



**DIJALO**  
PROPERTY SERVICES



# Traffic Impact Study

## Crossroads Mall

Submitted by:

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January 2014

# TRAFFIC IMPACT STUDY

Crossroads Mall

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**January 2014**

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 **DIJALO**  
PROPERTY SERVICES

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## **EXECUTIVE SUMMARY**

*This investigation focuses on the evaluation of the expected traffic impact of the proposed Crossroads Mall development planned by Dijalo Property Services (Pty) Ltd. in Kwa-Thema, Springs.*

*The proposed site (approximately 15 ha) for the Crossroads Mall is located in the north western corner of Tonk Meter Road (K161) and Rhokana Street, in Kwa-Thema. Preliminary indications are that the total extent of the development is expected to be approximately 31,600 m<sup>2</sup> GLA. For the purpose of the traffic impact study, a conservative approach was followed in analysing a development with the maximum extent of 38,000 m<sup>2</sup> GLA which is expected to generate approximately 1,550 primary trips during the weekday afternoon peak hour and approximately 2,630 primary trips during the Saturday peak hour.*

*The surrounding road network consists of Tonk Meter Road and Rhokana Street (both roads consisting of one lane per direction). Considering the available capacity at the critical intersections along these roads, it was found that the following intersections will need to be upgraded to cater for the existing and expected future background traffic volumes:*

- *Rhokana Street / Tonk Meter Road – installation of traffic signal required;*
- *Rhokana Street / Sam Ngema Drive – installation of traffic signal required together with the construction of an exclusive right turn lane on Rhokana Street (eastern approach).*

*It is proposed to provide accesses to the development on Rhokana Street and Tonk Meter Road. The access on Tonk Meter Road will be located approximately 730m north of Rhokana Street (at the existing intersection). The access on Rhokana Street is proposed opposite Thabahadi Street. Both accesses will be signalised and road improvements will be required to accommodate these accesses.*

*The Crossroads Mall development will be located in a low vehicle ownership area indicating that allowance should be made for private car parking as well as minibus-taxi bays on site. It is proposed to provide 1,260 private car parking bays and 59 minibus-taxi bays on the site which equates to an effective rate of 5.9 bays per 100 m<sup>2</sup> GLA (1 minibus-taxi bay is considered equal to 8 private car bays) which will be adequate to cater for the peak parking demand on the site.*

*Considering the location of the proposed development, it will be required to provided paved walkways along the street frontage of the site i.e. along Tonk Meter Road and Rhokana Street. Lay-bys should also be provided at the signalised intersection along Tonk Meter Road, downstream of the intersection on both sides of the road.*

*The typical cost associated with the road improvements (accesses and improvements at critical surrounding intersections) is expected to be in the order of R 17.5 million (excluding VAT).*

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## ADDENDA

Addendum A	Capacity Analyses Results
Addendum B	Preliminary layout of road improvements

## LIST OF ABBREVIATIONS

LOS	Level of Service
V/C	Volume over Capacity Ratio

## 1. INTRODUCTION

Dijalo Property Services (Pty) Ltd. appointed AECOM SA (Pty) Ltd. to conduct the traffic impact study for the proposed Crossroads Mall development in Kwa-Thema, Springs. The site under investigation is approximately 15 ha in extent and is located in Kwa-Thema, on the north western corner of Tonk Meter Road and Rhokana Street – *see Figure 1*. The proposed development will be approximately 31,600 m<sup>2</sup> GLA in extent and will consist of the following – *see Figure 2*:

- Shopping Mall (± 29,500 m<sup>2</sup> GLA);
- Builders Warehouse and KFC (± 2,100 m<sup>2</sup> GLA);

For the purpose of the traffic impact study, a conservative approach was followed in considering the potential rights on the site and analysing the impact of a single retail centre with a total maximum extent of 38,000 m<sup>2</sup> GLA.

## 2. APPROACH

The following approach was pursued in conducting the investigation:

- A site visit was conducted during which the layout of the surrounding road network was evaluated, the operating conditions observed and the location of required traffic surveys was confirmed.
- Peak period (Friday afternoon and Saturday midday) traffic counts were conducted to establish the existing traffic volumes at the critical intersections surrounding the site.
- The expected future (2018) background traffic volumes were calculated by applying an annual traffic growth rate to the existing traffic volumes.
- The number of trips that will be generated by the planned development during the peak hours was calculated and assigned to the surrounding road network.
- The required access arrangements to the development in Tonk Meter Road and Rhokana Street were evaluated.
- Capacity analyses were performed using the aaSIDRA Software Package to determine the operating conditions at the critical intersections for the following scenarios:
  - 2013 without the proposed Crossroads Mall development;
  - 2013 with the proposed Crossroads Mall development;
  - 2018 without the proposed Crossroads Mall development;
  - 2018 with the proposed Crossroads Mall development.
- Where required, practical and feasible road improvements were identified on the road network and accesses to ensure acceptable operating conditions during the critical peak periods.
- The parking requirements of the development were calculated considering the applicable town planning scheme.
- The public transport requirements of the development were evaluated and the appropriate recommendations were made.

### 3. ASSUMPTIONS AND LIMITATIONS

This report addresses the expected traffic impact of the proposed Crossroads Mall development on the surrounding road network and contains schematic layouts of the improvements together with a preliminary costing for budget purposes (2013 Rand). The study is based on a retail development with a maximum extent of 38,000 m<sup>2</sup> GLA.

### 4. DISCUSSION

#### 4.1 STATUS QUO ROAD NETWORK

The existing road network surrounding the proposed Crossroads Mall site consists of the following roads – see *Figure 1*:

- Tonk Meter Road to the east of the site  
Tonk Meter Road is a class 2 road and borders the eastern side of the site. This road provides north-south mobility and links Kwa-Thema with the N17 and Springs. Tonk Meter Road currently consists of one lane per direction and in future will serve as the K161 once upgraded to a dual carriageway.
- Rhokana Street  
Rhokana Street is a class 3 road consisting of one lane per direction. The intersections along Rhokana Street are mostly stop controlled.

The critical intersections analysed in the investigation are also shown in *Figure 1* and include the following:

- Tonk Meter Road / Coaton Avenue (signalised);
- Rhokana Street / Tonk Meter Road (4 way stop controlled);
- Rhokana Street / Thabahadi Street (1-way stop);
- Rhokana Street / Masibeni Street (1-way stop); and
- Rhokana Street / Sam Ngema Street (1-way stop).

The existing layouts of the various intersections are shown in *Figure 2*.

#### 4.2 STATUS QUO TRAFFIC VOLUMES

The existing traffic volumes at each of the intersections within the study area were surveyed during the end of month peak on Friday 30 August and Saturday 31 August 2013 respectively. The Friday afternoon peak hour occurred between 15h30 to 16h30 and the Saturday midday peak hour from 12h15 to 13h15. The traffic volumes are depicted in *Figure 3*. The existing traffic volumes on the road network are low and in general acceptable operating conditions prevail on the road network.



### 4.3 PROPOSED CROSSROADS MALL DEVELOPMENT

The proposed development will be approximately 31,600 m<sup>2</sup> GLA in extent and will consist of the following:

- Shopping Mall (± 29,500 m<sup>2</sup> GLA); and
- Builders Warehouse and KFC (± 2,100 m<sup>2</sup> GLA);

For the purpose of the traffic impact study, a conservative approach was followed in considering the potential rights on the site and analysing the impact of a single retail centre with a total maximum extent of 38,000 m<sup>2</sup> GLA.

In the long term, it is possible that a filling station will be developed on the northern corner of the site. However, this filling station will only be accessed from the internal Crossroads Mall road network and will not generate primary trips.

It is proposed to provide two accesses to the development i.e.:

- A signalised access on Tonk Meter Road, approximately 730m north of Rhokana Street (as per discussion with representatives of the Gauteng Department of Roads and Transport); and
- A signalised access on Rhokana Street, opposite Thabahadi Street.

The preliminary layout of the development and position of accesses are shown in *Figure 4*.

### 4.4 TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

#### 4.4.1 Trip Generation

The expected number of trips which will be generated by the proposed Crossroads Mall development was calculated using the average retail rate recommended by the *South African Trip Generation Rates Manual*<sup>(1)</sup> and considering a maximum Gross Leasable Area (GLA) of 38,000 m<sup>2</sup>:

**Table 1: Crossroads Mall - Trip Generation Rates (Fri PM and Sat AM)**

Land Use	GLA (m <sup>2</sup> )	Friday PM			Saturday AM		
		Rate/ 100m <sup>2</sup> GLA	Directional Split		Rate/ 100m <sup>2</sup> GLA	Directional Split	
			In	Out		In	Out
Retail Centre	38,000	4.90	50%	50%	8.62	50%	50%

The number of vehicle trips expected to be generated by the development was determined by applying its respective trip generation rate to its Gross Leasable Area. It was assumed that 35% of these trips would be pass-by trips i.e. trips already on the network that utilise the facility on route to another destination.

The anticipated number of vehicle trips to be generated by the Crossroads Mall development during the Friday afternoon and Saturday morning peak hours is summarised in *Table 2* below.

**Table 2: Expected Total Trip Generation (Fri PM and Sat AM)**

FRIDAY PM								
Pass-By Trips			Primary Trips			Total Trips		
In	Out	Total	In	Out	Total	In	Out	Total
414	414	828	769	769	1,538	1,183	1,183	2,366
SATURDAY AM								
Pass-By Trips			Primary Trips			Total Trips		
In	Out	Total	In	Out	Total	In	Out	Total
703	703	1,406	1,306	1,306	2,612	2,010	2,010	4,020

The above mentioned trips are considered to reflect the worst case scenario as recognition should be given to the low vehicle ownership area surrounding the proposed development and the important role of public transport in the area.

#### 4.4.2 Trip Distribution and Assignment

The trips were assigned onto the road network considering the locality of the surrounding areas, existing peak hour traffic volumes on the road network and also taking cognisance of the proposed access arrangements to the development. The distribution is summarised in the table below:

**Table 3: Assumed Trip Distribution**

From Direction	Road	Percentage of Trips
North	Tonk Meter Road	10%
East	Coaton Avenue	10%
	Rhokana Street	15%
South	Tonk Meter Road	15%
	Thabahadi Street	5%
West	Rhokana Street and Masibeni Street	45%
	<b>Total</b>	<b>100%</b>

The trips were assigned to the road network considering the location of the accesses and are presented in *Figure 5*.

## **4.5 EXPECTED FUTURE TRAFFIC VOLUMES AND SCENARIOS**

### **4.5.1 Growth Rate**

The year 2013 was used as the base year and 2018, five years later, as the horizon year. An annual traffic growth rate of 3% was assumed adequate for the purpose of calculating the anticipated future background traffic volumes.

### **4.5.2 Scenario 1 - Base Year (2013) Traffic Volumes without Crossroads Mall Development**

The status quo traffic volumes recorded in August 2013 represents the traffic demand for Scenario 1 – see Figure 3.

### **4.5.3 Scenario 2 - Base Year (2013) Traffic Volumes with Crossroads Mall Development**

The expected Crossroads Mall peak hour traffic volumes shown in Figure 5 were added to the traffic volumes recorded in August 2013 (see Figure 3) to identify the expected volumes on the road network for Scenario 2 – see Figure 6.

### **4.5.4 Scenario 3 - Horizon Year (2018) Traffic Volumes without Crossroads Mall Development**

Figure 7 illustrates the expected future demand for the weekday afternoon and Saturday peak periods in the horizon year considering the 3% annual growth rate.

### **4.5.5 Scenario 4 - Horizon Year (2018) Traffic Volumes with Crossroads Mall Development**

The expected Crossroads Mall peak hour traffic volumes shown in Figure 5 were added to the expected horizon year (2018) background volumes (see Figure 7) to identify the expected volumes on the road network for Scenario 2 – see Figure 8.

## **4.6 CAPACITY ANALYSES**

### **4.6.1 Background**

The Highway Capacity Software (for priority controlled intersections) and the aaSIDRA for Windows Software Package (for signal controlled intersections) were used to determine the current V/C ratios and levels of service (LOS) with regard to the delay experienced at each intersection. The software evaluates and measures an intersection's capacity in accordance with the Highway Capacity Manual. The output of the analysis is given as levels of service (LOS) which are based on the average delay experienced and range from A, very good with minimum delay, to F, very bad with unacceptable delays. The V/C ratios depict the volume of vehicles in relation to the available road capacity, where figures greater than 0.95 indicate insufficient capacity to accommodate vehicles, resulting in excessive queues and delay. It should be noted that the results determined using the Highway Capacity Software only reflect the critical/conflicting movements.

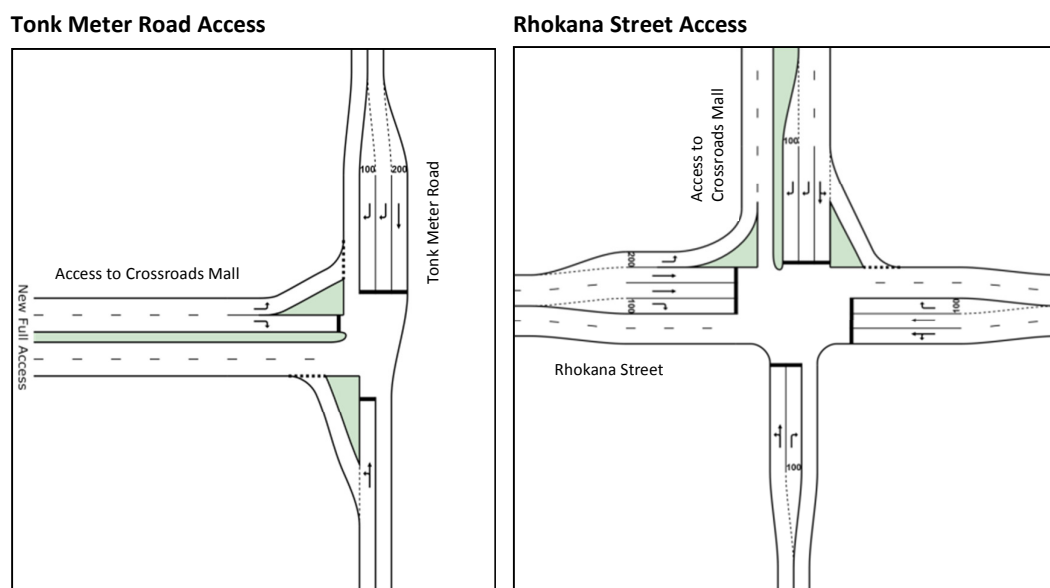
The results of the capacity analyses are attached as *Addendum A* and are discussed in the sections below.

#### 4.6.2 Scenario 1 - 2013 Without the Crossroads Mall Development

Considering the existing intersection layouts and prevailing peak hour traffic volumes, the capacity analyses confirmed that only the intersection of Rhokana Street / Tonk Meter Road needs to be upgraded by means of a traffic signal. No other road improvements are required on the road network as sufficient capacity is provided to cater for the peak hour traffic.

#### 4.6.3 Scenario 2 - 2013 With the Crossroads Mall Development

In analysing the impact of the Crossroads Mall development in 2013, the following access layouts were assumed on Tonk Meter Road and Rhokana Street.



**Schematic 1: Proposed Accesses**

Based on the capacity analyses, it was found that in addition to the construction of the accesses as per the layouts shown above, the following improvements will be required at the intersection of Rhokana Street and Sam Ngema Drive to cater for the combination of the 2013 background traffic volumes and the Crossroads Mall development traffic:

- a) Rhokana Street / Sam Ngema Drive
  - Installation of a traffic signal; and
  - Construction of an exclusive right turn lane on Rhokana Street (eastern approach).

#### 4.6.4 Scenario 3 - 2018 Without Crossroads Mall Development

As shown in *Annexure A*, the operating conditions at the various intersections are expected to be acceptable in the future, considering the 3% annual growth rate in background volumes. The available spare capacity at the intersections is therefore adequate to cater for the growth in background volumes.

#### 4.6.5 Scenario 4 - 2018 With Crossroads Mall Development

In conducting the analyses for scenario 4, it was assumed that the road improvements identified for the 2013 with Crossroad Mall Development scenario (scenario 2) have been implemented. These improvements include the following:

- Construction of the access on Tonk Meter Road and also on Rhokana Street;
- Installation of a traffic signal at the intersection of Rhokana Street / Tonk Meter Road;
- Installation of a traffic signal at the intersection of Rhokana Street / Sam Ngema Drive together with the construction of an exclusive right turn lane on Rhokana Street.

Considering these improvements, no additional upgrading measures will be required at any of the other intersections.

#### 4.7 PARKING REQUIREMENTS

In general, parking is provided at a rate of 6 bays per 100m<sup>2</sup> for normal retail centres. However, considering the location and layout of the Crossroads Mall development, it is clear that this is not a traditional retail centre and is expected to have a lower parking demand owing to the presence of public transport. The parking requirements of retail centres in low vehicle ownership areas is typically 3 bays per 100 m<sup>2</sup> GLA especially considering that specific provision is normally made for mini-bus taxi bays on site.

During 2008, BKS (now known as AECOM SA) conducted a parking investigation for the Tembisa Mall development along Andrew Mapheto Drive. In this investigation it was recommended that parking be provided at a minimum rate of 4 bays per 100 m<sup>2</sup> GLA. Within this rate, sufficient allowance needed to be made for minibus-taxi bays to ensure that the effective parking provision rate (considering that one taxi bay is equal to 8 normal bays) is at least 5 bays per 100 m<sup>2</sup> GLA. This recommendation was supported by the Ekurhuleni Metropolitan Municipality. During the 2008 parking study, AECOM also referred to the Tembisa Plaza development (18 000 m<sup>2</sup> GLA) located adjacent to Andrew Mapheto Drive where parking is provided at a rate of approximately 3 bays / 100 m<sup>2</sup> GLA and Tsakana Plaza Shopping Centre (31 778 m<sup>2</sup> GLA) where parking is provided at a rate of 3.6 bays per 100 m<sup>2</sup> GLA with 64 taxi bays resulting in a total effective rate of 5.2 bays per 100m<sup>2</sup> GLA.

According to the Site Development Plan, the total extent of the Crossroads Mall development will be 31,470 m<sup>2</sup> GLA and 1,260 parking bays are proposed. This relates to a parking rate of 4 bays per 100 m<sup>2</sup> GLA. However, in addition to the private parking bays, 59 minibus-taxi bays will also be provided which considering that one taxi bay is equal to 8 normal bays), results in 472 additional bays. The combination of the private parking bays (1,260) and the effective bays created by the minibus-taxi bays (472), results in 1,732 parking bays which is equal to a rate of 5.9 bays per 100 m<sup>2</sup> GLA.

AECOM supports this number of bays on site as this will be more than adequate to cater for any excessive peak parking demand.

## 4.8 PUBLIC TRANSPORT REQUIREMENTS

Reference was earlier made to the low surrounding vehicle ownership area and also the importance of public transport in the area surrounding Crossroads Mall. Considering the position and layout of the development, the following public transport and non-motorised transport facilities should be provided:

- Minibus taxi/bus lay-bys on Tonk Meter Road at the access, downstream of the intersection (both sides);
- Paved walkways along Tonk Meter Road and Rhokana Street along the street frontage of the development;
- Street lighting along the walkways;
- Signalised pedestrian crossing facilities at the accesses to the development;
- On-site minibus-taxi rank catering for at least 40 bays.

The minibus-taxi rank should be served by means of the access to the mall opposite Thabahadi Street and should also be accessible from the internal road network of the mall. In the SDP allowance was also made for an exit from the taxi rank onto Rhokana Street, opposite Masibeni Street.

## 4.9 COST ESTIMATE OF IMPROVEMENTS

### 4.9.1 Unit Construction Costs

A preliminary cost estimate of the various road improvements was performed for budget purposes. It should be noted that the costing is based on a preliminary layout only and will need to be refined once the detailed design thereof is conducted. For initial costing purposes, the following unit costs were assumed:

- Road construction: R 1,250 per m<sup>2</sup>
- Traffic signal installation R 500,000 per intersection

### 4.9.2 Preliminary Cost Estimate

A preliminary layout of the proposed road improvements has been prepared and is attached as *Addendum B*. The expected cost of the various improvements are summarised below:

- Construction of Tonk Meter Access
 

- Road widening: ± 2,600 m <sup>2</sup> @ R 1,250 per m <sup>2</sup>	= R 3,250,000
- Traffic signal	= R 500,000
<b>Sub-Total (excluding VAT)</b>	<b>= R 3,750,000</b>
  
- Construction of Rhokana Street Access
 

- Road widening: ± 8,050 m <sup>2</sup> @ R 1,250 per m <sup>2</sup>	= R 10,062,500
- Traffic signal	= R 500,000
<b>Sub-Total (excluding VAT)</b>	<b>= R 10,562,500</b>

• Tonk Meter Road / Rhokana Street Intersection		
- Traffic signal	= R	500,000
<b>Sub-Total (excluding VAT)</b>	<b>= R</b>	<b>500,000</b>
• Rhokana Street / Sam Ngema Drive		
- Road widening: $\pm 500 \text{ m}^2 @ \text{R } 1,250 \text{ per m}^2$	= R	625,000
- Traffic signal	= R	500,000
<b>Sub-Total (excluding VAT)</b>	<b>= R</b>	<b>1,125,000</b>
Contingencies (10%)	= R	1,593,750
<b>Total cost (excluding VAT)</b>	<b>= <math>\pm</math> R</b>	<b>17,5 million</b>

The above cost does not allow for the removal/relocation of major services, exclude professional fees and VAT.

## 5. CONCLUSIONS

The following conclusions are drawn from this investigation:

- The proposed Crossroads Mall development is expected to consist of approximately 31,600 m<sup>2</sup> GLA retail and will be located in Kwa-Thema, on the north western corner of Tonk Meter Road / Rhokana Street. Considering the proposed zoning of the properties, the traffic study addressed the expected traffic impact of a retail centre with a maximum extent of 38,000 m<sup>2</sup> GLA.
- It is proposed to provide two accesses to the development i.e. a signalised access on Tonk Meter Road (east of the site) and another signalised access on Rhokana Street (south of the site);
- The existing traffic volumes on the road network are minor road improvements will be required at the critical intersections provide sufficient capacity to cater for the existing and expected future (2018) background traffic volumes during the weekday afternoon and Saturday midday peak hours;
- The development is expected to generate approximately 1,550 primary trips during the weekday afternoon peak hour and 2,610 primary trips during the Saturday midday peak hour.
- Road improvements will be required to accommodate the proposed accesses to the development and also to cater for the additional development traffic to be generated by the mall.
- The Crossroads Mall development will be located in a low vehicle ownership area indicating that allowance should be made for private car parking as well as minibus-taxi bays on site. It is proposed to provide 1,260 private car parking bays and 59 minibus-taxi bays on the site which relates to an effective rate of 5.9 bays per 100 m<sup>2</sup> GLA (1 minibus-taxi bay is considered equal to 8 private car bays) which will be adequate to cater for the peak parking demand on the site.

- Non-motorised transport (NMT) facilities will be required in the area surrounding the development to cater for pedestrians and cyclists.
- Based on the preliminary layout of the identified road improvements and considering typical unit rates for road construction (R 1,250 per m<sup>2</sup>) and traffic signals (R 500,000 per signal), it is expected that the road improvements will cost in the order of R17.5 million (excluding VAT).

## 6. RECOMMENDATIONS

From this investigation, the following recommendations are made:

- Access should be provided by means of two signalised intersections i.e. access on Tonk Meter Road (approximately 730m north of Rhokana Street) and an access on Rhokana Street opposite Thabahadi Street.
- The following additional road improvements should be implemented to cater for the combination of the future development traffic and the background traffic volumes on the road network:
  - Installation of a traffic signal at the intersection of Rhokana Street and Tonk Meter Road;
  - Installation of a traffic signal at the intersection of Rhokana Street and Sam Ngema Drive together with the construction of an exclusive right turn lane on Rhokana Street (eastern approach);
- The following additional facilities/improvements will be required to cater for public transport vehicles and NMT:
  - Minibus taxi/bus lay-bys on Tonk Meter Road at the access, downstream of the intersection (both sides);
  - Paved walkways along Tonk Meter Road and Rhokana Street along the street frontage of the development;
  - Street lighting along the walkways;
  - Signalised pedestrian crossing facilities at the accesses to the development;
  - On-site minibus-taxi rank catering for at least 40 loading bays.
- The road improvements mentioned above should be discussed with the Ekurhuleni Metropolitan Municipality and the Gauteng Department of Roads and Transport to obtain approval and possible apportionment/phasing thereof. The improvements at the intersection of Rhokana Street / Sam Ngema Drive can be delayed and implemented only once the traffic signal is warranted.
- Parking be provided on site in the form of private car bays (1260 bays) and minibus-taxi bays (59 bays).
- It is recommended that the development be approved from a traffic engineering point of view and during the detailed design thereof, attention be given to manoeuvring of delivery vehicles on the site and general site circulation.

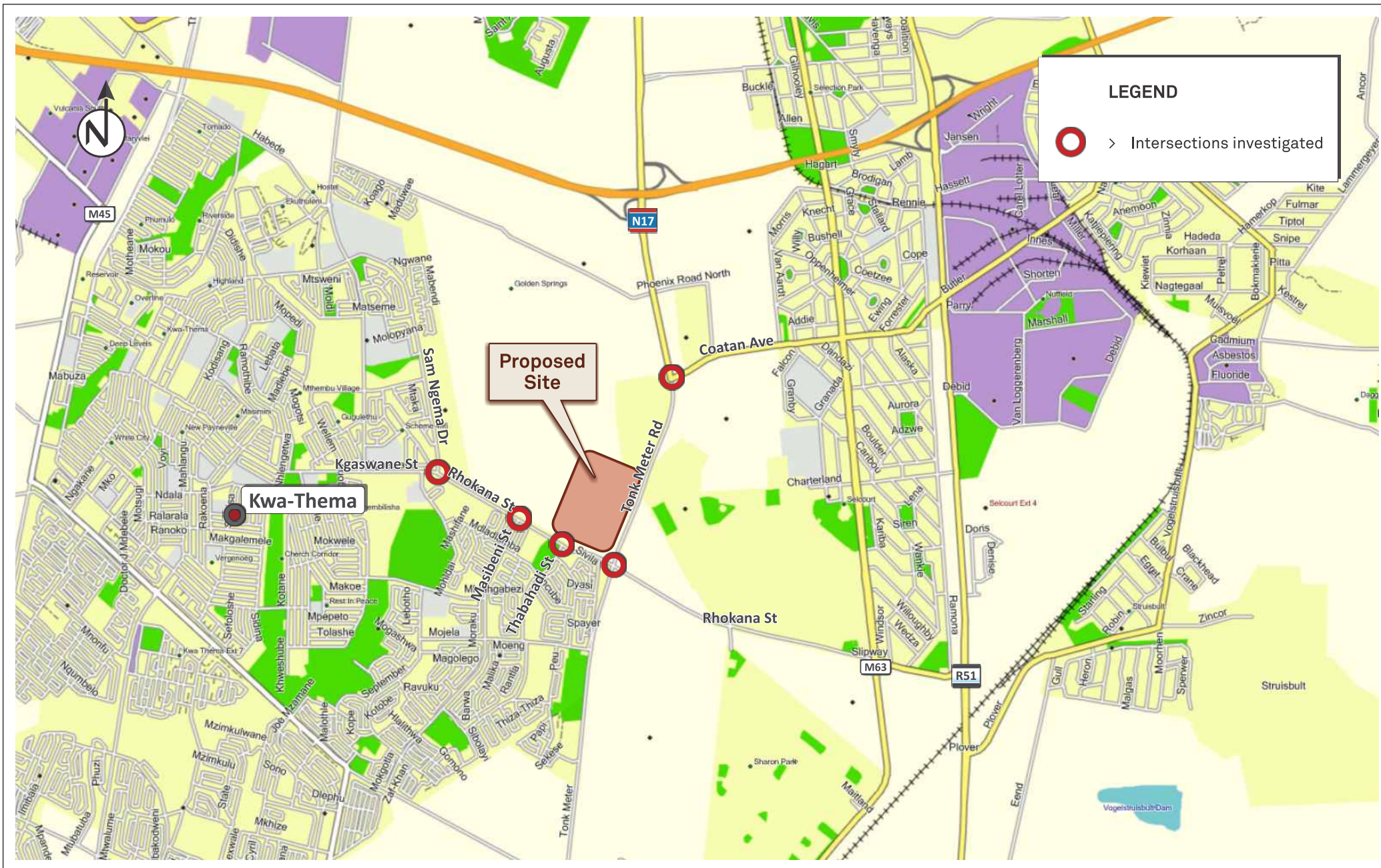


## 7. GLOSSARY OF TECHNICAL TERMS

- LOS - Level of Service  
Describes the operating conditions at an intersection where level of service A to D describes acceptable operating conditions and LOS E and F describes unacceptable conditions.
- V/C - Volume over Capacity Ratio  
Indicates the available spare capacity. A V/C ratio of 0.95 and higher indicates congested conditions.

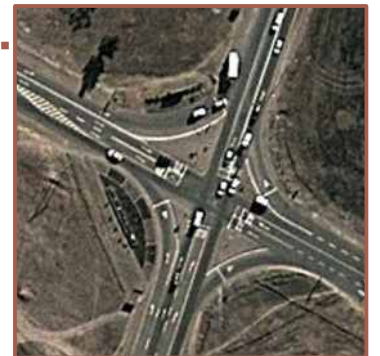
## 8. REFERENCES

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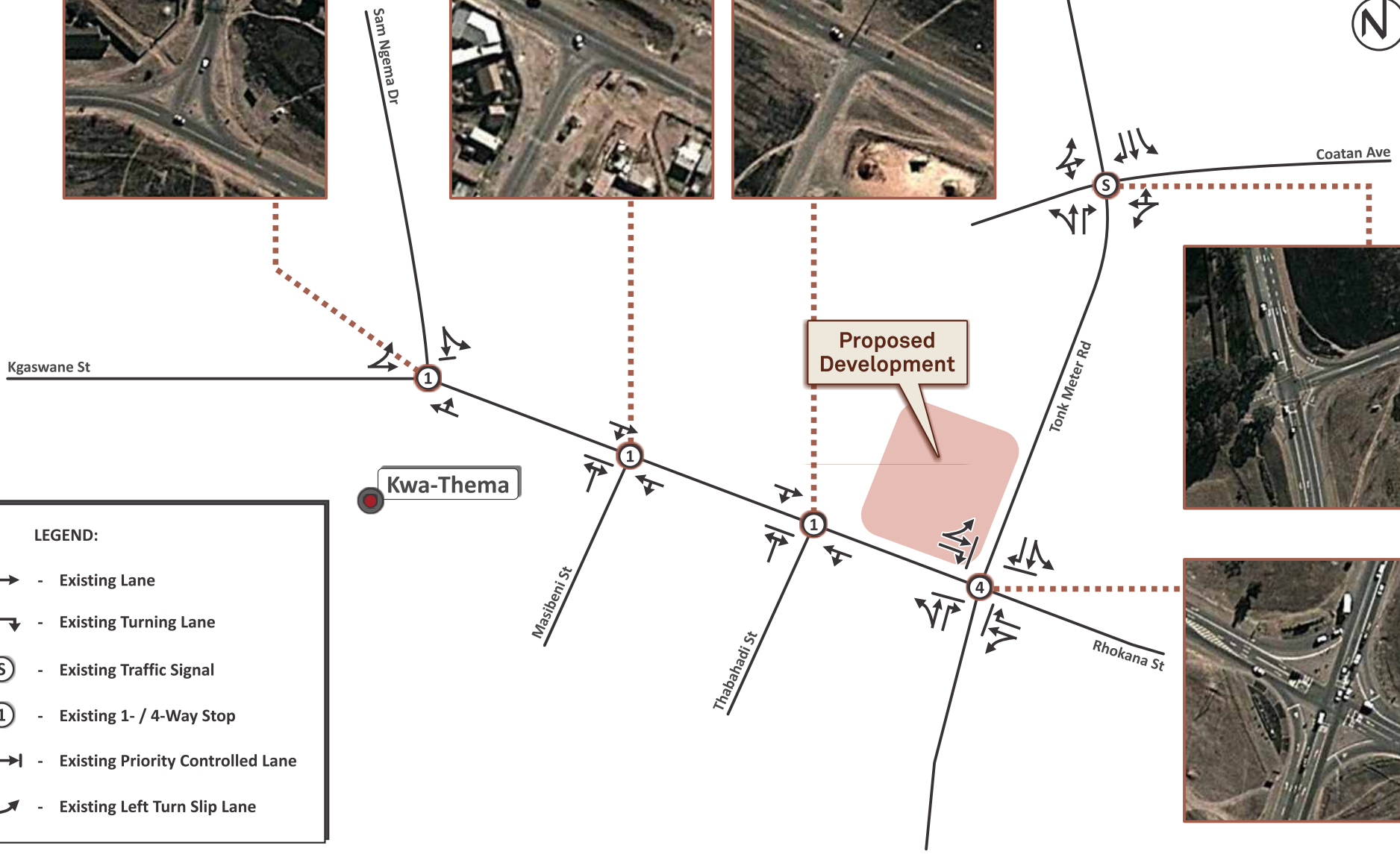
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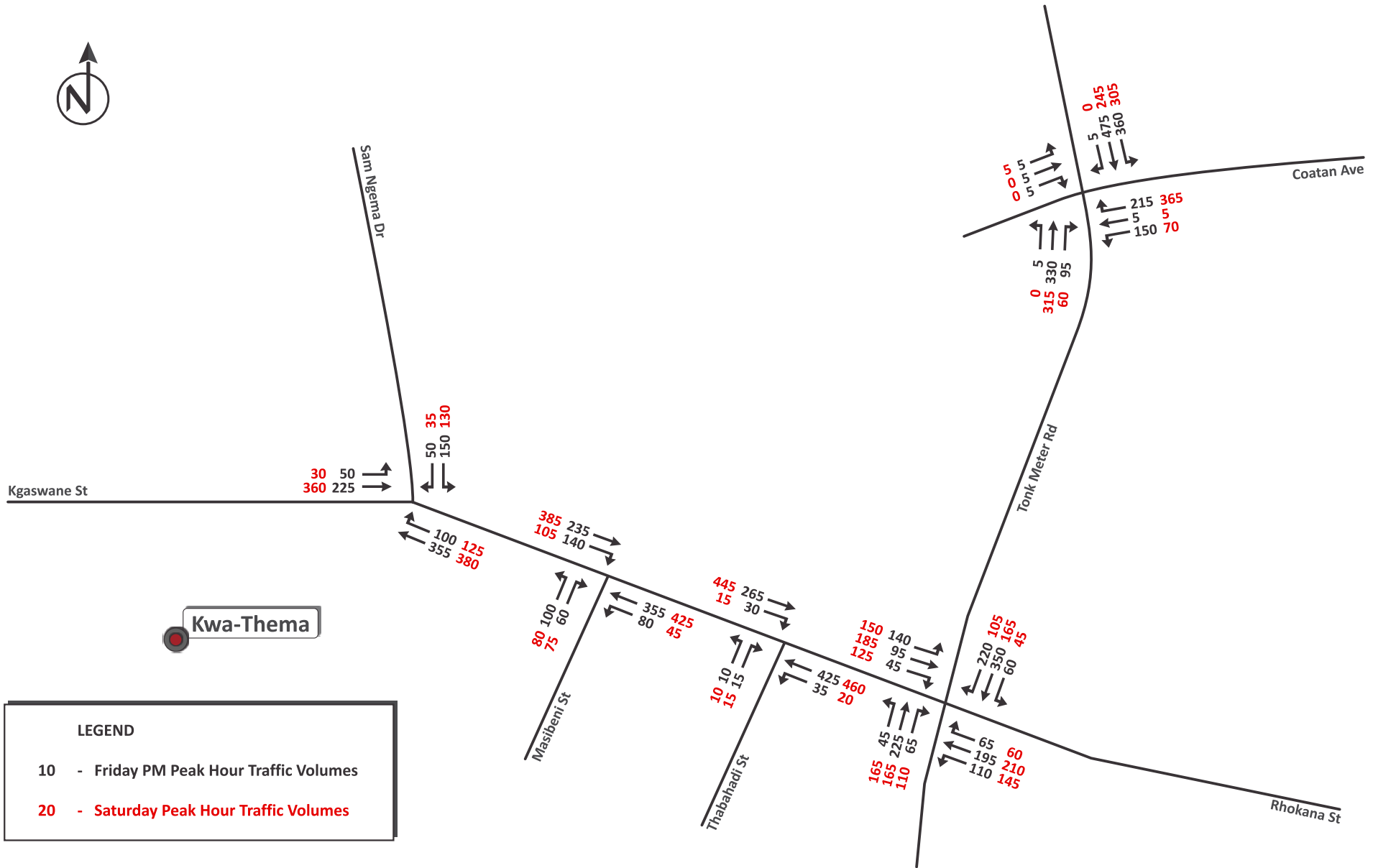




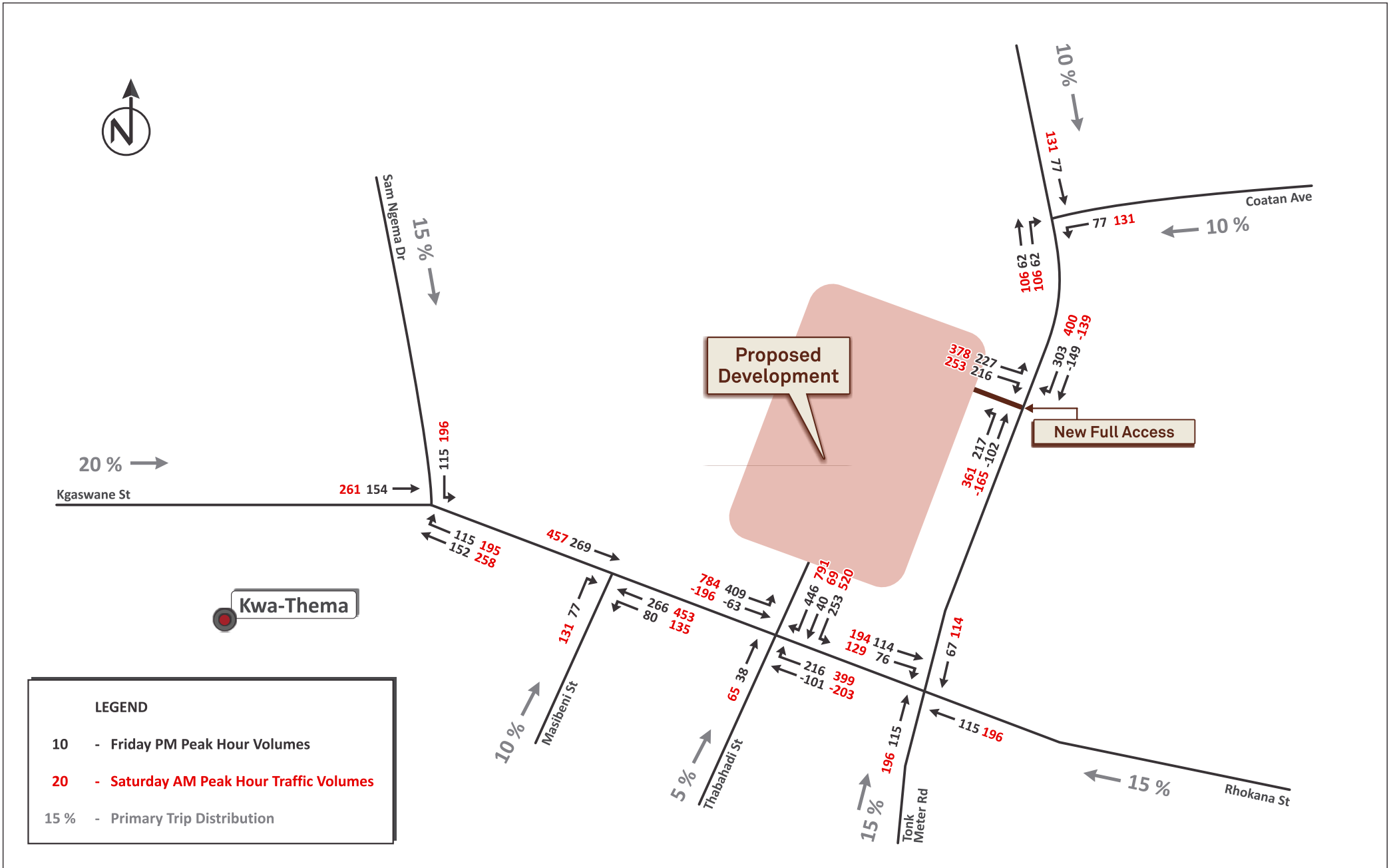
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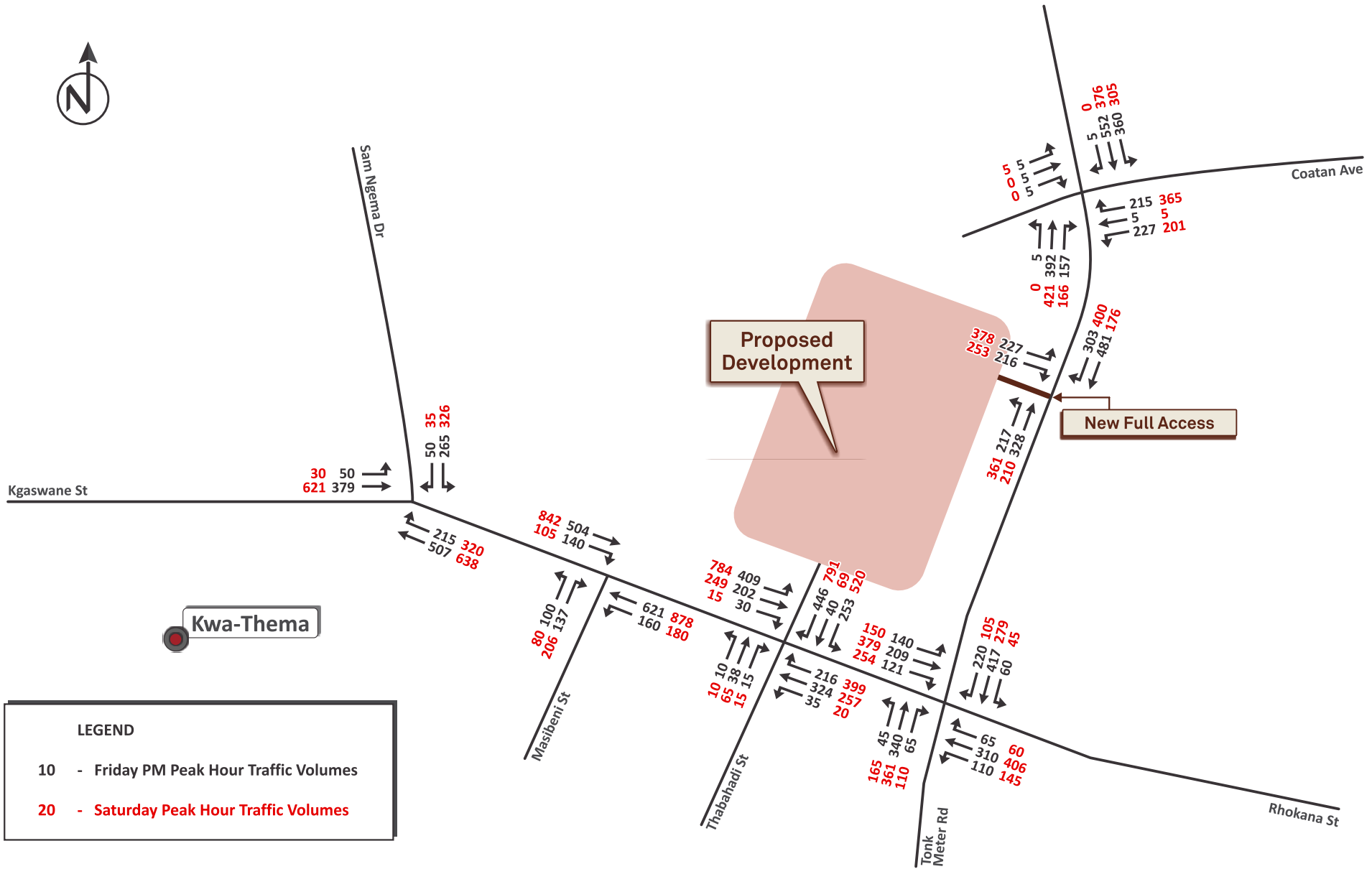
- - Existing Lane
- ↘ - Existing Turning Lane
- Ⓢ - Existing Traffic Signal
- Ⓛ - Existing 1- / 4-Way Stop
- | - Existing Priority Controlled Lane
- ↶ - Existing Left Turn Slip Lane



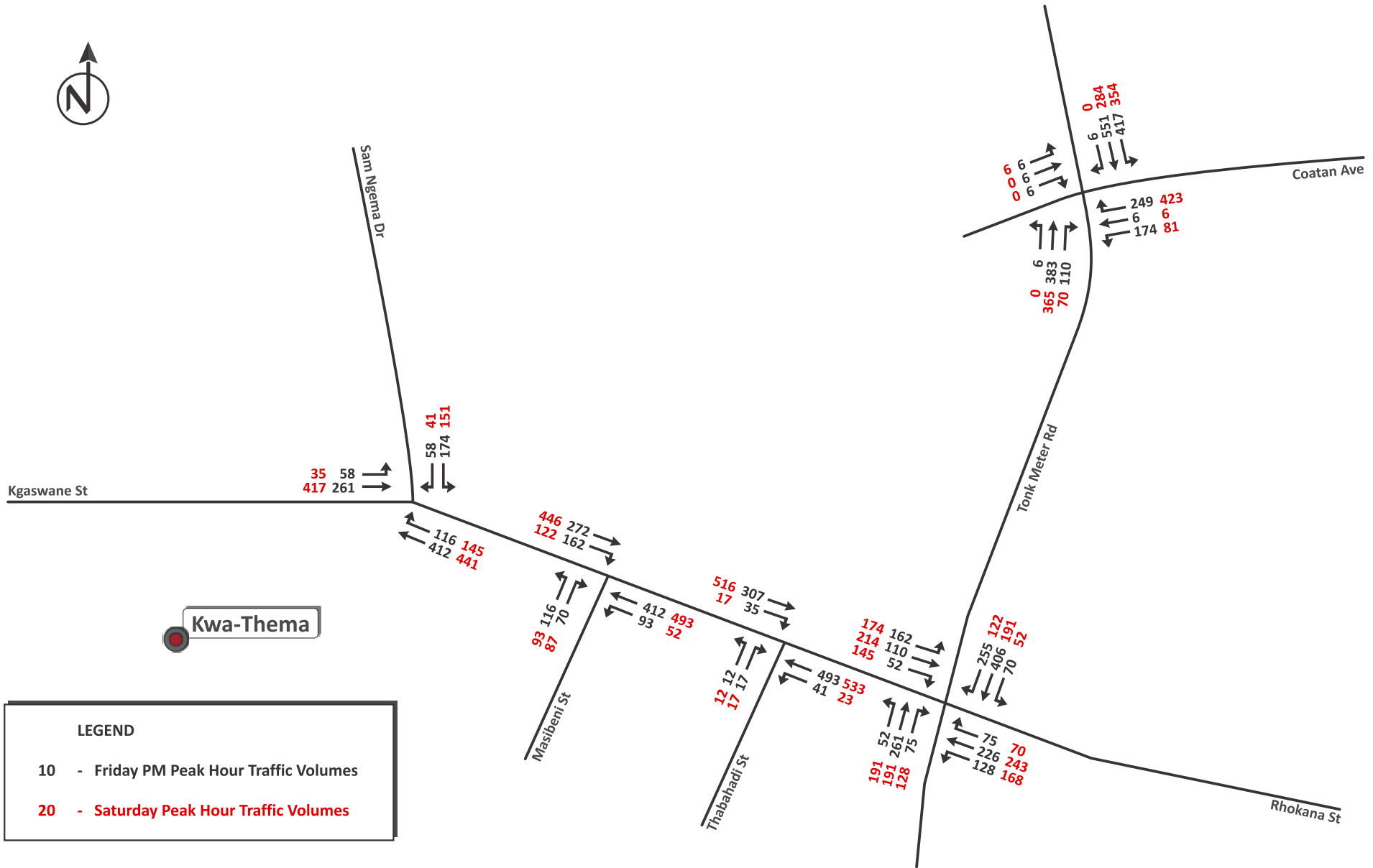


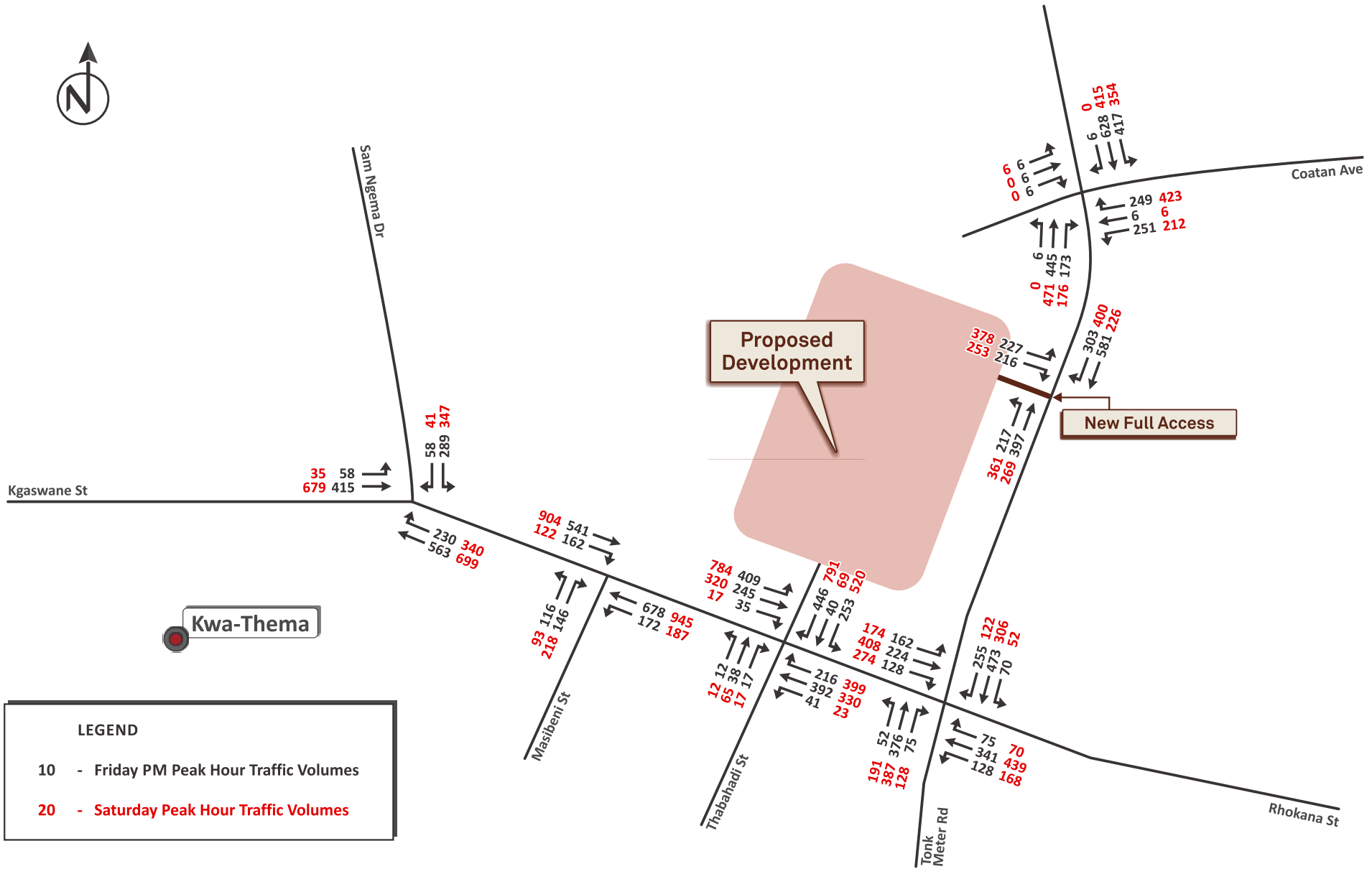












**LEGEND**

- 10 - Friday PM Peak Hour Traffic Volumes
- 20 - Saturday Peak Hour Traffic Volumes

# **ADDENDUM A: CAPACITY ANALYSES RESULTS**

Approach		2013 No Development						2013 With Development					
		No Improvement			With Improvement			No Improvement			With Improvement		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
<b>Tonk Meter / Coaton</b>													
<b>Control Type</b>		<b>Traffic Signal (optimised settings)</b>						<b>Traffic Signal (optimised settings)</b>					
Northbound	Left	0.34	21.7	C				0.47	27.8	C			
	Through	0.34	13.8	B				0.47	20.0	B			
	Right	0.28	32.0	C				0.73	52.0	D			
	Approach	0.34	17.9	B				0.73	29.1	C			
Westbound	Left	0.48	12.1	B				0.52	15.8	B			
	Through	0.48	4.3	A				0.52	7.9	A			
	Right	0.48	12.4	B				0.52	16.0	B			
	Approach	0.48	12.2	B				0.52	15.8	B			
Southbound	Left	0.28	8.0	A	No road improvements required			0.29	8.2	A	No road improvements required		
	Through	0.48	15.2	B				0.66	22.3	C			
	Right	0.01	25.2	C				0.02	33.4	C			
	Approach	0.48	12.2	B				0.66	16.8	B			
Eastbound	Left	0.05	30.2	C				0.04	25.5	C			
	Through	0.05	22.3	C				0.04	17.6	B			
	Right	0.05	30.6	C				0.04	25.9	C			
	Approach	0.05	27.7	C				0.04	23.0	C			
<b>Intersection</b>		<b>0.48</b>	<b>13.8</b>	<b>B</b>				<b>0.73</b>	<b>20.2</b>	<b>C</b>			
<b>Tonk Meter / New Full Access</b>													
<b>Control Type</b>		<b>Traffic Signal</b>						<b>Traffic Signal</b>					
Northbound	Left							0.59	15.7	B			
	Through							0.59	7.9	A			
	Approach							0.59	11.0	B			
Southbound	Through	Not Applicable			Not Applicable			0.44	8.7	A	No road improvements required		
	Right							0.28	19.4	B			
	Approach							0.44	12.9	B			
Eastbound	Left							0.22	9.3	A			
	Right							0.50	33.6	C			
	Approach							0.50	21.1	C			
<b>Intersection</b>								<b>0.59</b>	<b>14.4</b>	<b>B</b>			
<b>Tonk Meter / Rhokana</b>													
<b>Control Type</b>		<b>4-Way Stop</b>			<b>Traffic Signal</b>			<b>4-Way Stop</b>			<b>Traffic Signal</b>		
Northbound	Left				0.33	19.7	B				0.50	24.3	C
	Through	0.58	20.8	C	0.33	11.8	B	1.03	83.6	F	0.50	16.4	B
	Right	0.16	12.7	B	0.13	24.9	C	0.18	14.7	B	0.17	29.9	C
	Approach	0.58	19.2	C	0.33	15.4	B	1.03	73.7	F	0.50	19.2	B
Westbound	Left				0.49	24.0	C				0.60	25.6	C
	Through	0.65	23.6	C	0.49	16.2	B	1.11	107.5	F	0.60	17.7	B
	Right	0.16	12.7	B	0.13	25.6	C	0.18	14.7	B	0.13	25.6	C
	Approach	0.65	21.7	C	0.49	20.1	C	1.11	95.2	F	0.60	20.6	C
Southbound	Left				0.48	21.1	C				0.61	24.7	C
	Through	0.84	37.5	E	0.48	13.2	B	>1.20	>120	F	0.61	16.9	B
	Right	0.51	18.5	C	0.38	23.9	C	0.62	27.0	D	0.51	30.1	C
	Approach	0.84	30.7	D	0.48	17.7	B	>1.20	119.9	F	0.61	21.7	C
Eastbound	Left				0.36	17.7	B				0.49	21.7	C
	Through	0.51	18.1	C	0.36	9.9	A	0.91	56.5	F	0.49	13.8	B
	Right	0.11	12.4	B	0.10	27.7	C	0.35	17.7	C	0.30	29.9	C
	Approach	0.51	17.2	C	0.36	16.7	B	0.91	46.5	E	0.49	20.3	C
<b>Intersection</b>		<b>0.84</b>	<b>23.9</b>	<b>C</b>	<b>0.49</b>	<b>17.6</b>	<b>B</b>	<b>&gt;1.20</b>	<b>87.9</b>	<b>F</b>	<b>0.61</b>	<b>20.6</b>	<b>C</b>
<b>Rhokana / Thababadi</b>													
<b>Control Type</b>		<b>1-Way Stop</b>						<b>Traffic Signal</b>					
Northbound	Left							0.06	22.0	C			
	Through							0.06	13.9	B			
	Right							0.03	21.8	C			
	Approach	0.06	13.9	B				0.06	17.1	B			
Westbound	Left							0.21	20.4	C			
	Through							0.21	12.3	B			
	Right							0.39	23.2	C			
	Approach							0.39	16.9	B			
Southbound	Left				No road improvements required			0.31	12.2	B	No road improvements required		
	Through							0.31	4.3	A			
	Right							0.39	25.0	C			
	Approach							0.39	19.5	B			
Eastbound	Left							0.23	7.6				
	Through							0.12	11.7	B			
	Right							0.06	21.7	C			
	Approach	0.03	8.4	A				0.23	9.5	A			
<b>Intersection</b>								<b>0.39</b>	<b>15.5</b>	<b>B</b>			
<b>Rhokana / Masibeni</b>													
<b>Control Type</b>		<b>1-Way Stop</b>						<b>1-Way Stop</b>					
Northbound	Left												
	Right												
	Approach	0.48	23.1	C				>1.20	>120.0	F			
Westbound	Left				No road improvements required						No road improvements required		
	Through												
	Approach												
Eastbound	Through												
	Right							0.20	10.8	B			
	Approach	0.14	8.9	A									
<b>Intersection</b>													
<b>Rhokana / Sam Ngema</b>													
<b>Control Type</b>		<b>1-Way Stop</b>						<b>1-Way Stop</b>			<b>Traffic Signal</b>		
Westbound	Through										0.39	3.1	A
	Right	0.09	8.1	A				0.22	9.2	A	0.35	12.9	B
	Approach										0.39	6.0	A
Southbound	Left	0.22	11.0	B	No road improvements required			0.49	16.3	C	0.32	8.7	A
	Through	0.20	20.8	C				0.53	73.0	F	0.30	41.9	D
	Approach	0.22	13.5	B				0.53	25.3	D	0.32	14.0	B
Eastbound	Left										0.05	8.1	A
	Through										0.29	2.8	A
	Approach										0.29	3.4	A
<b>Intersection</b>											<b>0.39</b>	<b>7.0</b>	<b>A</b>

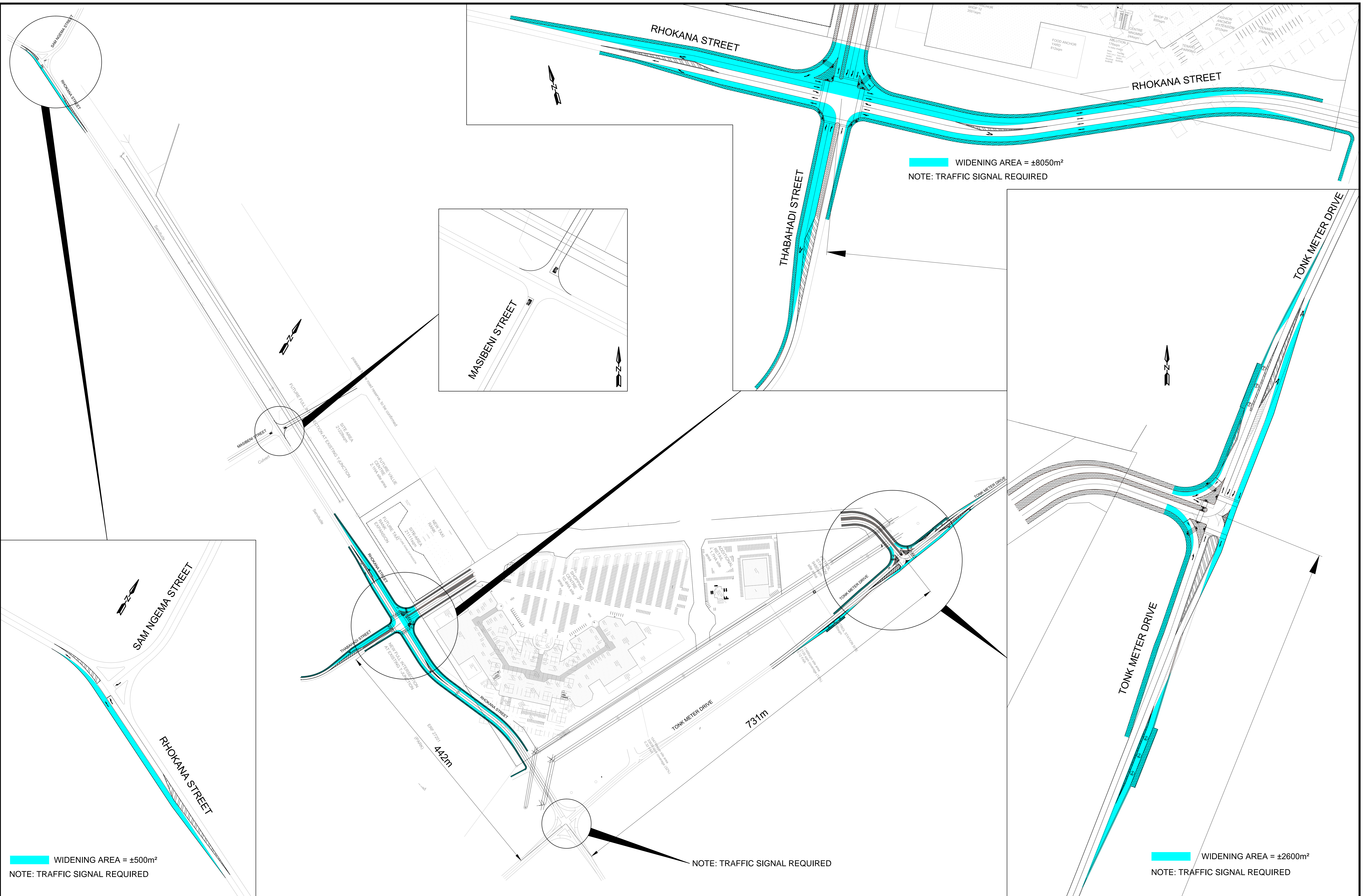
Approach		2013 No Development						2013 With Development					
		No Improvement			With Improvement			No Improvement			With Improvement		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
<b>Tonk Meter / Coaton</b>													
<b>Control Type</b>		<b>Traffic Signal (optimised settings)</b>						<b>Traffic Signal (optimised settings)</b>					
Northbound	Left	0.69	44.4	D				0.61	34.2	C			
	Through	0.69	36.5	D				0.61	26.3	C			
	Right	0.31	50.9	D				0.67	48.9	D			
	Approach	0.69	38.9	D				0.67	32.7	C			
Westbound	Left	0.47	10.5	B				0.64	13.5	B			
	Through	0.47	2.7	A				0.64	5.6	A			
	Right	0.47	10.8	B				0.64	13.7	B			
	Approach	0.47	10.7	B				0.64	13.6	B			
Southbound	Left	0.23	8.0	A	No road improvements required			0.25	8.3	A	No road improvements required		
	Through	0.53	34.5	C				0.54	25.3	C			
	Right	0.03	52.5	D				0.02	42.6	D			
	Approach	0.53	20.1	C				0.54	17.9	B			
Eastbound	Left	0.04	23.7	C				0.06	28.3	C			
	Through	0.04	15.8	B				0.06	20.4	C			
	Right	0.04	24.1	C				0.06	28.7	C			
	Approach	0.04	21.2	C				0.06	25.8	C			
<b>Intersection</b>		<b>0.69</b>	<b>22.3</b>	<b>C</b>				<b>0.67</b>	<b>21.3</b>	<b>C</b>			
<b>Tonk Meter / New Full Access</b>													
<b>Control Type</b>		<b>Traffic Signal</b>						<b>Traffic Signal</b>					
Northbound	Left							0.69	14.4	B			
	Through							0.69	6.5	A			
	Approach							0.69	11.5	B			
Southbound	Through	Not Applicable			Not Applicable			0.17	7.6	A	No road improvements required		
	Right							0.32	19.0	B			
	Approach							0.32	15.5	B			
Eastbound	Left							0.33	9.0	A			
	Right							0.56	33.2	C			
	Approach							0.56	18.7	B			
<b>Intersection</b>								<b>0.69</b>	<b>15.4</b>	<b>B</b>			
<b>Tonk Meter / Rhokana</b>													
<b>Control Type</b>		<b>4-Way Stop</b>			<b>Traffic Signal</b>			<b>4-Way Stop</b>			<b>Traffic Signal</b>		
Northbound	Left				0.53	19.0	B				0.85	36.1	D
	Through	0.91	55.2	F	0.53	11.2	B	>1.20	>120.0	F	0.85	28.3	C
	Right	0.33	16.6	C	0.25	26.5	C	0.36	18.1	C	0.30	30.0	C
	Approach	0.91	44.1	E	0.53	17.9	B	>1.20	>120.0	F	0.85	30.6	C
Westbound	Left				0.54	20.5	C				0.85	35.3	D
	Through	0.98	68.5	F	0.54	12.7	B	>1.20	>120.0	F	0.85	27.5	C
	Right	0.18	14.0	B	0.13	24.1	C	0.20	15.2	C	0.19	31.6	C
	Approach	0.98	60.6	F	0.54	17.1	B	>1.20	>120.0	F	0.85	29.8	C
Southbound	Left				0.34	21.9	C				0.51	26.5	C
	Through	0.61	25.0	D	0.34	14.0	B	0.99	74.6	F	0.51	18.7	B
	Right	0.33	17.0	C	0.24	26.3	C	0.34	17.8	C	0.37	34.6	C
	Approach	0.61	22.4	C	0.34	19.3	B	0.99	60.7	F	0.51	23.4	C
Eastbound	Left				0.50	18.9	B				0.77	29.2	C
	Through	0.92	55.2	F	0.50	11.1	B	>1.20	>120.0	F	0.77	21.4	C
	Right	0.38	17.5	C	0.28	25.9	C	0.82	44.2	E	0.86	45.8	D
	Approach	0.92	44.9	E	0.50	17.7	B	>1.20	>120.0	F	0.86	30.8	C
<b>Intersection</b>		<b>0.98</b>	<b>44.3</b>	<b>E</b>	<b>0.54</b>	<b>17.9</b>	<b>B</b>	<b>&gt;1.20</b>	<b>&gt;120.0</b>	<b>F</b>	<b>0.86</b>	<b>29.2</b>	<b>C</b>
<b>Rhokana / Thabahadi</b>													
<b>Control Type</b>		<b>1-Way Stop</b>			<b>Traffic Signal (4-Way)</b>			<b>Traffic Signal (4-Way)</b>			<b>Traffic Signal (4-Way)</b>		
Northbound	Left							0.12	23.1	C			
	Through							0.12	14.9	B			
	Right							0.03	23.3	C			
	Approach	0.09	18.4	C				0.12	17.2	B			
Westbound	Left							0.18	19.6	B			
	Through							0.18	11.5	B			
	Right							0.88	42.0	D			
	Approach							0.88	29.7	C			
Southbound	Left				No road improvements required			0.73	13.8	B	No road improvements required		
	Through							0.73	5.9	A			
	Right							0.88	42.7	D			
	Approach							0.88	29.9	C			
Eastbound	Left							0.50	7.6				
	Through							0.16	11.3	B			
	Right							0.03	20.8	C			
	Approach	0.02	8.6	A				0.50	8.7	A			
<b>Intersection</b>								<b>0.88</b>	<b>22.6</b>	<b>C</b>			
<b>Rhokana / Masibeni</b>													
<b>Control Type</b>		<b>1-Way Stop</b>			<b>1-Way Stop</b>			<b>1-Way Stop</b>			<b>Traffic Signal</b>		
Northbound	Left												
	Right												
	Approach	0.49	42.8	E				>1.20	>120.0	F			
Westbound	Left				No road improvements required						No road improvements required		
	Through												
	Approach												
Eastbound	Through												
	Right							0.21	13.0	B			
	Approach	0.12	9.0	A									
<b>Intersection</b>													
<b>Rhokana / Sam Ngema</b>													
<b>Control Type</b>		<b>1-Way Stop</b>			<b>1-Way Stop</b>			<b>1-Way Stop</b>			<b>Traffic Signal</b>		
Westbound	Through										0.48	3.5	A
	Right	0.12	8.6	A				0.40	11.7	B	0.75	23.4	C
	Approach										0.75	10.1	B
Southbound	Left	0.22	12.2	B	No road improvements required			0.82	41.6	E	0.49	10.5	B
	Right	0.19	26.6	D				1.12	>120.0	F	0.21	41.4	D
	Approach	0.22	15.2	C				1.12	72.6	F	0.49	13.5	B
Eastbound	Left										0.03	8.2	A
	Through										0.47	3.4	A
	Approach										0.47	3.6	A
<b>Intersection</b>											<b>0.75</b>	<b>8.6</b>	<b>A</b>

Approach	2018 No Development						2018 With Development								
	No Improvement			With Improvement			No Improvement			With Improvement					
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS			
<b>Tonk Meter / Coaton</b>															
<b>Control Type</b>		<b>Traffic Signal (optimised settings)</b>								<b>Traffic Signal (optimised settings)</b>					
Northbound	Left	0.39	22.2	C					0.45	21.2	C				
	Through	0.39	14.3	B					0.45	13.3	B				
	Right	0.37	35.3	D					0.67	40.3	D				
	Approach	0.39	19.1	B					0.67	20.9	C				
Westbound	Left	0.55	14.1	B					0.65	17.0	B				
	Through	0.55	6.3	A					0.65	9.2	A				
	Right	0.55	14.4	B					0.65	17.3	B				
	Approach	0.55	14.2	B					0.65	17.1	B				
Southbound	Left	0.33	8.1	A	No road improvements required				0.34	8.3	A	No road improvements required			
	Through	0.55	16.0	B					0.62	15.1	B				
	Right	0.01	26.5	C					0.02	25.9	C				
	Approach	0.55	12.7	B					0.62	12.5	B				
Eastbound	Left	0.06	30.1	C					0.06	26.1	C				
	Through	0.06	22.2	C					0.06	18.2	B				
	Right	0.06	30.5	C					0.06	26.5	C				
	Approach	0.06	27.6	C					0.06	23.6	C				
<b>Intersection</b>		<b>0.55</b>	<b>14.8</b>	<b>B</b>					<b>0.67</b>	<b>16.0</b>	<b>B</b>				
<b>Tonk Meter / New Full Access</b>															
<b>Control Type</b>										<b>Traffic Signal</b>					
Northbound	Left								0.61	15.0	B				
	Through								0.61	7.1	A				
	Approach								0.61	9.9	A				
Southbound	Through	Not Applicable				Not Applicable				0.50	7.5	A	No road improvements required		
	Right									0.29	18.9	B			
	Approach									0.50	11.4	B			
Eastbound	Left								0.24	9.8	A				
	Right								0.61	36.9	D				
	Approach								0.61	23.1	C				
<b>Intersection</b>									<b>0.61</b>	<b>13.6</b>	<b>B</b>				
<b>Tonk Meter / Rhokana</b>															
<b>Control Type</b>		<b>Traffic Signal</b>								<b>Traffic Signal</b>					
Northbound	Left	0.38	20.6	C					0.55	24.5	C				
	Through	0.38	12.7	B					0.55	16.7	B				
	Right	0.17	26.7	C					0.22	31.0	C				
	Approach	0.38	16.5	B					0.55	19.6	B				
Westbound	Left	0.58	25.6	C					0.70	28.5	C				
	Through	0.58	17.7	B					0.70	20.7	C				
	Right	0.15	26.5	C	No road improvements required				0.17	27.4	C	No road improvements required			
	Approach	0.58	21.6	C					0.70	23.4	C				
Southbound	Left	0.57	22.0	C					0.68	25.0	C				
	Through	0.57	14.2	B					0.68	17.2	B				
	Right	0.47	26.0	C					0.60	31.6	C				
	Approach	0.57	19.0	B					0.68	22.5	C				
Eastbound	Left	0.42	17.4	B					0.57	23.2	C				
	Through	0.42	9.5	A					0.57	15.3	B				
	Right	0.13	29.5	C					0.36	32.9	C				
	Approach	0.42	16.7	B					0.57	22.1	C				
<b>Intersection</b>		<b>0.58</b>	<b>18.7</b>	<b>B</b>					<b>0.70</b>	<b>22.0</b>	<b>C</b>				
<b>Rhokana / Thababadi</b>															
<b>Control Type</b>		<b>1-Way Stop</b>								<b>Traffic Signal (4-way)</b>					
Northbound	Left								0.07	22.8	C				
	Through								0.07	14.6	B				
	Right								0.03	22.5	C				
	Approach	0.08	16.0	C					0.07	18.1	B				
Westbound	Left								0.25	20.1	C				
	Through								0.25	11.9	B				
	Right				No road improvements required				0.41	22.7	C	No road improvements required			
	Approach								0.41	16.0	B				
Southbound	Left								0.33	12.6	B				
	Through								0.33	4.8	A				
	Right								0.42	26.0	C				
	Approach								0.42	20.3	C				
Eastbound	Left								0.23	7.6					
	Through								0.14	11.2	B				
	Right								0.08	21.8	C				
	Approach	0.04	8.7	A					0.23	9.6	A				
<b>Intersection</b>									<b>0.42</b>	<b>15.5</b>	<b>B</b>				
<b>Rhokana / Masibeni</b>															
<b>Control Type</b>		<b>1-Way Stop</b>								<b>1-Way Stop</b>					
Northbound	Left														
	Right														
	Approach	0.59	30.5	D					>1.20	>120.0	F				
Westbound	Left				No road improvements required							No road improvements required			
	Through														
	Approach														
Eastbound	Through														
	Right								0.23	11.1	B				
	Approach	0.17	9.1	A											
<b>Intersection</b>															
<b>Rhokana / Sam Ngema</b>															
<b>Control Type</b>		<b>Traffic Signal</b>								<b>Traffic Signal</b>					
Westbound	Through	0.30	3.2	A					0.41	3.2	A				
	Right	0.23	12.0	B					0.36	12.9	B				
	Approach	0.30	5.7	A					0.41	6.0	A				
Southbound	Left	0.17	8.2	A	No road improvements required				0.34	8.7	A	No road improvements required			
	Right	0.29	40.7	D					0.33	42.0	D				
	Approach	0.29	16.4	B					0.34	14.3	B				
Eastbound	Left	0.05	8.1	A					0.05	8.1	A				
	Through	0.19	2.9	A					0.30	2.8	A				
	Approach	0.19	3.8	A					0.30	3.5	A				
<b>Intersection</b>		<b>0.30</b>	<b>7.4</b>	<b>A</b>					<b>0.41</b>	<b>7.0</b>	<b>A</b>				

Approach		2018 No Development						2018 With Development					
		No Improvement			With Improvement			No Improvement			With Improvement		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
<b>Tonk Meter / Coaton</b>													
<b>Control Type</b>		<b>Traffic Signal (optimised settings)</b>						<b>Traffic Signal (optimised settings)</b>					
Northbound	Left	0.63	39.2	D				0.70	34.3	C			
	Through	0.63	31.3	C				0.70	26.4	C			
	Right	0.28	46.1	D				0.80	53.6	D			
	Approach	0.63	33.8	C				0.80	33.8	C			
Westbound	Left	0.57	11.1	B				0.66	15.4	B			
	Through	0.57	3.3	A				0.66	7.5	A			
	Right	0.57	11.4	B				0.66	15.6	B			
	Approach	0.57	11.3	B				0.66	15.5	B			
Southbound	Left	0.27	8.0	A	No road improvements required			0.28	8.3	A	No road improvements required		
	Through	0.48	29.5	C				0.61	25.2	C			
	Right	0.03	47.3	D				0.03	44.0	D			
	Approach	0.48	17.8	B				0.61	17.5	B			
Eastbound	Left	0.06	26.8	C				0.06	26.0	C			
	Through	0.06	18.9	B				0.06	18.1	B			
	Right	0.06	27.2	C				0.06	26.4	C			
	Approach	0.06	24.5	C				0.06	23.6	C			
<b>Intersection</b>		<b>0.63</b>	<b>20.2</b>	<b>C</b>				<b>0.80</b>	<b>22.0</b>	<b>C</b>			
<b>Tonk Meter / New Full Access</b>													
<b>Control Type</b>		<b>Traffic Signal</b>						<b>Traffic Signal</b>					
Northbound	Left							0.70	14.6	B			
	Through							0.70	6.7	A			
	Approach							0.70	11.2	B			
Southbound	Through	Not Applicable			Not Applicable			0.20	6.3	A	No road improvements required		
	Right							0.32	17.9	B			
	Approach							0.32	13.7	B			
Eastbound	Left							0.36	9.3	A			
	Right							0.67	37.1	D			
	Approach							0.67	20.4	C			
<b>Intersection</b>								<b>0.70</b>	<b>15.1</b>	<b>B</b>			
<b>Tonk Meter / Rhokana</b>													
<b>Control Type</b>		<b>Traffic Signal</b>						<b>Traffic Signal</b>					
Northbound	Left	0.58	20.1	C				0.88	40.1	D			
	Through	0.58	12.3	B				0.88	32.2	C			
	Right	0.28	26.7	C				0.34	30.3	C			
	Approach	0.58	18.8	B				0.88	34.0	C			
Westbound	Left	0.59	21.3	C				0.89	39.8	D			
	Through	0.59	13.4	B				0.89	32.0	C			
	Right	0.15	25.0	C	No road improvements required			0.22	31.9	C	No road improvements required		
	Approach	0.59	17.8	B				0.89	33.9	C			
Southbound	Left	0.37	22.5	C				0.53	26.7	C			
	Through	0.37	14.6	B				0.53	18.9	B			
	Right	0.26	26.6	C	0.42	35.0	D						
	Approach	0.37	19.7	B	0.53	23.8	C						
Eastbound	Left	0.55	19.8	B				0.80	31.0	C			
	Through	0.55	12.0	B				0.80	23.2	C			
	Right	0.32	27.0	C				0.91	51.5	D			
	Approach	0.55	18.6	B				0.91	33.8	C			
<b>Intersection</b>		<b>0.59</b>	<b>18.7</b>	<b>B</b>				<b>0.91</b>	<b>32.1</b>	<b>C</b>			
<b>Rhokana / Thabahadi</b>													
<b>Control Type</b>		<b>1-Way Stop</b>						<b>Traffic Signal</b>					
Northbound	Left							0.12	23.8	C			
	Through							0.12	15.6	B			
	Right							0.04	24.0	C			
	Approach	0.09	16.7	C				0.12	18.2	B			
Westbound	Left							0.21	19.2	B			
	Through							0.21	11.1	B			
	Right				Not Applicable			0.87	39.8	D	No road improvements required		
	Approach							0.87	26.6	C			
Southbound	Left							0.71	13.3	B			
	Through							0.71	5.4	A			
	Right				0.86	40.7	D						
	Approach				0.86	28.6	C						
Eastbound	Left							0.47	7.6				
	Through							0.19	10.9	B			
	Right							0.04	20.8	C			
	Approach	0.02	8.8	A				0.47	8.8	A			
<b>Intersection</b>								<b>0.87</b>	<b>21.2</b>	<b>C</b>			
<b>Rhokana / Masibeni</b>													
<b>Control Type</b>		<b>1-Way Stop</b>						<b>1-Way Stop</b>					
Northbound	Left												
	Right												
	Approach	0.83	65.8	F				>1.20	>120.0	F			
Westbound	Left				No road improvements required						No road improvements required		
	Through												
	Right												
	Approach												
Eastbound	Through												
	Right							0.24	13.3	B			
	Approach	0.14	9.2	A									
<b>Intersection</b>													
<b>Rhokana / Sam Ngema</b>													
<b>Control Type</b>		<b>Traffic signal</b>						<b>Traffic signal</b>					
Westbound	Through	0.31	2.9	A				0.50	3.5	A			
	Right	0.22	12.4	B				0.78	26.8	C			
	Approach	0.31	5.2	A				0.78	11.1	B			
Southbound	Left	0.18	8.5	A	No road improvements required			0.51	10.6	B	No road improvements required		
	Right	0.23	41.5	D				0.23	41.5	D			
	Approach	0.23	15.6	B				0.51	13.9	B			
Eastbound	Left	0.03	8.1	A				0.03	8.2	A			
	Through	0.30	2.8	A	0.48	3.5	A						
	Approach	0.30	3.2	A	0.48	3.7	A						
<b>Intersection</b>		<b>0.31</b>	<b>6.1</b>	<b>A</b>				<b>0.78</b>	<b>9.2</b>	<b>A</b>			

**ADDENDUM B:  
PRELIMINARY LAYOUT OF ROAD  
IMPROVEMENTS**





WIDENING AREA = ±500m<sup>2</sup>  
NOTE: TRAFFIC SIGNAL REQUIRED

WIDENING AREA = ±8050m<sup>2</sup>  
NOTE: TRAFFIC SIGNAL REQUIRED

WIDENING AREA = ±2600m<sup>2</sup>  
NOTE: TRAFFIC SIGNAL REQUIRED