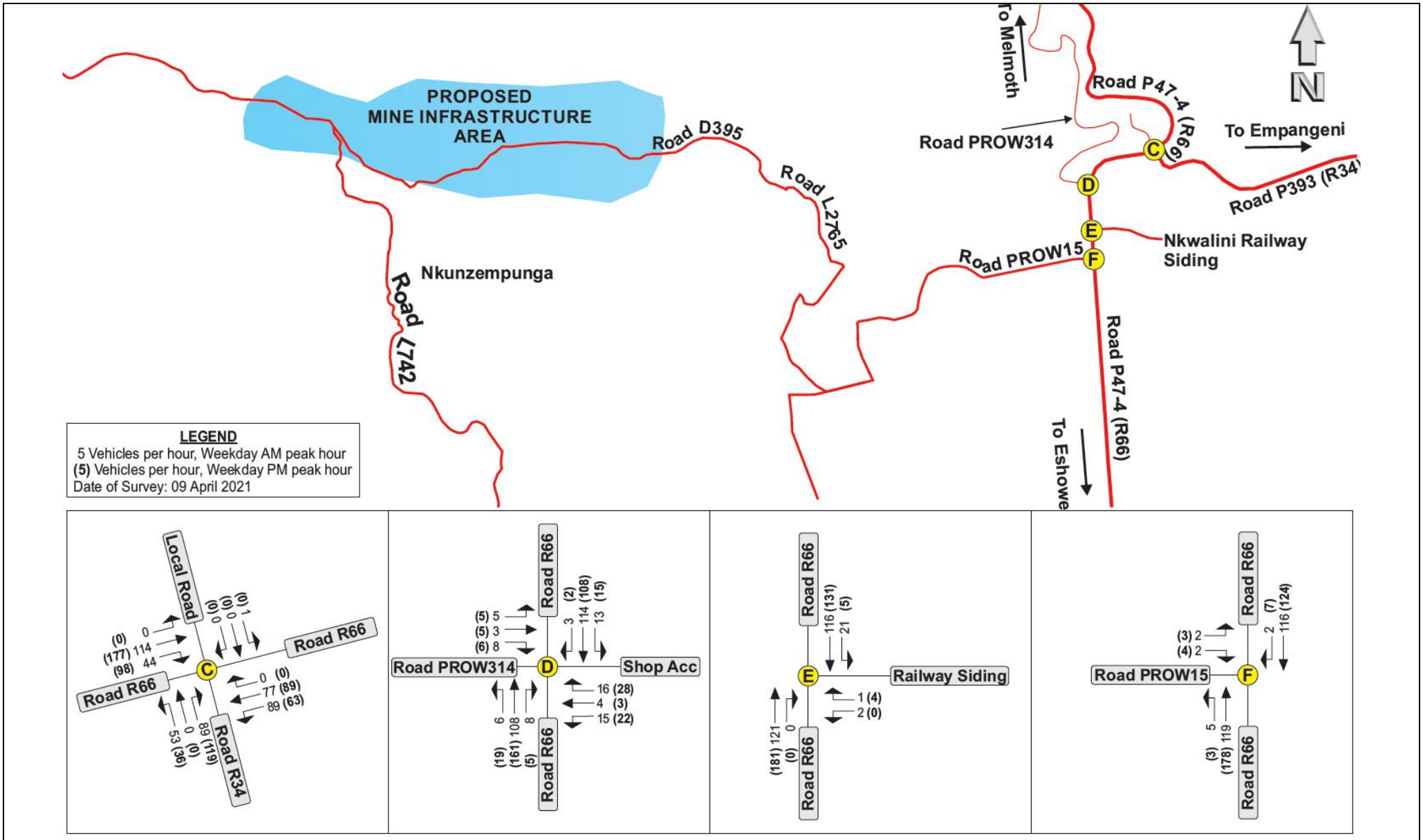


FIGURE B-1: 2021 PEAK-HOUR TRAFFIC (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT

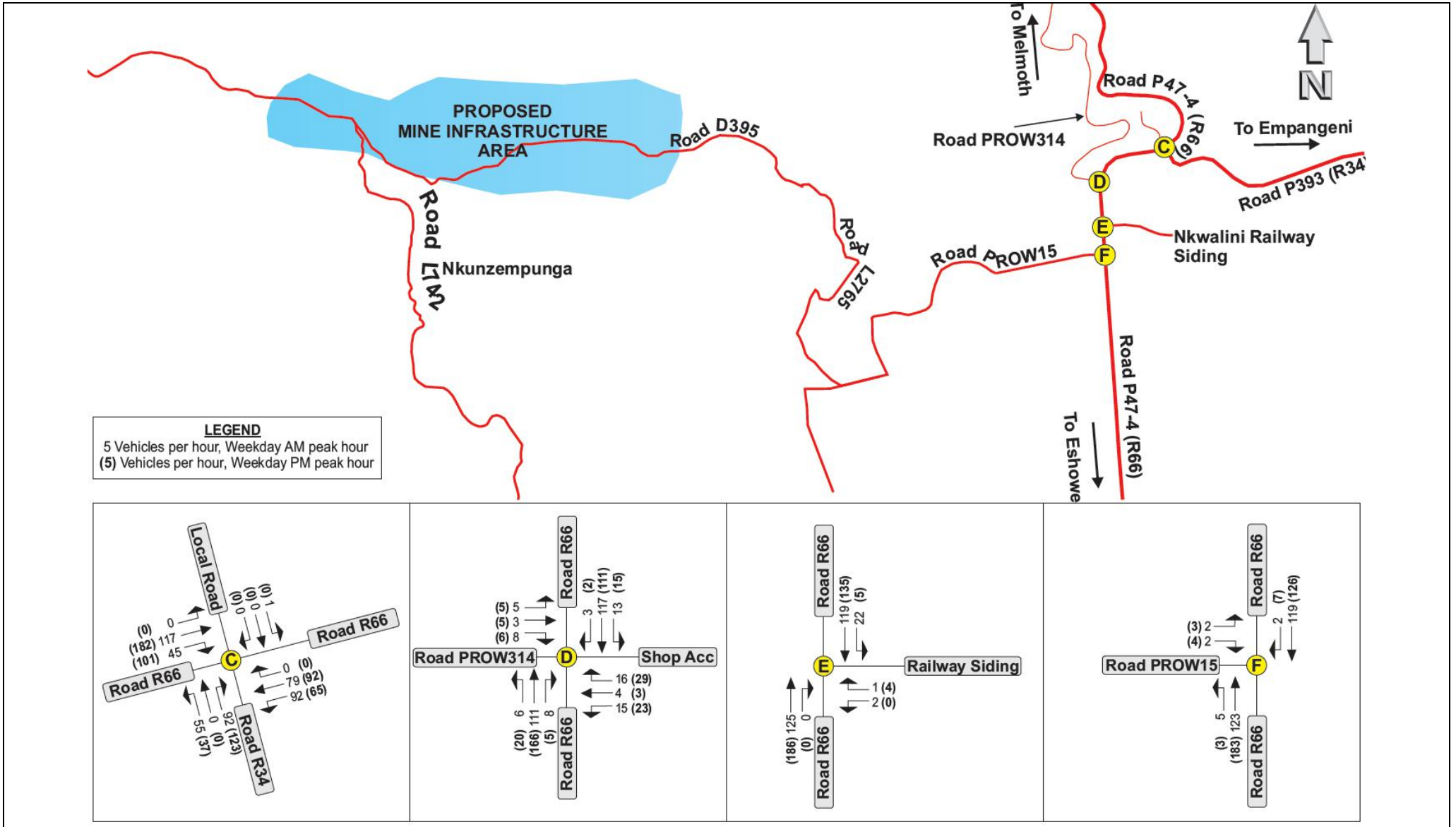


FIGURE B-2: PROJECTED 2023 PEAK-HOUR TRAFFIC (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 1) (BASEYEAR)

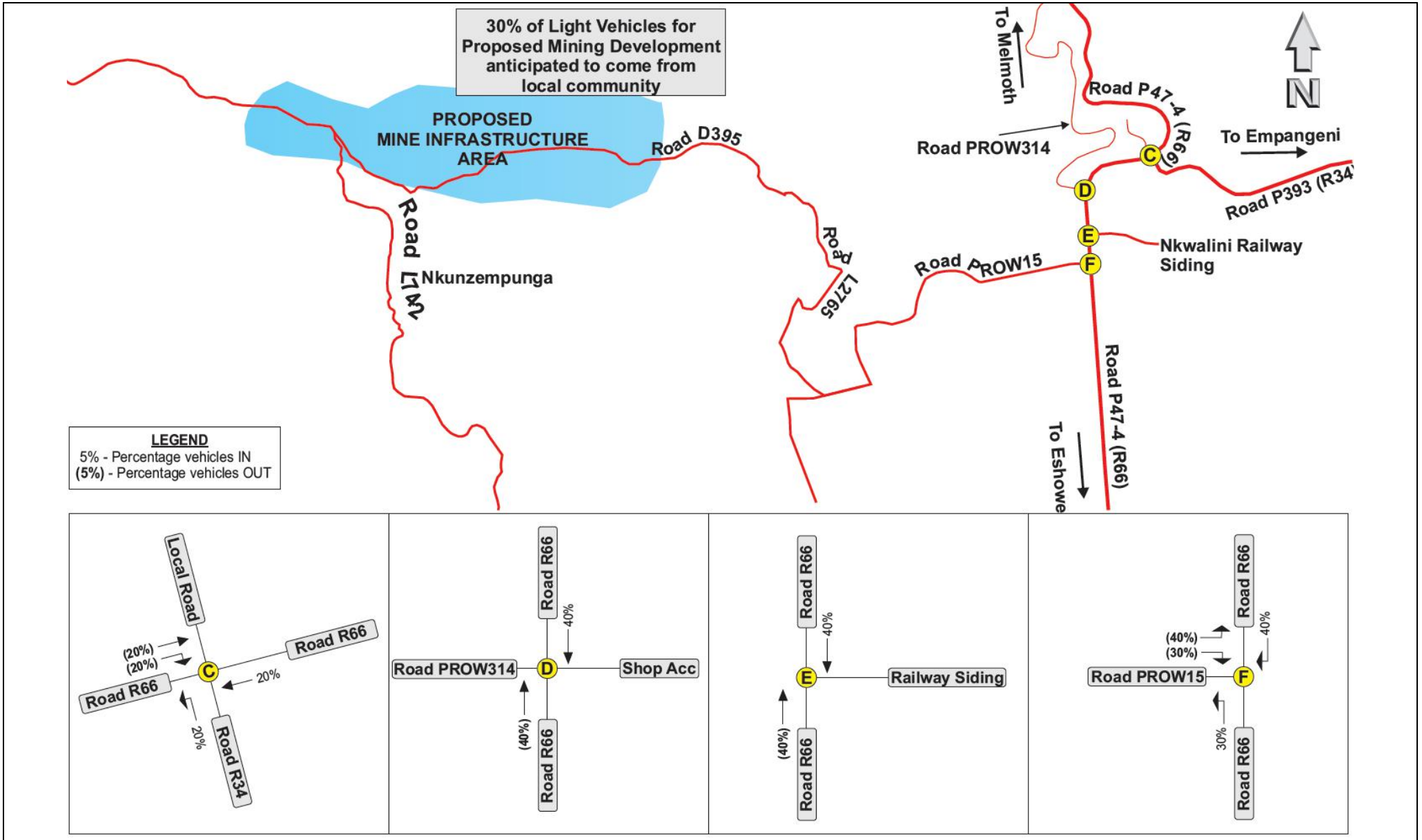


FIGURE B-3: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (LIGHT VEHICLES)

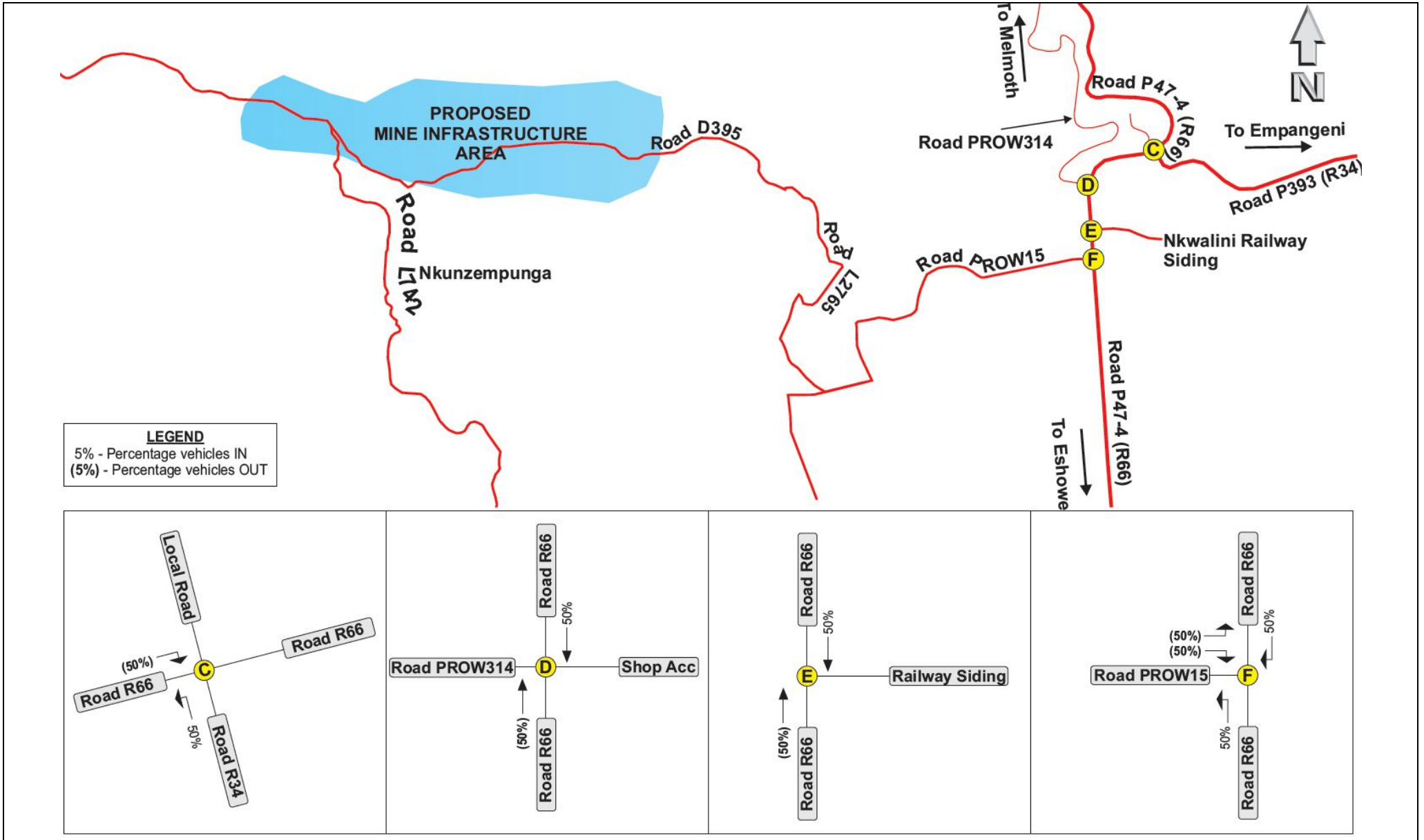


FIGURE B-4: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (DELIVERY VEHICLES)

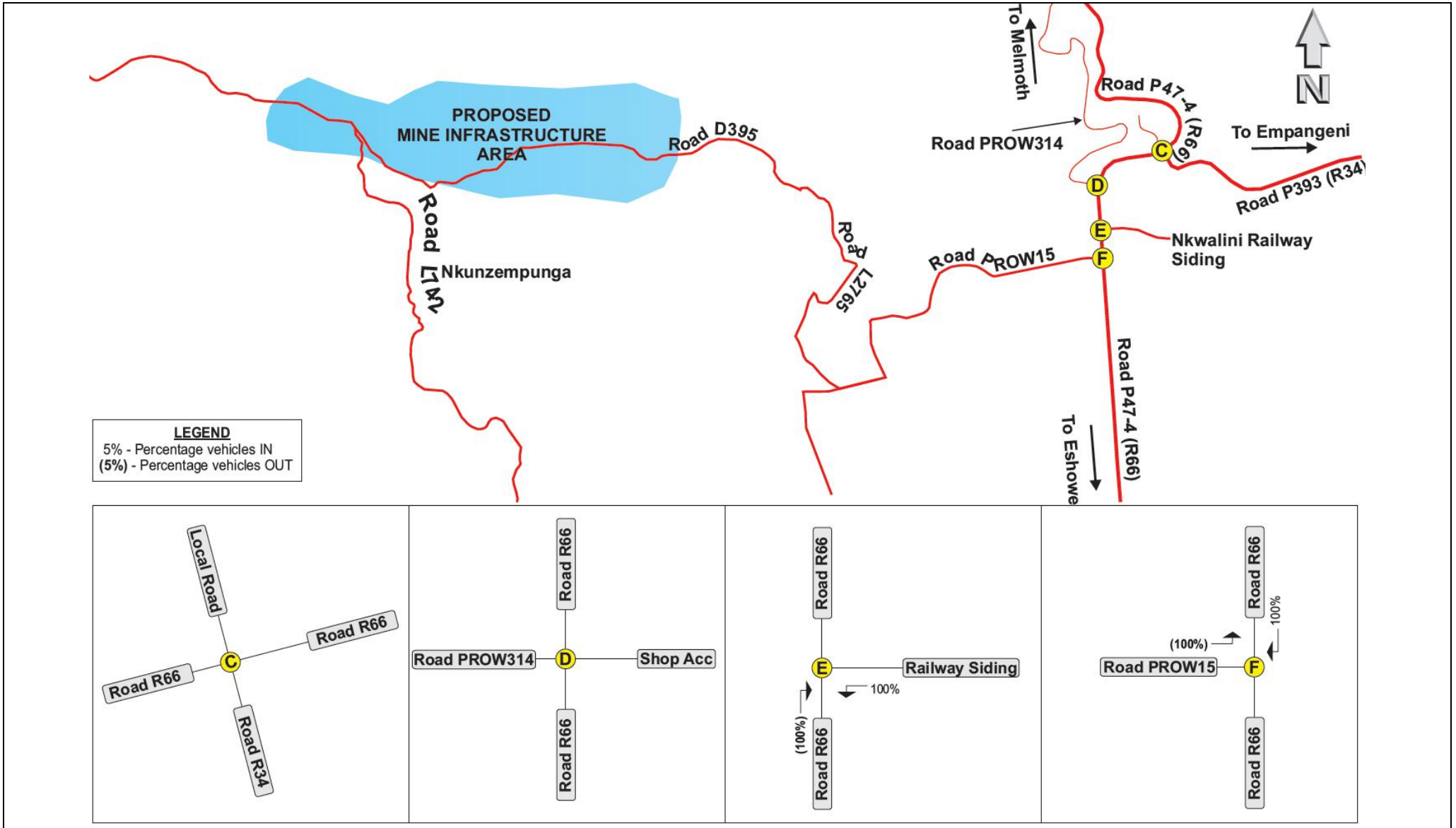


FIGURE B-5: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (CONCENTRATE TRANSPORT VEHICLES)

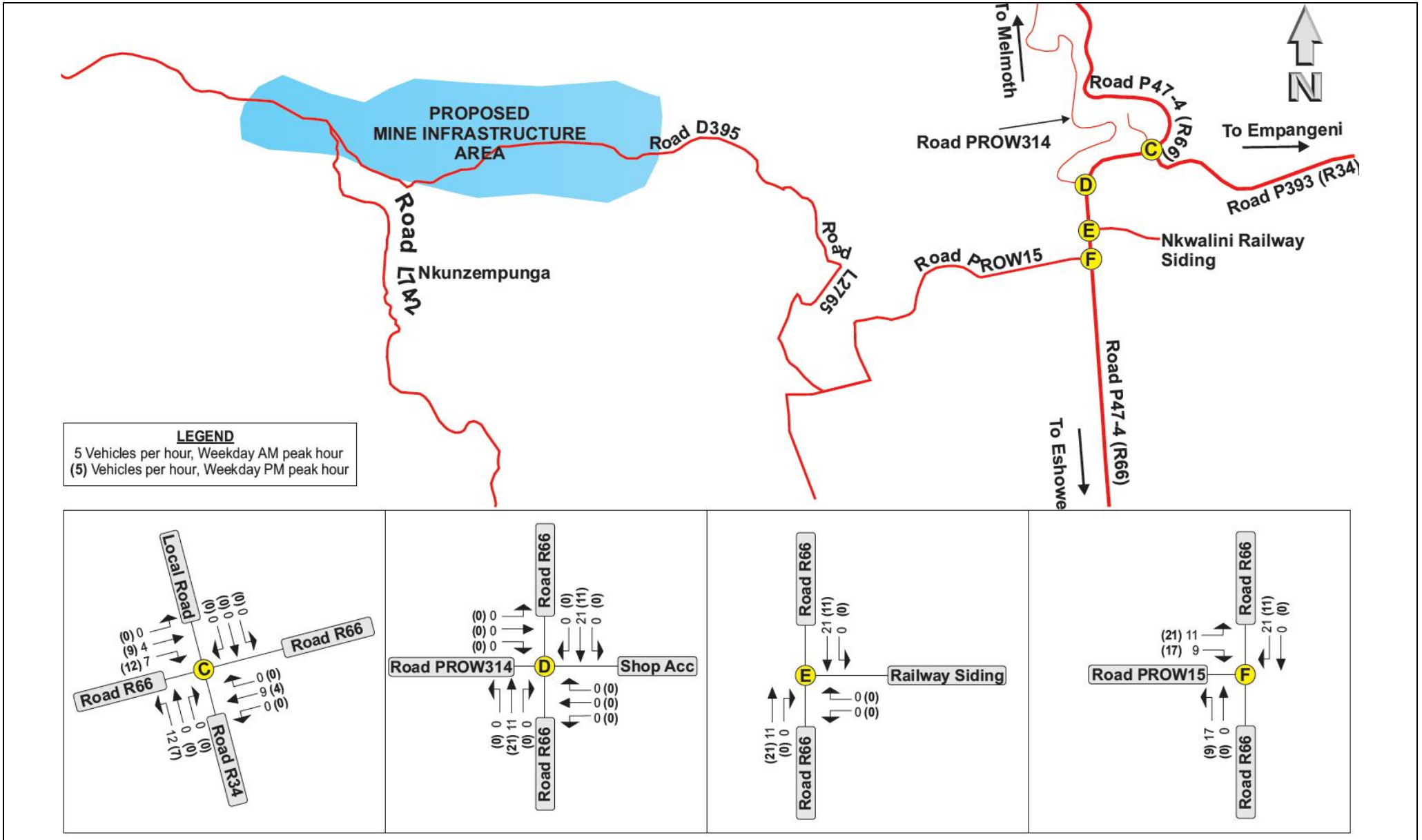


FIGURE B-6: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE)

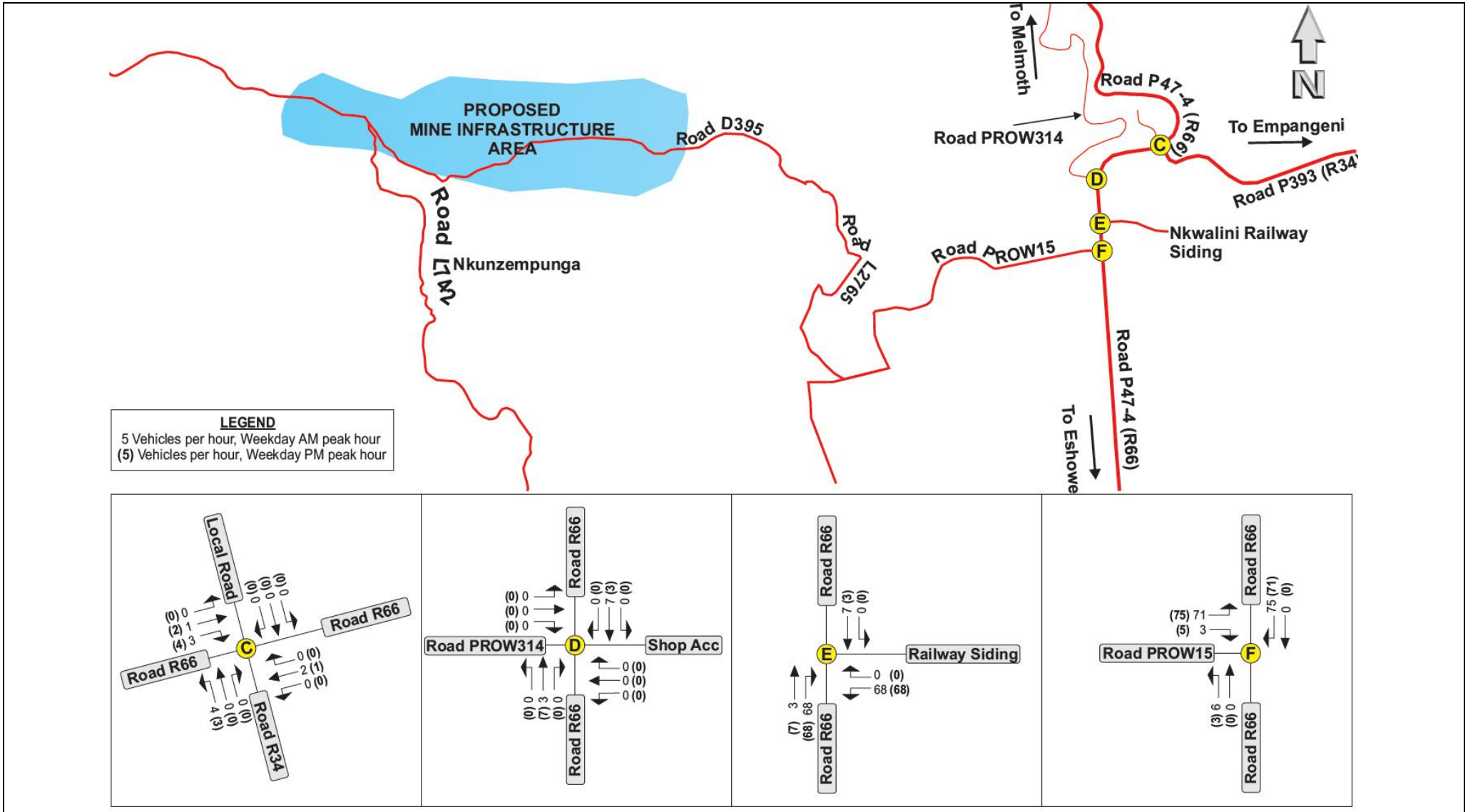


FIGURE B-7: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 5 years FROM BASEYEAR (2028)

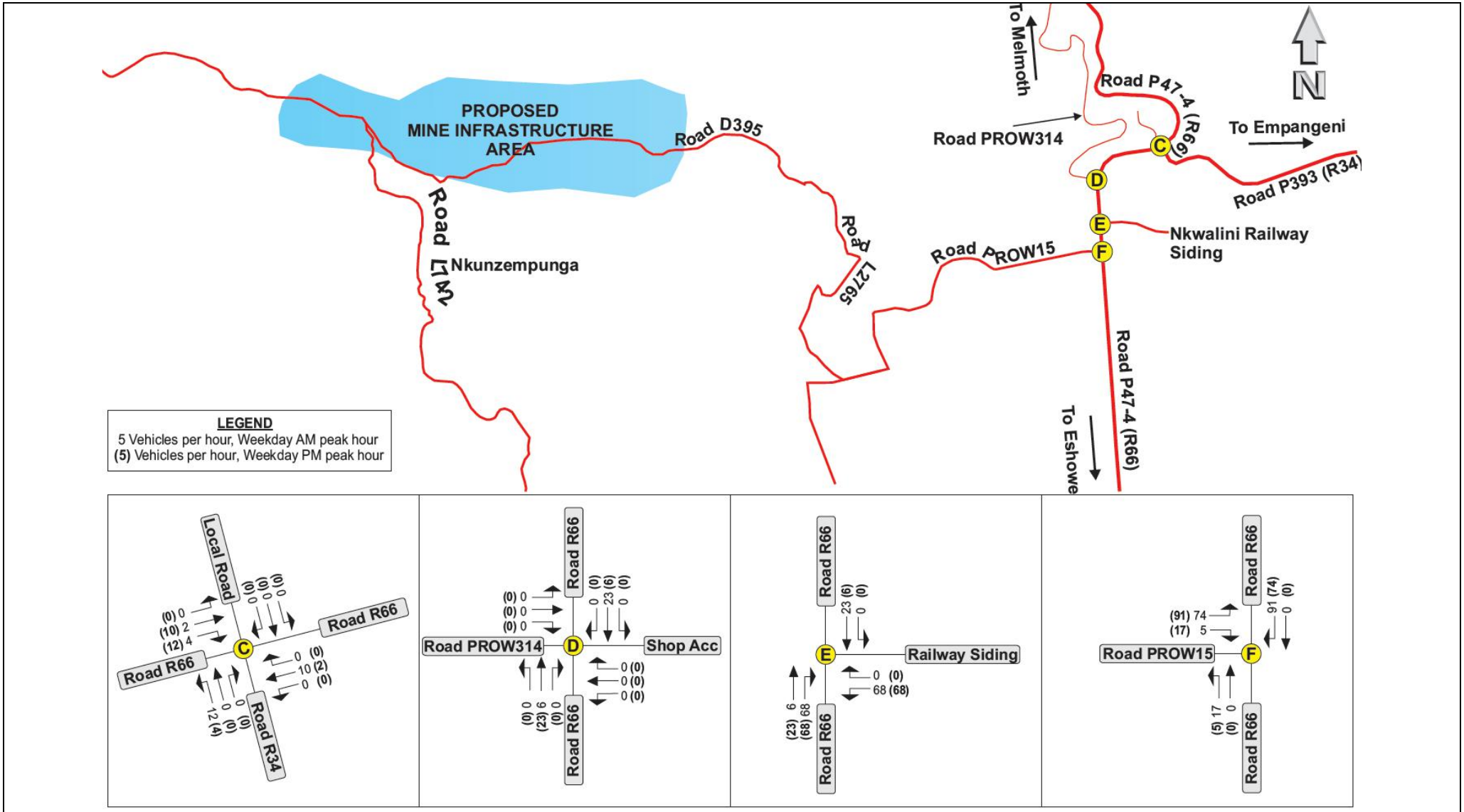


FIGURE B-8: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 10 YEARS FROM BASEYEAR (2032)

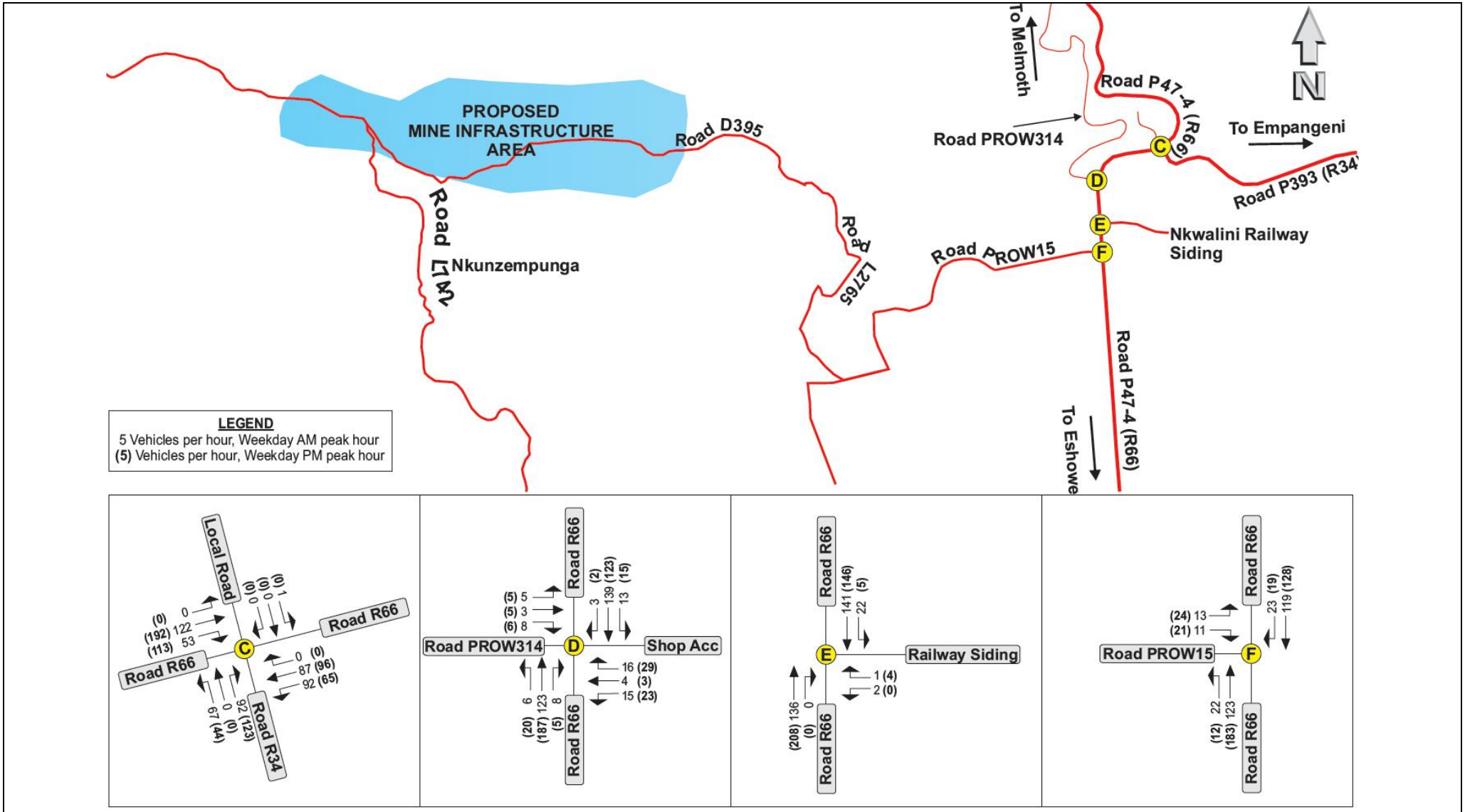


FIGURE B-9: PROJECTED 2023 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE) (SCENARIO 2)

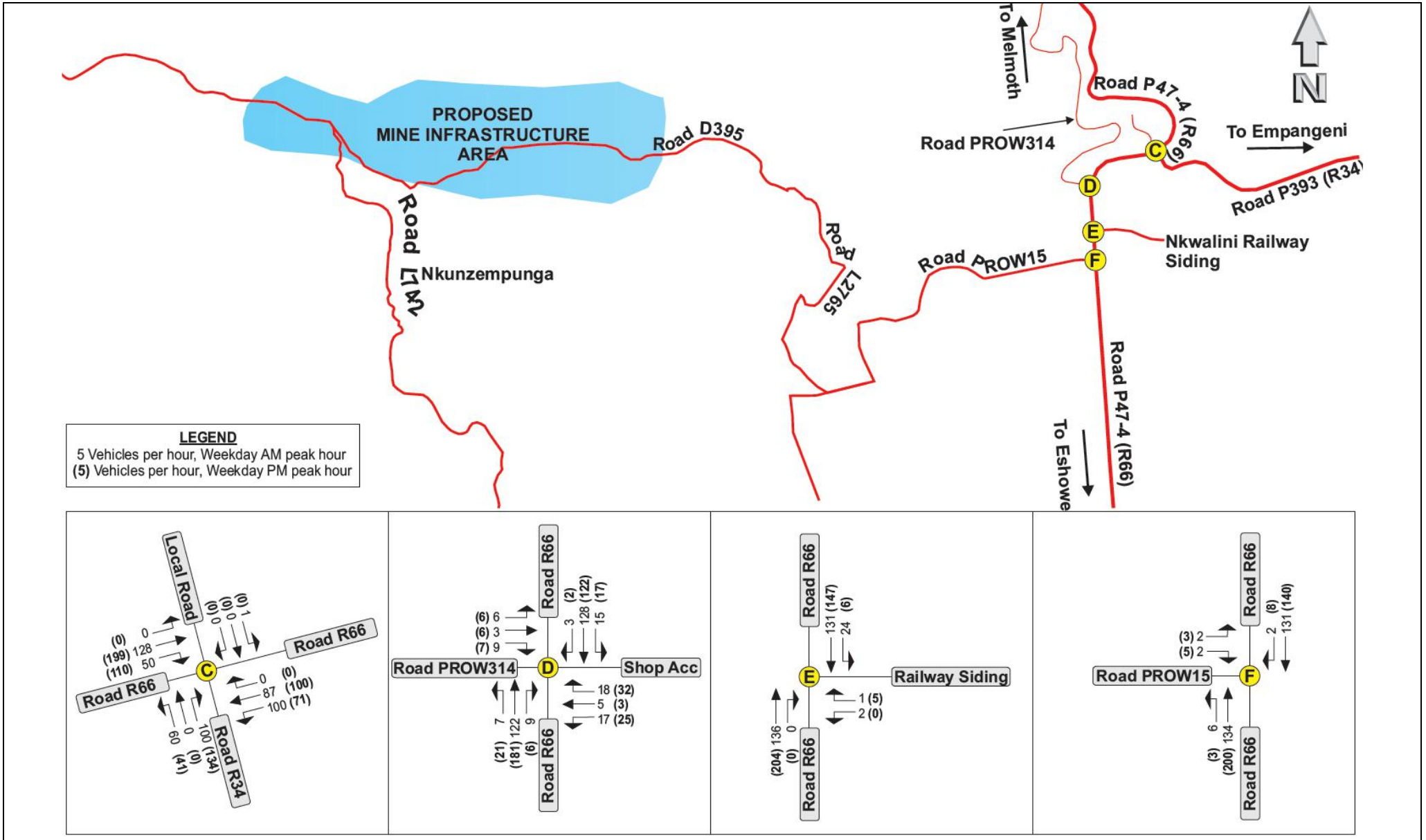


FIGURE B-10: PROJECTED 2028 PEAK-HOUR TRAFFIC WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 3)

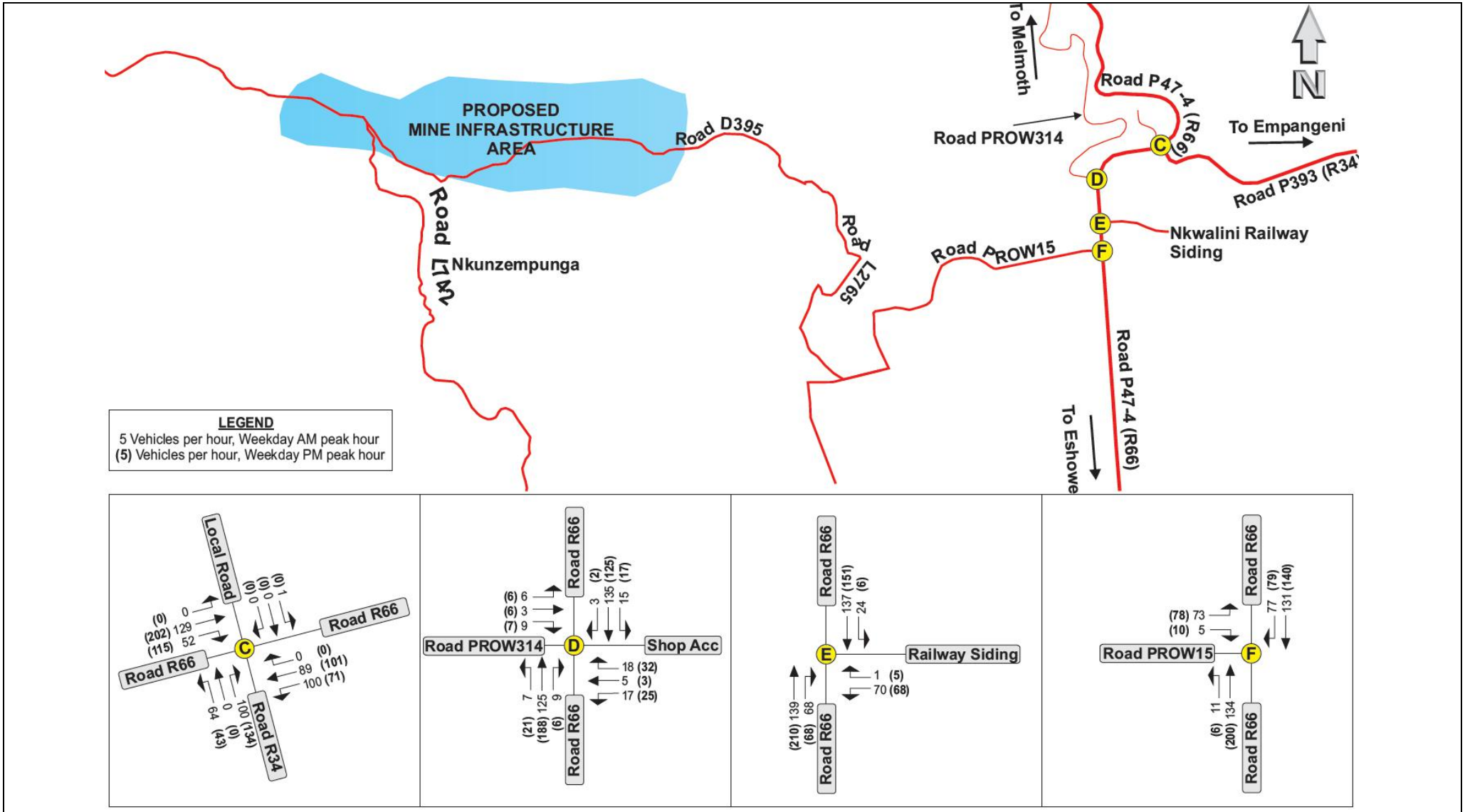


FIGURE B-11: PROJECTED 2028 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 5 years FROM BASEYEAR) (SCENARIO 4)

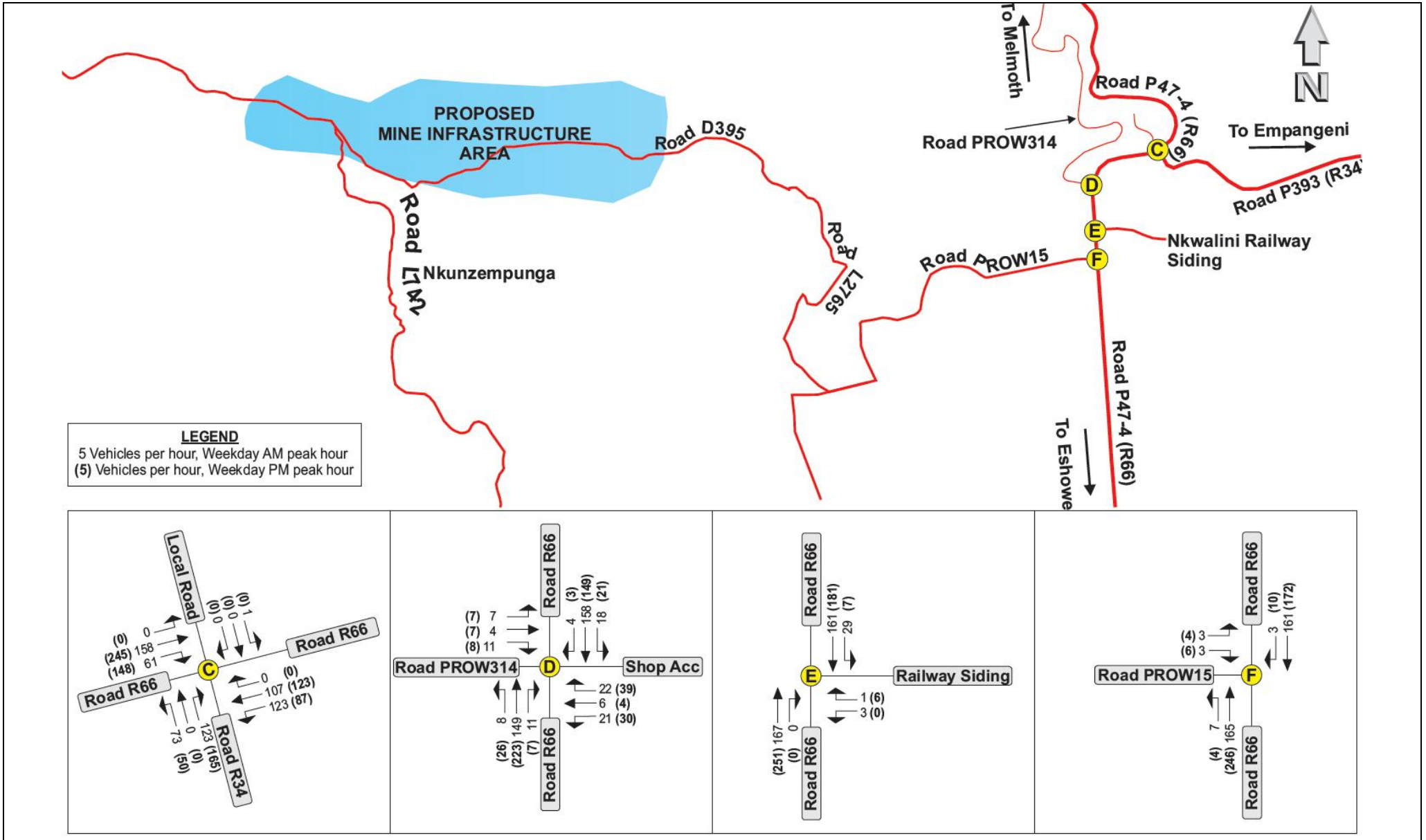


FIGURE B-12: PROJECTED 2032 PEAK-HOUR TRAFFIC WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 5)

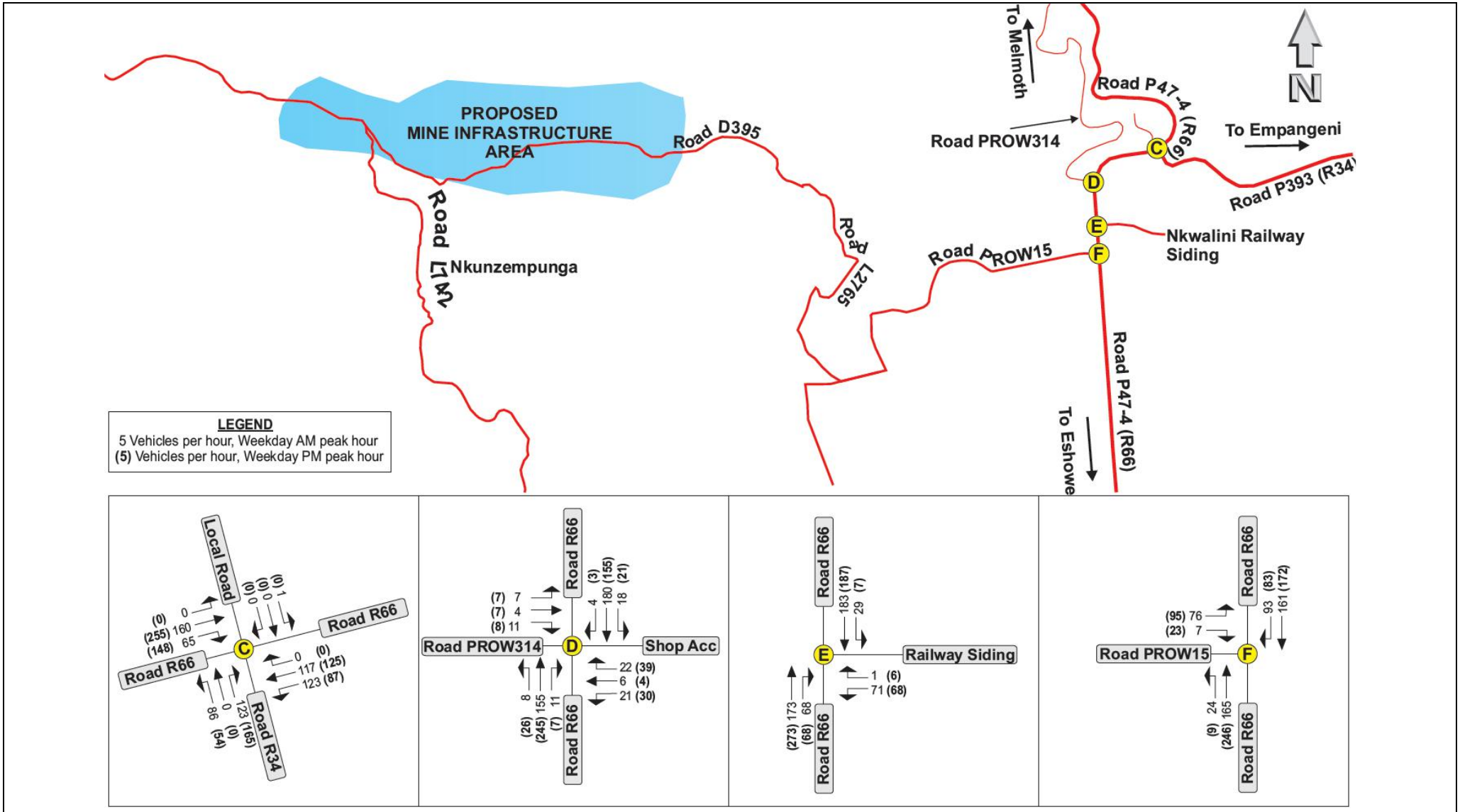


FIGURE B-13: PROJECTED 2032 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 10 YEARS FROM BASEYEAR) (SCENARIO 6)

APPENDIX C

SIDRA CALCULATION RESULTS

TABLE C-1: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2023 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 1)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.3	B	0.005	12.0	B	0.007
East (Road R66)	3.1	A	0.056	2.4	A	0057
South (Road R34)	9.9	A	0211	11.8	B	0.308
West (Road R66)	1.8	A	0.068	2.3	A	0.115
Intersection	**4.8**	**A**	**0.211**	**4.9**	**A**	**0.308**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.070	0.8	A	0.070
East (Shop Acc)	11.6	B	0.063	10.8	B	0.097
South (Road R66)	0.7	A	0.063	0.8	A	0.102
West (PROW314)	10.9	B	0.028	10.8	B	0.030
Intersection	**2.5**	**A**	**0.028**	**2.6**	**A**	**0.102**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.072	0.2	A	0.085
East (Railway Siding)	9.1	A	0.004	10.8	B	0.010
South (Road R66)	0.1	A	0.076	0.0	A	0.122
Intersection	**0.5**	**A**	**0.076**	**0.3**	**A**	**0.122**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.084	0.4	A	0.083
South (Road R66)	0.2	A	0.089	0.1	A	0.118
West (PROW15)	8.7	A	0.005	10.0	A	0.010
Intersection	**0.3**	**A**	**0.089**	**0.4**	**A**	**0.118**

TABLE C-2: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2023 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE) (SCENARIO 2)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.5	B	0.005	12.5	B	0.007
East (Road R66)	2.9	A	0.056	2.3	A	0.059
South (Road R34)	10.0	B	0.228	12.2	B	0.325
West (Road R66)	1.9	A	0.071	2.4	A	0.121
Intersection	**4.8**	**A**	**0.228**	**5.0**	**A**	**0.325**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.6	A	0.085	0.7	A	0.080
East (Shop Acc)	12.2	B	0.068	11.3	B	0.108
South (Road R66)	0.7	A	0.070	0.8	A	0.116
West (PROW314)	11.5	B	0.030	11.3	B	0.032
Intersection	**2.3**	**A**	**0.085**	**2.5**	**A**	**0.116**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.087	0.2	A	0.095
East (Railway Siding)	9.3	A	0.004	11.3	B	0.011
South (Road R66)	0.0	A	0.085	0.0	A	0.140
Intersection	**0.5**	**A**	**0.087**	**0.2**	**A**	**0.140**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	1.0	A	0.083	0.8	A	0.079
South (Road R66)	0.8	A	0.086	0.4	A	0.117
West (PROW15)	9.9	A	0.041	11.5	B	0.085
Intersection	**1.6**	**A**	**0.086**	**1.8**	**A**	**0.117**

TABLE C-3: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2028 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 3)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.6	B	0.005	12.6	B	0.007
East (Road R66)	3.0	A	0.061	2.4	A	0.062
South (Road R34)	10.1	B	0.235	12.7	B	0.349
West (Road R66)	1.8	A	0.074	2.3	A	0.125
Intersection	**4.8**	**A**	**0.235**	**5.1**	**A**	**0.349**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.079	0..8	A	0.079
East (Shop Acc)	12.1	B	0.076	11.3	B	0.118
South (Road R66)	0.8	A	0.071	0.8	A	0.114
West (PROW314)	11.3	B	0.033	11.3	B	0.038
Intersection	**2.6**	**A**	**0.033**	**2.7**	**A**	**0.118**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.081	0.2	A	0.095
East (Railway Siding)	9.3	A	0.004	11.3	B	0.011
South (Road R66)	0.0	A	0.085	0.0	A	0.137
Intersection	**0.5**	**A**	**0.085**	**0.2**	**A**	**0.095**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.093	0.4	A	0.093
South (Road R66)	0.2	A	0.098	0.1	A	0.129
West (PROW15)	9.0	A	0.005	10.5	B	0.013
Intersection	**0.3**	**A**	**0.098**	**0.4**	**A**	**0.129**

TABLE C-4: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2028 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE– 5 YEARS FROM BASEYEAR) (SCENARIO 4)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.7	B	0.005	12.8	B	0.007
East (Road R66)	3.0	A	0.061	2.4	A	0.062
South (Road R34)	3.0	A	0.061	12.8	B	0.355
West (Road R66)	10.2	B	0.241	2.3	A	0.127
Intersection	**4.8**	**A**	**0.241**	**5.2**	**A**	**0.355**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.083	0.8	A	0.081
East (Shop Acc)	12.2	B	0.078	11.4	B	0.120
South (Road R66)	0.8	A	0.072	0.8	A	0.118
West (PROW314)	11.4	B	0.033	11.4	B	0.038
Intersection	**2.6**	**A**	**0.083**	**2.7**	**A**	**0.120**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.085	0.2	A	0.098
East (Railway Siding)	8.9	A	0.075	9.3	A	0.102
South (Road R66)	1.9	A	0.087	1.6	A	0.142
Intersection	**2.6**	**A**	**0.087**	**2.3**	**A**	**0.142**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	2.3	A	0.091	2.4	A	0.086
South (Road R66)	0.4	A	0.094	0.2	A	0.127
West (PROW15)	9.2	A	0.110	10.2	B	0.132
Intersection	**2.9**	**A**	**0.110**	**2.8**	**A**	**0.132**

TABLE C-5: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2032 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 5)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	11.5	B	0.006	14.7	B	0.009
East (Road R66)	3.0	A	0.075	2.4	A	0.076
South (Road R34)	10.8	B	0.307	16.2	C	0.488
West (Road R66)	1.9	A	0.091	2.5	A	0.154
Intersection	**5.0**	**A**	**0.307**	**6.1**	**A**	**0.488**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.097	0.8	A	0.098
East (Shop Acc)	13.1	B	0.105	12.6	B	0.164
South (Road R66)	0.8	A	0.087	0.8	A	0.141
West (PROW314)	12.3	B	0.046	12.5	B	0.050
Intersection	**2.8**	**A**	**0.105**	**3.0**	**A**	**0.164**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.100	0.2	A	0.117
East (Railway Siding)	9.5	A	0.005	12.9	B	0.018
South (Road R66)	0.0	A	0.104	0.0	A	0.169
Intersection	**0.5**	**A**	**0.104**	**0.3**	**A**	**0.169**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.115	0.5	A	0.115
South (Road R66)	0.2	A	0.120	0.1	A	0.159
West (PROW15)	9.3	A	0.009	11.1	B	0.018
Intersection	**0.3**	**A**	**0.120**	**0.5**	**A**	**0.159**

TABLE C-6: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2032 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE– 10 YEARS FROM BASEYEAR) (SCENARIO 6)

***POINT C*: Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	11.7	B	0.006	15.0	C	0.009
East (Road R66)	2.9	A	0.075	2.3	A	0.077
South (Road R34)	11.0	B	0.328	16.3	C	0.495
West (Road R66)	2.0	A	0.092	2.5	A	0.161
Intersection	**5.1**	**A**	**0.328**	**6.1**	**A**	**0.495**

***POINT D*: Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.6	A	0.110	0.8	A	0.102
East (Shop Acc)	13.7	B	0.111	13.0	B	0.173
South (Road R66)	0.8	A	0.090	0.8	A	0.152
West (PROW314)	12.8	B	0.048	12.9	B	0.053
Intersection	**2.7**	**A**	**0.111**	**2.9**	**A**	**0.173**

***POINT E*: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.113	0.2	A	0.121
East (Railway Siding)	9.2	A	0.081	9.9	A	0.110
South (Road R66)	1.7	A	0.108	1.3	A	0.184
Intersection	**2.3**	**A**	**0.113**	**2.0**	**A**	**0.184**

***POINT F*: Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	2.4	A	0.112	2.3	A	0.106
South (Road R66)	0.7	A	0.116	0.2	A	0.157
West (PROW15)	9.7	A	0.128	11.8	B	0.219
Intersection	**3.0**	**A**	**0.128**	**3.2**	**A**	**0.219**

APPENDIX D

LEVEL OF SERVICE CRITERIA DESCRIPTION

TABLE D-1: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR UNSIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	**AVERAGE TOTAL DELAY (SEC/VEH)**	**PERFORMANCE EVALUATION**
A	≤ 5	Excellent
B	> 5 and ≤ 10	Very Good
C	>10 and ≤ 20	Good
D	>20 and ≤ 30	Average
E	>30 and ≤ 45	Poor
F	>45	Fail

TABLE D-2: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR SIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	**AVERAGE TOTAL DELAY (SEC/VEH)**	**PERFORMANCE EVALUATION**
A	≤ 5	Excellent
B	> 5 and ≤ 15	Very Good
C	> 15 and ≤ 25	Good
D	> 25 and ≤ 40	Average
E	> 40 and ≤ 60	Poor
F	> 60	Fail

Level of Service criteria obtained from *The Highway Capacity Manual (Special Report 2009)*

APPENDIX E

SUMMARY OF IMPACT RATINGS

TABLE E-1: IMPACT RATING WITHOUT THE PROPOSED MINING DEVELOPMENT

RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Existing conditions without mining activities	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*

TABLE E-2: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Construction of Infrastructure	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes) **Point F**.	*H*	*H*	*M*	*High*	*H*	*High*	*H+*	*H*	*M*	*Positive High*	*H*	*Positive High*	*Provision of dedicated right-turn lane on northern approach.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*

TABLE E-3: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Construction of Infrastructure	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes) **Point F**.	*H*	*H*	*M*	*High*	*H*	*High*	*H+*	*H*	*M*	*Positive High*	*H*	*Positive High*	*Provision of dedicated right-turn lane on northern approach.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*

TABLE E-4: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (CLOSURE PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Existing conditions without mining activities	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*

APPENDIX F

IMPACT RATING CRITERIA

TABLE F-1: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DEFINITIONS AND CRITERIA		
PART A: DEFINITIONS AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of intensity, spatial extent and duration**
Criteria for ranking of the INTENSITY of environmental impacts	**VH**	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilisation against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	**VL**	Very short, always less than a year. Quickly reversible.
	L	Short term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity.)
	VH	Very long, permanent, +20 years. (Irreversible. Beyond closure.)
Criteria for ranking the EXTENT of impacts	**VL**	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours.
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

TABLE F-2: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DETERMINING CONSEQUENCE							
PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	**VH**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Long term	**H**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Medium term	**M**	**Very Low**	**Low**	**Low**	**Low**	**Medium**
	Short term	**L**	**Very low**	**Very Low**	**Low**	**Low**	**Low**
	Very short	**VL**	**Very low**	**Very Low**	**Very Low**	**Low**	**Low**
INTENSITY = L							
DURATION	Very long	**VH**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Long term	**H**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Medium term	**M**	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Short term	**L**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Very short	**VL**	**Very low**	**Low**	**Low**	**Low**	**Medium**
INTENSITY = M							
DURATION	Very long	**VH**	**Medium**	**High**	**High**	**High**	**Very High**
	Long term	**H**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Very short	**VL**	**Low**	**Low**	**Low**	**Medium**	**Medium**
INTENSITY = H							
DURATION	Very long	**VH**	**High**	**High**	**High**	**Very High**	**Very High**
	Long term	**H**	**Medium**	**High**	**High**	**High**	**Very High**
	Medium term	**M**	**Medium**	**Medium**	**High**	**High**	**High**
	Short term	**L**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**Medium**	**High**
INTENSITY = VH							
DURATION	Very long	**VH**	**High**	**High**	**Very High**	**Very High**	**Very High**
	Long term	**H**	**High**	**High**	**High**	**Very High**	**Very High**
	Medium term	**M**	**Medium**	**High**	**High**	**High**	**Very High**
	Short term	**L**	**Medium**	**Medium**	**High**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**High**	**High**

VL	**L**	**M**	**H**	**VH**
A part of the site/property	Whole site	Beyond the site, affecting neighbours	Extending far beyond the site but localised	Regional/ National
EXTENT				

TABLE F-3: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DETERMINING SIGNIFICANCE							
PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**VH**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Probable	**H**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Possible/ Frequent	**M**	**Very Low**	**Very Low**	**Low**	**Medium**	**High**
	Conceivable	**L**	**Insignificant**	**Very Low**	**Low**	**Medium**	**High**
	Unlikely/ Improbable	**VL**	**Insignificant**	**Insignificant**	**Very Low**	**Low**	**Medium**
			VL	**L**	**M**	**H**	**VVH**
			CONSEQUENCE				

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline.**
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation.
Insignificant	Inconsequential, not requiring any consideration.

APPENDIX G

PROFESSIONAL REGISTRATION AND CURRICULUM VITAE

ENGINEERING COUNCIL OF SOUTH AFRICA

10-Sep-2021 12:59

Profile Number : ECSA-00080528
Tel : +27 82 371 0253
Email : leon@siyazi.co.za

Mr,L,Roets
P O Box 11182

Bendor Park
0713

Dear Leon Roets

RENEWAL OF REGISTRATION(s) 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 registration(s), in terms of Section 22(1) of the Engineering Profession Act, 2000 (Act 46 of 2000), has been successful and your registration(s) has been renewed for a further period of (5) years until 14-Nov-2026 00:00, subject to you paying your annual fees.

Congratulations, on the continued recognition of your status with the Engineering Council of South Africa.

Yours Faithfully
Ms Carmen Wright
Manager: Education and CPD

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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)
Southern African Institute of Civil Engineering (SAICE)

EMPLOYMENT RECORD

07/1996 – Current:	Director and shareholder to SIYAZI Group of Companies
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

Leon Roets has a total of 32 years' experience of Transport and Traffic Engineer with wide experience in transportation planning and modelling, data processing as well as Traffic Impact Studies. He further was involved as part of Taxi Industry related projects for the past 25 years.

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:

	PROJECT	CLIENT	DEVELOPMENT	
			SIZE	STATUS
a)	Anglo American Project Smartpower: Hydrogen Production Plant at Mogalakwena Mine - Traffic Specialist Study	SLR Consulting	N/a	Busy with Study
b)	Contract SANRAL R.518-020-2019 /1F - for Consulting Engineering services for the Upgrading on National Route R518 Section 2 from Mapeta (KM 97.5) to Mokopane (KM 102.2)	iX engineers (Pty) Ltd	N/a	Busy with Study
c)	TIA for upgrading of Euphoria Shopping Centre Mookgophong	Naboom Commodities	9 100 m^2	Busy with Study
d)	Contract SANRAL N.001-280-2020/1F - for Consulting Engineering Services for the Upgrade on National Route N1 Section 28 from Polokwane (KM 0.0) to Dwarsrivier (KM 49.0)	iX engineers (Pty) Ltd	N/a	Busy with Study
e)	Road network planning for the CBD of Thohoyandou	KTN Consulting Engineers Project Managers	N/a	Busy with Study
f)	Keaton Energy Holdings Limited (KEHL): Leeuw Braakfontein Colliery (Pty) Ltd [LBC] - Opencast & Underground Mining	Letsolo Water and Environmental Services	N/a	TIA done for EIA
g)	Kudumane Manganese Resources Expansion Project, near Hotazel in the Northern Cape Province	SRK Consulting	N/a	TIA done for EIA
h)	Proposed Township Establishment Remainder of Portion 16 of the Farm Tweefontein 915 LS, Limpopo	Specon CC	N/a	TIA done.
i)	Proposed Virginia Solar Park, Free State Province	Ages Limpopo (Pty) Ltd	N/a	TIA done for EIA
j)	Limpopo Central Hospital	Sakhiwo Health Solutions (Limpopo) (Pty) Ltd	488 Beds	TIA Approved
k)	Proposed Filling Station on Giyani D2 Ext 1	Rivoni (Pty) LTD	18 000 m^2	Busy with Study
l)	Proposed Development on remainder of portions 166 & 168 of the farm Tweefontein 915-LS	Natura Professional Planners	N/a	TIA Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:				
PROJECT		CLIENT	DEVELOPMENT	
			SIZE	STATUS
m)	Proposed Ga-Sekgopo Filling Station to be situated on the Farm Uitspanning 820 LS, Road R81, Ga-Sekgopo, Greater Letaba Local Municipality, Limpopo Province (Rest and Service Facilities)	Rivoni (Pty) LTD	N/a	Busy with Study
n)	Proposed Access application to Filling Station on Portion 44 of the farm Deer Park 459 Mopani	BF Branded Marketer	N/a	Done.
o)	Shopping Centre Siloam	Illungile Consulting Services	8 700m²	Constructed.
p)	Traffic Impact Assessment for Student Accommodation at TUT on corner of Mark and Hospital Street	Seco Construction Project Managers	1057 beds	TIA approved.
q)	Proposed Pfunanani Special School, Giyani	PG Consulting Engineers (Pty) Ltd	500 students	TIA approved.
r)	Nkuzana City and Filling station development	Masingita Group of Companies	120 000m²	Busy with Study.
s)	Traffic Impact Assessment for Proposed Filling Station on Road R37 Thokwaneng	Matome Rapotu	N/a	TIA approved.
t)	New Dwarsrivier Mine Heavy Vehicle Access Traffic Impact Assessment	Neda Engineering Group (PTY) Ltd	N/a	Constructed
u)	Development to be on Portion 39 of the Farm Koppiefontein 686-LS	Nhlatse Planning Consultants	N/a	Approved
v)	Township Layout Plan, Portion 145 of the Farm Tweefontein 915 LS	Nhlatse Planning Consultants	N/a	Approved
w)	Upgrading of the Existing Access to the New Clydesdale Colliery-Site Traffic Assessment	Universal Coal PLC	N/a	In Process
x)	Twin City Rustenburg Taxi Facilities	Twin City Development (Pty) Ltd.	N/a	Constructed
y)	Widening and upgrading of existing truck access to Xstrata Alloys Lion Ferrochrome	Xstrata Alloys Lion Ferrochrome	N/a	Constructed
z)	Tengwa Africa Truck Stop	Prof Planners & Associates Town and Regional Planners	N/a	Approved
aa)	Proposed West Wits Mining Development	SLR Consulting Engineers (Metago)	N/a	In Process
bb)	Proposed access to Filling Station From Road D212 Dwarsrivier	Boulder Group of Companies	N/a	TIA approved
cc)	Ficksburg Border Bridge - Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
dd)	Maseru Border Bridge – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ee)	Kopfontein Border – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ff)	Pure Resource Mine, Parys	Pure Resource Mine	N/a	Planning
gg)	University of Limpopo (Turfloop Campus) RFT No: UL001/2014 - OFF Campus Student Residences	Zutari	6800 beds	Panning
hh)	Polokwane 90MW PV Solar Plant	Phakanani Environmental	90MW PV	Planning
ii)	Bolobedu Solar Site	Ages Limpopo (Pty) Ltd	75MW PV	Planning
jj)	Makhado Regional Mall	Masingita Properties	45,000 m²	Construction
kk)	Giyani Regional Mall	Masingita Properties	60,000 m²	Constructed
ll)	Burgersfort Regional Mall with Taxi Rank **with Taxi Facility implementation**	Resilient Properties	45,000 m²	Constructed
mm)	Burgersfort Convenience Shopping Centre	Resilient Properties	28,000 m²	Planning
nn)	Ivydale Agricultural Holdings - Ivypark Ext 41, Ivydale 58 & 59	Arrow Creek Investments	20,000 m²	Approved
oo)	Elim Community Shopping Centre with Taxi Rank **with Taxi Facility implementation**	Twin City Development	14,000 m²	Constructed
pp)	Tzaneen Lifestyle Centre **with Taxi Facility implementation**	Resilient Properties	20,000 m²	Constructed
qq)	Morgenzon Township Developments Shopping & Residential (12,000 units)	Scarlet Ibis Twentieth	30,000 m²	Approved
rr)	Tzaneng Mall, Tzaneen **with Bus Terminal implementation**	Resilient Properties	40,000 m²,	Constructed
ss)	Polokwane Convention and Exhibition Centre portions 84, 85, 86 and 87 Ivydale	BE Consult (Polokwane Municipality)	45,000 m²	Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:			
PROJECT	CLIENT	DEVELOPMENT	
		SIZE	STATUS
tt) New complex for Builder's Warehouse, Tile Warehouse, Toyota, etc., when entering Polokwane on the N1 from Gauteng	Giuricich Developments	50,000 m²	Constructed
uu) BB Auto Development	Lessis Finance	25,000 m²	Constructed
vv) Blue Haze Shopping Centre, Hazyview **with Taxi Facility implementation**	Twin City Developments	60,000 m²	Constructed
ww) Tzaneen Crossing Shopping Centre, **with Taxi Facility implementation**	Resilient Properties	25,000 m²	Constructed
xx) Standard Bank Building in Polokwane	BB Auto	20,000 m²	Constructed
yy) Musina Shopping Centre	Bepro Group of Companies	15,000 m²	Constructed
zz) Proposed development on Erf 1697, Pietersburg Extension 3	Business Partners Limited	10,000 m²	Constructed
aaa) Motor City (Pietersburg Erf 7589, Traffic Impact Study)	Prism Architects	20,000 m²	Constructed
bbb) **Thohoyandou Intermodal Facility**	LPDORT	N/a	Constructed
ccc) Jozini Shopping Centre, **with Taxi Facility implementation**	CK Projects	20 000 m²	Constructed
ddd) Tugela Ferry Shopping Centre,**with Taxi Facility implementation**	CK Projects	20 000 m²	Constructed
eee) Groblersdal Twin City Regional Shopping Centre **upgrade existing Taxi Facility**	Twin City Development	35 000m²	Constructed
fff) Technical Advisor Polokwane for Taxi Industry Polokwane Integrated Rapid Public Transport System	Polokwane Municipality	N/a	In Process

SOME OF MR ROETS' OTHER TRAFFIC AND TRANSPORT ENGINEERING EXPERTISE AND EXPERIENCE INCLUDE THE FOLLOWING (PLEASE REFER TO ATTACHED TABLE FOR MORE DETAIL AND BREAKDOWN):
a) Shopping Centre's that Range from 2 000 m^2 to 60 000 m^2
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 Systems
f) Residential Development that varies 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, 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.

SOME OF THE TRANSPORT PLANNING PROJECTS THAT LEON ROETS HAD BEEN INVOLVED IN, INCLUDE:																
Authority / Project Description	**Transport Forum**	**CPTR**	**OLS**	**RATPlan**	**PTP**	**ITP**	**LITP**	**D\CITP**	**Business Plans**	**Liaison**	**Public Transport Intermodal Facilities**	**Public Transport Facilities**	**Colour Coding**	**Transport Framework**	**Corridor Planning**	**Year**
Taxi Industry Technical Advisor – Taxi Industry Polokwane Integrated Rapid System									Y	Y		Y			Y	2022-2011
Taxi Industry Technical Advisor – Taxi Industry Mangaung Integrated Rapid System																2022-2015
Polokwane Municipality Comprehensive Integrated Transport Plan (CITP)								Y								2021-2019
Matlosana NDPG Project for Jabulani Street upgrade										Y		Y				2015-2014
Elim Mall, Tzaneng Mall, Tzaneen Crossing, Tzaneen Lifestyle Centre, Burgersfort Mall, Malamulele												Y				2012-1998
Greater Tubatse Municipality	Y															2013-2003
Road R37 between Polokwane and Burgersfort (Dilokong Corridor)										Y					Y	2013-2003
Polokwane Intermodal Facilities, as part of Prism Consortium (Planning)											Y					2013-2010
Thohoyandou Intermodal Facilities, as part of MCE Consortium											Y					2013-2010
Giyani Intermodal Facility, Taxi Facilitation											Y					2013-2010
Giyani, Makhado, Thohoyandou, Burgersfort, Special advisor for Intersite											Y					2013-2010
Vhembe District Municipality								Y								2010
Burgersfort, Road Master Network															Y	2009-2007
Mogalakwena Local Municipality	Y															2009-2006
Ba-Phalaborwa Local Municipality						Y										2008
Mogalakwena Local Municipality							Y									2008
Mogalakwena, Relocation and Road Safety of Road N11															Y	2008
Fetakgomo Local Municipality	Y															2007-2005
Polokwane, 2010 Priority Statement (PTIS)									Y							2007-2005
Polokwane Local Municipality					Y	Y										2007
Mogalakwena Local Municipality					Y											2007
Polokwane Local Municipality	Y															2006-1997
Sekhukhune District Municipality		Y	Y	Y	Y	Y										2006
Limpopo Department or Roads and Transport													Y			2004
Part of team for Limpopo in Motion														Y		2004
Greater Tubatse Municipality		Y	Y	Y	Y	Y										2003
Capricorn District Municipality		Y														2003
Vhembe District Municipality		Y	Y		Y	Y										2003
Mopani District Municipality		Y	Y		Y	Y										2003
Pietersburg-Polokwane Transport Strategy						Y										2000
Polokwane, N1 Eastern bypass															Y	2000
Pietersburg-Polokwane Public Transport Strategy					Y											1997

APPENDIX A

INFORMATION RELATED TO STATUS QUO

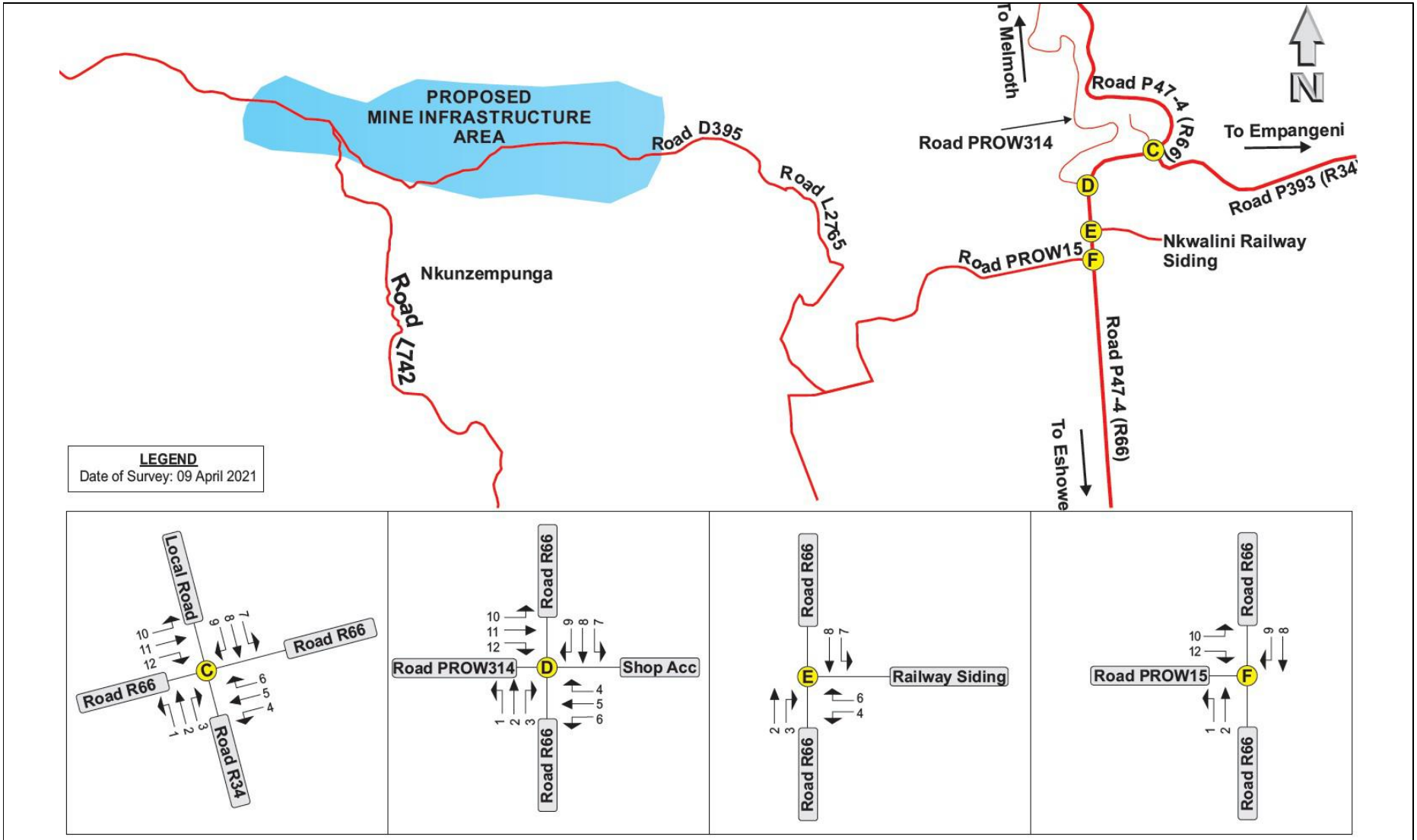

FIGURE A-1: RELEVANT MOVEMENTS RELATED TO TRAFFIC COUNTS (SOUTHERN BLOCK AREA)

TABLE A-1: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD P393 (R34) (POINT C) (09 APRIL 2021)													
TIME INTERVALS	MOVEMENTS												
	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
06:00-07:00	42	0	61	42	68	1	2	0	0	1	78	37	**332**
06:15-07:15	48	0	84	49	76	1	2	0	0	2	87	44	**393**
06:30-07:30	47	0	93	55	85	0	2	0	0	2	104	47	**435**
06:45-07:45	52	0	96	58	75	0	3	0	0	2	106	40	**432**
07:00-08:00	53	0	89	81	69	0	1	0	0	1	108	38	**440**
07:15-08:15	53	0	89	89	77	0	1	0	0	0	114	44	**467**
07:30-08:30	55	0	77	98	80	1	1	0	0	1	107	39	**459**
07:45-08:45	48	0	73	90	99	1	0	0	0	1	96	38	**446**
08:00-09:00	57	0	66	79	108	1	0	0	0	1	96	57	**465**
08:15-09:15	58	0	80	82	97	1	0	0	0	1	105	60	**484**
08:30-09:30	62	0	98	87	105	0	0	0	0	0	106	65	**523**
08:45-09:45	55	0	90	101	92	0	0	0	0	0	103	75	**516**
09:00-10:00	48	0	100	119	102	0	0	0	1	1	103	55	**529**
09:15-10:15	40	0	82	116	106	0	0	0	1	1	96	57	**499**
09:30-10:30	39	0	75	104	96	0	0	0	1	1	95	61	**472**
09:45-10:45	48	0	66	98	90	0	0	0	1	1	107	66	**477**
10:00-11:00	46	0	80	70	73	0	0	0	0	0	101	68	**438**
10:15-11:15	44	0	77	63	73	0	0	0	0	0	102	69	**428**
10:30-11:30	50	0	70	63	65	0	0	0	0	0	100	63	**411**
10:45-11:45	45	0	79	65	57	0	0	0	0	0	84	53	**383**
11:00-12:00	46	0	76	64	45	0	0	0	0	0	83	53	**367**
11:15-12:15	58	0	77	65	40	0	0	0	0	0	76	51	**367**
11:30-12:30	46	0	81	70	40	0	0	0	0	0	81	53	**371**
11:45-12:45	49	0	88	60	63	0	0	0	0	0	90	62	**412**
12:00-13:00	50	0	77	54	72	0	0	0	0	0	92	63	**408**
12:15-13:15	40	0	86	69	88	3	0	0	0	0	99	61	**446**
12:30-13:30	44	0	85	70	92	5	0	0	0	0	106	66	**468**
12:45-13:45	44	0	80	80	82	7	0	0	0	0	118	66	**477**
13:00-14:00	44	0	96	82	82	10	0	0	0	0	138	101	**553**
13:15-14:15	47	0	89	72	71	7	0	0	0	0	142	108	**536**
13:30-14:30	44	0	92	87	73	5	0	0	0	0	139	109	**549**
13:45-14:45	54	0	110	80	76	3	0	0	0	0	144	109	**576**
14:00-15:00	44	0	88	99	82	0	0	0	0	0	126	75	**514**
14:15-15:15	34	0	96	107	84	0	0	0	0	0	126	102	**549**
14:30-15:30	38	0	109	102	83	0	0	0	0	0	112	108	**552**
14:45-15:45	29	0	111	110	80	0	0	0	0	0	93	96	**519**
15:00-16:00	39	0	124	89	84	0	0	0	0	0	104	120	**560**
15:15-16:15	49	0	126	79	73	0	0	0	0	0	110	88	**525**
15:30-16:30	39	0	116	74	93	0	0	0	0	0	149	85	**556**
15:45-16:45	36	0	119	63	89	0	0	0	0	0	177	98	**582**
16:00-17:00	32	0	118	61	75	0	0	0	0	0	180	86	**552**
16:15-17:15	22	0	121	61	85	0	0	0	0	0	168	81	**538**
16:30-17:30	23	0	118	42	60	0	0	0	0	0	146	80	**469**
16:45-17:45	29	0	102	39	50	0	0	0	0	0	137	79	**436**
17:00-18:00	31	0	98	38	57	0	0	0	0	0	159	88	**471**

TABLE A-2: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD PROW314 (POINT D) (09 APRIL 2021)													
TIME INTERVALS	MOVEMENTS												
	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
06:00-07:00	1	86	0	7	1	4	0	107	3	3	4	6	222
06:15-07:15	1	89	7	4	1	5	4	116	4	3	3	6	243
06:30-07:30	1	105	8	8	1	9	10	118	4	4	4	5	277
06:45-07:45	3	104	9	7	2	15	12	110	5	3	4	5	279
07:00-08:00	3	104	10	12	2	18	13	102	7	4	4	6	285
07:15-08:15	6	108	8	15	4	16	13	114	3	5	3	8	303
07:30-08:30	6	102	8	12	4	19	13	119	3	3	2	6	297
07:45-08:45	6	92	7	13	3	13	13	132	2	3	3	6	293
08:00-09:00	6	91	8	14	2	12	18	147	0	3	2	4	307
08:15-09:15	5	104	5	21	3	28	18	134	3	3	2	1	327
08:30-09:30	7	103	4	26	4	21	14	149	4	3	2	1	338
08:45-09:45	5	101	5	30	5	24	18	125	4	3	2	0	322
09:00-10:00	8	98	6	28	6	26	18	129	4	2	5	2	332
09:15-10:15	5	96	4	25	4	15	21	124	2	1	5	2	304
09:30-10:30	5	88	11	29	3	20	22	112	2	2	5	2	301
09:45-10:45	5	98	13	27	10	20	21	113	5	2	4	2	320
10:00-11:00	4	95	10	27	13	17	19	95	5	3	1	0	289
10:15-11:15	9	88	13	23	12	19	16	96	5	3	2	0	286
10:30-11:30	7	95	6	18	12	16	13	98	4	5	1	3	278
10:45-11:45	9	79	4	17	8	17	9	92	1	4	1	3	244
11:00-12:00	7	79	5	21	4	20	7	80	4	3	1	3	234
11:15-12:15	4	76	4	20	5	14	8	86	4	4	0	3	228
11:30-12:30	8	76	5	17	5	16	11	70	5	1	1	0	215
11:45-12:45	6	83	9	22	1	13	14	93	5	1	1	0	248
12:00-13:00	6	86	8	20	1	10	16	101	5	2	1	0	256
12:15-13:15	6	92	9	20	0	9	15	109	4	2	3	1	270
12:30-13:30	2	101	11	18	0	10	19	113	4	2	2	1	283
12:45-13:45	10	110	6	19	2	14	23	98	5	4	4	2	297
13:00-14:00	12	125	9	16	2	17	24	100	2	4	6	4	321
13:15-14:15	12	130	8	17	4	17	23	93	2	4	4	4	318
13:30-14:30	16	126	5	19	4	20	23	93	1	4	5	4	320
13:45-14:45	8	138	6	13	5	21	21	107	2	2	4	4	331
14:00-15:00	9	120	5	13	6	21	22	102	2	1	2	3	306
14:15-15:15	13	117	4	12	4	23	22	93	3	1	3	4	299
14:30-15:30	9	104	7	13	5	17	22	96	3	1	5	5	287
14:45-15:45	11	84	6	15	3	13	18	90	1	2	4	4	251
15:00-16:00	10	97	5	21	4	19	16	106	1	3	4	4	290
15:15-16:15	10	100	8	22	4	25	17	104	1	3	6	5	305
15:30-16:30	14	138	5	24	4	29	15	115	2	4	4	5	359
15:45-16:45	19	161	5	22	3	28	15	108	2	5	5	6	379
16:00-17:00	21	163	4	14	1	18	14	91	2	5	5	5	343
16:15-17:15	23	152	1	14	3	11	14	92	1	5	3	2	321
16:30-17:30	21	132	1	11	2	7	11	71	1	5	3	1	266
16:45-17:45	18	124	3	12	2	10	12	66	1	3	3	3	257
17:00-18:00	18	146	3	12	2	11	10	77	1	2	3	4	289

TABLE A-3: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND NKWALINI RAILWAY SIDING ACCESS ROAD (POINT E) (09 APRIL 2021)							
TIME INTERVALS	**MOVEMENTS**						
	2	**3**	**4**	**6**	**7**	**8**	**TOTAL**
06:00-07:00	87	1	3	0	5	115	**211**
06:15-07:15	97	0	0	0	6	120	**223**
06:30-07:30	114	0	0	0	8	123	**245**
06:45-07:45	115	0	0	1	23	99	**238**
07:00-08:00	116	0	2	1	21	99	**239**
07:15-08:15	121	0	2	1	21	116	**261**
07:30-08:30	115	0	2	1	21	116	**255**
07:45-08:45	105	0	2	0	6	145	**258**
08:00-09:00	105	1	1	0	3	162	**272**
08:15-09:15	111	1	1	3	7	149	**272**
08:30-09:30	111	1	1	3	7	169	**292**
08:45-09:45	108	1	1	3	7	148	**268**
09:00-10:00	109	0	0	3	9	150	**271**
09:15-10:15	103	0	0	2	4	147	**256**
09:30-10:30	102	0	0	2	2	141	**247**
09:45-10:45	113	0	0	3	2	140	**258**
10:00-11:00	103	0	0	6	0	122	**231**
10:15-11:15	106	0	0	4	0	119	**229**
10:30-11:30	94	0	0	14	1	118	**227**
10:45-11:45	79	0	0	13	1	111	**204**
11:00-12:00	81	0	0	10	1	103	**195**
11:15-12:15	74	0	0	10	2	107	**193**
11:30-12:30	89	0	0	0	1	86	**176**
11:45-12:45	98	0	0	0	1	114	**213**
12:00-13:00	100	0	0	0	1	120	**221**
12:15-13:15	107	0	0	0	1	129	**237**
12:30-13:30	114	0	0	0	1	131	**246**
12:45-13:45	126	1	0	0	2	117	**246**
13:00-14:00	146	1	1	0	2	118	**268**
13:15-14:15	149	1	1	1	1	113	**266**
13:30-14:30	146	1	1	1	1	115	**265**
13:45-14:45	151	0	1	1	0	124	**277**
14:00-15:00	133	0	0	1	0	118	**252**
14:15-15:15	134	0	0	0	0	109	**243**
14:30-15:30	120	0	0	0	0	114	**234**
14:45-15:45	101	1	0	0	0	109	**211**
15:00-16:00	112	1	0	0	2	129	**244**
15:15-16:15	115	1	0	3	2	129	**250**
15:30-16:30	153	1	0	4	5	139	**302**
15:45-16:45	181	0	0	4	5	131	**321**
16:00-17:00	184	0	0	4	3	107	**298**
16:15-17:15	174	0	0	2	3	105	**284**
16:30-17:30	152	0	0	2	0	83	**237**
16:45-17:45	142	0	0	3	0	81	**226**
17:00-18:00	164	1	0	3	0	93	**261**

TABLE A-4: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROAD P47-4 (R66) AND ROAD PROW15 (POINT F) (09 APRIL 2021)							
TIME INTERVALS	MOVEMENTS						
	1	2	8	9	10	12	TOTAL
06:00-07:00	0	80	115	3	8	3	209
06:15-07:15	0	95	118	2	2	4	221
06:30-07:30	0	112	121	2	2	4	241
06:45-07:45	0	114	97	2	1	2	216
07:00-08:00	0	114	99	2	2	1	218
07:15-08:15	5	119	116	2	2	2	246
07:30-08:30	6	113	116	2	2	2	241
07:45-08:45	8	102	145	2	3	2	262
08:00-09:00	8	104	161	2	2	2	279
08:15-09:15	4	109	149	1	3	0	266
08:30-09:30	4	108	170	0	4	1	287
08:45-09:45	2	106	149	0	3	1	261
09:00-10:00	2	106	150	0	3	1	262
09:15-10:15	1	102	146	1	1	1	252
09:30-10:30	1	102	140	1	0	0	244
09:45-10:45	1	113	138	2	0	0	254
10:00-11:00	1	102	120	2	1	0	226
10:15-11:15	1	105	117	2	1	0	226
10:30-11:30	0	93	116	2	1	0	212
10:45-11:45	1	78	109	2	1	1	192
11:00-12:00	2	81	98	5	0	1	187
11:15-12:15	2	74	102	5	0	1	184
11:30-12:30	2	88	78	8	1	1	178
11:45-12:45	1	97	107	7	1	0	213
12:00-13:00	0	99	116	4	1	0	220
12:15-13:15	0	104	125	4	3	0	236
12:30-13:30	0	110	129	2	4	0	245
12:45-13:45	0	122	113	4	5	2	246
13:00-14:00	0	142	115	4	5	2	268
13:15-14:15	0	146	110	4	4	2	266
13:30-14:30	0	143	113	3	4	3	266
13:45-14:45	0	147	123	2	4	3	279
14:00-15:00	0	127	115	3	6	3	254
14:15-15:15	0	129	107	2	5	3	246
14:30-15:30	0	117	112	2	3	2	236
14:45-15:45	0	100	107	2	2	0	211
15:00-16:00	0	112	127	2	1	0	242
15:15-16:15	3	114	124	5	2	1	249
15:30-16:30	3	152	132	7	2	2	298
15:45-16:45	3	178	124	7	3	4	319
16:00-17:00	3	182	101	6	2	4	298
16:15-17:15	0	173	102	3	1	4	283
16:30-17:30	1	150	82	1	2	3	239
16:45-17:45	1	139	80	1	3	2	226
17:00-18:00	1	162	92	1	3	2	261

APPENDIX B

TRIP INFORMATION RELATED TO THE EXISTING TRAFFIC

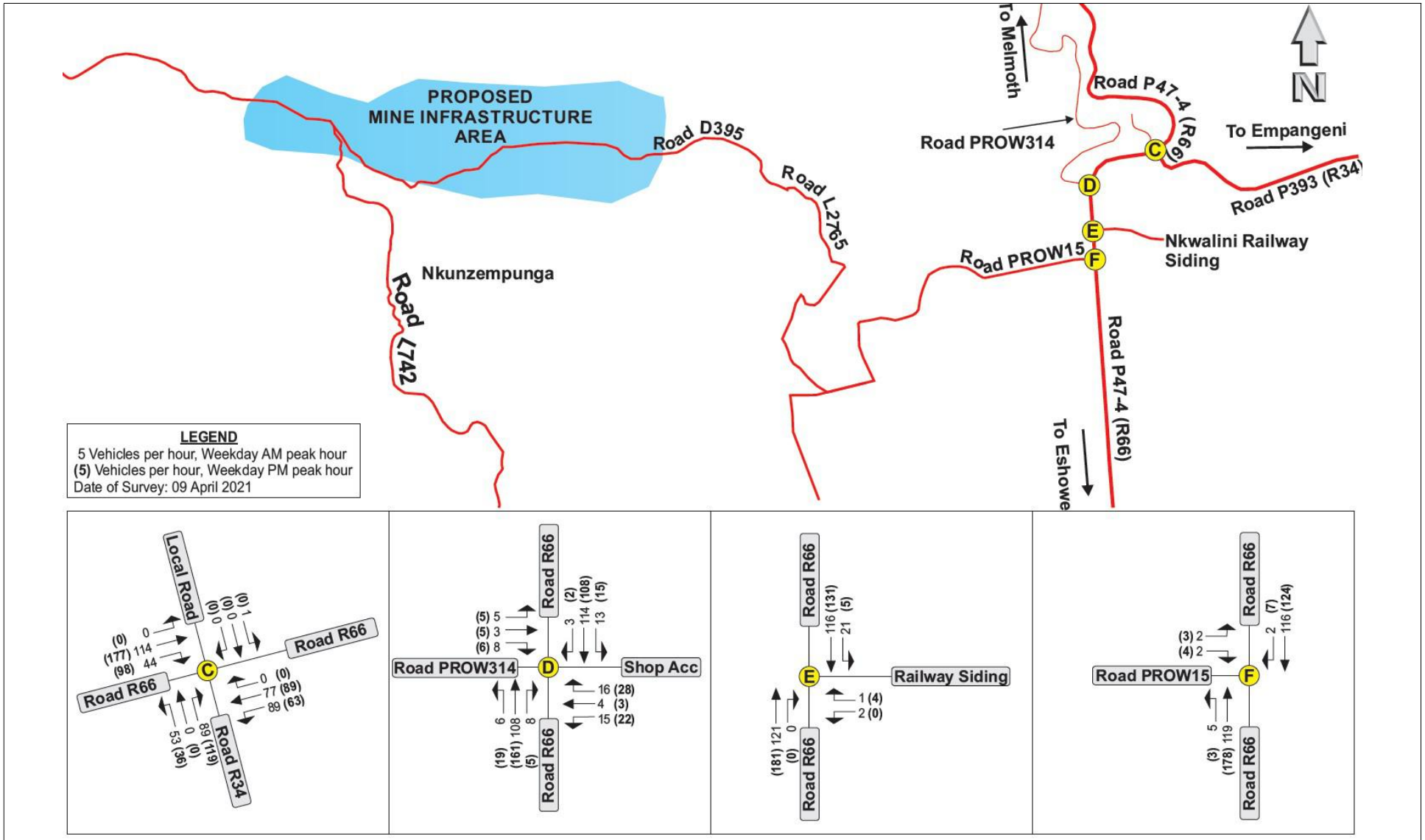

FIGURE B-1: 2021 PEAK-HOUR TRAFFIC (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT

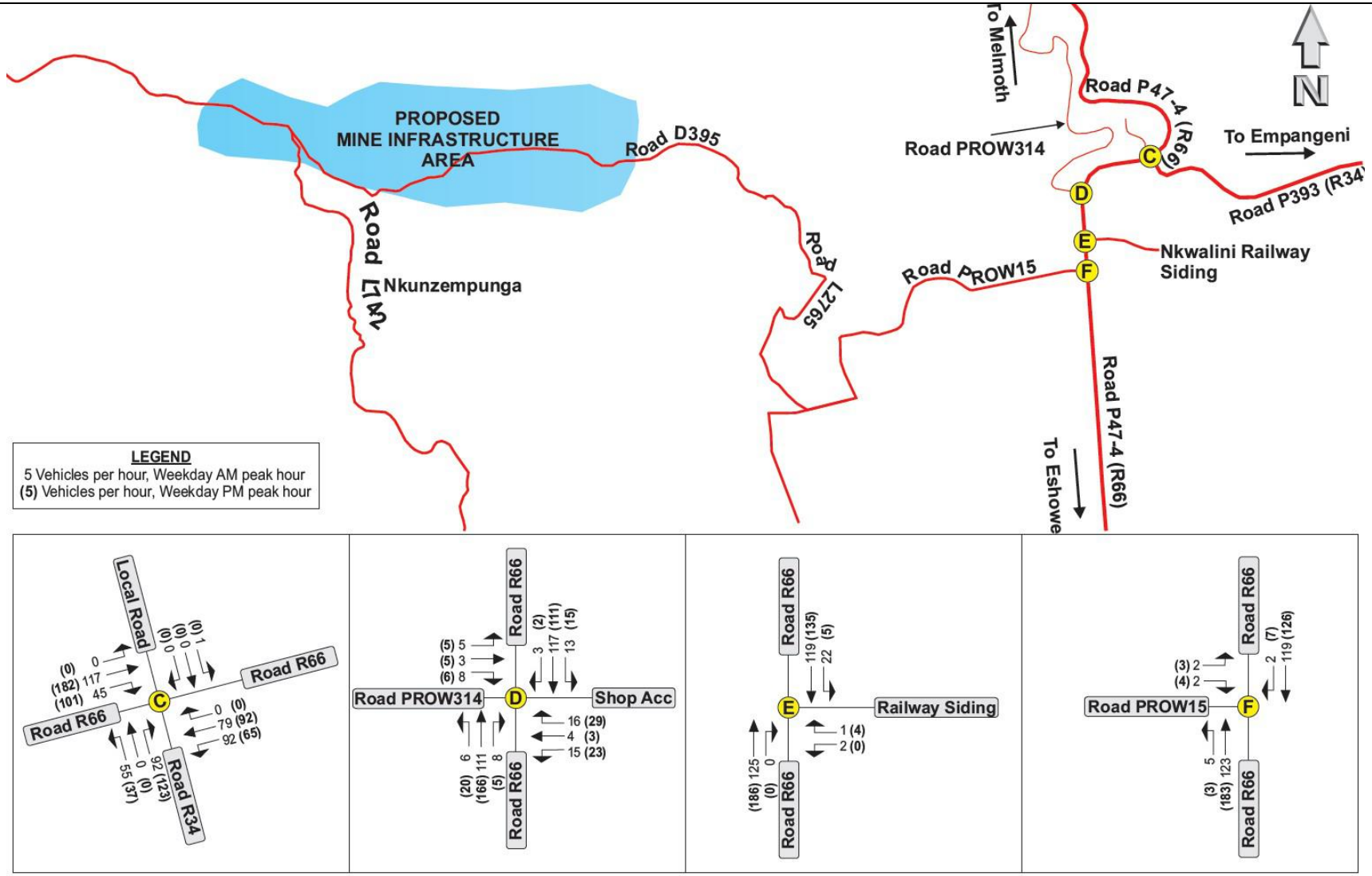

FIGURE B-2: PROJECTED 2023 PEAK-HOUR TRAFFIC (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 1) (BASEYEAR)

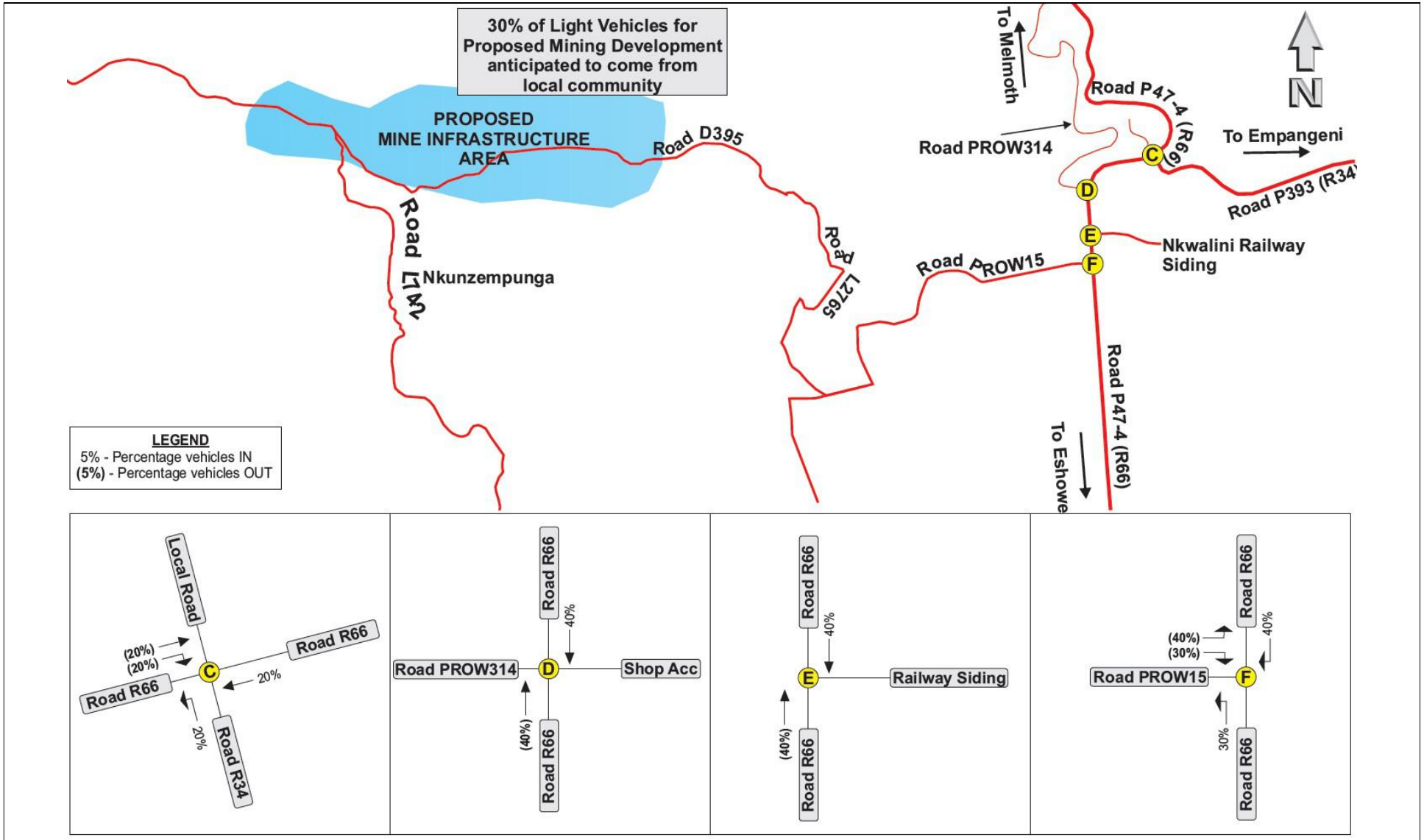

FIGURE B-3: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (LIGHT VEHICLES)

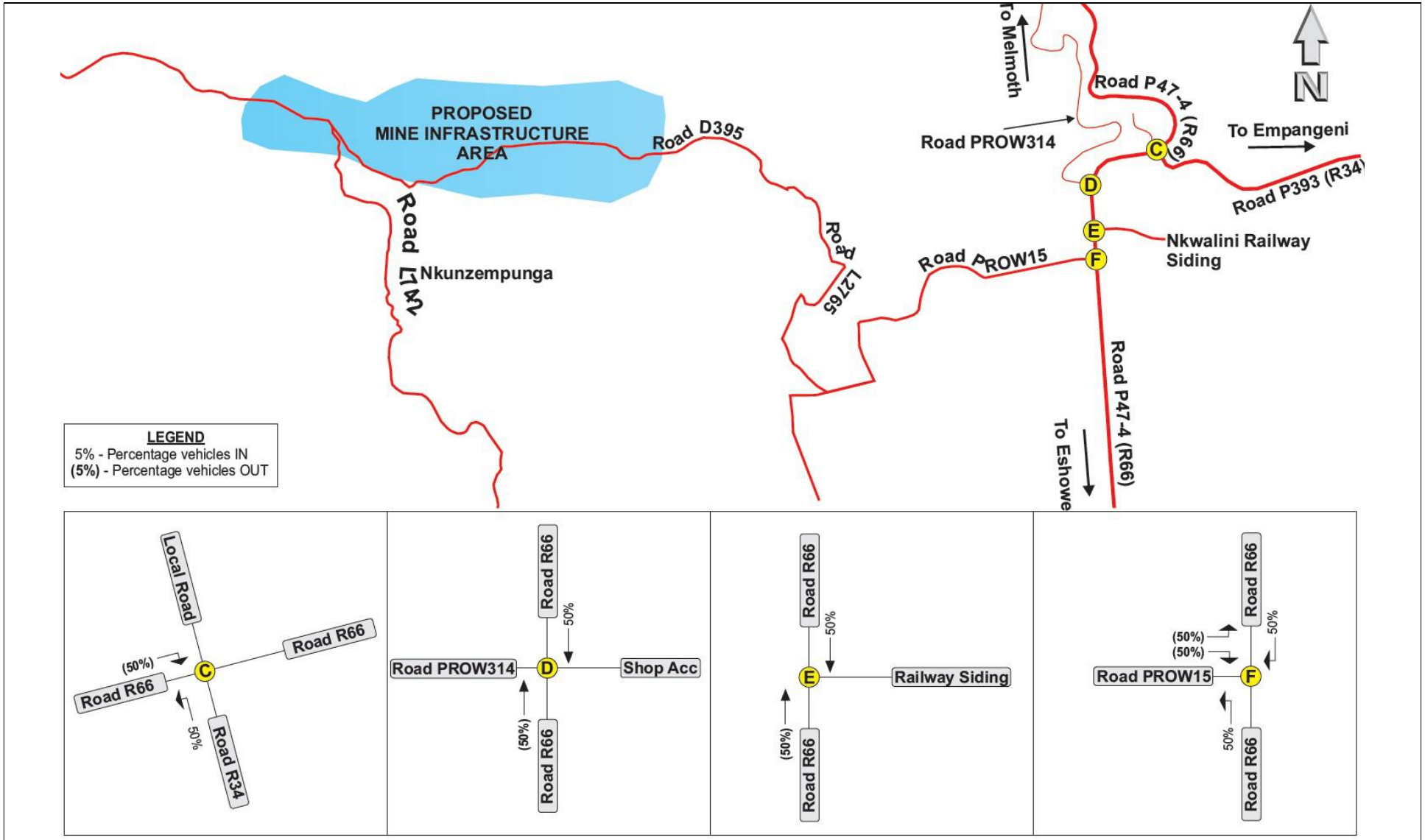

FIGURE B-4: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (DELIVERY VEHICLES)

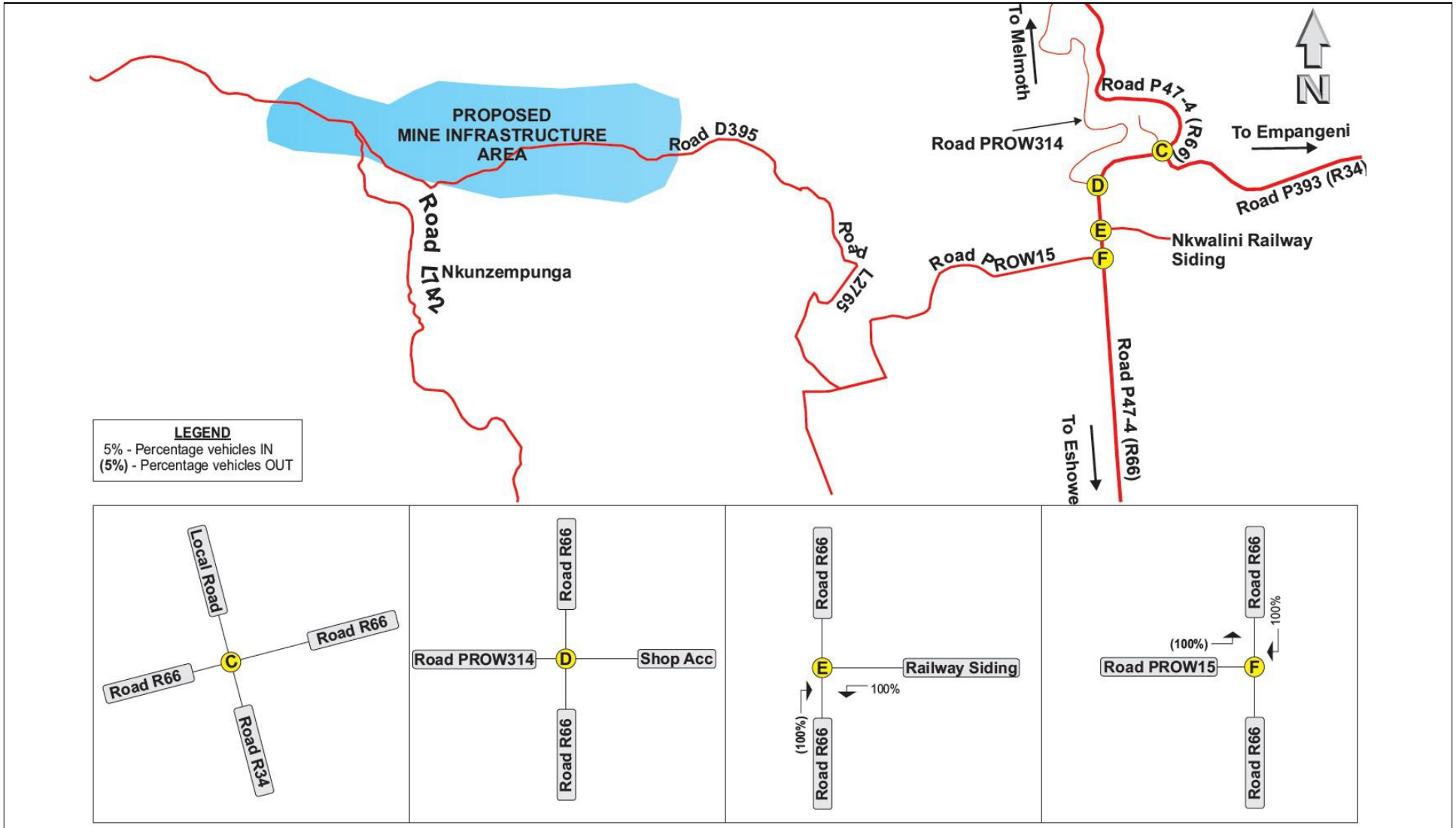

FIGURE B-5: PROJECTED VEHICLE TRIP DISTRIBUTION FOR THE PROPOSED MINING DEVELOPMENT (CONCENTRATE TRANSPORT VEHICLES)

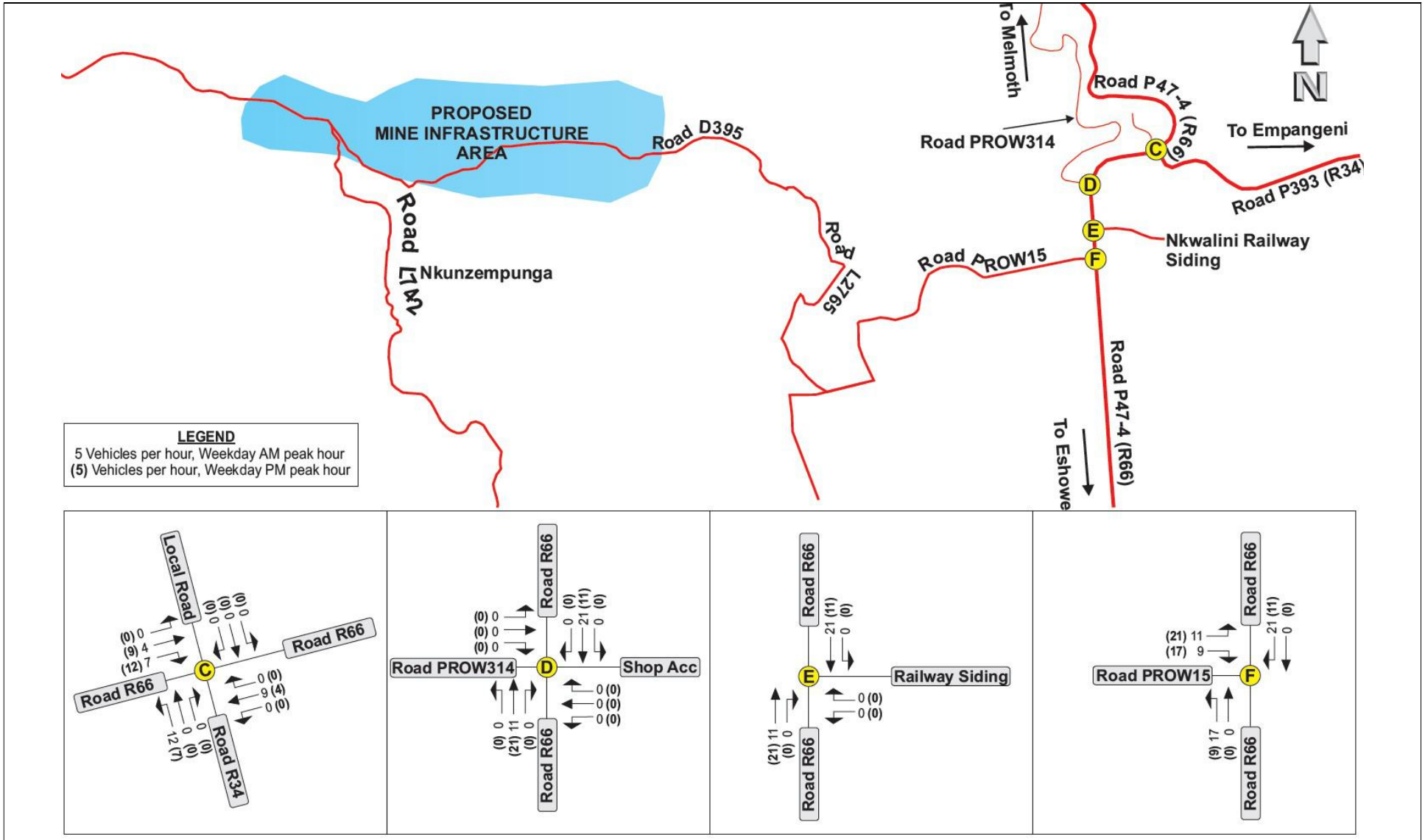

FIGURE B-6: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE)

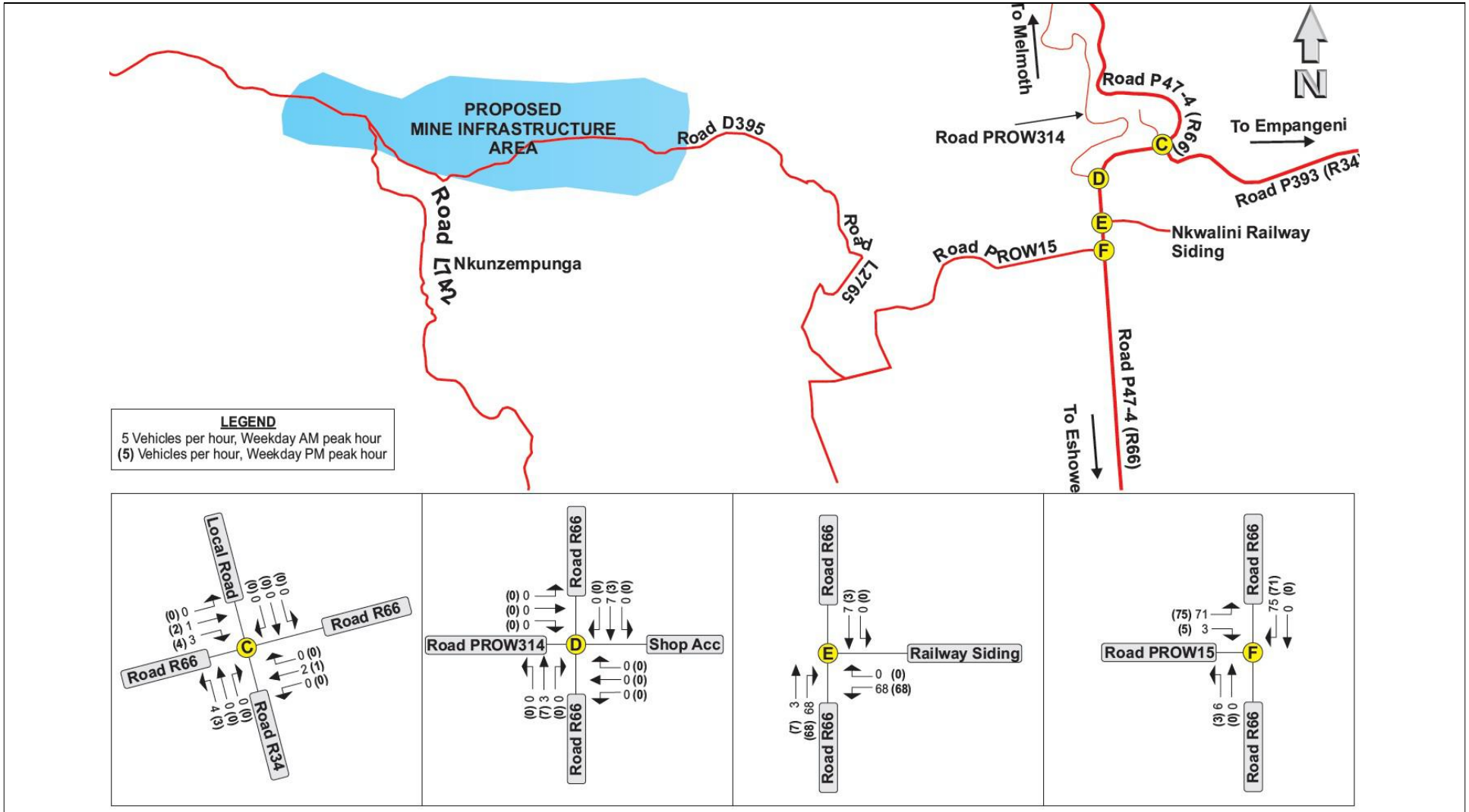

FIGURE B-7: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 5 years FROM BASEYEAR (2028)

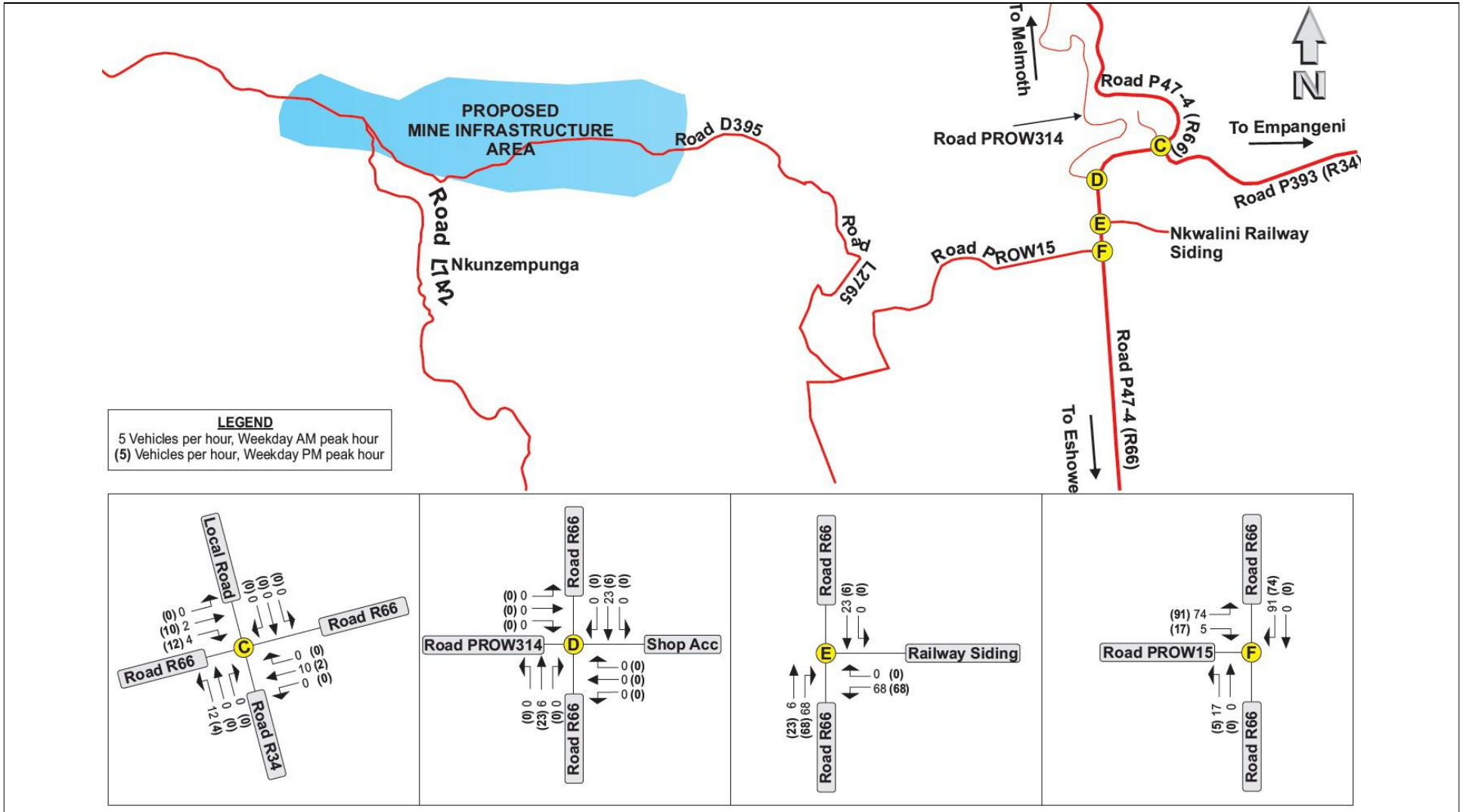

FIGURE B-8: PROJECTED VEHICLE TRIPS TO BE GENERATED BY THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 10 YEARS FROM BASEYEAR (2032)

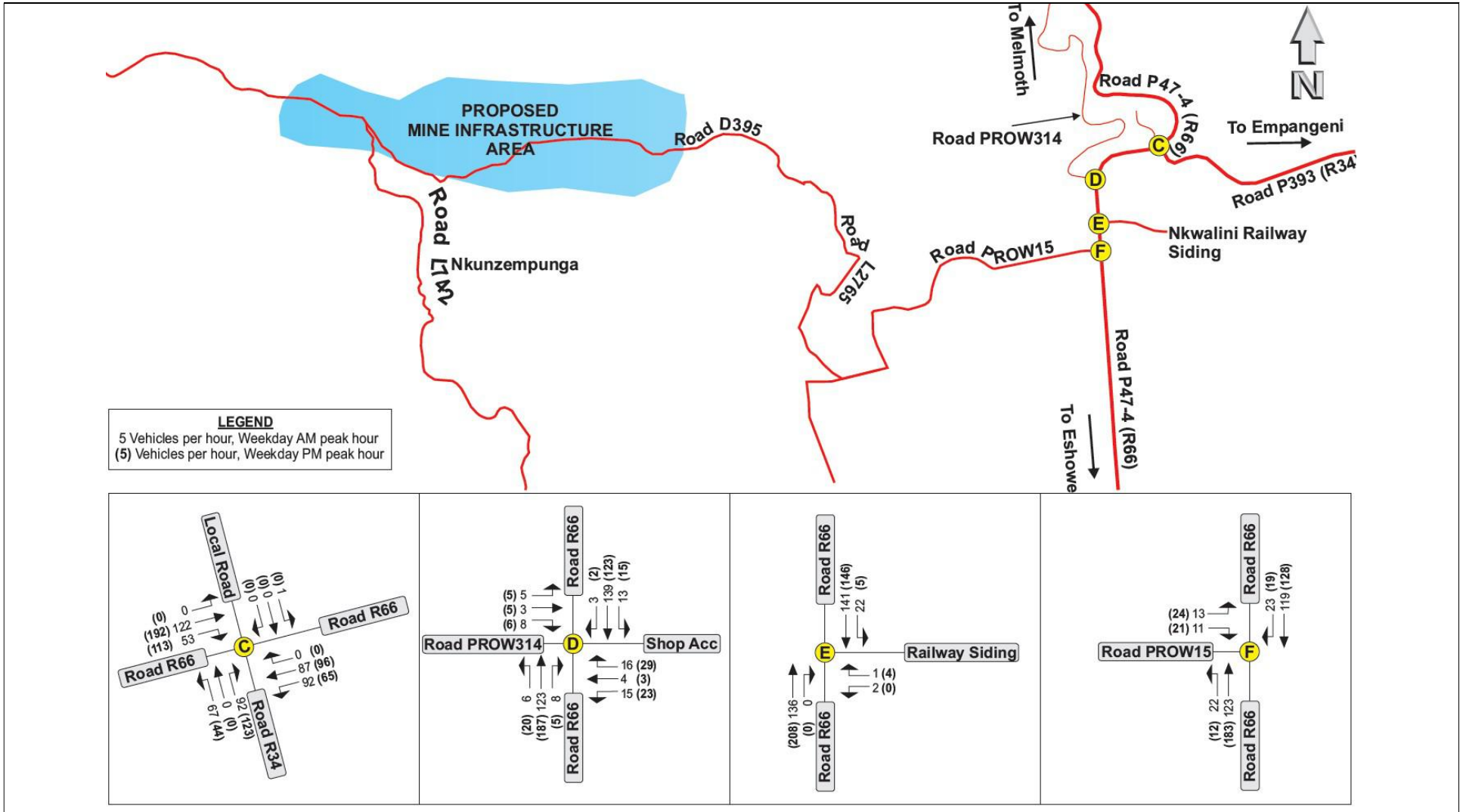

FIGURE B-9: PROJECTED 2023 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE) (SCENARIO 2)

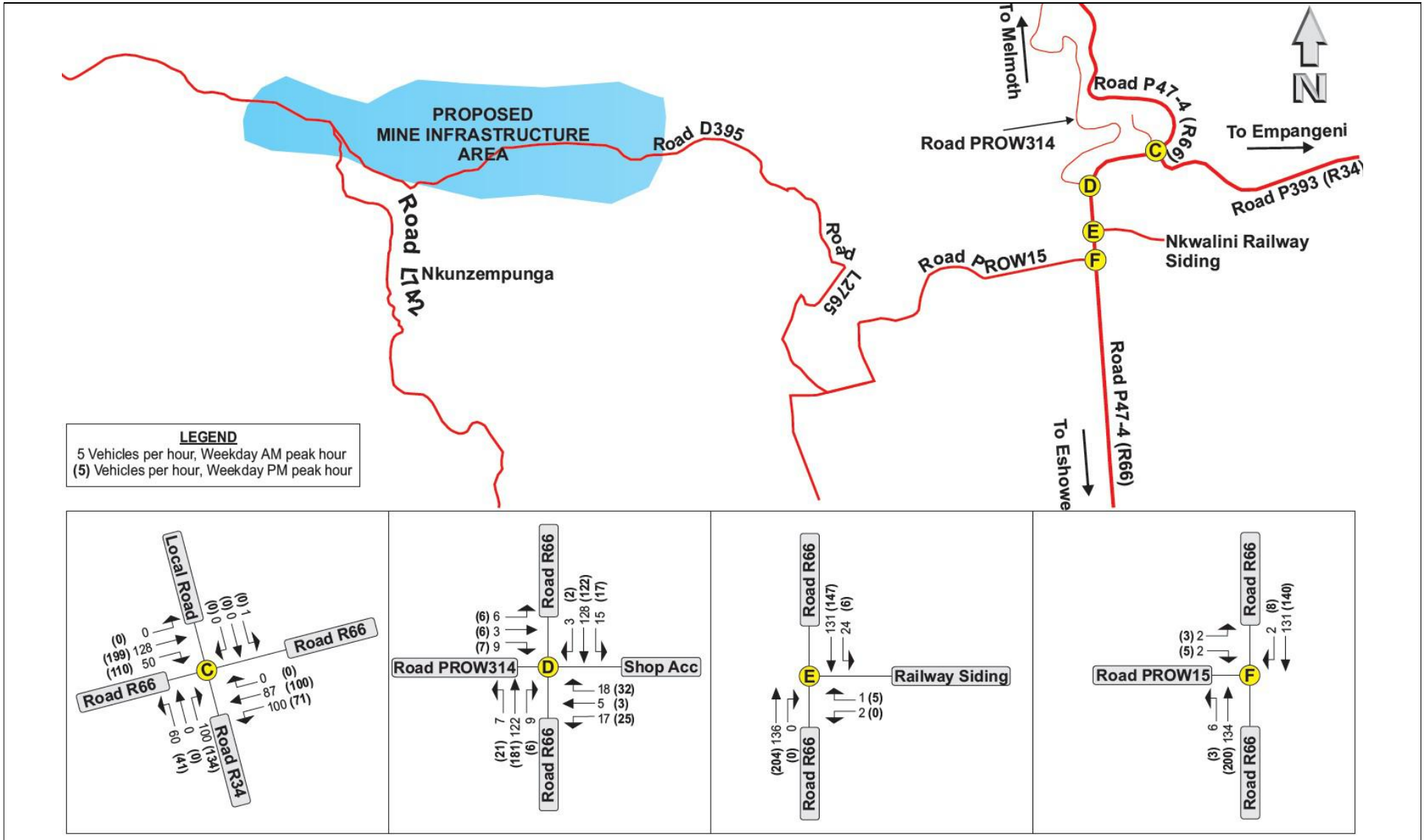

FIGURE B-10: PROJECTED 2028 PEAK-HOUR TRAFFIC WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 3)

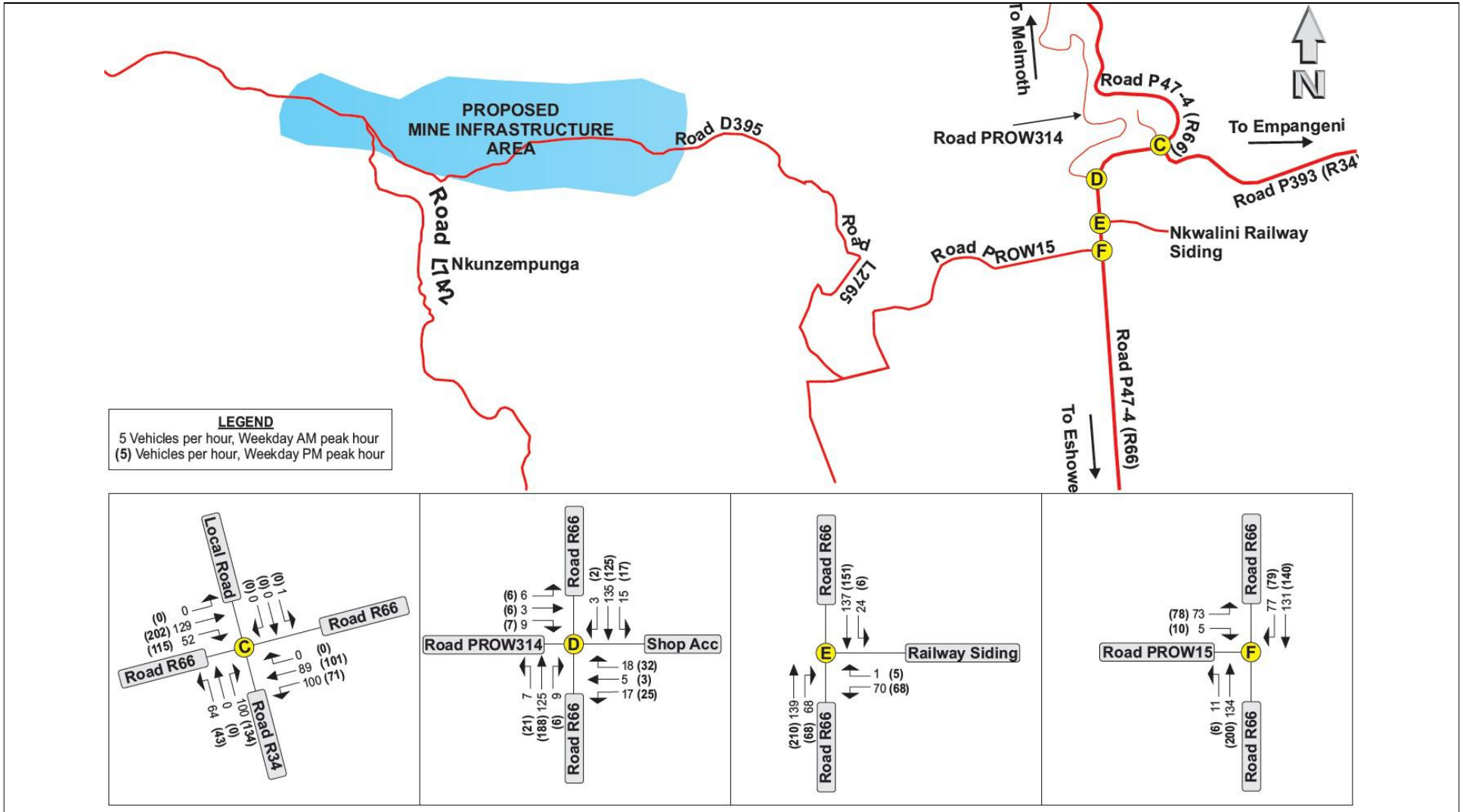

FIGURE B-11: PROJECTED 2028 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 5 years FROM BASEYEAR) (SCENARIO 4)

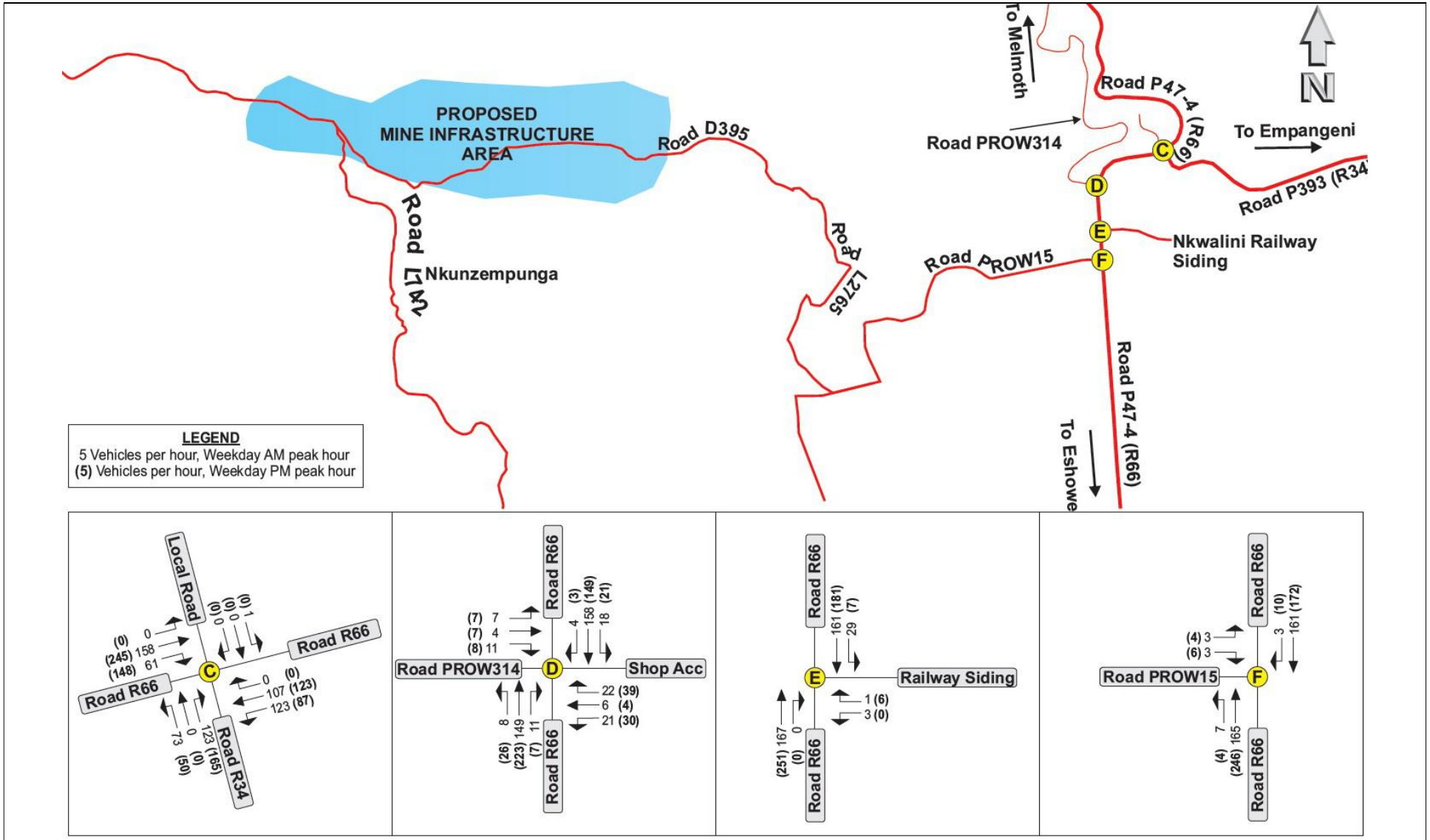

FIGURE B-12: PROJECTED 2032 PEAK-HOUR TRAFFIC WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 5)

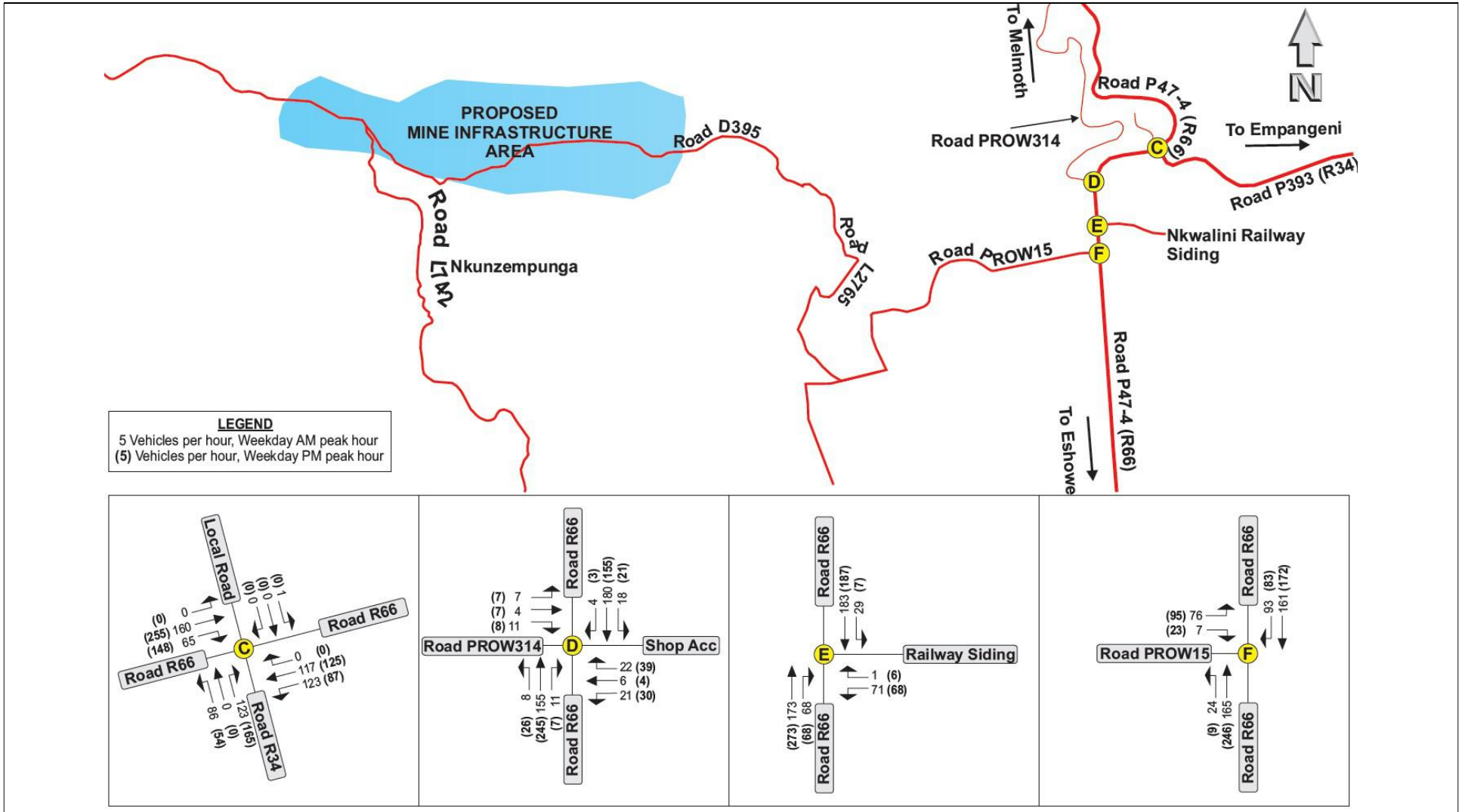

FIGURE B-13: PROJECTED 2032 PEAK-HOUR TRAFFIC WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE – 10 YEARS FROM BASEYEAR) (SCENARIO 6)

APPENDIX C

SIDRA CALCULATION RESULTS

TABLE C-1: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2023 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 1)

***POINT C*: Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.3	B	0.005	12.0	B	0.007
East (Road R66)	3.1	A	0.056	2.4	A	0057
South (Road R34)	9.9	A	0211	11.8	B	0.308
West (Road R66)	1.8	A	0.068	2.3	A	0.115
Intersection	**4.8**	**A**	**0.211**	**4.9**	**A**	**0.308**

***POINT D*: Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.070	0.8	A	0.070
East (Shop Acc)	11.6	B	0.063	10.8	B	0.097
South (Road R66)	0.7	A	0.063	0.8	A	0.102
West (PROW314)	10.9	B	0.028	10.8	B	0.030
Intersection	**2.5**	**A**	**0.028**	**2.6**	**A**	**0.102**

***POINT E*: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.072	0.2	A	0.085
East (Railway Siding)	9.1	A	0.004	10.8	B	0.010
South (Road R66)	0.1	A	0.076	0.0	A	0.122
Intersection	**0.5**	**A**	**0.076**	**0.3**	**A**	**0.122**

***POINT F*: Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.084	0.4	A	0.083
South (Road R66)	0.2	A	0.089	0.1	A	0.118
West (PROW15)	8.7	A	0.005	10.0	A	0.010
Intersection	**0.3**	**A**	**0.089**	**0.4**	**A**	**0.118**

TABLE C-2: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2023 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE) (SCENARIO 2)

***POINT C*: Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.5	B	0.005	12.5	B	0.007
East (Road R66)	2.9	A	0.056	2.3	A	0.059
South (Road R34)	10.0	B	0.228	12.2	B	0.325
West (Road R66)	1.9	A	0.071	2.4	A	0.121
Intersection	**4.8**	**A**	**0.228**	**5.0**	**A**	**0.325**

***POINT D*: Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.6	A	0.085	0.7	A	0.080
East (Shop Acc)	12.2	B	0.068	11.3	B	0.108
South (Road R66)	0.7	A	0.070	0.8	A	0.116
West (PROW314)	11.5	B	0.030	11.3	B	0.032
Intersection	**2.3**	**A**	**0.085**	**2.5**	**A**	**0.116**

***POINT E*: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.087	0.2	A	0.095
East (Railway Siding)	9.3	A	0.004	11.3	B	0.011
South (Road R66)	0.0	A	0.085	0.0	A	0.140
Intersection	**0.5**	**A**	**0.087**	**0.2**	**A**	**0.140**

***POINT F*: Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	1.0	A	0.083	0.8	A	0.079
South (Road R66)	0.8	A	0.086	0.4	A	0.117
West (PROW15)	9.9	A	0.041	11.5	B	0.085
Intersection	**1.6**	**A**	**0.086**	**1.8**	**A**	**0.117**

TABLE C-3: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2028 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 3)

***POINT C*: Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.6	B	0.005	12.6	B	0.007
East (Road R66)	3.0	A	0.061	2.4	A	0.062
South (Road R34)	10.1	B	0.235	12.7	B	0.349
West (Road R66)	1.8	A	0.074	2.3	A	0.125
Intersection	**4.8**	**A**	**0.235**	**5.1**	**A**	**0.349**

***POINT D*: Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.079	0..8	A	0.079
East (Shop Acc)	12.1	B	0.076	11.3	B	0.118
South (Road R66)	0.8	A	0.071	0.8	A	0.114
West (PROW314)	11.3	B	0.033	11.3	B	0.038
Intersection	**2.6**	**A**	**0.033**	**2.7**	**A**	**0.118**

***POINT E*: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.081	0.2	A	0.095
East (Railway Siding)	9.3	A	0.004	11.3	B	0.011
South (Road R66)	0.0	A	0.085	0.0	A	0.137
Intersection	**0.5**	**A**	**0.085**	**0.2**	**A**	**0.095**

***POINT F*: Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.093	0.4	A	0.093
South (Road R66)	0.2	A	0.098	0.1	A	0.129
West (PROW15)	9.0	A	0.005	10.5	B	0.013
Intersection	**0.3**	**A**	**0.098**	**0.4**	**A**	**0.129**

TABLE C-4: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2028 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE– 5 YEARS FROM BASEYEAR) (SCENARIO 4)

***POINT C*: Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	10.7	B	0.005	12.8	B	0.007
East (Road R66)	3.0	A	0.061	2.4	A	0.062
South (Road R34)	3.0	A	0.061	12.8	B	0.355
West (Road R66)	10.2	B	0.241	2.3	A	0.127
Intersection	**4.8**	**A**	**0.241**	**5.2**	**A**	**0.355**

***POINT D*: Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.083	0.8	A	0.081
East (Shop Acc)	12.2	B	0.078	11.4	B	0.120
South (Road R66)	0.8	A	0.072	0.8	A	0.118
West (PROW314)	11.4	B	0.033	11.4	B	0.038
Intersection	**2.6**	**A**	**0.083**	**2.7**	**A**	**0.120**

***POINT E*: Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.085	0.2	A	0.098
East (Railway Siding)	8.9	A	0.075	9.3	A	0.102
South (Road R66)	1.9	A	0.087	1.6	A	0.142
Intersection	**2.6**	**A**	**0.087**	**2.3**	**A**	**0.142**

***POINT F*: Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	2.3	A	0.091	2.4	A	0.086
South (Road R66)	0.4	A	0.094	0.2	A	0.127
West (PROW15)	9.2	A	0.110	10.2	B	0.132
Intersection	**2.9**	**A**	**0.110**	**2.8**	**A**	**0.132**

TABLE C-5: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2032 (BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 5)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	11.5	B	0.006	14.7	B	0.009
East (Road R66)	3.0	A	0.075	2.4	A	0.076
South (Road R34)	10.8	B	0.307	16.2	C	0.488
West (Road R66)	1.9	A	0.091	2.5	A	0.154
Intersection	**5.0**	**A**	**0.307**	**6.1**	**A**	**0.488**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.097	0.8	A	0.098
East (Shop Acc)	13.1	B	0.105	12.6	B	0.164
South (Road R66)	0.8	A	0.087	0.8	A	0.141
West (PROW314)	12.3	B	0.046	12.5	B	0.050
Intersection	**2.8**	**A**	**0.105**	**3.0**	**A**	**0.164**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.8	A	0.100	0.2	A	0.117
East (Railway Siding)	9.5	A	0.005	12.9	B	0.018
South (Road R66)	0.0	A	0.104	0.0	A	0.169
Intersection	**0.5**	**A**	**0.104**	**0.3**	**A**	**0.169**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.1	A	0.115	0.5	A	0.115
South (Road R66)	0.2	A	0.120	0.1	A	0.159
West (PROW15)	9.3	A	0.009	11.1	B	0.018
Intersection	**0.3**	**A**	**0.120**	**0.5**	**A**	**0.159**

TABLE C-6: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2032 (BACKGROUND TRAFFIC) WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE– 10 YEARS FROM BASEYEAR) (SCENARIO 6)

***POINT C:* Intersection of Road P47-4 (R66) and Road P393 (R34)**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Local Road)	11.7	B	0.006	15.0	C	0.009
East (Road R66)	2.9	A	0.075	2.3	A	0.077
South (Road R34)	11.0	B	0.328	16.3	C	0.495
West (Road R66)	2.0	A	0.092	2.5	A	0.161
Intersection	**5.1**	**A**	**0.328**	**6.1**	**A**	**0.495**

***POINT D:* Intersection of Road P47-4 (R66) and Road PROW314**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.6	A	0.110	0.8	A	0.102
East (Shop Acc)	13.7	B	0.111	13.0	B	0.173
South (Road R66)	0.8	A	0.090	0.8	A	0.152
West (PROW314)	12.8	B	0.048	12.9	B	0.053
Intersection	**2.7**	**A**	**0.111**	**2.9**	**A**	**0.173**

***POINT E:* Intersection of Road P47-4 (R66) and Nkwalini Railway Siding Access Road**

Type of intersection control: Free flow along Road R66

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	0.7	A	0.113	0.2	A	0.121
East (Railway Siding)	9.2	A	0.081	9.9	A	0.110
South (Road R66)	1.7	A	0.108	1.3	A	0.184
Intersection	**2.3**	**A**	**0.113**	**2.0**	**A**	**0.184**

***POINT F:* Intersection of Road P47-4 (R66) and Road PROW15**

Type of intersection control: Free flow along Road R66

With recommended intersection geometric improvements

Levels of Service acceptable

APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R66)	2.4	A	0.112	2.3	A	0.106
South (Road R66)	0.7	A	0.116	0.2	A	0.157
West (PROW15)	9.7	A	0.128	11.8	B	0.219
Intersection	**3.0**	**A**	**0.128**	**3.2**	**A**	**0.219**

APPENDIX D

LEVEL OF SERVICE CRITERIA DESCRIPTION

TABLE D-1: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR UNSIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	**AVERAGE TOTAL DELAY (SEC/VEH)**	**PERFORMANCE EVALUATION**
A	≤ 5	Excellent
B	> 5 and ≤ 10	Very Good
C	>10 and ≤ 20	Good
D	>20 and ≤ 30	Average
E	>30 and ≤ 45	Poor
F	>45	Fail

TABLE D-2: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR SIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	**AVERAGE TOTAL DELAY (SEC/VEH)**	**PERFORMANCE EVALUATION**
A	≤ 5	Excellent
B	> 5 and ≤ 15	Very Good
C	> 15 and ≤ 25	Good
D	> 25 and ≤ 40	Average
E	> 40 and ≤ 60	Poor
F	> 60	Fail

Level of Service criteria obtained from *The Highway Capacity Manual (Special Report 2009)*

APPENDIX E

SUMMARY OF IMPACT RATINGS

TABLE E-1: IMPACT RATING WITHOUT THE PROPOSED MINING DEVELOPMENT

RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Existing conditions without mining activities	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	VL	H	M	Low	H	Low	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	VL	H	M	Low	H	Low	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	VL	H	M	Low	H	Low	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	VL	H	M	Low	H	Low	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	VL	H	M	Low	H	Low	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	VL	H	M	Low	H	Low	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes).	VL	H	M	Low	H	Low	*No mitigating measures required.*						*No mitigating measures required.*
			8. Pedestrian movements (Point D).	H	H	VL	Med	H	Med	H+	H	VL	Med	H	Positive Med	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	VL	H	M	Low	H	Low	*No mitigating measures required.*						*No mitigating measures required.*

TABLE E-2: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (CONSTRUCTION PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Construction of Infrastructure	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes) **Point F**.	*H*	*H*	*M*	*High*	*H*	*High*	*H+*	*H*	*M*	*Positive High*	*H*	*Positive High*	*Provision of dedicated right-turn lane on northern approach.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*

TABLE E-3: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (OPERATIONAL PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Construction of Infrastructure	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes) **Point F**.	*H*	*H*	*M*	*High*	*H*	*High*	*H+*	*H*	*M*	*Positive High*	*H*	*Positive High*	*Provision of dedicated right-turn lane on northern approach.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*

TABLE E-4: IMPACT RATING WITH THE PROPOSED MINING DEVELOPMENT (CLOSURE PHASE)																		
RECEPTOR	ACTIVITY		IMPACT	BEFORE MITIGATION MEASURES						AFTER MITIGATION MEASURES						Comments and Mitigation Measures
				Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	Intensity	Duration	Spatial Scale	Consequence	Probability	Significance	
Road and Traffic	Existing conditions without mining activities	Road Capacity	1. Relevant road sections (reconstructing/repairing of roads).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						Road vehicle capacity is no problem.
			2. Relevant intersections (Need for additional lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.3** and **Appendix C** of the report. (No additional lanes required at relevant intersections from a road capacity point of view).
		Road Safety Matters	3. Intersection (access) spacing.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			4. Vertical road alignment.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			5. Available sight distances at intersections under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						See **Section 2.7** of the report. (No mitigation measures required).
			6. Speed limit along relevant roads under investigation.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigation measures required.*
			7. Relevant intersections (Need for dedicated left- and right-turn lanes).	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*
			8. Pedestrian movements (Point D).	*H*	*H*	*VL*	*Med*	*H*	*Med*	*H+*	*H*	*VL*	*Med*	*H*	*Positive Med*	Regardless of the Proposed Mining Development, road safety mitigating measures at **Point D** which includes pedestrian crossings/walkways should be implemented. Loading and off-loading facilities should be provided at strategic points where mining related workers is proposed to be loaded and off-loaded.
			9. Public transport loading and off-loading.	*VL*	*H*	*M*	*Low*	*H*	*Low*	*No mitigating measures required.*						*No mitigating measures required.*

APPENDIX F

IMPACT RATING CRITERIA

TABLE F-1: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DEFINITIONS AND CRITERIA		
PART A: DEFINITIONS AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of intensity, spatial extent and duration**
Criteria for ranking of the INTENSITY of environmental impacts	**VH**	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilisation against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	**VL**	Very short, always less than a year. Quickly reversible.
	L	Short term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity.)
	VH	Very long, permanent, +20 years. (Irreversible. Beyond closure.)
Criteria for ranking the EXTENT of impacts	**VL**	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours.
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

TABLE F-2: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DETERMINING CONSEQUENCE							
PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	**VH**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Long term	**H**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Medium term	**M**	**Very Low**	**Low**	**Low**	**Low**	**Medium**
	Short term	**L**	**Very low**	**Very Low**	**Low**	**Low**	**Low**
	Very short	**VL**	**Very low**	**Very Low**	**Very Low**	**Low**	**Low**
INTENSITY = L							
DURATION	Very long	**VH**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Long term	**H**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Medium term	**M**	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Short term	**L**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Very short	**VL**	**Very low**	**Low**	**Low**	**Low**	**Medium**
INTENSITY = M							
DURATION	Very long	**VH**	**Medium**	**High**	**High**	**High**	**Very High**
	Long term	**H**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Very short	**VL**	**Low**	**Low**	**Low**	**Medium**	**Medium**
INTENSITY = H							
DURATION	Very long	**VH**	**High**	**High**	**High**	**Very High**	**Very High**
	Long term	**H**	**Medium**	**High**	**High**	**High**	**Very High**
	Medium term	**M**	**Medium**	**Medium**	**High**	**High**	**High**
	Short term	**L**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**Medium**	**High**
INTENSITY = VH							
DURATION	Very long	**VH**	**High**	**High**	**Very High**	**Very High**	**Very High**
	Long term	**H**	**High**	**High**	**High**	**Very High**	**Very High**
	Medium term	**M**	**Medium**	**High**	**High**	**High**	**Very High**
	Short term	**L**	**Medium**	**Medium**	**High**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**High**	**High**

VL	**L**	**M**	**H**	**VH**
A part of the site/property	Whole site	Beyond the site, affecting neighbours	Extending far beyond the site but localised	Regional/ National
EXTENT				

TABLE F-3: CRITERIA USED IN THE ASSESSMENT OF IMPACTS – DETERMINING SIGNIFICANCE							
PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**VH**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Probable	**H**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Possible/ Frequent	**M**	**Very Low**	**Very Low**	**Low**	**Medium**	**High**
	Conceivable	**L**	**Insignificant**	**Very Low**	**Low**	**Medium**	**High**
	Unlikely/ Improbable	**VL**	**Insignificant**	**Insignificant**	**Very Low**	**Low**	**Medium**
			VL	**L**	**M**	**H**	**VVH**
			CONSEQUENCE				

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline.**
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation.
Insignificant	Inconsequential, not requiring any consideration.

APPENDIX G

PROFESSIONAL REGISTRATION AND CURRICULUM VITAE

ECSA

ENGINEERING COUNCIL OF SOUTH AFRICA

10-Sep-2021 12:59

Profile Number : ECSA-00080528
Tel : +27 82 371 0253
Email : leon@siyazi.co.za

Mr,L,Roets
P O Box 11182

Bendor Park
0713

Dear Leon Roets

RENEWAL OF REGISTRATION(s) 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 registration(s), in terms of Section 22(1) of the Engineering Profession Act, 2000 (Act 46 of 2000), has been successful and your registration(s) has been renewed for a further period of (5) years until 14-Nov-2026 00:00, subject to you paying your annual fees.

Congratulations, on the continued recognition of your status with the Engineering Council of South Africa.

Yours Faithfully
Ms Carmen Wright
Manager: Education and CPD

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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)
Southern African Institute of Civil Engineering (SAICE)

EMPLOYMENT RECORD

07/1996 – Current:	Director and shareholder to SIYAZI Group of Companies
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

Leon Roets has a total of 32 years' experience of Transport and Traffic Engineer with wide experience in transportation planning and modelling, data processing as well as Traffic Impact Studies. He further was involved as part of Taxi Industry related projects for the past 25 years.

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:

	PROJECT	CLIENT	DEVELOPMENT	
			SIZE	STATUS
a)	Anglo American Project Smartpower: Hydrogen Production Plant at Mogalakwena Mine - Traffic Specialist Study	SLR Consulting	N/a	Busy with Study
b)	Contract SANRAL R.518-020-2019 /1F - for Consulting Engineering services for the Upgrading on National Route R518 Section 2 from Mapeta (KM 97.5) to Mokopane (KM 102.2)	iX engineers (Pty) Ltd	N/a	Busy with Study
c)	TIA for upgrading of Euphoria Shopping Centre Mookgophong	Naboom Commodities	9 100 m^2	Busy with Study
d)	Contract SANRAL N.001-280-2020/1F - for Consulting Engineering Services for the Upgrade on National Route N1 Section 28 from Polokwane (KM 0.0) to Dwarsrivier (KM 49.0)	iX engineers (Pty) Ltd	N/a	Busy with Study
e)	Road network planning for the CBD of Thohoyandou	KTN Consulting Engineers Project Managers	N/a	Busy with Study
f)	Keaton Energy Holdings Limited (KEHL): Leeuw Braakfontein Colliery (Pty) Ltd [LBC] - Opencast & Underground Mining	Letsolo Water and Environmental Services	N/a	TIA done for EIA
g)	Kudumane Manganese Resources Expansion Project, near Hotazel in the Northern Cape Province	SRK Consulting	N/a	TIA done for EIA
h)	Proposed Township Establishment Remainder of Portion 16 of the Farm Tweefontein 915 LS, Limpopo	Specon CC	N/a	TIA done.
i)	Proposed Virginia Solar Park, Free State Province	Ages Limpopo (Pty) Ltd	N/a	TIA done for EIA
j)	Limpopo Central Hospital	Sakhiwo Health Solutions (Limpopo) (Pty) Ltd	488 Beds	TIA Approved
k)	Proposed Filling Station on Giyani D2 Ext 1	Rivoni (Pty) LTD	18 000 m^2	Busy with Study
l)	Proposed Development on remainder of portions 166 & 168 of the farm Tweefontein 915-LS	Natura Professional Planners	N/a	TIA Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:				
PROJECT		CLIENT	DEVELOPMENT	
			SIZE	STATUS
m)	Proposed Ga-Sekgopo Filling Station to be situated on the Farm Uitspanning 820 LS, Road R81, Ga-Sekgopo, Greater Letaba Local Municipality, Limpopo Province (Rest and Service Facilities)	Rivoni (Pty) LTD	N/a	Busy with Study
n)	Proposed Access application to Filling Station on Portion 44 of the farm Deer Park 459 Mopani	BF Branded Marketer	N/a	Done.
o)	Shopping Centre Siloam	Illungile Consulting Services	8 700m²	Constructed.
p)	Traffic Impact Assessment for Student Accommodation at TUT on corner of Mark and Hospital Street	Seco Construction Project Managers	1057 beds	TIA approved.
q)	Proposed Pfunanani Special School, Giyani	PG Consulting Engineers (Pty) Ltd	500 students	TIA approved.
r)	Nkuzana City and Filling station development	Masingita Group of Companies	120 000m²	Busy with Study.
s)	Traffic Impact Assessment for Proposed Filling Station on Road R37 Thokwaneng	Matome Rapotu	N/a	TIA approved.
t)	New Dwarsrivier Mine Heavy Vehicle Access Traffic Impact Assessment	Neda Engineering Group (PTY) Ltd	N/a	Constructed
u)	Development to be on Portion 39 of the Farm Koppiefontein 686-LS	Nhlatse Planning Consultants	N/a	Approved
v)	Township Layout Plan, Portion 145 of the Farm Tweefontein 915 LS	Nhlatse Planning Consultants	N/a	Approved
w)	Upgrading of the Existing Access to the New Clydesdale Colliery-Site Traffic Assessment	Universal Coal PLC	N/a	In Process
x)	Twin City Rustenburg Taxi Facilities	Twin City Development (Pty) Ltd.	N/a	Constructed
y)	Widening and upgrading of existing truck access to Xstrata Alloys Lion Ferrochrome	Xstrata Alloys Lion Ferrochrome	N/a	Constructed
z)	Tengwa Africa Truck Stop	Prof Planners & Associates Town and Regional Planners	N/a	Approved
aa)	Proposed West Wits Mining Development	SLR Consulting Engineers (Metago)	N/a	In Process
bb)	Proposed access to Filling Station From Road D212 Dwarsrivier	Boulder Group of Companies	N/a	TIA approved
cc)	Ficksburg Border Bridge - Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
dd)	Maseru Border Bridge – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ee)	Kopfontein Border – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ff)	Pure Resource Mine, Parys	Pure Resource Mine	N/a	Planning
gg)	University of Limpopo (Turfloop Campus) RFT No: UL001/2014 - OFF Campus Student Residences	Zutari	6800 beds	Panning
hh)	Polokwane 90MW PV Solar Plant	Phakanani Environmental	90MW PV	Planning
ii)	Bolobedu Solar Site	Ages Limpopo (Pty) Ltd	75MW PV	Planning
jj)	Makhado Regional Mall	Masingita Properties	45,000 m²	Construction
kk)	Giyani Regional Mall	Masingita Properties	60,000 m²	Constructed
ll)	Burgersfort Regional Mall with Taxi Rank **with Taxi Facility implementation**	Resilient Properties	45,000 m²	Constructed
mm)	Burgersfort Convenience Shopping Centre	Resilient Properties	28,000 m²	Planning
nn)	Ivydale Agricultural Holdings - Ivypark Ext 41, Ivydale 58 & 59	Arrow Creek Investments	20,000 m²	Approved
oo)	Elim Community Shopping Centre with Taxi Rank **with Taxi Facility implementation**	Twin City Development	14,000 m²	Constructed
pp)	Tzaneen Lifestyle Centre **with Taxi Facility implementation**	Resilient Properties	20,000 m²	Constructed
qq)	Morgenzon Township Developments Shopping & Residential (12,000 units)	Scarlet Ibis Twentieth	30,000 m²	Approved
rr)	Tzaneng Mall, Tzaneen **with Bus Terminal implementation**	Resilient Properties	40,000 m²,	Constructed
ss)	Polokwane Convention and Exhibition Centre portions 84, 85, 86 and 87 Ivydale	BE Consult (Polokwane Municipality)	45,000 m²	Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:			
PROJECT	CLIENT	DEVELOPMENT	
		SIZE	STATUS
tt) New complex for Builder's Warehouse, Tile Warehouse, Toyota, etc., when entering Polokwane on the N1 from Gauteng	Giuricich Developments	50,000 m²	Constructed
uu) BB Auto Development	Lessis Finance	25,000 m²	Constructed
vv) Blue Haze Shopping Centre, Hazyview **with Taxi Facility implementation**	Twin City Developments	60,000 m²	Constructed
ww) Tzaneen Crossing Shopping Centre, **with Taxi Facility implementation**	Resilient Properties	25,000 m²	Constructed
xx) Standard Bank Building in Polokwane	BB Auto	20,000 m²	Constructed
yy) Musina Shopping Centre	Bepro Group of Companies	15,000 m²	Constructed
zz) Proposed development on Erf 1697, Pietersburg Extension 3	Business Partners Limited	10,000 m²	Constructed
aaa) Motor City (Pietersburg Erf 7589, Traffic Impact Study)	Prism Architects	20,000 m²	Constructed
bbb) **Thohoyandou Intermodal Facility**	LPDORT	N/a	Constructed
ccc) Jozini Shopping Centre, **with Taxi Facility implementation**	CK Projects	20 000 m²	Constructed
ddd) Tugela Ferry Shopping Centre,**with Taxi Facility implementation**	CK Projects	20 000 m²	Constructed
eee) Groblersdal Twin City Regional Shopping Centre **upgrade existing Taxi Facility**	Twin City Development	35 000m²	Constructed
fff) Technical Advisor Polokwane for Taxi Industry Polokwane Integrated Rapid Public Transport System	Polokwane Municipality	N/a	In Process

SOME OF MR ROETS' OTHER TRAFFIC AND TRANSPORT ENGINEERING EXPERTISE AND EXPERIENCE INCLUDE THE FOLLOWING (PLEASE REFER TO ATTACHED TABLE FOR MORE DETAIL AND BREAKDOWN):
a) Shopping Centre's that Range from 2 000 m^2 to 60 000 m^2
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 Systems
f) Residential Development that varies 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, 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.

SOME OF THE TRANSPORT PLANNING PROJECTS THAT LEON ROETS HAD BEEN INVOLVED IN, INCLUDE:																
Authority / Project Description	**Transport Forum**	**CPTR**	**OLS**	**RATPlan**	**PTP**	**ITP**	**LITP**	**DICITP**	**Business Plans**	**Liaison**	**Public Transport Intermodal Facilities**	**Public Transport Facilities**	**Colour Coding**	**Transport Framework**	**Corridor Planning**	**Year**
Taxi Industry Technical Advisor – Taxi Industry Polokwane Integrated Rapid System									Y	Y		Y			Y	2022-2011
Taxi Industry Technical Advisor – Taxi Industry Mangaung Integrated Rapid System																2022-2015
Polokwane Municipality Comprehensive Integrated Transport Plan (CITP)								Y								2021-2019
Matlosana NDPG Project for Jabulani Street upgrade										Y		Y				2015-2014
Elim Mall, Tzaneng Mall, Tzaneen Crossing, Tzaneen Lifestyle Centre, Burgersfort Mall, Malamulele												Y				2012-1998
Greater Tubatse Municipality	Y															2013-2003
Road R37 between Polokwane and Burgersfort (Dilokong Corridor)										Y					Y	2013-2003
Polokwane Intermodal Facilities, as part of Prism Consortium (Planning)											Y					2013-2010
Thohoyandou Intermodal Facilities, as part of MCE Consortium											Y					2013-2010
Giyani Intermodal Facility, Taxi Facilitation											Y					2013-2010
Giyani, Makhado, Thohoyandou, Burgersfort, Special advisor for Intersite											Y					2013-2010
Vhembe District Municipality								Y								2010
Burgersfort, Road Master Network															Y	2009-2007
Mogalakwena Local Municipality	Y															2009-2006
Ba-Phalaborwa Local Municipality						Y										2008
Mogalakwena Local Municipality							Y									2008
Mogalakwena, Relocation and Road Safety of Road N11															Y	2008
Fetakgomo Local Municipality	Y															2007-2005
Polokwane, 2010 Priority Statement (PTIS)									Y							2007-2005
Polokwane Local Municipality					Y	Y										2007
Mogalakwena Local Municipality					Y											2007
Polokwane Local Municipality	Y															2006-1997
Sekhukhune District Municipality		Y	Y	Y	Y	Y										2006
Limpopo Department or Roads and Transport													Y			2004
Part of team for Limpopo in Motion														Y		2004
Greater Tubatse Municipality		Y	Y	Y	Y	Y										2003
Capricorn District Municipality		Y														2003
Vhembe District Municipality		Y	Y		Y	Y										2003
Mopani District Municipality		Y	Y		Y	Y										2003
Pietersburg-Polokwane Transport Strategy						Y										2000
Polokwane, N1 Eastern bypass															Y	2000
Pietersburg-Polokwane Public Transport Strategy					Y											1997