
Traffic Study: Sublime Road Exit (Exxaro Matla)

J37158

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1 Introduction

GIBB (PTY) LTD was appointed by Exxaro Matla Coal to conduct a traffic study to investigate the formalization of the existing access along the R580. Exxaro Mine plan to increase the import of coal via trucks from 400 to 900 trucks over a 10 year period.

1.1 Objective of the Traffic Impact Assessment

The objective of this Traffic Study is to investigate the impact of the additional trucks on the existing exit onto the R580 and to propose a safe and effective intersection.

1.2 Study Area

The Exxaro Matla Coal is situated in Matla, Mpumalanga within the eMalahleni Local Municipality. The study area is bounded the R580, R547 and the R545.

Figure 1.1 below shows the location of the site.

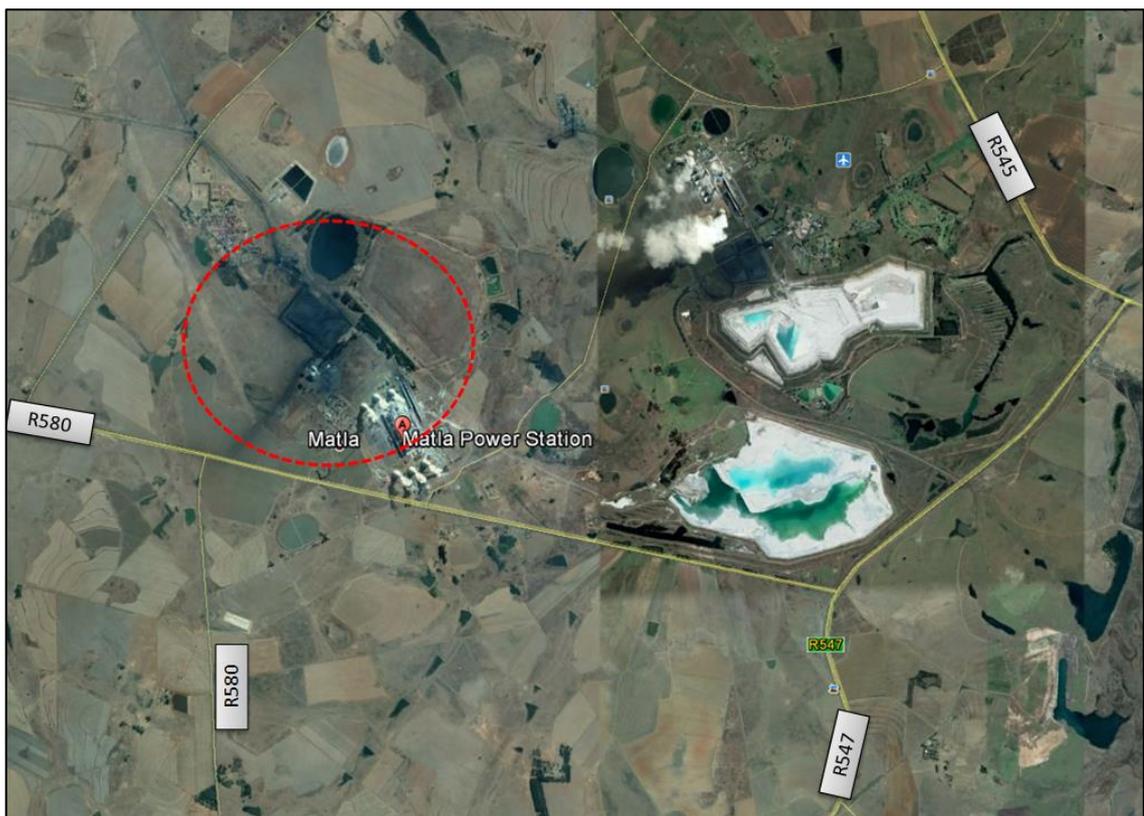


Figure 1-1: Study Area

2 *Development Particulars*

The development is the formalization of the Sublime Road access onto the R580.

3 *Road Network*

3.1 Existing Road Network

- R580 – it is a class 3 Minor arterial which serves as a district distributor. It consists of one lane per direction.
- R547 - it is a class 3 Minor arterial which serves as a district distributor. It consists of one lane per direction.
- R545 - it is a class 3 Minor arterial which serves as a district distributor. It consists of one lane per direction.

4 *Traffic Demand Estimation*

4.1 Vehicle Traffic counts

14 hour manual vehicle traffic counts were conducted on the 12th of September 2017 from 05h00 to 19h00. The peak hours were determined as follows:

- 06h15 to 07h15 for the AM Peak
- 15h45 to 16h45 for the PM peak

The traffic counts were conducted at the following intersections:

- R580 and Road A
- R580 and R580
- R580 and Access
- R580 and R547

Figure 4.1 below shows the location of the intersections where traffic counts were conducted.

Traffic Counts are shown in **Annexure A**



Figure 4-1: Traffic Counts Location

4.2 Trip Generation

The Exxaro mine aim to increase their current coal imports via trucks from 400 trucks per day to a maximum of 900 trucks per day over a period of 10 years. A growth rate of 2% per year was used to escalate the 2017 background traffic to 2027 horizon year.

Table 4.1 below shows the estimated trips

Table 4-1: Estimated trips

	Peak Hour Counts	24 hour counts	Trips based on 900 trucks	
	OUT	OUT	IN/OUT	IN/OUT
AM	17	431	4%	36
PM	87	431	20%	180

It is assumed that all the trucks that goes in the mine, will all come out.

The calculations done as indicated in Table 4-1, show that during the AM peak 4% of the 900 trucks will enter and leave through the access on Sublime Road and 20% during the PM peak. Thus the trips during AM and PM peak are 36 and 180 respectively.

4.3 Trip Assignment

The trip assignment is shown in **Annexure B**

5 Capacity Analysis

5.1 Analysis Method

The capacity analysis of the intersections was done using SIDRA Intersection 6.

5.2 Scenarios Analysed

The following scenarios were analysed:

- Existing 2017 Base Traffic – weekday AM Peak
- Existing 2017 Base Traffic – weekday PM Peak
- Future 2027 Background Traffic - weekday AM Peak
- Future 2027 Background Traffic - weekday PM Peak

The existing base traffic was escalated to 2027 horizon year with a growth rate of 2%. Three intersections were analysed and are as follows:

- R580 and Road A
- R580 and R580
- R580 and Access / Sublime Road

5.3 Base year 2017 Traffic Demand

The current layout was analysed and the capacity analysis results summary are shown in **Table 5.1** below.

Table 5-1: 2017 Base Traffic Capacity Analysis Summary Results

Intersection	Background Traffic	
	Weekday AM	Weekday PM
R580 and Road A	NA (5.0) {0.143}	NA (4.9) {0.206}
R580 and R580	NA (5.2) {0.214}	NA (2.9) {0.077}
R580 and Access / Sublime Road	NA (0.6) {0.144}	NA (3.1) (0.104)
Legend	B – Level of Service (LOS) (10.1) – Delay in seconds {0.069} – Volume/ capacity	

All the intersection analysed are operating at acceptable level of service (LOS) and no upgrades are required.

5.4 2022 Horizon Year Traffic Demand

The 2017 background traffic was escalated by 2% growth factor to 2027 horizon year. The capacity analysis results summary is shown in **Table 5.2** below.

Table 5-2: 2027 Horizon Traffic Capacity Analysis Summary results

Intersection	Background Traffic	
	Weekday AM	Weekday PM
R580 and Road A	NA (1.6) {0.176}	NA (5.2) {0.277}
R580 and R580	NA (5.3) {0.285}	NA (2.5) {0.142}
R580 and Access / Sublime Road	NA (1.7) {0.173}	NA (7.1) {0.389}
Legend	B – Level of Service (LOS) (10.1) – Delay in seconds {0.069} – Volume/ capacity	

All the intersection analysed are operating at acceptable level of service (LOS) and no upgrades are required. The capacity analysis is shown in **Annexure C**

6 Access to the development

The existing access to the mine is not formalised and it is not paved. The existing access location is shown **Figure 7.1**.



Figure 6-1: Access Location

6.1 Proposed Access Layout

The capacity analysis for the access was carried out in **Chapter 5** and the results indicate that it is operating at an acceptable level of service. The proposed access layout is shown in **Figure 6.2** below.

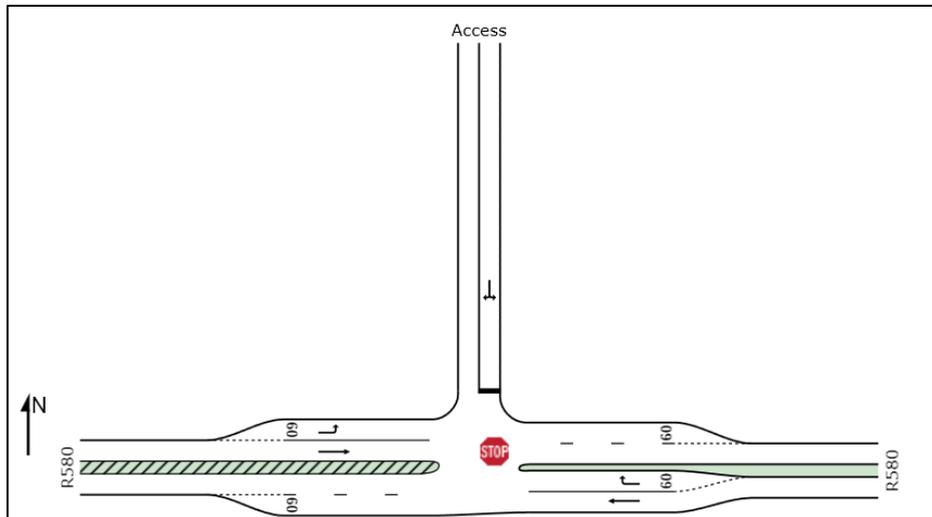


Figure 6-2: Proposed Access Layout

The access should be formalised and constructed according to the layout shown in **Figure 6.2** above.

6.2 Sight Distance

The *Geometric Design of Rural Roads TRH17* was used as guidance for the required sight distance.

The following minimum standards must be adhere to for a 100km/hr speed limit:

- Minimum shoulder sight distance of 200m
- Minimum decision sight distance of 300m

However, due to safety issues regarding mist and the amount of heavy vehicles, it is recommended that the speed should be reduced from at a distance of at least 500m from the access to 80km/hr.

If the speed along the R580 can be reduced to 80km/hr the following minimum standards must be adhered to:

- Minimum shoulder sight distance at the access of 150m
- Minimum decision sight distance of 240m

7 *Conclusion and Recommendations*

The following is concluded from the investigation and analysis:

- 110 Year horizon year truck trips during the AM and PM peak is 36 and 180 respectively,
- None of the intersections analysed require additional upgrades to accommodate the future year traffic
- The shoulder sight distance at the intersection of the R580 and the access does conform to the minimum standards for shoulder sight distance and decision sight distance
- The intersection spacing along the R580 is also adequate

It is recommended that the following be implemented:

- It is recommended that the speed along the R580 should be reduced to 80km/hr,
- The access should be constructed according to Figure 6.2,
- That this traffic study be approved to enable the construction of the intersection.

Appendix A: Traffic Counts

Appendix B: Trip Assignment

Appendix C: Capacity Analysis Results

Document Control and Disclaimer



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