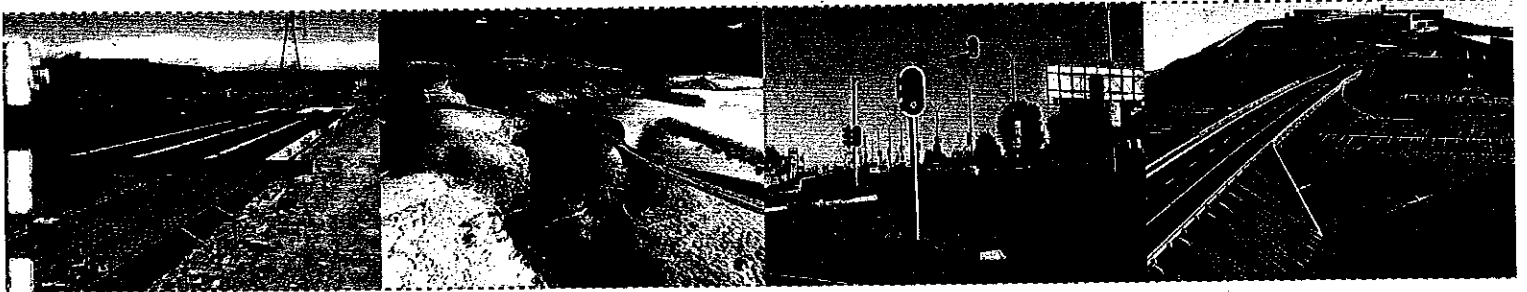




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TRAFFIC IMPACT STUDY

BOKSBURG MINING BELT

Nine (9) different Residential, Industrial & Mixed Land Use Townships, including Reiger Park Extensions 8, 9, 10, 11 & 17, South Germiston Extensions 17 & 20 and Delmore Park Extensions 5, 6 and 7.

June 2008



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Ekurhuleni Metropolitan Municipality
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For Attention: Mr Barend Deminey

Dear Sir,

BOKSBURG MINING BELT (Various Townships):
TRAFFIC IMPACT STUDY

Herewith please find a copy of our Traffic Impact Study for various townships located in the old Boksburg Mining Belt, some 4km to the east of the Germiston CBD. The TIS is a combined study for the following townships:

- Land Parcel 1: Reiger Park Ext 9;
- Land Parcel 2: Reiger Park Ext 8 & South Germiston Ext 17;
- Land Parcel 3: Reiger Park Ext 17 & South Germiston Ext 20;
- Land Parcel 4: Site 4 (township name not known at time of report);
- Land Parcel 5: Delmore Park Ext 7;
- Land Parcel 6: Delmore Park Ext 5;
- Land Parcel 7a: Delmore Park Ext 6;
- Land Parcel 7b: Reiger Park Ext 10; and
- Land Parcel 8: Reiger Park Ext 11.

Your earliest comments and/or approval in principle would be appreciated. Should you have any queries, feel free to contact the undersigned.

Yours sincerely

Desmond Hundermark (Pr Eng)
for INFRAGEN Consultants (Pty) Ltd

CC: Mr Willie Vos, Southnet
Mr Henk le Roux, Urban Dynamics
Mr Dave Rudolph, SEF Environmental
Mr Naas Henning, VIP Consulting Engineers
Mr Gerhard Zandberg, Kwezi V3 Consulting Engineers



Title: **TRAFFIC IMPACT STUDY: BOKSBURG MINING BELT**
Nine (9) different Residential, Industrial & Mixed Land Use Townships, including Reiger Park Extensions 8, 9, 10, 11 & 17, South Germiston Extensions 17 & 20 and Delmore Park Extensions 5, 6 and 7.

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Project No: **Infragen 2722**

Date: **June 2008**

Report Status: **FINAL**



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1. INTRODUCTION

Infragen Consulting Engineers have been appointed to undertake a combined Traffic Impact Study for some nine (9) different residential, industrial and mixed land use townships located in the old Boksburg Mining Belt area, approximately 4km to the east of the Germiston CBD. The site location is shown in **Figure 1**. Most of the land to be developed are old mining areas, which has become available for development in recent years. Most of the areas that will be developed are vacant, while small portions of land currently have informal settlements (i.e. squatters) located on them.

The proposed nine (9) townships are:

- o Land Parcel 1: Reiger Park Extension 9;
- o Land Parcel 2: Reiger Park Extension 8 & South Germiston Extension 17;
- o Land Parcel 3: Reiger Park Extension 17 & South Germiston Extension 20;
- o Land Parcel 4: Site 4 (township name not known at time of report);
- o Land Parcel 5: Delmore Park Extension 7;
- o Land Parcel 6: Delmore Park Extension 5;
- o Land Parcel 7a: Delmore Park Extension 6;
- o Land Parcel 7b: Reiger Park Extension 10; and
- o Land Parcel 8: Reiger Park Extension 11.

At the time of compiling and submitting this document, some of the township applications have already been submitted to the various authorities, whilst the other townships were still in its planning stages.

This study, which forms part of the various township applications, investigates the traffic flow conditions at several nearby key intersections and estimates the expected trip generation of the various proposed townships. It takes into account the type of development and determines the anticipated traffic impact on the surrounding road network and at key intersections. Comments and proposals are made in terms of access, road/intersection upgrades and public transport.

To note is that several discussions had been held with the relevant senior officials at both Gautrans (i.e. Mr Daan Visser) and Ekurhuleni Metropolitan Municipality's (EMM) Southern Region (i.e. Mr Barend Deminey) regarding this study, including the various accesses to the townships. It has also been recognised that additional reports would have to be prepared and submitted to Gautrans in terms of *Section 7 of the Gauteng Transportation Act 8* for future routes K127 and K110.



2. SITE LOCATION & SURROUNDING ROAD NETWORK

As shown in **Figures 1 and 2** the proposed townships are situated in the old Boksburg Mining Belt area, between the CBDs of Germiston and Boksburg. The following existing and future roads are relevant to the study area.

2.1 Existing Roads

Commissioner Street (M46 / K110): This is an east-west Class 2 provincial road which connects the Germiston and Boksburg centres with one another. Past its intersection with Wit Deep Road, this road is known as Lower Boksburg Road. In the vicinity of the site Commissioner Street is a 4-lane undivided road with additional right-turn and/or left-turn slip lanes at most of its major intersections. Between its intersections with Simon Bekker Road and Leon Ferreira Drive the peak hour traffic volumes of Commissioner Street varies between 2900 and 1800 vph (total both directions). Commissioner Street is probably the most significant road in the study area, both in terms of primary access to the various townships and in terms of traffic generations;

Elsburg Road (M35 / K92): This north-south arterial is another Class 2 provincial road, but which terminates at its signalised intersection with Commissioner Street. Past Land Parcel 1 Elsburg Road is a 2-lane single carriageway road, but with additional right- and/or left-turning lanes at its intersections with Commissioner and Archie Jonas Streets. The peak hour traffic volumes on Elsburg Road between Commissioner Street and Archie Jonas Street is in the order of 1100 and 800 vph (total both directions) for the AM and PM peaks respectively;

Simon Bekker Road (M39 / K127): This is another north-south arterial, to be upgraded to the K127 in future. Past Land Parcel 3 Simon Bekker Road is a 2-lane single carriageway, which widens to two northbound lanes past Land Parcel 4 before its signalised T-intersection with Lower Boksburg Road; there are no turning lanes at its intersection with Henderson Street. The peak hour traffic volumes on Simon Bekker Road just south of Lower Boksburg Road is approximately 1100 vph (total both directions) during both the AM and PM peaks;

Rondebult Road (R21 / K90): This Class 2 provincial road is located on the northeastern periphery of the study area and has been included in the study as some changes in the traffic patterns can be expected once a proposed link road is implemented. Through its intersection with Comet Road South, this road has three northbound and two southbound through lanes with additional right-turn and left-turn



slip lanes. The peak hour traffic volumes on Rondebult Road just north of its intersection with Comet Road South is approximately 4800 and 4700 vph (total both directions) for the AM and PM peaks respectively;

Du Preez Street: Du Preez Street is a 2-lane Class 4 collector street, which forms a signalised T-intersection with Commissioner Street. It's a relative short street, which provides access to existing Delmore Park Extension 2 as well as an informal settlement located to the north of this township. The current traffic volumes on Du Preez Street are of a low order, i.e. approximately 160 and 110 vph (total both directions) for the AM and PM peaks respectively;

Wit Deep Road: This road currently serves as an important north-south arterial road between Commissioner/Lower Boksburg Road and Main Reef Road (R29) further to the north. Wit Deep Road is the only road across the railway line in the area, apart from Knights Road further to the west and Rondebult Road further to the east. It is also important to note that once the Commissioner/Haupt is upgraded to a full 4-legged intersection, Wit Deep Road at its intersection with Commissioner/Lower Boksburg Road would have to be closed, as per the Basic Planning of K110 (see **Annexure B**). The existing traffic on Wit Deep Road through this intersection, which is approximately 1450 and 1170 vph (total both directions) during the AM and PM peaks respectively, would have to divert to the Haupt Street intersection instead;

Haupt Street: Currently, Haupt Street where it intersects with Commissioner Street allows for left-in-left-out traffic only, which results in low traffic volumes on Haupt Street, especially during the AM peak. A substantial upgrade of this intersection would be required in order to cater for all the traffic from Wit Deep Road plus the additional development traffic. The proposed upgrade is discussed in more detail later in this document.

Leon Ferreira Drive: Leon Ferreira Drive is a 2-lane Class 4 collector street, which forms a signalised intersection with Commissioner Street. The northern leg of this intersection provides access to the East Rand rail station, whilst the southern leg serves the residential area of Reiger Park. The current peak hour traffic volumes on Leon Ferreira Drive are about 520 and 380 vph (total both directions) for the AM and PM peaks respectively;

Archie Jonas Street: This is another 2-lane collector street, which provides access into the low income townships of Reiger Park and Reiger Park Extension 5, and which forms a signalised intersection with Elsburg Road. Further to the west this road becomes a gravel road, which also provides access to an existing informal settlement



/ squatter camp. The current peak hour traffic volumes on Archie Jonas Street just west of its intersection with Elsburg Road are approximately 260 and 540 vph (total both directions) during the AM and PM peaks respectively;

Henderson Road: Henderson Road is a 2-lane collector which forms a signalised T-intersection with Simon Bekker Road. It provides access to both an industrial area located to the west of Simon Bekker as well as a low income residential township. The current traffic volumes on Henderson Road are of a relatively low order, i.e. approximately 300 vph (total both directions) during the AM and PM peaks;

2.2 Future Roads

Attached **Annexure A** provides an extract of Gautrans' Strategic Road Network (March 2007) in the vicinity of the proposed townships. The relevant future K-routes and PWV-routes are the following:

K110: The existing Commissioner Street / Lower Boksburg Road will be upgraded in future to become the K110; and extract of the K110 Basic Planning is shown in **Annexure B**. Important to note from this planning is the proposed upgrading of Haupt Street and the closure of Wit Deep Road, which is as a result of the future K127 located to the west of this intersection. As part of providing access to proposed Reiger Park Extension 8 and South Germiston Extension 17, it is proposed to upgrade the Commissioner / Haupt intersection to a full 4-legged signalised intersection, which would also imply the closure of Wit Deep Road. It should also be mentioned that approved Basic Planning (or Preliminary Design) of K110 only to the west of K92 is currently in place. For the K110 section to the east of K92, only Route Determination have been completed and approved;

K92: This future K92 would generally follow the north-south alignment of the existing Elsburg Road, but adjacent and parallel to this future K-route would be the future PWV13 freeway. Approved Basic Planning of this future K92 is already in place, which also indicate an at-grade intersection with K110. Generally, the access to this future road would be very limited;

K127: This is another north-south arterial, i.e. Simon Bekker Road, to be upgraded to the K127 in future. As noted in **Figure 2** and **Annexure A** the most northern section this future K127 (i.e. past Land Parcel 4) would follow a new alignment. Basic Planning of the K127 to the north of K110 is already in place and approved, whilst the section of K127 to the south of K110 is still in Route Determination stage;



PWV13: This PWV13 will be a future Class 1 provincial freeway, which will run in a north-south direction directly to the west and parallel to the K92. Basic Planning of this PWV13 is already in place and approved.

Although the basic planning and route determination stage of these roads have been undertaken in the 1970's and 1980's it is unclear when these will be implemented, if at all. Given the lack of available funds, it is unlikely that any of these roads would be implemented to its planned standards within the next 10 years. As noted in **Figure 2**, several informal settlements / squatter camps have evolved over the years within the future road reserves of these roads, which would further complicate the implementation thereof.

Apart from the planned provincial road, other routes have also been planned and/or provision been made for as part of the proposed townships covered in this document. These routes are:

New Link Road: As noted in **Annexure C** a new Link Road is planned across the railway line (incl road over rail bridge) that will provide a direct link between Rondebult Road and Commissioner Street. This link road, which will cut through proposed Reiger Park Extension 11, is expected to also attract existing traffic demand to/from the west (eg. Germiston CBD), which is currently forced to use a detour via local streets such as Comet Road South and Middel Street. At this stage it is the intention to actually implement this link road, but only as part of the last townships. This traffic impact study also takes account of the proposed link road;

Future Route between Reiger Park Extensions 8 and 9 (LP 1 and 2): The township layouts in **Annexure D** shows the provision of a future route across a river between these two township, but which will not be constructed by the developer of these townships;

Future Route between Reiger Park Extensions 8 and 17 (LP 2 and 3): This is another future route across a river between these two townships (see **Annexure D**), but which will not be constructed by the developer of these townships;

Future Route across the railway line next to Delmore Park Extension 5: As shown in the township layout for Delmore Park Extension 5, provision has been made for a possible future 3rd order route across the railway line which will intersect with Wit Deep Road further to the northwest. For the interim, the developer of these townships will construct this new road up to a point just before the future bridge.



3. PROPOSED DEVELOPMENT & SITE ACCESSES

With reference to the various proposed township layouts in **Annexure D** the following are relevant in respect of the proposed development and its accesses.

3.1 Proposed Development

As noted before, this is a combined Traffic Impact Study for nine (9) different townships, all located within an area with radius of approximately 1,5km. **Table 1** below summarises the various land uses on each of the proposed townships; layouts of the proposed townships are enclosed in **Annexure D**.

Important to note is that for the purposes of this Traffic Impact Study only, two (2) development phases had been considered. The purpose of this was mainly to split the traffic generations of the development (i.e. all townships) and to test the traffic impact of such two thresholds. The capacity analyses as well as the road and intersection upgrades are then broken down into two phases.

Given the likely implementation stages of the townships, their locations as well as the type of land uses proposed, Phases 1 and 2 are defined as follows:

- o **PHASE 1** (Land Parcels 1, 2, 3, 4 and 5) Reiger Park Extensions 8, 9 & 17, South Germiston Extensions 17 & 20 and Delmore Park Extension 7. Site 4 is also a proposed township, but which name was not yet known at the time of compiling this report.
- o **PHASE 2** (Land Parcels 6, 7a, 7b and 8) Delmore Park Extensions 5 & 6 and Reiger Park Extensions 10 & 11.



Table 1: Summary of the Proposed Township Land Uses & Extent

LP	Township Name & (Developable Land Area) [#]	Land Use & Extent (approximate)	Note
PHASE 1			
1	Reiger Park Extension 9 (19,93ha)	Residential: Semi-detached and Row Houses (1520 units)	Full subsidised housing (lowest income)
		Business & Taxi rank	Ancillary to residential use
		Institutional: Community facilities, church, crèche, clinic	Ancillary to residential use
2	Reiger Park Extension 8 & South Germiston Extension 17 (35,79ha)	Residential 1: 860 erven Residential 3: 990 units	Affordable housing (low-middle income).
		Business, Taxi rank/parking, Spaza, Transit stop	Ancillary to residential use
		Institutional: Community facilities, church, crèche, clinic, primary school	Ancillary to residential use
		Commercial: 29 000m²GLA	Commercial
3	Reiger Park Extension 17 & South Germiston Extension 20 (4,04ha)	Residential 3: 485 units	Affordable housing / 3-storey small walk-up owned/rental apartments (lower income households).
4	Site 4 (8,80ha)	Residential 3: 1055 units	Affordable housing / 3-storey small walk-up owned/rental apartments (lower income households).
5	Delmore Park Extension 7 (13,19ha)	Residential 1: 250 erven Residential 3: 220 units	Affordable housing (low-middle income).
PHASE 2			
6	Delmore Park Extension 5 (20,43ha)	Industrial: 123 000m²GLA	Industrial
7a	Delmore Park Extension 6 (15,40ha)	Row Housing: 750 erven Semi-Detached: 380 erven	Full subsidised housing (lowest income)
		Business & Taxi rank	Ancillary to residential use
		Institutional: Community facilities, church, crèche.	Ancillary to residential use
7b	Reiger Park Extension 10 (43,89ha)	Industrial: 206 000m²GLA	Industrial
		Commercial: 12 000m²GLA	Industrial
		Business & Taxi rank	Ancillary to industrial & commercial
8	Reiger Park Extension 11 (21,52ha)	Residential 4: 660 units	Affordable housing / 3-storey small walk-up owned/rental apartments (lower income households).
		Industrial: 96 000m²GLA	Industrial

[#] Excluding public open spaces, pedestrian walkways, streets and undetermined areas



As a whole, it is proposed to develop residential, industrial and commercial uses. PHASE 1 mostly comprises residential with some commercial uses proposed along Commissioner Street (K110) as part of Reiger Park Extension 8 and South Germiston Extension 17.

PHASE 2 mostly comprises industrial uses to the north of Commissioner Street (K110), with one of the four townships residential in the form of subsidised housing.

For both the industrial and commercial uses, the gross leasable area (GLA) shown in Table 1 has been derived by applying an floor area ratio (FAR) of 0,6. This FAR is considered realistic for such developments, which also allows for sufficient space on site for access, roadways, parking and heavy vehicle manoeuvring.

As noted in **Table 1** and the proposed township layouts in **Annexure D**, reference is made to several ancillary uses such as community facilities, churches, crèches, clinics, primary school, taxi ranks and business. These uses are categorised ancillary for the purposes of this document as it is argued that those uses are developed to mostly cater for the said township and would therefore not generate any notable new traffic from outside the township boundaries. The business components would be very small with the purpose of catering for the local people.

Further to note is that Land Parcels 1 and 7a would be subsidised housing townships. These portions of land had been made available by the developer as part of an agreement with EMM. It is understood that the services for these townships would be implemented by EMM. Currently there are informal settlements (i.e. squatter camps) occupied on the same land parcels. According to information from the developer, approximately 1500 and 500 families are currently residing in these two squatter camps respectively. It is partly the intension to provide the same residents with fully subsidised housing in the new formal townships.

In summary, and for the purposes of determining the traffic generations, the extent of the various land uses for the township as a whole comprises the following. All other uses are viewed ancillary :

Residential 7 170 units (including 2 650 full subsidised housing units);

Industrial 425 000 m² GLA; and

Commercial..... 41 000 m² GLA.



3.2 Site Accesses

Various accesses are of relevance. This Traffic Impact Study should however be viewed from a macro perspective; i.e. the focus is on the primary access(es) of the proposed township as a whole and not for the individual erven/developments within these townships. The latter will be dealt with at Site Development Plan stage.

Table 2 below provides a summary of the main accesses to the various township with relevant key notes for each. For more detail of the accesses, refer to the relevant township layouts in **Annexure D**.

Table 2: Summary of the Various Township Accesses

LP	Township	Proposed Primary Access
PHASE 1		
1	Reiger Park Extension 9	<ul style="list-style-type: none"> o Access via adjacent Reiger Park Ext 5 along Fish Eagle and Impamgele Streets (both currently gravel streets – will be upgraded by EMM to paved streets in future; o Fish Eagle and Impamgele Streets in turn intersect with Archie Jonas Street, which then connects to Elsburg Road at a signalised intersection; o Provision is made in the township layout for a future link road to Reiger Park Ext 8 (LP 2), across the river. The latter link road will not be developed at this stage.
2	Reiger Park Extension 8 & South Germiston Extension 17	<ul style="list-style-type: none"> o Access 1: The new southern 4th leg to the existing Commissioner (K110) / Du Preez signalised T-intersection will one of the two main accesses; o Access 2: The new southern 4th leg to the existing Commissioner (K110) / Haupt T-intersection will be the second main access; o Provision is made in the township layout for future link roads to both Reiger Park Ext 8 (LP 1) and Reiger Park Ext 17 (LP 3) across rivers. These link roads will not be developed at this stage.
3	Reiger Park Extension 17 & South Germiston Extension 20	<ul style="list-style-type: none"> o Access to township opposite existing Simon Bekker (K127) / Henderson signalised T-intersection; i.e. new 4th leg to intersection; o Provision is made in the township layout for future link roads to both Reiger Park Ext 8 (LP 1) and Reiger Park Ext 17 (LP 3) across rivers. These link roads will not be developed at this stage.
4	Site 4	<ul style="list-style-type: none"> o Access to township opposite existing Simon Bekker / Sezela priority T-intersection; i.e. new 4th leg to intersection; o Another 2nd access off Simon Bekker Road is also under investigation.
5	Delmore Park Extension 7	<ul style="list-style-type: none"> o Access to township off Du Preez Street some 170m from its signalised intersection with Commissioner Street (K110).



PHASE 2		
6	Delmore Park Extension 5	<ul style="list-style-type: none">o Access to township via a new northern extension of Du Preez Street (see also Figure 2), which in turn intersects with Commissioner Street (K110);o Provision is made to the east of this township for a future link road across the railway line to connect to Wit Deep or Main Reef Road. The link road will not be developed at this stage.
7a	Delmore Park Extension 6	<ul style="list-style-type: none">o Access to township via a new northern extension of Du Preez Street (see also Figure 2), which in turn intersects with Commissioner Street (K110);o Provision is made to the west of this township for a future link road across the railway line to connect to Wit Deep or Main Reef Road. The link road will not be developed at this stage.
7b	Reiger Park Extension 10	<ul style="list-style-type: none">o Access to township off a new T-intersection with Commissioner Street (K110);o Internal link road to adjacent Reiger Park Extension 11 will be implemented.
8	Reiger Park Extension 11	<ul style="list-style-type: none">o Access to township off a new T-intersection with Commissioner Street (K110).o New Link Road across the railway line (incl road over rail bridge) that will provide a direct link between Rondebult Road and Commissioner Street (see Annexure C)o Internal link road to adjacent Reiger Park Extension 10 will be implemented.

From a traffic flow and well as road planning point of view, all the primary accesses to the proposed townships are acceptable and feasible.

To note is that some of the accesses will be off provincial roads, namely Commissioner Street (future K110) and Simon Bekker Road (future K127). The two accesses off future K110 to Reiger Park Extension 8 and South Germiston Extension 17 is strictly according to the Basic Planning of K110 (see **Annexure A**).

For the section of future K110 to the east of Elsburg Road (i.e. future K92), only Route Determination had been completed for K110. In this case the two proposed accesses off K110 to Reiger Park Extensions 10 and 11 had been discussed with Gautrans (i.e. Mr Daan Visser). It is understood that this section of future K110 is being protected under *Section 7 of the Gauteng Transportation Act 8 of 2001*, which requests a separate report to this effect. The necessary investigation and consultation is currently in progress and the *Section 7* report will be submitted to Gautrans in due course. The location of the K110 road reserve, accesses and relevant intersection splays shown in the township layouts in **Annexure D** are therefore provisional and will be confirmed at a later stage, once Gautrans has approved the *Section 7* report.



For the future K127 (i.e. Simon Bekker Road) also only Route Determination had been completed, which implies that the townships alongside Simon Bekker Road and the proposed access opposite Henderson Street are affected. In this case future K127 is also being protected under *Section 7 of the Gauteng Transportation Act 8 of 2001*, which requests such *Section 7* report. The necessary investigation and consultation for this document is also currently in progress and the *Section 7* report will be submitted to Gautrans in due course. The location of the K127 road reserve, access intersection opposite Henderson Street and relevant splays shown in the township layouts in **Annexure D** are therefore provisional and will be confirmed at a later stage, once Gautrans has approved the *Section 7* report.



4. TRAFFIC FLOWS & TRIP GENERATION

4.1 Existing Traffic Flows

Manual traffic counts were carried out during the weekday commuter peaks over a period of time since October 2007 to May 2008 at several key intersections within and around the study area. The following intersections were counted:

- o Commissioner Str (M46) / Leon Ferreira Dr (signalised);
- o Commissioner Str (M46) / Elsburg Rd (M35) (signalised);
- o Commissioner Str (M46) / Du Preez Str (signalised);
- o Commissioner Str (M46) / Wit Deep Rd (signalised);
- o Lower Boksburg Rd (M46) / Simon Bekker Rd (M39) (signalised)
- o Commissioner Str (M46) / Haupt Str (signalised);
- o Simon Bekker Rd (M39) / Sezela Str (priority-controlled);
- o Simon Bekker Rd (M39) / Henderson Rd (signalised);
- o Elsburg Rd (M35) / Archie Jonas Str (signalised);
- o Archie Jonas Str / Fish Eagle Str (mini-roundabout);
- o Elsburg Rd (M35) / Heidelberg Rd (M35) (signalised);
- o Rondebult Rd (R21) / Comet Road South (signalised); and
- o Rondebult Rd (R21) / Middel Street.

The existing weekday morning (AM) and afternoon (PM) peak hour traffic volumes at these intersections are summarised in **Figure 3a**. Our surveys were carried out typically over a 3hr peak period.

4.2 Future 2013 Base Traffic Flows

The *Manual for Traffic Impact Studies (1995)* suggests that for developments which generate more than 150 peak hour trips, it is necessary to escalate the existing traffic volumes to a future base. For this study a 5-year horizon had been used.

In this case it was assumed that the background traffic would increase at a rate of 3% per annum over the next 5 years to a future 2013 base year. In light of its relatively



close location of only 1,5km to the Germiston CBD, which experiences limited growth, the 3% growth rate is viewed as marginally conservative for this study. **Figure 4a** shows the projected future 2013 base peak hour traffic volumes, which is the current 2008 traffic volumes inflated by 3% per annum over 5 years.

4.3 Development Trip Generation Rates

As a whole, the nine different townships comprise several land use types. As noted in Section 3.1 the townships comprise three main land use types, namely residential, industrial and commercial, whilst the other minor uses are viewed ancillary to the main uses and which will not generate notable external traffic. For the three main uses, the *South African Trip Generation Manual (SATGM)* of 1992 have been used as a reference basis, and adjusted accordingly for the type and extent of the proposed development as well as the trip rates used in other studies for similar developments.

The relatively close location of the proposed township in relation to the Germiston and Boksburg CBD as well as other employment nodes together with the usage of public transport affect the trip generation rates. The types of land use proposed would most certainly attract users of public transport, both from a residential/commuter and employment (i.e. industrial) point of view. As covered in Section 7 of this report, the sites are general well located in terms of the provision of public transport services, including rail and walking. Commuter rail is a very popular transport mode mainly because of its low fares – four (4) existing railway stations are located well within walking distance of most of the proposed townships.

The trip generation rates of the three main land uses used in this document are briefly discussed below:

Residential: The residential developments proposed will cater for households from the lowest income to the lower/middle income; generally the bulk of the target market households have a low socio economic profile and a significant portion of the residents depend on public transport for commuting to and from work. Consequently the vehicle trip generation characteristics of such townships are substantially different to that of other medium to high income townships and therefore it would be incorrect to apply the standard *SATGM* trip rates. Distinction is made in this study between three types of residential developments, given the area, level of engineering services provided, target market and sizes of units. They are as follows:



- o Affordable / bonded housing: These are mostly single residential erven of 180-250m² erven, which will cater for the low-medium income households who can qualify for a mortgage loan. It is assumed that a large portion of these households would own a private vehicle, but who would not necessarily use the vehicle to commute to/from work within the peak hours. Trip generation rate used = **0,6 trips/unit** with 80/20 directional split;
- o High density units / 3 storey walk-ups: These units will be at a density of up to 120 units/ha and in a price range lower than the affordable housing. The apartments would vary from 25m² to 60m² in size. It is anticipated that some of these units will be rental apartments; in some cases a portion of the mortgage loans could be subsidised. It is assumed that a portion of these households would own a private vehicle, but who would not necessarily use the vehicle to commute to/from work within the peak hours. Parking provision would also be more restricted compared with the single erven developments. Trip generation rate used = **0,45 trips/unit** with 80/20 directional split;
- o Full subsidized housing: Households only in the lowest income bracket would qualify for these houses, which will be developed by EMM. These would be small erven, semi-detached houses and row houses. In the short to medium term the level of engineering services would be basic, which would exclude paved roads. Most of the residents who commute to work would be making use of public transport (i.e. buses, minibus taxis and rail), lift clubs or would walk. Unemployment is also at a high level in these townships. Trip generation rate used = **0,30 trips/unit** with 80/20 directional split.

Industrial: The *SATGM* proposes trip rates of 0,6/100m² GLA and 0,9/100m² GLA for the "medium-large industrial" and "industrial area" respectively. Industrial areas would be typical industrial areas such as Wadeville and Jetpark, which often also include several other smaller land uses. The average trip rates recorded in *SATGM* were 0,4 and 0,7 respectively. Lately it has become common for traffic engineering practitioners to use the average rates as oppose to the 75th percentile rates, as it provides a more realistic estimation of the actual trips. It was therefore decided to use the trip rate of **0,7 trips/100m² GLA**. *SATGM*'s recommended IN/OUT directional split of 75/25 for industrial areas was applied.

Commercial: This land use is not covered in the *SATGM*. The proposed commercial use is expected to include some manufacturing, warehousing and office components. In this case the *SATGM* trip rates for warehousing and offices as well as the *ITE Manual* for manufacturing were used as a basis. It was decided to use a trip rate of



1,5 trips/100m² GLA which is double the rate of the industrial use. The 70/30 directional split as per *SATGM* was used.

The proposed trip rates are considered marginally conservative as no adjustments had been made in the traffic generations for inter township trips. Thus, as a whole the nine township would establish both significant housing and employment. In such case it would be reasonable to assume that a significant portion of the residents would take up employment at the nearby new industrial areas.

Another factor worth mentioning are the existing informal settlements (i.e. squatter camps) located on Land Parcels 1 and 7a, which currently accommodate approximately 1500 and 500 families respectively. The traffic generation of these settlements are already included in the traffic counts. It is anticipated that most of these families would either be accommodated in the subsidised housing in Reiger Park Extension 9 and Delmore Park Extension 6 or would upgrade to the housing units made available in the other townships.



4.4 Development Trips

By applying abovementioned trips to each of the proposed townships, **Table 3** provides a summary of the estimated weekday AM and PM peak hour traffic generations of each of the proposed townships.

Table 3: Summary of Estimated Development Trips

Proposed Township (land use & extent)	AM Peak Hour			PM Peak Hour			Percentage of Total Traffic
	IN	OUT	TOTAL	IN	OUT	TOTAL	
PHASE 1							
Reiger Park Ext 9 (Subsidized housing = 1520 units)	90	370	460	370	90	460	7%
Reiger Park Ext 8 & South Germiston Ext 17 (Affordable housing = 1850 units; Commercial = 29 000m ² GLA)	500	910	1410	910	500	1410	21%
Reiger Park Ext 17 & South Germiston Ext 20 (h/density affordable apartm = 485 units)	40	180	220	180	40	220	3%
Site 4 (h/density affordable apartm = 1050 units)	90	380	470	380	90	470	7%
Delmore Park Ext 7 (Affordable housing = 470 units)	50	230	280	230	50	280	4%
PHASE 2							
Delmore Park Ext 5 (Industrial = 123 000m ² GLA)	650	210	860	210	650	860	13%
Delmore Park Ext 6 (Subsidized housing = 1130 units)	70	270	340	270	70	340	5%
Reiger Park Ext 10 (Industrial = 206 000m ² GLA; Commercial = 12 000m ² GLA)	1220	410	1630	410	1220	1630	25%
Reiger Park Ext 11 (h/density affordable apartm = 660 units; Industrial = 96 000m ² GLA)	410	560	970	560	410	970	15%
TOTAL	3120	3520	6640	3520	3120	6640	100%

The last column of Table 3 shows the relevant portion of contribution of the total development of each of the proposed townships. The traffic generations of Phase 1 constitute approximately 42% of the total development trips. Also to note is that the three townships in Phase 2, which make up all of the industrial developments to the north of Commissioner Street jointly comprise 53% of the total development trips.



4.5 Trip Distribution

Trip distributions were done separately for each of the nine township, but within the same study area. Assumptions on the expected trip distribution for each township were based on the location of the primary site access in relation with the external road network, the existing surrounding road network, the type of development and the existing peak period traffic patterns in the study area.

Figures 5a to 5e depict the expected development trip distribution of each of the proposed townships in Phase 1. The estimated development trips for the Phase 1 townships are shown in **Figures 6a to 6e** with the total Phase 1 development trips summarised in **Figure 6f**.

Figures 7a to 7d depict the expected development trip distribution of each of the proposed townships in Phase 2. The estimated development trips for the Phase 2 townships are shown in **Figures 8a to 8d** with the total Phase 2 development trips summarised in **Figure 8e**.

The total development trips of all nine townships are summarised in **Figure 9**.

4.6 TOTAL Future Traffic Flows

Figure 10 shows the total 2008 plus PHASE 1 peak traffic flows, which is the summation of **Figures 3a** and **6f**. **Figure 11** shows the total future 2013 base plus PHASE 1 peak traffic flows, which is the summation of **Figures 4a** and **6f**.

Figure 12 shows the total 2008 plus PHASE 1 plus 2 peak traffic flows, which is the summation of **Figures 3b** and **9**. **Figure 13** shows the total future 2013 base plus PHASE 1 plus 2 peak traffic flows, which is the summation of **Figures 4b** and **9**.



5. TRAFFIC IMPACT & CAPACITY ANALYSES

In order to determine the expected traffic impact of the proposed development at the nearby key intersections, capacity analyses were carried out by using SIDRA3, the latest version of this well known traffic engineering software package. The following key intersections were analysed:

- Commissioner Str (M46) / Leon Ferreira Dr (signalised);
- Commissioner Str (M46) / Elsburg Rd (M35) (signalised);
- Commissioner Str (M46) / Du Preez Str (signalised);
- Commissioner Str (M46) / Wit Deep Rd (signalised)
- Lower Boksburg Rd (M46) / Simon Bekker Rd (M39) (signalised)
- Commissioner Str (M46) / Haupt Str (signalised);
- Simon Bekker Rd (M39) / Sezela Str (priority-controlled);
- Simon Bekker Rd (M39) / Henderson Rd (signalised)
- Elsburg Rd (M35) / Archie Jonas Str (signalised);
- Archie Jonas Str / Fish Eagle Str (mini-roundabout);
- Elsburg Rd (M35) / Heidelberg Rd (M35) (signalised)
- Rondebult Rd (R21) / Comet Road South (signalised)
- Commissioner Str (M46) / Proposed New Link to Rondebult Road; and
- Commissioner Str (M46) / Proposed New Access to Reiger Park Ext 10.

The following scenarios were analysed at the above intersections, namely:

- Existing 2008 Weekday AM and PM peak hour traffic flows without the proposed development (as per **Figure 3a**);
- Future 2013 Base Weekday AM and PM peak hour traffic flows without the proposed development (as per **Figure 4a**)
- Existing 2008 Weekday AM and PM peak hour traffic flows PLUS PROPOSED DEVELOPMENT PHASE 1 only traffic generations (as per **Figure 10**);
- Existing 2013 Base Weekday AM and PM peak hour traffic flows PLUS PROPOSED DEVELOPMENT PHASE 1 only traffic generations (as per **Figure 11**);



- o Existing 2008 Weekday AM and PM peak hour traffic flows PLUS PROPOSED DEVELOPMENT PHASE 1 plus 2 traffic generations (as per **Figure 12**); and
- o Existing 2013 Base Weekday AM and PM peak hour traffic flows PLUS PROPOSED DEVELOPMENT PHASE 1 plus 2 traffic generations (as per **Figure 13**).

The sub sections hereafter briefly discuss the results and key conclusions at each of the key intersections analysed, with the details of the capacity analyses enclosed in **Annexures E1 to E14**. To note is that optimised traffic signal settings have been used/assumed for all SIDRA3 capacity analyses.

5.1 Commissioner Str (M46) / Leon Ferreira Dr Intersection

Annexures E1.1 to E1.12 have reference:

Currently this is a signalised intersection with its northern leg providing access to the East Rand Rail Station. Through this intersection Commissioner Street is a single carriageway road with three (3) through lanes in the westbound direction and two (2) through lanes in the eastbound direction. The Commissioner Street east approach has a shared left- and through lane, two through lanes and an exclusive right-turn lane. The western approach of Commissioner Street has a shared left- and through lane, a through lane and an exclusive right-turn lane. Both the north and south approaches of Leon Ferreira Drive has two approach lanes, namely shared left- and through lane and a short exclusive right-turn lane.

The SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E1.1 to E1.4**) indicate that the intersection is currently operating well at overall LOS B and A during the weekday AM and PM peaks respectively. The results also indicate that the intersection is currently operating well below its capacity levels.

With the **PHASE 1** development traffic added to this intersection and without any improvements, the results in **Annexures E1.5 to E1.8** indicate that the intersection will continue to operate at the same overall LOS B and A during the weekday AM and PM peaks respectively.

With the **PHASE 2** development traffic added, the SIDRA3 results in **Annexures E1.9 to E1.12** still indicate overall LOS B and A during the weekday AM and PM peaks respectively and only marginally increases in the average intersection delays.



It is concluded that the existing intersection has sufficient spare capacity to absorb the additional development traffic of both Phases 1 and 2 without the need for geometric improvements.

5.2 Commissioner Str (M46) / Elsburg Rd (M35) Intersection

Annexures E2.1 to E2.12 have reference:

This is a signalised T-intersection with Elsburg Road from the south intersecting with Commissioner Street. At the intersection Elsburg Road has two approach lanes, namely a right-turn lane and a left-turn slip lane. The eastern approach of Commissioner Street has a left-turn slip lane and two through lanes; the western approach of this street has two approach lanes, namely a through lane and a shared through- and right-turn lane. The traffic signal has a protected right-turn phase.

The SIDRA3 capacity analyses for the **existing 2008** scenario (i.e. **Annexures E2.1 to E2.2**) shows overall LOS B for both the AM and PM peaks, whilst the results for the **future 2013 base** traffic flow scenarios (i.e. **Annexures E2.3 to E2.4**) shows that the AM peak will change to LOS C; the PM will remain at LOS B.

Some additional capacity at this intersection at this intersection will be required for the increase in traffic due to **PHASE 1** of the development. Suggested improvements are the addition of an exclusive right-turn lane on the Commissioner Street western approach as well as extending the existing left-turn slip lane on Elsburg Road to about 120m (see also **Figure 15a**). With these suggested improvements in place, the SIDRA3 results for the 2008 and 2013 base plus Phase 1 typically show overall LOS B/C (i.e. **Annexures E2.5 to E2.8**) for the AM and PM peaks and with average intersection delays in the order of 20 seconds.

As part of the overall upgrade for **PHASE 2**, it is recommended that this section of Commissioner Street be upgraded to three (3) through lanes per direction (see **Figure 15b**). With such upgrade in place at this intersection for Phase 2, in addition with the upgrades for Phase 1, the results of the capacity analyses in **Annexures E2.9 to E2.12** indicate overall LOS C/D for the AM peak and LOS B/C for the PM peak, which is considered acceptable levels of service.

It is concluded that the proposed intersection upgrades, as discussed above, will be able to sufficiently mitigate the anticipated traffic impact of the Phase 1 and Phase 2 stages of the proposed development.



5.3 Commissioner Str (M46) / Du Preez Str Intersection

Annexures E3.1 to E3.12 have reference:

Currently this is a signalised T-intersection with Du Preez Street intersecting from the north. At the intersection Du Preez Street has two approach lanes in the form of a right-turn lane and a short left-turn slip lane. Both the western and eastern approaches of Commissioner Street has three lanes. The east approach has two through lanes and a short right-turn lane, whilst the western approach has two through lanes and a short left-turn slip lane. The traffic signal operate on two main phases only.

The SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E3.1 to E3.4**) indicate that the intersection is currently operating very well at overall LOS A during both the weekday AM and PM peaks. The results also indicate that the intersection is currently operating well below its capacity levels.

As part of providing access to proposed Reiger Park Extension 8 (part of Phase 1), which is located to the south of Commissioner Street, it is proposed to convert this T-intersection to a 4-legged intersection. For this **PHASE 1** upgrade, the suggested geometry for the new south approach comprises a right-turn lane of about 80m and a shared through- and left-turn slip lane. An exclusive right-turn lane on the Commissioner Street west approach is also essential. The proposed layout is shown in **Figure 16a**. With this proposed geometry in place and the associated development traffic of the townships under Phase 1 added, the SIDRA3 results for the 2008 and 2013 base plus Phase 1 typically show overall LOS B (i.e. **Annexures E3.5 to E3.8**) for the AM and PM peaks and with average intersection delays in the order of 10-14 seconds.

For **PHASE 2**, it should be noted that all the traffic generated by proposed townships Delmore Park Extensions 5 and 6 will travel via Du Preez Street through this intersection. A substantially increase in capacity at this intersection will be required. As part of the overall upgrade for **PHASE 2**, it is recommended that this section of Commissioner Street be upgraded to three (3) through lanes per direction. In addition to the extra through lanes on Commissioner Street it is also recommended that the left-turn lane on the northern approach be increased to about 100m. The proposed layout is shown in **Figure 16b**. With the upgraded geometry and the additional traffic of the Phase 2 townships added, the SIDRA3 results (i.e. **Annexures E3.9 to E3.12**) for the 2008 and 2013 base plus Phases 1 plus 2 indicate overall LOS D and C for the



AM and PM peaks respectively, which is considered acceptable performance levels. Thus, the proposed upgrade will be sufficient to cater for all the additional traffic.

It is concluded that the proposed intersection upgrades as discussed above for Phase 1 and Phase 2 respectively, will be able to sufficiently mitigate the anticipated traffic impact of the respective Phase 1 and Phase 2 stages of the proposed development.

5.4 Commissioner Str (M46) / Wit Deep Rd Intersection

Annexures E4.1 to E4.4 have reference:

As noted earlier in this document, the basic planning of the future K110 (i.e. Commissioner Street) indicate that this intersection will be closed in future, mainly due to the sub-standard intersection spacing between this intersection at the future K127 which will cross/intersect with the K110 to the west. According to the planning the adjacent Haupt Street will be the main intersection, which new southern leg will also provide access to proposed Reiger Park Extension 8 and South Germiston Extension 17.

Although this intersection will be closed as part of the Phase 1 upgrades (including access to Reiger Park Extension 8 and South Germiston Extension 17) it was considered necessary to establish the current traffic volumes and intersection performance during the peaks.

This Commissioner/Wit Deep intersection is quite a busy intersection and as noted in Figure 3a the northern leg of Wit Deep Road currently carries some 1200-1500 vph (total both directions) during the peak hours. The existing intersection geometry of this signalised intersection comprises two approach lanes on Wit Deep Road northern approach in the form of a right-turn lane and a left-turn slip lane. Both the western and eastern approaches of Commissioner Street has three lanes. The east approach has two through lanes and an exclusive right-turn lane, whilst the western approach has two through lanes and a left-turn slip lane. The traffic signal operates on three phases, including a leading right-turn phase for the Commissioner Street east approach.

According to the SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E4.1 to E4.4**) the intersection is typically operating at overall LOS C during both the weekday AM and PM peaks with average intersection delays in the order of 18-24 seconds.



5.5 Lower Boksburg (M46) / Simon Bekker (M39) Intersection

Annexures E5.1 to E5.12 have reference:

This is a signalised T-intersection. The Lower Boksburg Road (M46) eastern and western approaches both have three approach lanes at the intersection. The eastern approach has an exclusive left-turn lane and two through lanes, whilst the western approach has two through lanes plus an exclusive right-turn lane. The southern approach of Simon Bekker Road (M39) also has three approach lanes, namely left-turn lane and a double right-turn. The traffic signal has a protected right-turn phase from the west.

The SIDRA3 capacity analyses for the **existing 2008** scenario (i.e. **Annexures E5.1 to E5.2**) show overall LOS B for both the AM and PM peaks. For the **future 2013 base** traffic flow scenarios the results indicate (i.e. **Annexures E5.3 to E5.4**) some marginal deterioration – overall LOS C and B can be expected for the AM and PM peaks respectively.

It has been recognised that the intersection will be under pressure when the Phase 1 development traffic is added, and consequently some minor improvements are recommended. For the **PHASE 1** development, it is suggested that both the left-turn lanes on the Simon Bekker Road south approach and Lower Boksburg Road east approaches be changed to slip lanes (see **Figure 17a**), i.e. not using signal green time. With this upgrade and the **Phase 1 development traffic added to the 2008 traffic**, the SIDRA3 results in **Annexures E5.5 to E5.6** show overall LOS C and B for the AM and PM peaks respectively, which is the same as the 2013 base without the development traffic. For the **2013 base with the Phase 1 development traffic**, the results in **Annexures E5.7 to E5.8** show overall LOS E and C for the AM and PM peaks respectively. Some movements will be reaching capacity levels, but which is mainly ascribed to the increase in background traffic (i.e. growth).

As for a number of the other intersections along Commissioner Street, it is recommended that this road be upgraded to three (3) through lanes per direction from this Simon Bekker intersection up to and including the proposed new intersection which will provide a new link to Rondebult Road – the upgrade will be part of the **PHASE 2** upgrade (see also **Figure 17b**). With additional through lanes in place and the additional traffic of the **Phase 2 townships added to the 2008 traffic**, the SIDRA3 results in **Annexures E5.9 to E5.10** indicate that overall LOS C can be expected for both the AM and PM peaks. The results for the **future 2013 base plus Phase 2 development traffic**, in **Annexures E5.11 to E5.12** show overall LOS D



and C for the AM and PM peaks respectively, which is considered acceptable performance levels.

It is concluded that the proposed intersection upgrades, as discussed above, will be able to sufficiently mitigate the anticipated traffic impact of the Phase 1 and Phase 2 stages of the proposed development. It is suggested that local upgrade of Phase 1 be covered under the upgrades for Reiger Park Extension 8 and South Germiston Extension 17.

5.6 Commissioner Str (M46) / Haupt Str Intersection

Annexures E6.1 to E6.12 have reference:

Currently this is a priority-controlled T-intersection. Through this intersection Commissioner Street (becoming Lower Boksburg Road to the west) has two through lanes per direction – a narrow median island obstruction in the form of “teeth” fitted to the surface have been installed to prevent right-turn to and from Haupt Street. The northern approach of Haupt Street has one approach lane only and due to the obstruction on the median island, only left-in-left-out traffic is currently allowed to/from Haupt Street.

According to the SIDRA3 capacity analyses for both the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E6.1 to E6.4**) the left-turn from Haupt Street experiences LOS C and F during the AM and PM peaks respectively. The major difference between the AM and PM is due to the difference in traffic volumes on this left-turn movement as noted in Figure 3a. During the PM peak this volume is substantial compared to the AM peak. To note is that although the results show LOS F, this is not quite the case in practise since the upstream signals at the Wit Deep Road intersection creates ample gaps for the left-turn.

The status of this intersection will however change significantly in the sense that this will become the major intersection, whilst the Wit Deep Road intersection will be closed (also refer to Section 2 of this report). This change is as a result of the future planning of the K110 (i.e. Commissioner / Lower Boksburg) which would include the future K127 running in a north-south direction and intersecting with K110 to the west of Wit Deep Road. Intersection spacing measured from the future K127 along the K110 necessitates the closure of Wit Deep Road. This also implies that all the traffic from Wit Deep Road to/from Commissioner Street (K110) would then have to use this Haupt Street intersection instead.



As part of providing access to proposed Reiger Park Extension 8 and South Germiston Extension 17 (part of Phase 1), which is located to the south of Commissioner Street, it is proposed to upgrade this intersection to a full 4-legged signalised intersection (see also **Figure 18a**). For this **PHASE 1** upgrade, the suggested geometry for the new south approach comprises a right-turn lane of about 80m, a through lane and a left-turn slip lane of about 80m. For the Commissioner Street east approach three lanes are proposed, namely a right-turn lane of about 80m, a through lane and a shared through- and left-turn slip lane. For the Commissioner Street west approach a similar layout to that of Wit Deep Road is suggested, namely a right-turn lane of about 80m, two through lanes and an exclusive left-turn slip lane of at least 100m. The northern approach of Haupt Street would have to be upgraded to cater for the substantial increase in traffic – two approach lanes would be required, namely a right-turn lane and a shared through- and left-turn slip lane of at least 100m in length.

For the **2008 plus Phase 1 development traffic** and assuming the intersection geometry as per **Figure 18a**, the SIDRA3 results for the 2008 and 2013 base plus Phase 1 typically show overall LOS C and E (i.e. **Annexures E6.5 and E6.6**) for the AM and PM peaks respectively and average intersection delays of 31 and 68 seconds. With the 3% per annum increase in background traffic over 5 years, the **2013 base plus Phase 1 development** shows some one level of deterioration, namely overall LOS D and F (i.e. **Annexures E6.7 and E6.8**) for the respective AM and PM peaks.

Although it could be argued that some additional improvement would be required in the latter 2013 scenario, additional upgrades in the form of a 3rd through lane on Commissioner Street is proposed as part of PHASE 2. It would only make sense to undertake the implementation of the 3rd through lane between Simon Bekker and Rondebult Road as one project.

For **PHASE 2**, and with the additional 3rd through lane added on both the Commissioner Street eastbound and westbound, as per the proposed layout in **Figure 18b**, the SIDRA3 results for the **2008 plus Phase 2 development traffic** indicate overall LOS C (i.e. **Annexures E6.9 and E6.10**) both the AM and PM peaks respectively and average intersection delays in the order of 27-32 seconds. The results for the **2013 base plus Phase 2 development** (i.e. **Annexures E6.11 and E6.12**) show overall LOS D for both the AM and PM peaks, which is still considered an acceptable level of service.



It is concluded that the proposed intersection upgrades as discussed above for Phase 1 and Phase 2 respectively, will be able to sufficiently mitigate the anticipated traffic impact of the respective Phase 1 and Phase 2 stages of the proposed development. Due to the high volumes of traffic on Wit Deep Road, it would be essential that this Commissioner/Haupt intersection be upgraded to full Phase 1 stage (as per **Figure 18a**) and be fully operational before the closure of Wit Deep Road can commence.

5.7 Simon Bekker Rd (M39) / Sezela Str Intersection

Annexures E7.1 to E7.12 have reference:

This is a priority-controlled T-intersection with the traffic along Simon Bekker Road with the right of way. Traffic on the southern approach of Sezela Street has to stop and wait for gaps along Simon Bekker Road. Past this intersection with Sezela Street, there are two northbound lanes and one southbound lane along Simon Bekker Road. The stop approach of Sezela Street has one approach lane only.

Currently the traffic volumes exiting from Sezela Street are very low and therefore the traffic from this side road experiences minimal delays when exiting into Simon Bekker Road. This is confirmed by the results of the SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E7.1 to E7.4**), which suggests that AM peak is the most critical peak when the exiting traffic on the stop approach experiences LOS C at worst and with approach delay of about 15-19 seconds. The queues on this stop approach, however, never exceeds one vehicle.

As part of providing access to Site 4, it is proposed to convert this T-intersection to a 4-legged intersection; both the northern and southern approaches of Sezela Street would provide access to the proposed township. **Figure 19** depicts the proposed intersection layout with the necessary local upgrades as part of **PHASE 1**. The proposed upgrades comprises a new short right-turn lane on Simon Bekker Road, a short right-turn lane on the existing southern approach of Sezela Street and the new northern approach which also needs two approach lanes, namely a right-turn lane and a short shared through- and left-turn lane.

Assuming priority-control for this intersection, all the SIDRA3 results of the **2008 and 2013 scenarios with the Phase 1 and Phase 2 development traffic** added (i.e. **Annexures E7.5 to E7.12**) indicate that the right-turn movement on both the northern



and southern Sezela Street stop approaches will experience long delays, LOS F. The left-turn movements will vary from LOS C to D; the AM peak would be the most critical as this is the peak when residential traffic exit the area onto Simon Bekker Road. It should however be noted that SIDRA3 assumes random arrivals, whilst in this case traffic signals are located at both ends of this intersection, namely at Lower Boksburg Road to the north and at Henderson Road to the south, which tend to create some platooning affect in the traffic flow along Simon Bekker Road. The SIDRA3 results may therefore be viewed as marginally overestimating the actual situation.

It is our submission that the traffic signals may not be warranted at this intersection and therefore it is considered sufficient to only implement the geometric improvements as per **Figure 19** without traffic signals.

5.8 Simon Bekker Rd (M39) / Henderson Rd Intersection

Annexures E8.1 to E8.12 have reference:

This is a signalised T-intersection with all three its approaches having one approach lane only. The traffic signal operates on the two main phases only.

The SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E8.1 to E8.4**) indicate that the intersection is currently operating well at overall LOS A/B during both the weekday AM and PM peaks; the average intersection delays are in the order of 10-15 seconds.

As part of providing access to Reiger Park Extension 17 and South Germiston Extension 20 (i.e. Land Parcel 3), it is proposed to convert this T-intersection to a 4-legged intersection, whereby the new eastern approach will be the access to the new township. In order to ensure efficiency of the traffic signals and to ensure that right-turning traffic do not obstruct through traffic, short right turn lanes on all four approaches are also recommended. The proposed 4th leg to the intersection together with the local upgrades as per **Figure 20**, would form part of the **PHASE 1 upgrades**.

With this PHASE 1 upgrades in place, the SIDRA3 results for both the **2008 plus Phase 1** and **2013 base plus Phase 1** (i.e. **Annexures E8.5 to E8.8**) indicate that overall LOS B can be expected in both the AM and PM for both scenarios. The expected average intersection delays will be in the order of 11-14 seconds.

With further improvements for PHASE 2, the SIDRA3 results show hardly changes the intersection performance when the additional traffic as of Phase 1 is added. Both the **2008 plus Phase 2** and **2013 base plus Phase 2** (i.e. **Annexures E8.9 to E8.12**)



indicate that the intersection will continue to operate at overall LOS B during both the weekday AM and PM peaks. The expected average intersection delays will also remain in the same order.

It is concluded that the proposed intersection upgrade to 4 legs and the suggested short right-turn lanes on all four approaches (see **Figure 20**), as part of Phase 1 upgrades, will be sufficient to mitigate the anticipated traffic impact of the proposed townships.

5.9 Elsburg Road (M35) / Archie Jonas Str Intersection

Annexures E9.1 to E9.12 have reference:

This is a 4-legged signalised intersection; both the northern and southern approaches of Elsburg Road have two approach lanes, namely an exclusive right-turn lane and a shared through- and left-turn slip lane. The eastern and western approaches of Archie Jonas Street also have two approach lanes, namely an exclusive left-turn slip lane and a shared through- and right-turn lane. The traffic signal provides the right-turn on Elsburg Road with a protected green phase.

The SIDRA3 capacity analyses for both the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E9.1 to E9.4**) show intersection performance at overall LOS B during both the weekday AM and PM peaks and with the average intersection delays varying between 11 and 18 seconds.

Apart from some increases in traffic on Archie Jonas Street as a result of proposed Reiger Park Extension 9, notable increases in traffic along Elsburg Road can also be expected due to townships under both Phases 1 and 2. Improving the capacity of this intersection would be necessary at some stage. Local upgrades as part of **PHASE 1** (i.e. Reiger Park Extension 9 in this case) are therefore suggested comprising the construction of short exclusive right-turn lanes on the eastern and western approaches of Archie Jonas Street (see **Figure 21**). For both the **existing 2008 plus Phase 1** and **future 2013 base plus Phase 1**, and the assuming the abovementioned local upgrades in place, the results of the capacity analyses (i.e. **Annexures E9.5 to E9.8**) indicate that the intersection will continue to operate at overall LOS B during both the weekday AM and PM peaks and with the average intersection delays in the order of 16-19 seconds.

Without further improvements to the intersection, but adding the additional development traffic of **PHASE 2**, the SIDRA3 results in **Annexures E9.9 to E9.12** for



the **2008 plus Phase 2** show overall LOS C for both the weekday AM and PM peaks, whilst the **2013 base plus Phase 2** indicate overall LOS C and D for the weekday AM and PM peaks respectively. The higher increases in average delay for the latter is mostly ascribed to the increase in background traffic (i.e. traffic growth) on Elsburg Road.

The proposed local upgrade as part of Phase 1, i.e. short exclusive right-turn lanes on the eastern and western approaches of Archie Jonas Street as per **Figure 21** would be sufficient to mitigate traffic impact of the proposed developments. New traffic signals timing plans for the intersection in conjunction with the geometric improvements would be essential. It is suggested that the proposed upgrade be implemented as part of Reiger Park Extension 9.

5.10 Archie Jonas Str / Fish Eagle Str Intersection

Annexures E10.1 to E10.12 have reference:

This intersection is currently controlled by a mini-roundabout. All four of the approaches to the intersection has single lane approaches. The northern and western legs of the intersection are gravel road whilst the southern and eastern legs to the intersection are surfaced roads. It was also noted on site that a public telephone booth had been erected on the traffic island, which from a traffic flow and safety point of view should not be allowed.

The results of the SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E10.1 to E10.4**) show good overall LOS A for both the weekday AM and PM peaks of both scenarios average intersection delays of less than 10 seconds. Generally the intersection is operating well below its capacity – as noted in Figure 3a, the traffic volumes through this intersection are of a low order.

With the **PHASE 1** development traffic added to this intersection for the 2008 and 2013 base scenarios and assuming the same geometry as above, the results in **Annexures E10.5 to E10.8** indicate that the intersection will continue to operate at the same overall LOS A during both the weekday AM and PM peaks and with the average intersection delays still remaining below 10 seconds.

With the **PHASE 2** development traffic added, the SIDRA3 results in **Annexures E10.9 to E10.12** still show overall LOS A for both the weekday AM and PM peaks and without change to the average intersection delays; the results are actually the same



for Phase 1 since it was assumed that no additional traffic of the Phase 2 townships would be generated from this area.

From the above analyses, it is concluded that the existing intersection with its mini roundabout has sufficient spare capacity to absorb the additional development traffic of both Phases 1 and 2 without the need for any geometric improvements. However, as part of the establishment of the proposed subsidised housing for Reiger Park Extension 9 it is recommended that the existing gravel road (i.e. western and northern legs of the intersection) be surfaced as it would serve as the main access routes to proposed Reiger Park Extension 9. It is further recommended that the public telephone booth on the traffic island be removed.

5.11 Elsburg Road (M35) / Heidelberg Rd (M35) Intersection

Annexures E1.1 to E11.12 have reference:

This is a signalised T-intersection. Heidelberg Road is a dual carriageway at this intersection; its southeast approach has two long continuous left-turn slip lane plus a double right-turn into Elsburg Road. The through traffic on the Elsburg Road northbound has continuous flow, whilst the double right-turn on the southwestern approach has a protected right-turn at the traffic signals. The southbound on Elsburg Road has two approach lanes at the intersection, namely a through lane and a shared through- and left-turn slip lane.

According to the SIDRA3 capacity analyses for the **existing 2008 and future 2013 base** traffic flow scenarios (i.e. **Annexures E11.1 to E11.4**) the intersection is typically operating at overall LOS B/C during both the weekday AM and PM peaks with average intersection delays in the order of 17-21 seconds. Generally the intersection is operating well below its capacity.

With the **PHASE 1** development traffic added to this intersection and without the need for any improvements, the results in **Annexures E11.5 to E11.8** indicate that the intersection will continue to operate at the same overall LOS B/C during both the weekday AM and PM peaks with average intersection delays in the order of 17-21 seconds.

With the **PHASE 2** development traffic added, the SIDRA3 results in **Annexures E11.9 to E11.12** still show overall LOS B/C for both the weekday AM and PM peaks and with hardly any increase in the average intersection delays.



From the above analyses, it is concluded that the existing intersection has sufficient spare capacity to absorb the additional development traffic of both Phases 1 and 2 without the need for any geometric improvements.

5.12 Rondebult Rd (R21) / Comet Road South Intersection

Annexures E12.1 to E12.8 have reference:

This intersection had been included in the study area since the traffic patterns through this intersection will change once the proposed link road (see **Annexure C**) across the railway line between Commissioner Street and Rondebult Road is implemented.

Currently the western leg of this 4-legged intersection serves an old mining settlement and the traffic flows are of a very low order. Through this intersection Rondebult Road (R21) is by far the major route, which has three northbound through lanes and two southbound through lanes. There are also slip lanes on all approaches, with particularly one very long slip lane from the Rondebult Road north approach left into Comet Road South.

The SIDRA3 capacity analyses for the **existing 2008** scenario (i.e. **Annexures E12.1 to E12.2**) show overall LOS B for both the AM and PM peaks. For the **future 2013 base** traffic flow scenarios the results indicate (i.e. **Annexures E12.3 to E12.4**) a drop from LOS B to C in the PM peak, whilst the AM peak will remain at LOS B.

For the purposes of this study it has been assumed that the proposed townships under **PHASE 1** will have no impact on this intersection due to the status of the current road network.

For **PHASE 2** it is proposed to implement the proposed link as mentioned above and as depicted in **Annexure C**. This new link road will become an important 3rd order Class 4 collector road which will provide traffic with more direct link between Rondebult Road and Commissioner Street, which lacks at present due to the grade separated interchange and the railway lines. From both our site observations and traffic counts it is evident that this traffic demand between Rondebult Road and Commissioner Street are forced to divert through local streets such as the eastern leg of Comet Road South, Church Street, Rissik Street, South Street and Middel Road. As noted in Figure 3a about 500-600vph have been recorded turning left from Rondebult Road into Comet Road South in the AM peak and *vice versa* in the PM peak – it is estimated that at least 1/3 of this volume is actually traffic demand to/from the Commissioner Street in the direction of Germiston CBD.



As part of the **PHASE 2** upgrades and implementation of the proposed link road (as per **Annexure C**) it is also recommended that the existing right-turn lane on the Rondebult Road north approach be extended to at least 120m together with the implementation of a protected leading right-turn phase. It is also recommended that the existing left-turn slip lane on the western approach of Comet Road South be extended to about 50-60m (see also **Figure 22**).

With above improvements in place and assuming some changes in the existing traffic patterns as well, the SIDRA3 results in **Annexures E12.5 and E12.6** for the **2008 plus Phase 2** indicate overall LOS B for both the weekday AM and PM peaks, whilst the **2013 base plus Phase 2** indicate overall LOS C and B for the weekday AM and PM peaks respectively.

It is concluded that the proposed local improvements to this intersection would be more than adequate to cater for the additional traffic of Phases 1 and 2 as well as the anticipated changes in the traffic patterns. It should further be emphasised that the proposed link road and upgrade of this intersection would be of a major benefit to the existing commuter traffic and which will also provide substantial relief to other intersections such as the Rondebult/Middel and Commissioner/Rissik intersections.

5.13 Commissioner (M46) / New Link to Rondebult Intersection

Annexures E13.1 to E13.4 have reference:

This will be a new signalised T-intersection which will provide access to Reiger Park Extension 11 as well as being the new link overall the railway line between Commissioner Street and Rondebult Road (see **Annexure C**), and which will be implemented as part of PHASE 2.

The proposed intersection geometry of this intersection is depicted in **Figure 23**, which proposes a double right-turn lane and short left-turn slip lane on the new northern approach. For Commissioner Street east approach three (3) through lanes plus an exclusive right-turn lane is proposed. For the western approach of Commissioner Street an exclusive left-turn lane is proposed. To note is that the proposed new 3rd through lane on Commissioner Street should start/terminate at this intersection. As noted in **Figure 23**, it is proposed that the 3rd lane on the western approach will become an exclusive left-turn slip lane, whilst on the eastern approach the 3rd through lane will start as a short lane.



With the above intersection geometry in place as part of **PHASE 2** and traffic signals operating only on the two main phases, the SIDRA3 results (i.e. **Annexures E13.1 and E13.4**) for both the **2008 and 2013 plus Phase 2 development** traffic added, indicate that the intersection will operate at a good overall LOS B during both the weekday AM and PM peaks and for both scenarios.

The results of the capacity analyses therefore confirm that the suggested intersection geometry with signalisation (as per **Figure 23**) will be adequate to cater for the additional development traffic of Phases 1 and 2 as well as the anticipated changes in the traffic patterns as a result of the proposed link road.

5.14 Commissioner (M46) / Access Reiger Park Ext 10 Intersection

Annexures E14.1 to E14.4 have reference:

As part of providing access to proposed Reiger Park Extension 10, a new T-intersection is proposed some 600m to the east of the existing Commissioner/Elsburg intersection, which will be implemented as part of PHASE 2. Given the projected traffic generations of Reiger Park Extension 10, it would be essential that traffic signals be installed at this intersection, including a protected right-turn phase from the east.

The proposed intersection geometry as shown in **Figure 24**, which proposes a double right-turn lane and short left-turn slip lane on the new northern approach. For Commissioner Street east approach three (3) through lanes plus an exclusive right-turn lane is proposed; three (3) through lanes plus a left-turn slip lane on the western approach as well.

With the above intersection geometry in place as part of **PHASE 2** and traffic signals with the suggested leading right-turn phase, the SIDRA3 results (i.e. **Annexures E14.1 and E14.4**) for both the **2008 and 2013 plus Phase 2 development traffic** added, indicate that the intersection will operate at a good overall LOS B/C during the weekday AM and PM peaks and for both scenarios.

The results of the capacity analyses therefore confirm that the suggested intersection geometry with signalisation (as per **Figure 24**) will be adequate to cater for the additional development traffic of Phases 1 and 2.



6. ROAD AND/OR INTERSECTION IMPROVEMENTS

Based on the expected trip generations (Section 4), the detailed capacity analyses covered in Section 5 as well as our site observations, **Tables 4 and 5** below summarize the proposed road/intersection upgrades for Phases 1 and 2 and each of the proposed townships. **Figures 14 to 24** conceptually show the various proposed upgrades:

Table 4: Proposed Upgrades for PHASE 1

PHASE 1 townships and relevant road and intersection upgrades			
Proposed Township		Proposed Road and/or Intersection Upgrade	Reference
LP	Township Name		
1	Reiger Park Ext 9	<p><u>Elsburg / Archie Jonas Intersection</u> Construct short exclusive right-turn lanes on the eastern and western approaches of Archie Jonas Street</p> <p><u>Archie Jonas / Fish Eagle Intersection</u> It is recommended that the existing gravel road (i.e. western and northern legs of the intersection) be surfaced as it would serve at the main access routes to the proposed township. Remove existing public telephone booth located on the island the traffic circle.</p>	Figure 21
2	Reiger Park Ext 8 South Germiston Ext 17	<p><u>Commissioner / Elsburg Intersection</u> Construct additional exclusive right-turn lane on the Commissioner Street western approach; extend the existing left-turn slip lane on Elsburg Road to about 120m.</p> <p><u>Commissioner / Du Preez Intersection</u> Change existing T-junction to a 4-legged intersection and simultaneous upgrade of the traffic signals to accommodate the 4th leg. An exclusive right-turn lane on the Commissioner Street west approach is essential (painted island can be utilized in this case). For the new south approach a right-turn lane of about 80m and a shared through- and left-turn slip lane is recommended. Update traffic signal timing plans.</p> <p><u>Commissioner / Haupt Intersection</u> Upgrade to full 4-legged signalised intersection. New south approach = right-turn lane of about 80m, a through lane and a left-turn slip lane of about 80m. Commissioner Street east approach = right-turn lane of about 80m, a through lane and a shared through- and left-turn slip lane; Commissioner Street west approach = right-turn lane of about 80m, two through lanes and an exclusive left-turn slip lane of at least 100m. Haupt Street northern approach = a right-turn lane and a shared through- and left-turn slip lane of at least 100m in length. Modifications to the Wit Deep / Haupt intersection essential. New traffic signal timing plans.</p>	Figure 15a Figure 16a Figure 18a



		<p><u>Commissioner / Wit Deep Intersection</u> Close off Wit Deep Road where it intersects with Commissioner Street, but only after the proposed upgrading of Commissioner/Haupt intersection has been completed and commissioned.</p> <p><u>Lower Boksburg / Simon Bekker Intersection</u> Converting both the existing exclusive left-turn lanes on Simon Bekker Road south approach and Lower Boksburg Road east approaches to slip lanes. Update traffic signal timing plans.</p>	- Figure 17a
3	Reiger Park Ext 17 & South Germiston Ext 20	<p><u>Simon Bekker / Henderson Intersection</u> Change existing T-junction to a 4-legged intersection and simultaneous upgrade of the traffic signals to accommodate the 4th leg. Construct short right turn lanes on all four approaches. Update traffic signal timing plans.</p>	Figure 20 -
4	Site 4 (township name not yet known)	<p><u>Simon Bekker / Sezela Intersection</u> Change existing T-junction to a 4-legged intersection. Construct new short right-turn lane on Simon Bekker Road; add a short right-turn lane on the existing southern approach of Sezela Street; new northern approach should have two approach lanes, namely a right-turn lane and a short shared through- and left-turn lane. Upgrade existing Sezela Street to paved standards.</p>	Figure 19 -
5	Delmore Park Ext 7	Included in the proposed upgrades of Land Parcels 1 and 2. Needs to contribute towards the same upgrades	Figure 15a, 16a, 18a & 17a,



Table 5: Proposed Upgrades for PHASE 2

PHASE 2 townships and relevant road and intersection upgrades			
Proposed Township		Proposed Road and/or Intersection Upgrade	Reference
LP	Township Name		
6, 7a, 7b & 8	ALL Phase 2 townships, namely Delmore Park Ext 5 & 6 and Reiger Park Ext 10 & 11	Construct a new 3 rd through lane on both the Commissioner Street eastbound and westbound directions from directly west of the Simon Bekker intersection to just east of the proposed Link Road to Rondebult Road, which is a distance of approximately 3,95km.	Figure 14
		Construct the proposed new Link Road across the railway line (incl road over rail bridge) that will provide a direct link between Rondebult Road and Commissioner Street.	Annex C
		<u>Commissioner / Elsburg Intersection</u> Where applicable, reinstate the existing turning lanes on Commissioner Street when constructing the 3 rd through lanes.	Figure 15b
		<u>Commissioner / Du Preez Intersection</u> Where applicable, reinstate the existing turning lanes on Commissioner Street when constructing the 3 rd through lanes.	Figure 16b
		<u>Commissioner / Haupt Intersection</u> Where applicable, reinstate the existing turning lanes on Commissioner Street when constructing the 3 rd through lanes.	Figure 18b
		<u>Lower Boksburg / Simon Bekker Intersection</u> Where applicable, reinstate the existing turning lanes on Commissioner Street when constructing the 3 rd through lanes.	Figure 17b
		<u>Rondebult / Comet Rd South Intersection</u> Extend the existing right-turn lane on the Rondebult Road north approach to at least 120m; extend the existing left-turn slip lane on the western approach of Comet Road South to about 50-60m. Implement a protected leading right-turn phase for north-to-west traffic. Update the traffic signal timing plans.	Figure 22
8	Reiger Park Ext 10	<u>Commissioner / New Link Road Intersection</u> Apart from the 3 rd through lane, construct a double right-turn lane and short left-turn slip lane on the new northern approach. An exclusive right-turn lane for the Commissioner Street east approach is required. Install new traffic signals.	Figure 22
		<u>Commissioner / Reiger Park Ext 10 Access Intersection</u> Apart from the 3 rd through lane, construct a double right-turn lane and short left-turn slip lane on the new northern approach. An exclusive right-turn lane for the Commissioner Street east approach and a left-turn slip lane on the western approach are required. Install new traffic signals with protected right-turn phase.	Figure 24



The above upgrades are quite substantial, especially the implementation of the proposed 3rd through lane on Commissioner Street and the proposed new Link Road connecting Commissioner Street with Rondebult Road. It is suggested that the implementation of these upgrades, particularly the abovementioned two items, which falls under Phase 2, be discussed and negotiated with the relevant provincial and local authorities. This would be especially needed at the time of preparing the services agreements for the townships of Delmore Park Extensions 5 and 6 and Reiger Park Extensions 10 and 11.



7. PUBLIC TRANSPORT

In terms of the National Land Transport Transition Act (NLTTA) 22 of 2000, Section 29, it is a requirement that an assessment of the public transport be included in a traffic impact study. Despite the requirements of the Act, it is noted that some of the proposed townships comprise subsidised and affordable housing, whilst other will be significant industrial townships. For all of these townships it is anticipated that a significant portion of the persons trips generated, will be making use of public transport in the form of buses, minibus taxis and commuter rail. Walking is also expected to be a significant mode, especially in light of the mixed use townships and the nearby location of employment opportunities, such as the existing industrial areas of South Germiston to the west and Anderbolt to the northeast.

Public transport in the form of buses and minibus taxis are currently provided along most the main routes within the study, such as Commissioner Street, Elsburg Road, Simon Bekker Road, Leon Ferreira Drive, Wit Deep Road and Rondebult Road. Minibus taxis are also the most significant transport mode to/from the low income areas within the study area, such as Reiger Park and several other informal settlements.

Commuter rail is also a very popular transport mode, which is available well within walking distance of most of the proposed townships. Four (4) existing railway stations are relevant in this instance (see **Figure 1**), namely:

- o East Rand Station, located to the east of proposed Reiger Park Extension 11;
- o Angelo Station, located to the north of proposed Delmore Park Extension 6 & 10;
- o Delmore Station, located to the west of proposed Delmore Park Extension 5; and
- o Kutalo Station, located to the southwest of Site 4.

Generally, the proposed townships are well served by public transport as well as walking, especially if one compares the location of these townships with other development much further away from the city centres such as Germiston and Boksburg. The availability of public transport therefore also justifies the marginally lower trip generation rates as covered in Section 4 of this document, in fact, the estimated traffic generations for the developments as a whole is viewed as conservative.

Several public transport facilities are proposed, which are briefly applicable to each of the proposed townships as follows:



Table 6: Proposed Public Transport Facilities

Proposed Township		Proposed Public Transport Facilities
LP	Township Name	
1	Reiger Park Extension 9	<ul style="list-style-type: none"> o An on-site public transport facility located in the centre of the proposed township (see Annexure D). An erf has been allocated for this purpose; o Public transport laybys to be constructed on Elsburg Road, at locations downstream of its intersection with Archie Jonas Street; o Paved sidewalks of at least 1,5m wide along at least one side of the main routes through the township.
2	Reiger Park Extension 8 & South Germiston Extension 17	<ul style="list-style-type: none"> o An on-site public transport facility (see Annexure D), located near the Commissioner/Du Preez intersection . An erf has been allocated for this purpose; o Public transport laybys to be constructed on Commissioner Street at locations downstream of its intersections with Du Preez Street and Haupt Street; o Paved sidewalks of at least 1,5m wide along at least one side of the main routes through the township.
3	Reiger Park Ext 17 & South Germiston Ext 20	<ul style="list-style-type: none"> o Public transport laybys to be constructed on Simon Bekker Road at locations downstream of its intersection with Henderson Road; o Paved sidewalks of at least 1,5m wide along at least one side of the main routes through the township.
4	Site 4 (township name not yet known)	<ul style="list-style-type: none"> o Public transport laybys to be constructed on Simon Bekker Road at locations downstream of its intersection with Sezela Street; o Paved sidewalks of at least 1,5m wide along at least one side of Sezela Street and the main routes through the township.
5	Delmore Park Extension 7	<ul style="list-style-type: none"> o Paved sidewalks of at least 1,5m wide along at least one side of the main routes through the township.
6	Delmore Park Extension 5	<ul style="list-style-type: none"> o Paved sidewalks of at least 1,5m wide along at least one side of all routes within this industrial township as well as along one side of the new access road up its intersection with Commissioner Street.
7a	Delmore Park Extension 6	<ul style="list-style-type: none"> o An on-site public transport facility located in the centre of the proposed township (see Annexure D). An erf has been allocated for this purpose; o Paved sidewalks of at least 1,5m wide along at least one side of the main routes through the township.
7b	Reiger Park Extension 10	<ul style="list-style-type: none"> o Public transport laybys to be constructed on Commissioner Street at locations downstream of its new T-intersection; o Paved sidewalks of at least 1,5m wide along at least one side of all routes within this industrial township as well as along one side of the new access road up its intersection with Commissioner Street.
8	Reiger Park Extension 11	<ul style="list-style-type: none"> o Public transport laybys to be constructed on Commissioner Street at locations downstream of its new T-intersection with the Link Road; o Paved sidewalks of at least 1,5m wide along at least one side of all routes within this industrial township as well as along one side of the new Link Road up its intersection with Commissioner Street.



To note is that the proposed sidewalks would not only ease and formalize the movements of pedestrians to/from work, business, community centres or the nearest public transport service, such sidewalks would also improve pedestrian safety, especially on routes where the traffic volumes are higher and pedestrians walking within the roadway should be avoided.

More details of proposed facilities and locations of the sidewalks would be provided as part of the Site Development Plans. For townships such as Reiger Park Extensions 8, 9 & 17, South Germiston Extension 17 & 20 and Delmore Park Extension 6 it would essential that the local authority and local taxi operators be consulted during the planning stages of such on-site facilities.



8. CONCLUSION & RECOMMENDATIONS

Based on the content of this document, the following key conclusions and recommendations are relevant:

- o This is a combined Traffic Impact Study for nine (9) proposed townships located on approximately 277ha of land in the old Boksburg Mining Belt area, about 4km to the east of the Germiston CBD (see **Figure 1**). The proposed townships are the following:
 - ❖ Land Parcel 1: Reiger Park Ext 9;
 - ❖ Land Parcel 2: Reiger Park Ext 8 & South Germiston Ext 17;
 - ❖ Land Parcel 3: Reiger Park Ext 17 & South Germiston Ext 20;
 - ❖ Land Parcel 4: Site 4 (township name not known at time of report);
 - ❖ Land Parcel 5: Delmore Park Ext 7;
 - ❖ Land Parcel 6: Delmore Park Ext 5;
 - ❖ Land Parcel 7a: Delmore Park Ext 6;
 - ❖ Land Parcel 7b: Reiger Park Ext 10; and
 - ❖ Land Parcel 8: Reiger Park Ext 11.
- o The proposed land uses and extent thereof for each township are summarised in **Table 1** (pg 7), with the proposed township layouts enclosed in **Annexure D**. In summary, and for the purposes of determining the traffic generations, the various land uses as a whole comprise the following (all other uses are viewed ancillary to the main uses):
 - ❖ Residential 7 170 units (including 2 650 full subsidised housing units);
 - ❖ Industrial 425 000 m² GLA; and
 - ❖ Commercial... 41 000 m² GLA.
- o For the purposes of this Traffic Impact Study only, two development phases had been considered. The purpose of this was mainly to split the traffic generations of the developments and to test the traffic impact of the two thresholds. The capacity analyses as well as the road and intersection upgrades have been broken down into two phases. PHASE 1 comprises the first five land parcels, and PHASE 2 the last four land parcels;
- o **Access:** Numerous accesses are proposed. This TIS should however be viewed from a macro perspective, which focuses on the primary access(es) of various townships as a whole and not on the individual erven/developments



within these townships. More details of the accesses within the townships will be dealt with at Site Development Plan stage. **Table 2** (pg 9) provides a summary of the proposed main accesses to the various townships (see also **Annexure D** for each township), including proposed and future link roads;

- o Trip generation rates for the three main land uses are discussed and presented in Section 4.3, which has taken account of the standard *SATGM* rates, the types and extent of the developments, general location of the site in relation with other main centres and the likely usage of public transport. The table below summarises the estimated weekday AM and PM peak hour traffic generations of the proposed individual townships and as a whole;

Summary of Estimated Development Trips							
Proposed Township (land use & extent)	AM Peak Hour			PM Peak Hour			Percentage of Total Traffic
	IN	OUT	TOTAL	IN	OUT	TOTAL	
PHASE 1							
Reiger Park Ext 9 (Subsidized housing = 1520 units)	90	370	460	370	90	460	7%
Reiger Park Ext 8 & South Germiston Ext 17 (Affordable housing = 1850 units; Commercial = 29 000m ² GLA)	500	910	1410	910	500	1410	21%
Reiger Park Ext 17 & South Germiston Ext 20 (h/density affordable apartm = 485 units)	40	180	220	180	40	220	3%
Site 4 (h/density affordable apartm = 1050 units)	90	380	470	380	90	470	7%
Delmore Park Ext 7 (Affordable housing = 470 units)	50	230	280	230	50	280	4%
PHASE 2							
Delmore Park Ext 5 (Industrial = 123 000m ² GLA)	650	210	860	210	650	860	13%
Delmore Park Ext 6 (Subsidized housing = 1130 units)	70	270	340	270	70	340	5%
Reiger Park Ext 10 (Industrial = 206 000m ² GLA; Commercial = 12 000m ² GLA)	1220	410	1630	410	1220	1630	25%
Reiger Park Ext 11 (h/density affordable apartm = 660 units; Industrial = 96 000m ² GLA)	410	560	970	560	410	970	15%
TOTAL	3120	3520	6640	3520	3120	6640	100%



- o The traffic distribution of the **PHASE 1 development trips** onto the study area road network are shown schematically in **Figure 6f**. The total development trips, i.e. **PHASE 1 plus 2** are shown in **Figure 9**.
- o The proposed trip rates and estimated traffic generations are considered marginally conservative for two reasons, namely:
 - ❖ no adjustments had been made in the traffic generations for inter township trips; it would have been reasonable to assume that a significant portion of the residents would take up employment at the nearby new industrial areas; and
 - ❖ existing informal settlements (i.e. squatter camps) are currently located on Land Parcels 1 and 7a, which accommodate approximately 1500 and 500 families respectively, of which the traffic generation of these settlements are already included in the traffic counts in Figure 3a. It is anticipated that most of these families would be accommodated in the new townships.
- o **Road and Intersection Upgrades:** Based on the expected trip generations and detailed capacity analyses, using SIDRA3, several road and intersection upgrades are recommended. **Tables 4 and 5** (pg 34 & 36) summarize the proposed upgrades for Phases 1 and 2 and each of the proposed townships (see also conceptual layouts in **Figures 14 to 24**). Apart from the local upgrades as tabled, the most significant upgrades are:
 - ❖ The upgrading of Commissioner (M46/K110)/Haupt Street intersection to a full 4-legged signalised intersection, and the simultaneous closure of the existing Commissioner/Wit Deep Road signalised T-intersection. Minor modifications to the Wit Deep/Haupt intersection would also be required;
 - ❖ A proposed new Link Road across the railway line (including a new road over rail bridge) that will provide a direct link between Rondebult Road and Commissioner Street, and which will cut through proposed Reiger Park Extension 11 (concept shown in **Annexure C**). The proposed Link Road and upgrade of the Rondebult/Comet South intersection would also be of a major benefit to the existing commuter traffic, which is expected to provide substantial relief to other intersections such as the Rondebult/Middel and Commissioner/Rissik intersections;



- ❖ Implementation of a new 3rd through lane on both the Commissioner Street eastbound and westbound directions from directly west of the Simon Bekker intersection to just east of the proposed Link Road, which is a distance of approximately 3,95km (see **Figure 14**);
- The above upgrades are quite substantial, especially the implementation of the proposed 3rd through lane on Commissioner Street and the proposed new Link Road connecting Commissioner Street with Rondebult Road. It is suggested that the implementation of these upgrades, be discussed and negotiated with the relevant provincial and local authorities. This would be especially needed at the time of preparing the services agreements for the townships covered in PHASE 2;
- **Public Transport:** It is anticipated that a significant portion of the persons trips generated, will be making use of public transport in the form of buses, minibus taxis and commuter rail. Walking is also expected to be a significant mode, especially in light of the mixed use townships and the nearby location of employment opportunities. It has been concluded that the proposed townships are generally well located and served by public transport, including rail - some four railway stations are available well within walking distance of most of the proposed townships. Several public transport facilities are proposed for each of the various townships, which are summarised in **Table 6** (pg 39). More details of proposed facilities and locations of the sidewalks would be provided as part of the Site Development Plans. For townships such as Reiger Park Extensions 8, 9 & 17, South Germiston Extension 17 & 20 and Delmore Park Extension 6 it would essential that the local authority and local taxi operators be consulted during the planning stages of such on-site facilities;
- To note is that several discussions had been held with the relevant senior officials at both Gautrans (i.e. Mr Daan Visser) and EMM Southern Region (i.e. Mr Barend Deminey) regarding this study, including the various accesses to the townships. It has been recognised that additional reports would have to be prepared and submitted to Gautrans in terms of *Section 7 of the Gauteng Transportation Act 8* for future routes K127 and K110. The necessary investigations and preparation for these reports are currently in progress.

It is submitted that the proposed townships are supported from a traffic engineering perspective, provided that the proposed road and intersection improvements be implemented to the relevant design standards of the local and provincial authorities. It is recommended that EMM and Gautrans approves this document in principle.